# STATEMENT OF CONFORMITY

## Introduction

This Letter of Conformity with the Sustainable Design and Construction Statement has been produced by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development on behalf of St George West London Limited, in respect of the Petrol Filling Station (PFS) site, also known as Phase 1a, and is part of the wider Camden Goods Yard (CGY) redevelopment, shown in the site plan below.

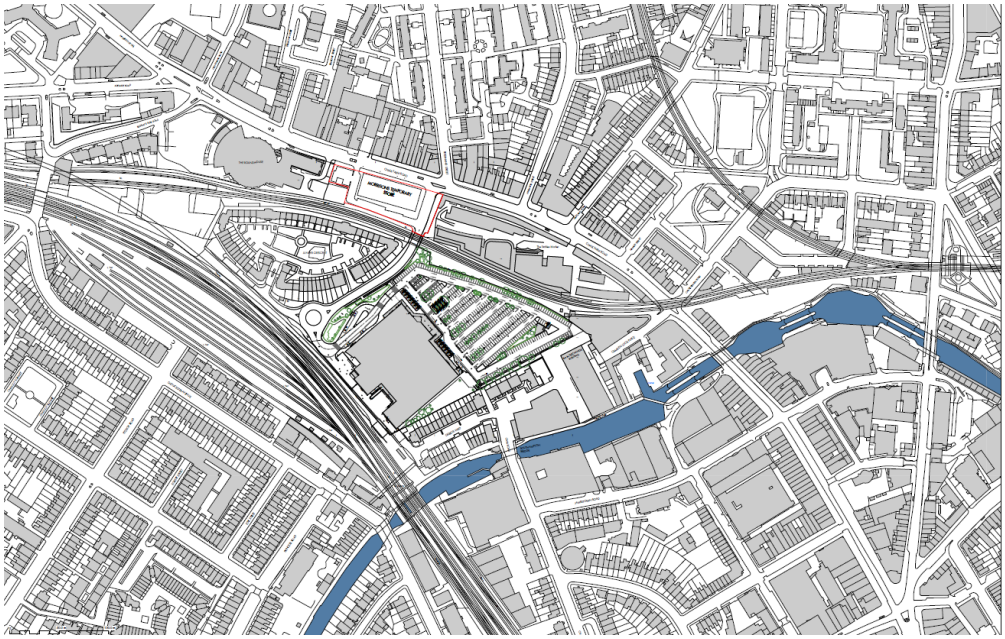

**Figure 1: Existing Site Location Plan (Allies and Morrison LLP – October 2024)**

Phase 1a comprised the demolition of an existing PFS and construction of a temporary structure for the temporary retail store, to be subsequently replaced by a 6-storey office building (the Juniper Building). This was granted permission by the London Borough of Camden (LBC) on 5th May 2020 (application ref: 2020/0034/P). This allowed the Morrisons to vacate the existing store on the main CGY site without the Juniper Building having to be constructed.

The 5th May 2020 permission also inserted a new planning condition (Condition 70), which ensured the use was discontinued on or before 50 months from the date of occupation.

The current application seeks to extend the permission of the temporary Morrisons store at the site by 25 months, from 50 to 75 months. The principle of the extension has been agreed through discussions with the LBC.

An 'Energy and Sustainability Statement' (January 2020) was produced to satisfy the policy requirements. An 'Energy and Sustainability Report: Planning Condition 72 and S106 Energy Plan Review' (March 2021) was produced to satisfy the planning conditions for the planning permission 2020/3116/P.

Since the submission and approval of the original application, the London Plan has been updated, whilst LBC's Adopted Local Plan remains the same. The Statement seeks to consider the findings of the Energy and Sustainability Report in the updated policy context. The document will assess whether the previous findings are still valid.

This document outlines the following energy and sustainability strategies for the temporary food store:

> Energy Strategy

> Construction Waste

> BREEAM Benchmarking

> Water Efficiency

> Circular Economy

# 1 – Energy Strategy

SBEM assessments were carried out for the temporary store at the shell and core and fit-out stages. The original requirement was to achieve a 28% reduction in $CO_2$ emissions over the Part L 2013 baseline. The as-built assessments demonstrated that the temporary store has performed better than the required target. Table 1 demonstrates the reduction achieved following the GLA energy hierarchy of *Be Lean, Be Clean, and Be Green.*

**Table 1: Reduction in regulated $CO_2$ emissions using SAP 10 carbon factors**

| | Baseline (kg $CO_2$/year) | *Be Lean* (kg $CO_2$/year) | *Be Clean* (kg $CO_2$/year) | *Be Green* (kg $CO_2$/year) | Reduction Achieved (%) |
|---|---|---|---|---|---|
| **Temporary Store – Shell and Core Design Stage** | 39,400 | 32,400 | 32,400 | 27,600 | 30.0% |
| **Temporary Store – Shell and Core As Built Stage** | 39,700 | 31,300 | 31,300 | 26,300 | 33.8% |
| **Temporary Store – Fit-Out As Built Stage** | 21,300 | 15,000 | 15,000 | 11,400 | 46.3% |

Since this assessment was undertaken, Part L 2021 has been adopted. However, the temporary store was built in line with Part L 2013, which was the relevant standard at the time. The results of the as-built assessment demonstrate that the $CO_2$ reduction performed better than the requirement, demonstrating a high level of energy performance and sustainability.

The BRUKLs and the GLA spreadsheet used to concert the results to SAP 10 carbon factors are shown in Appendices A – C.

A Building Management System (BMS) has been provided to monitor heating and cooling and the hours of use of the plant. Sub-meters were installed for the air source heat pumps and the other M&E equipment. The energy usage data is fed back to the BMS which is used to monitor and control the energy usage of the plant.

# 2 – Construction Waste

The approved Sustainability Plan required 85% of construction waste to be recycled. Waste was monitored and recorded during the construction phase. The waste records confirm that 6.1 tonnes of construction waste was generated per 100sqm of gross internal floor area (GIFA). This performs better than the target submitted in the benchmark report, which was a requirement of 11.1 tonnes per 100sqm GIFA. A total of 91% of waste has been diverted from landfill, which exceeds the BREEAM target.

As the construction of the temporary food store has been completed, the requirement has been achieved.

# 3 – Benchmark BREEAM Performance

In accordance with the approved Sustainability Plan, the temporary food store was assessed against the BREEAM Shell-only requirements, without certification. This assessment was undertaken in line with BREEAM New Construction 2014 requirements. Since this assessment, BREEAM New Construction Version 6.1 has come into effect. The assessment against the BREEAM New Construction 2014 remains the valid BREEAM regime in light of the fact that the store was completed in 2020.

The BREEAM Assessment achieved a score of 39.18%, which was a 3.02% uplift from the scope of 36.16% in the preliminary Benchmark Report. The following credits were targeted and achieved:

> **Management 01:** All relevant third-party stakeholders were consulted by the design team on the minimum consultation content, as defined by BREEAM standards.

> **Management 02:** The capital cost of the building was provided by the development as £1,231 per sqm, in line with BREEAM requirements.

> **Management 03:** To ensure the construction site was managed in an environmentally and socially considerate, responsible and accountable manner, the site was registered with the Considerate Constructors Scheme and achieved a score of 37. Water and energy consumption was also monitored

and recorded, which indicated 90 cubic metres of water was used on site during the construction period. Transport movements and impacts were monitored and recorded.

- **Health and Wellbeing 01:** All external lighting within the construction was specified in accordance with BS5489-1:2013 and BS EN 12464-2:214. The external lighting installed provides illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night.

- **Energy 01:** Using the modelled outputs from the SBEM software, an energy performance ratio (EPR) of 0.54 was achieved, which enabled 7 credits to be awarded.

- **Energy 03:** All external lighting located in the construction zone had an average initial luminous efficacy no less than 70 luminaire lumens per circuit watt. The fittings featured automatic control mechanisms to prevent operation during daylight hours along with presence detection capabilities in terms of intermittent pedestrian traffic.

- **Energy 04:** A feasibility study considered local low or zero carbon technologies was undertaken by Hodkinson Consultancy and recommendation were implemented within the scheme. This included the use of heat pumps, resulting in a $CO_2$ saving of 5.4%, which is above the minimum requirement of 5%.

- **Transport 01:** The site has a high Public Transport Accessibility Level (PTAL) of 6a and an Accessibility Index of 29.82, indicating proximity to good public transport networks.

- **Transport 02:** The building is located with 500m of accessible local amenities appropriate to the building type and its users.

- **Transport 03:** BREEAM compliant cycle storage spaces have been provided, including cycle storage lockers and Sheffield stands. A total of 50 cycle parking spaces have been provided.

- **Transport 05:** A Travel Plan was developed and tailored to the specific needs of the building users.

- **Water 02:** A pulsed water meter was installed in the store to encourage water consumption management and monitoring in order to reduce the impacts of inefficiencies and leakage.

- **Materials 01:** Construction materials were selected to ensure a low environmental impact over the full life cycle of the building were possible. The Green Guide rating was used to determine the impact (where a rating of A+ represents a low impact where E represents a high impact):

    - External walls: A

    - Roof: A+

    - Windows: D

- **Materials 03:** A sustainable procurement plan was developed and implemented to ensure materials were responsibly sourced. A total of 80% of materials were sourced from suppliers who were certified to

BES 6001 and ISO 14001. All timber was sourced in accordance with the UK Governments Timber Procurement Policy.

> **Materials 04:** Insulation with a low embodied environmental impact was specified. The insulation index calculation floor the specified insulation was 3, which is greater than the minimum of 2.5.

> **Waste 01:** Waste records confirm that 6.1 tonnes of construction waste was generated per 100 sqm. This exceeds the target submitted in the benchmark report, which was a requirement of 11.1 tonnes per 100sqm GIFA. A total of 91% of waste has been diverted from landfill, which exceeds the BREEAM target.

> **Land Use and Ecology 01:** Drawings were provided which confirmed at least 75% of the development's footprint is on an area of land which was previously occupied.

> **Pollution 03:** The Flood Risk Assessment confirmed that the development is in a location that is at a low risk of flooding from sources including rivers, tidal, surface water, groundwater, sewers, reservoirs, and artificial sources.

> **Pollution 04:** The external light strategy was designed in compliance with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 2011. All external lighting (except for safety and security light) can be automatically switched off between 23:00 and 07:00. This is in line with BREEAM requirements.

> **Pollution 05:** A Noise Impact Assessment compliant with BS 4142:2014 was carried out by Ardent in order to measure existing background noise levels and noise rating level from the assessed building. The noise level assessment is at least 5dB lower than the background noise, which is compliance with BREEAM requirements.

# 4 – Water Efficiency

Water efficiency was required to be assessed under BREEAM Fit-out and Refurbishment Wat 01 requirements. Wat 01 does not apply to BREEAM Shell-only assessments, which was the assessment undertaken and discussed in the previous section.

Flow rates were specified to achieve the required credits, which includes the following:

> WCs: 6 litres effective flush volume

> Urinals: Not specified

> Basin taps: 8 litres/min

> Kitchen taps: 8 litres/min

> Showers: 11 litres/min

> Domestic dishwasher (staff room): 15 litres/min

The above specification allowed 1 credit to be achieved under the BREEAM scheme, demonstrating as 12.5% improvement in water consumption over the baseline.

# Circular Economy

The London Plan Circular Economy Guidance (March 2022) came into effect after the completion of the temporary store. As such, the temporary store was built in accordance with the relevant standards at the time.

The principles of a Circular Economy have been considered within the design. At the end of the life of the temporary store, the slab will be crushed and used as pile mat for Phase 3 of the development. The main structure (i.e. cladding, steel) will be reused in a nearby development. A Reuse and Restoration Strategy will be submitted for approval prior to vacation of the store, as secured by with Condition 71. This will further detail how the building, materials and plant will be disassembled and reused.

# Conclusion

This Statement of Conformity has considered the findings of the approved 'Energy and Sustainability Statement' (January 2020) and 'Energy and Sustainability Report: Planning Condition 72 and S106 Energy Plan Review' (March 2021) to support a full planning application for the extension of the temporary food store duration from 50 to 75 months.

This statement demonstrates the sustainability performance benefits the temporary food store has implemented. At the time of the works, the temporary store complied with the relevant planning regulations in effect. As the temporary store is operational, the updated regulations would not apply. Therefore, the building remains compliant as there has been no change to building design. The standards the building was assessed against remain valid and therefore this application fully satisfies policy requirements.

# APPENDIX A: DESIGN STAGE BRUKLS AND GLA CARBON EMISSION REPORTING SPREADSHEET – SHELL AND CORE SBEM ASSESSMENT

**BRUKL – *Be Lean***

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

**Project name** **Shell and Core**

## Temporary Store Be Lean

As designed

**Date:** Wed Jun 03 15:37:09 2020

## Administrative information

### Building Details

**Address:** Temporary Store, London, NW1

### Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v5.6.a.1

**Interface to calculation engine:** DesignBuilder SBEM

**Interface to calculation engine version:** v6.1.0

**BRUKL compliance check version:** v5.6.a.1

### Owner Details

**Name:**

**Telephone number:**

**Address:** , ,

### Certifier details

**Name:** Nimco Ali

**Telephone number:** 02036031613

**Address:** Trinity Court Batchworth Island Church Street Rickmansworth, London, WD3 1RT

## Criterion 1: The calculated $CO_2$ emission rate for the building must not exceed the target

| | |
|---|---|
| $CO_2$ emission rate from the notional building, $kgCO_2/m^2.annum$ | 60.8 |
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 60.8 |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 47.8 |
| Are emissions from the building less than or equal to the target? | BER =< TER |
| Are as built details the same as used in the BER calculations? | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

**Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.**

**Building fabric**

| Element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | Surface where the maximum value occurs* |
|---|---|---|---|---|
| Wall** | 0.35 | 0.2 | 0.2 | BOH - Kitchen_W_8 |
| Floor | 0.25 | 0.2 | 0.2 | BOH - Kitchen_S_3 |
| Roof | 0.25 | 0.18 | 0.2 | BOH - Kitchen_R_4 |
| Windows***, roof windows, and rooflights | 2.2 | 1.5 | 1.5 | General Retail - Entrance_draftlobby_G_6 |
| Personnel doors | 2.2 | 1.5 | 1.5 | BOH - Store_various 1_D_8 |
| Vehicle access & similar large doors | 1.5 | 2.2 | 2.2 | BOH - Store_various 1_D_9 |
| High usage entrance doors | 3.5 | - | - | "No external high usage entrance doors" |

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

* There might be more than one surface where the maximum U-value occurs.
** 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.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 10 | 10 |

## Building services

**The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.**

| | |
|---|---|
| **Whole building lighting automatic monitoring & targeting with alarms for out-of-range values** | NO |
| **Whole building electric power factor achieved by power factor correction** | <0.9 |

1- Indirectly Heated by heat pump

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.91 | - | - | - | - |
| **Standard value** | 0.91* | N/A | 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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

2- Indirectly heated by VRF

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.91 | - | - | - | - |
| **Standard value** | 0.91* | N/A | 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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

3- Sales floor

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.91 | 4.2 | - | - | - |
| **Standard value** | 0.91* | N/A | 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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

4- Training Room

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.91 | 4.57 | - | - | - |
| **Standard value** | 0.91* | N/A | 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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

5- General Office

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.91 | 4.57 | - | - | - |
| **Standard value** | 0.91* | N/A | 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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

6- Canteen / Staff Room

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.91 | 3.81 | - | - | - |
| **Standard value** | 0.91* | N/A | 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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

1- Project DHW

| | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|---|---|---|
| **This building** | 0.93 | 0 |
| **Standard value** | 0.9* | N/A |
| * Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73. | | |

**Local mechanical ventilation, exhaust, and terminal units**

| ID | System type in Non-domestic Building Services Compliance Guide |
|---|---|
| A | Local supply or extract ventilation units serving a single area |
| 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 supply and extract ventilation units serving a single room or zone with heating and heat recovery |
| E | Local supply and extract ventilation system serving a single area with heating and heat recovery |
| F | Other local ventilation units |
| G | Fan-assisted terminal VAV unit |
| H | Fan coil units |
| I | Zonal extract system where the fan is remote from the zone with grease filter |

| 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 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | Zone | Standard |
| BOH - Kitchen | - | - | - | - | - | - | - | - | 1 | - | N/A |
| BOH - Circulation_private | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |
| BOH - Toilets | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |
| General Retail - General_retail | - | 1 | 0.5 | - | - | - | - | - | - | - | N/A |
| BOH - TrainingOffice | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |
| BOH - SecureOffice | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |
| BOH - Canteen | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |

**Shell and core configuration**

| Zone | Assumed shell? |
|---|---|
| BOH - Kitchen | NO |
| BOH - Store_various 1 | NO |
| BOH - Circulation_private | NO |
| BOH - Toilets | NO |
| BOH - Plant | NO |
| General Retail - Entrance_draftlobby | NO |
| General Retail - ATM Room | NO |
| General Retail - General_retail | NO |
| BOH - TrainingOffice | NO |
| BOH - SecureOffice | NO |
| BOH - Canteen | NO |

**General lighting and display lighting**

| | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| Zone name | Luminaire | Lamp | Display lamp | General lighting [W] |
| Standard value | 60 | 60 | 22 | |
| BOH - Kitchen | - | 100 | - | 430 |
| BOH - Store_various 1 | 100 | - | - | 198 |

| General lighting and display lighting | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| **Zone name** | **Luminaire** | **Lamp** | **Display lamp** | **General lighting [W]** |
| **Standard value** | 60 | 60 | 22 | |
| BOH - Circulation_private | - | 100 | - | 67 |
| BOH - Toilets | - | 100 | - | 97 |
| BOH - Plant | 100 | - | - | 55 |
| General Retail - Entrance_draftlobby | - | 100 | - | 70 |
| General Retail - ATM Room | 100 | - | - | 110 |
| General Retail - General_retail | - | 115 | 60 | 6714 |
| BOH - TrainingOffice | 100 | - | - | 135 |
| BOH - SecureOffice | 100 | - | - | 125 |
| BOH - Canteen | - | 100 | 60 | 67 |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| General Retail - ATM Room | N/A | N/A |
| General Retail - General_retail | NO (-88%) | NO |
| BOH - TrainingOffice | N/A | N/A |
| BOH - SecureOffice | N/A | N/A |
| BOH - Canteen | N/A | N/A |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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 |
|---|---|---|
| Area [$m^2$] | 1327.8 | 1327.8 |
| External area [$m^2$] | 3445.8 | 3445.8 |
| Weather | LON | LON |
| Infiltration [$m^3/hm^2$@ 50Pa] | 10 | 3 |
| Average conductance [W/K] | 794.33 | 1103.36 |
| Average U-value [$W/m^2K$] | 0.23 | 0.32 |
| Alpha value* [%] | 12.27 | 12.39 |

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

## Building Use

| % Area | Building Type |
|---|---|
| **100** | **A1/A2 Retail/Financial and Professional services** |
| | A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways |
| | B1 Offices and Workshop businesses |
| | B2 to B7 General Industrial and Special Industrial Groups |
| | B8 Storage or Distribution |
| | C1 Hotels |
| | C2 Residential Institutions: Hospitals and Care Homes |
| | C2 Residential Institutions: Residential schools |
| | C2 Residential Institutions: Universities and colleges |
| | C2A Secure Residential Institutions |
| | Residential spaces |
| | D1 Non-residential Institutions: Community/Day Centre |
| | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
| | D1 Non-residential Institutions: Education |
| | D1 Non-residential Institutions: Primary Health Care Building |
| | D1 Non-residential Institutions: Crown and County Courts |
| | D2 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 | 22.43 | 17.77 |
| Cooling | 28.01 | 41.92 |
| Auxiliary | 29.28 | 30.65 |
| Lighting | 24.14 | 38.58 |
| Hot water | 3.21 | 3.4 |
| Equipment* | 154.67 | 154.67 |
| **TOTAL**** | **107.07** | **132.33** |

* 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 |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 547.58 | 619.3 |
| Primary energy* [$kWh/m^2$] | 281.27 | 358.55 |
| Total emissions [$kg/m^2$] | 47.8 | 60.8 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## 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] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas** | | | | | | | | | | |
| | **Actual** | 125.5 | 48.9 | 42.9 | 0 | 17.8 | 0.81 | 0 | 0.91 | 0 |
| | **Notional** | 129.6 | 71.1 | 44 | 0 | 10.4 | 0.82 | 0 | ---- | ---- |
| **[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas** | | | | | | | | | | |
| | **Actual** | 277.8 | 323.4 | 95 | 0 | 2.6 | 0.81 | 0 | 0.91 | 0 |
| | **Notional** | 282.8 | 132.5 | 95.9 | 0 | 1.2 | 0.82 | 0 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 29.5 | 686.3 | 9.7 | 42 | 36.1 | 0.85 | 4.54 | 0.91 | 6.4 |
| | **Notional** | 4.5 | 803.8 | 1.5 | 62 | 41.5 | 0.82 | 3.6 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 204.9 | 52.9 | 67.1 | 3.4 | 6.3 | 0.85 | 4.38 | 0.91 | 6.17 |
| | **Notional** | 323.9 | 334.4 | 109.8 | 25.8 | 3.8 | 0.82 | 3.6 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 123.2 | 84 | 40.4 | 3.8 | 6.3 | 0.85 | 6.14 | 0.91 | 8.65 |
| | **Notional** | 171.4 | 326.9 | 58.1 | 25.2 | 3.8 | 0.82 | 3.6 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 120.3 | 66.1 | 39.4 | 4.1 | 10.9 | 0.85 | 4.53 | 0.91 | 6.38 |
| | **Notional** | 99.8 | 301.3 | 33.8 | 23.2 | 5 | 0.82 | 3.6 | ---- | ---- |

### 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

# Key Features

**The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.**

**Building fabric**

| Element | $U_{i\text{-}Typ}$ | $U_{i\text{-}Min}$ | Surface where the minimum value occurs* |
|---|---|---|---|
| Wall | 0.23 | 0.2 | BOH - Kitchen_W_8 |
| Floor | 0.2 | 0.2 | BOH - Kitchen_S_3 |
| Roof | 0.15 | 0.18 | BOH - Store_various 1_R_15 |
| Windows, roof windows, and rooflights | 1.5 | 1.5 | General Retail - Entrance_draftlobby_G_6 |
| Personnel doors | 1.5 | 1.5 | BOH - Store_various 1_D_8 |
| Vehicle access & similar large doors | 1.5 | 2.2 | BOH - Store_various 1_D_9 |
| High usage entrance doors | 1.5 | - | "No external high usage entrance doors" |

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

| Air Permeability | Typical value | This building |
|---|---|---|
| m³/(h.m²) at 50 Pa | 5 | 10 |

# GLA Carbon Emission Reporting Spreadsheet – Baseline

## NON-DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Building Use | Area per unit ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION BY END USE (kWh/$m^2$ p.a.) TER - SOURCE: BRUKL OUTPUT | | | | | | | REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/$m^2$ p.a.) TER - SOURCE: BRUKL.INP or *SIM.CSV FILE | | | | | | REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/$m^2$ p.a.) - TER BRUKL | | | | | | REGULATED CO2 EMISSIONS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated TER 2012 (kgCO2 / m2) | BRUKL TER 2012 (kgCO2 / m2) | Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | Lighting | Auxiliary | Cooling | Natural Gas | Grid Electricity | | | | 2012 CO2 emissions (kgCO2 p.a.) | Natural Gas | Grid Electricity | | | | SAP10 CO2 emissions (kgCO2 p.a.) | BRUKL TER SAP10 (kgCO2 / m2) |
| | | | | | | | | | | | | | 0.216 kgCO2/kWh | 0.519 kgCO2/kWh | | | | | 0.210 kgCO2/kWh | 0.233 kgCO2/kWh | | | | | |
| Retail | *1327.8* | *1* | *1328* | 60.8 | 60.8 | *17.77* | *Natural Gas* | *3.4* | *Natural Gas* | *38.58* | *30.65* | *41.92* | 21 | 108 | | | | 80,753 | 21 | 108 | | | | 39,431 | 29.7 |
| Sum | 1,328 | 1 | 1,328 | 60.8 | - | 23,595 | 23,595 | 0 | 0 | 0 | 0 | 0 | 21 | 108 | N/A | N/A | N/A | *80,753* | 21 | 108 | N/A | N/A | N/A | *39,431* | 29.7 |

## SITE-WIDE ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

# GLA Carbon Emission Reporting Spreadsheet – *Be Lean*

## NON-DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Building Use | Area per unit ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION BY END USE (kWh/$m^2$ p.a.) 'BE LEAN' BER - SOURCE: BRUKL OUTPUT | | | | | | | REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/$m^2$ p.a.) 'BE LEAN' BER - SOURCE: BRUKL.INP or *SIM.CSV | | | 2012 CO2 emissions (kgCO2 p.a.) | REGULATED CO2 EMISSIONS PER UNIT | | | SAP10 CO2 emissions (kgCO2 p.a.) | BRUKL BER SAP10 (kgCO2 / m2) | | NON-DOMESTIC ENERGY DEMAND | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated BER 2012 (kgCO2 / m2) | BRUKL BER 2012 (kgCO2 / m2) | Space Heating (kWh/$m^2$ p.a.) | Fuel type Space Heating | Domestic Hot Water (kWh/$m^2$ p.a.) | Fuel type Domestic Hot Water | Lighting (kWh/$m^2$ p.a.) | Auxiliary (kWh/$m^2$ p.a.) | Cooling (kWh/$m^2$ p.a.) | Natural Gas | Grid Electricity | | | Natural Gas | Grid Electricity | | | | | REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.) | | | | |
| | | | | | | | | | | | | | 0.216 kgCO2/kWh | 0.519 kgCO2/kWh | | | 0.210 kgCO2/kWh | 0.233 kgCO2/kWh | | | | | Space Heating (kWh p.a.) | Domestic Hot Water (kWh p.a.) | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) |
| Retail | *1327.8* | *1* | *1327.8* | **47.8** | **47.8** | *22.43* | *Natural Gas* | *3.21* | *Natural Gas* | *24.14* | *29.28* | *28.01* | **26** | **81** | | **63.469** | **26** | **81** | | **32,342** | **24.4** | N/A | | | | | |

**BRUKL – *Be Green***

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

**Project name** **Shell and Core**

## Temporary Store Be Green

As designed

**Date:** Wed Jun 03 15:42:35 2020

## Administrative information

### Building Details

**Address:** Temporary Store, London, NW1,

### Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v5.6.a.1

**Interface to calculation engine:** DesignBuilder SBEM

**Interface to calculation engine version:** v6.1.0

**BRUKL compliance check version:** v5.6.a.1

### Owner Details

**Name:**

**Telephone number:**

**Address:** , ,

### Certifier details

**Name:** Nimco Ali

**Telephone number:** 02036031613

**Address:** Trinity Court Batchworth Island Church Street Rickmansworth, , WD3 1RT

## Criterion 1: The calculated $CO_2$ emission rate for the building must not exceed the target

| | |
|---|---|
| $CO_2$ emission rate from the notional building, $kgCO_2/m^2.annum$ | 60 |
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 60 |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 45.5 |
| Are emissions from the building less than or equal to the target? | BER =< TER |
| Are as built details the same as used in the BER calculations? | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

**Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.**

**Building fabric**

| Element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | Surface where the maximum value occurs* |
|---|---|---|---|---|
| Wall** | 0.35 | 0.2 | 0.2 | BOH - Kitchen_W_8 |
| Floor | 0.25 | 0.2 | 0.2 | BOH - Kitchen_S_3 |
| Roof | 0.25 | 0.18 | 0.2 | BOH - Kitchen_R_4 |
| Windows***, roof windows, and rooflights | 2.2 | 1.5 | 1.5 | General Retail - Entrance_draftlobby_G_6 |
| Personnel doors | 2.2 | 1.5 | 1.5 | BOH - Store_various 1_D_8 |
| Vehicle access & similar large doors | 1.5 | 2.2 | 2.2 | BOH - Store_various 1_D_9 |
| High usage entrance doors | 3.5 | - | - | "No external high usage entrance doors" |

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

* There might be more than one surface where the maximum U-value occurs.
** 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.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 10 | 10 |

## Building services

**The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.**

| | |
|---|---|
| **Whole building lighting automatic monitoring & targeting with alarms for out-of-range values** | NO |
| **Whole building electric power factor achieved by power factor correction** | <0.9 |

1- Indirectly Heated by heat pump

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 4.1 | - | - | - | - |
| **Standard value** | 2.5* | N/A | 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. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

2- Indirectly heated by VRF

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 4.3 | - | - | - | - |
| **Standard value** | 2.5* | N/A | 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. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

3- Sales floor

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 4.3 | 4.2 | - | - | - |
| **Standard value** | 2.5* | N/A | 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. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

4- Training Room

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 4.24 | 4.57 | - | - | - |
| **Standard value** | 2.5* | N/A | 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. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

5- General Office

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 5.1 | 4.57 | - | - | - |
| **Standard value** | 2.5* | N/A | 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. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

6- Canteen / Staff Room

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 4.1 | 3.81 | - | - | - |
| **Standard value** | 2.5* | N/A | 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. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

1- Project DHW

| | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|---|---|---|
| **This building** | 0.93 | 0 |
| **Standard value** | 0.9* | N/A |
| * Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73. | | |

**Local mechanical ventilation, exhaust, and terminal units**

| ID | System type in Non-domestic Building Services Compliance Guide |
|---|---|
| A | Local supply or extract ventilation units serving a single area |
| 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 supply and extract ventilation units serving a single room or zone with heating and heat recovery |
| E | Local supply and extract ventilation system serving a single area with heating and heat recovery |
| F | Other local ventilation units |
| G | Fan-assisted terminal VAV unit |
| H | Fan coil units |
| I | Zonal extract system where the fan is remote from the zone with grease filter |

| 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 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | Zone | Standard |
| BOH - Kitchen | - | - | - | - | - | - | - | - | 1 | - | N/A |
| BOH - Circulation_private | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |
| BOH - Toilets | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |
| General Retail - General_retail | - | 1 | 0.5 | - | - | - | - | - | - | - | N/A |
| BOH - TrainingOffice | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |
| BOH - SecureOffice | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |
| BOH - Canteen | - | - | - | 1.5 | - | - | - | - | - | 0.74 | 0.65 |

**Shell and core configuration**

| Zone | Assumed shell? |
|---|---|
| BOH - Kitchen | NO |
| BOH - Store_various 1 | NO |
| BOH - Circulation_private | NO |
| BOH - Toilets | NO |
| BOH - Plant | NO |
| General Retail - Entrance_draftlobby | NO |
| General Retail - ATM Room | NO |
| General Retail - General_retail | NO |
| BOH - TrainingOffice | NO |
| BOH - SecureOffice | NO |
| BOH - Canteen | NO |

**General lighting and display lighting**

| | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| Zone name | Luminaire | Lamp | Display lamp | General lighting [W] |
| Standard value | 60 | 60 | 22 | |
| BOH - Kitchen | - | 100 | - | 430 |
| BOH - Store_various 1 | 100 | - | - | 198 |

| General lighting and display lighting | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| **Zone name** | **Luminaire** | **Lamp** | **Display lamp** | **General lighting [W]** |
| **Standard value** | 60 | 60 | 22 | |
| BOH - Circulation_private | - | 100 | - | 67 |
| BOH - Toilets | - | 100 | - | 97 |
| BOH - Plant | 100 | - | - | 55 |
| General Retail - Entrance_draftlobby | - | 100 | - | 70 |
| General Retail - ATM Room | 100 | - | - | 110 |
| General Retail - General_retail | - | 115 | 60 | 6714 |
| BOH - TrainingOffice | 100 | - | - | 135 |
| BOH - SecureOffice | 100 | - | - | 125 |
| BOH - Canteen | - | 100 | 60 | 67 |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| General Retail - ATM Room | N/A | N/A |
| General Retail - General_retail | NO (-88%) | NO |
| BOH - TrainingOffice | N/A | N/A |
| BOH - SecureOffice | N/A | N/A |
| BOH - Canteen | N/A | N/A |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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 |
|---|---|---|
| Area [$m^2$] | 1327.8 | 1327.8 |
| External area [$m^2$] | 3445.8 | 3445.8 |
| Weather | LON | LON |
| Infiltration [$m^3/hm^2$@ 50Pa] | 10 | 3 |
| Average conductance [W/K] | 794.33 | 1103.36 |
| Average U-value [$W/m^2K$] | 0.23 | 0.32 |
| Alpha value* [%] | 12.27 | 12.39 |

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

## Building Use

| % Area | Building Type |
|---|---|
| **100** | **A1/A2 Retail/Financial and Professional services** |
| | A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways |
| | B1 Offices and Workshop businesses |
| | B2 to B7 General Industrial and Special Industrial Groups |
| | B8 Storage or Distribution |
| | C1 Hotels |
| | C2 Residential Institutions: Hospitals and Care Homes |
| | C2 Residential Institutions: Residential schools |
| | C2 Residential Institutions: Universities and colleges |
| | C2A Secure Residential Institutions |
| | Residential spaces |
| | D1 Non-residential Institutions: Community/Day Centre |
| | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
| | D1 Non-residential Institutions: Education |
| | D1 Non-residential Institutions: Primary Health Care Building |
| | D1 Non-residential Institutions: Crown and County Courts |
| | D2 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 | 4.87 | 5.99 |
| Cooling | 28.01 | 41.92 |
| Auxiliary | 29.28 | 30.65 |
| Lighting | 24.14 | 38.58 |
| Hot water | 3.21 | 3.4 |
| Equipment* | 154.67 | 154.67 |
| **TOTAL**** | **89.51** | **120.55** |

* 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 |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 547.59 | 619.3 |
| Primary energy* [$kWh/m^2$] | 268.86 | 354.8 |
| Total emissions [$kg/m^2$] | 45.5 | 60 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## 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] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Natural Gas** | | | | | | | | | | |
| | **Actual** | 125.5 | 48.9 | 9.5 | 0 | 17.8 | 3.66 | 0 | 4.1 | 0 |
| | **Notional** | 129.6 | 71.1 | 14.8 | 0 | 10.4 | 2.43 | 0 | ---- | ---- |
| **[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Natural Gas** | | | | | | | | | | |
| | **Actual** | 277.6 | 323.7 | 20.1 | 0 | 2.6 | 3.84 | 0 | 4.3 | 0 |
| | **Notional** | 282.8 | 132.5 | 32.3 | 0 | 1.2 | 2.43 | 0 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 29.5 | 686.3 | 2 | 42 | 36.1 | 4.01 | 4.54 | 4.3 | 6.4 |
| | **Notional** | 4.5 | 803.8 | 0.5 | 62 | 41.5 | 2.43 | 3.6 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 204.9 | 52.9 | 14.4 | 3.4 | 6.3 | 3.95 | 4.38 | 4.24 | 6.17 |
| | **Notional** | 323.9 | 334.4 | 37 | 25.8 | 3.8 | 2.43 | 3.6 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 123.2 | 84 | 7.2 | 3.8 | 6.3 | 4.75 | 6.14 | 5.1 | 8.65 |
| | **Notional** | 171.4 | 326.9 | 19.6 | 25.2 | 3.8 | 2.43 | 3.6 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 120.3 | 66.1 | 8.7 | 4.1 | 10.9 | 3.82 | 4.53 | 4.1 | 6.38 |
| | **Notional** | 99.8 | 301.3 | 11.4 | 23.2 | 5 | 2.43 | 3.6 | ---- | ---- |

### Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
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Cool con [kWh/m2] = Cooling energy consumption
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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

# Key Features

**The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.**

**Building fabric**

| Element | $U_{i\text{-}Typ}$ | $U_{i\text{-}Min}$ | Surface where the minimum value occurs* |
|---|---|---|---|
| Wall | 0.23 | 0.2 | BOH - Kitchen_W_8 |
| Floor | 0.2 | 0.2 | BOH - Kitchen_S_3 |
| Roof | 0.15 | 0.18 | BOH - Store_various 1_R_15 |
| Windows, roof windows, and rooflights | 1.5 | 1.5 | General Retail - Entrance_draftlobby_G_6 |
| Personnel doors | 1.5 | 1.5 | BOH - Store_various 1_D_8 |
| Vehicle access & similar large doors | 1.5 | 2.2 | BOH - Store_various 1_D_9 |
| High usage entrance doors | 1.5 | - | "No external high usage entrance doors" |

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

| Air Permeability | Typical value | This building |
|---|---|---|
| m³/(h.m²) at 50 Pa | 5 | 10 |

# GLA Carbon Emission Reporting Spreadsheet – *Be Green*

## NON-DOMESTIC ENERGY CONSUMPTION AND CO2 ANALYSIS

| | | | | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION BY END USE (kWh/m² p.a.) 'BE GREEN' BER - SOURCE: BRUKL OUTPUT | | | | | | | | | | | REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m² p.a.) 'BE GREEN' BER - SOURCE: BRUKL.INP or *SIM.CSV FILE | | | | | | | | | REGULATED CO2 EMISSIONS PER UNIT | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Use | Area per unit (m²) | Number of units | Total area represented by model (m²) | Calculated BER 2012 (kgCO2 / m2) | BRUKL BER 2012 (kgCO2 / m2) | Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | | | | | | | Electricity generated by CHP (-) | Electricity generated by renewable technology (-) | Lighting | Auxiliary | Cooling | Natural Gas | Grid Electricity | Bespoke DH Factor | Electricity generated by CHP (-) | Electricity generated by renewable technology (-) | Enter Carbon Factor 1 | Enter Carbon Factor 2 | Enter Carbon Factor 3 | 2012 CO2 emissions (kgCO2 p.a.) | Natural Gas | Grid Electricity | Bespoke DH Factor | Electricity generated by CHP (-) | Electricity generated by renewable technology (-) | Enter Carbon Factor 1 | Enter Carbon Factor 2 | Enter Carbon Factor 3 | SAP10 CO2 emissions | SAP10 BER (kgCO2 / m2) |
| | | | | | | | | | | | | | | | | If applicable | If applicable | | | | | | | If applicable | If applicable | | | | | | | | If applicable | If applicable | | | | | |
| Retail | *1327.8* | *1* | *1327.8* | **45.5** | **45.5** | *4.87* | *Grid Electricity* | *3.21* | *Natural Gas* | N/A | N/A | N/A | N/A | N/A | N/A | *0* | | *24.14* | *29.28* | *28.01* | **3** | **86** | | | | | | | **60,392** | 3 | 86 | | | | | | | 27,594 | 20.8 |
| **Sum** | **1,328** | **1** | **1,328** | **45.5** | - | **6,466** | N/A | **4,262** | N/A | | | | | | | **0** | **0** | **32,053** | **38,878** | **37,192** | **3** | **86** | **0** | **0** | **0** | **0** | **0** | **0** | **60,392** | **3** | **86** | **0** | **0** | **0** | **0** | **0** | **0** | **27,594** | **20.8** |

| Table 1: Regulated $CO_2$ Emissions using SAP 10 Carbon Factors from GLA Carbon Emission Reporting Spreadsheet | | | | | | |
|---|---|---|---|---|---|---|
| | **TFA ($m^2$)** | **BER ($kg/CO_2/m^2$)** | **BER*TFA ($kg/CO_2$)** | **TER ($kg/CO_2/m^2$)** | **TER*TFA ($kg/CO_2$)** | **$CO_2$ Reduction (%)** |
| Baseline | 1327.8 | N/A | N/A | 29.7 | 39436 | 0 |
| Be Lean | | 24.4 | 32398 | | | 18% |
| Be Green | | 20.8 | 27618 | | | 15% |
| **Overall $CO_2$ Reduction** | | | | | | **30.0%** |

| Table 2: Regulated $CO_2$ Emissions in tonnes | | | |
|---|---|---|---|
| | | | |
| | **$TCO_2$** | **$TCO_2$ Reduction** | **$CO_2$ Reduction (%)** |
| Baseline | 39.4 | N/A | N/A |
| Be Lean | 32.4 | 7.0 | 17.8% |
| Be Green | 27.6 | 4.8 | 14.8% |
| **Total** | | **11.8** | **30.0%** |

**BRUKL – *Be Lean***

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

**Project name** **Shell and Core**

## Petrol Filling Station

As built

**Date:** Fri Nov 27 12:20:43 2020

## Administrative information

### Building Details

**Address:** Petrol Filling Station, Camden Goods Yard, Chalk Farm Road, London, NW1 8EH

### Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v5.6.b.0

**Interface to calculation engine:** DesignBuilder SBEM

**Interface to calculation engine version:** v6.1.7

**BRUKL compliance check version:** v5.6.b.0

### Certifier details

**Name:** Nimco Ali

**Telephone number:** 02036031613

**Address:** Trinity Court Batchworth Island Church Street, Rickmansworth, WD3 1RT

## Criterion 1: The calculated $CO_2$ emission rate for the building must not exceed the target

| | |
|---|---|
| $CO_2$ emission rate from the notional building, $kgCO_2/m^2.annum$ | 60.2 |
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 60.2 |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 46.2 |
| Are emissions from the building less than or equal to the target? | BER =< TER |
| Are as built details the same as used in the BER calculations? | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

**Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.**

### Building fabric

| Element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | Surface where the maximum value occurs* |
|---|---|---|---|---|
| Wall** | 0.35 | 0.18 | 0.23 | "General Retail - ATM Room_W_4" |
| Floor | 0.25 | 0.14 | 0.14 | "General Retail - Entrance Lobby_S_3" |
| Roof | 0.25 | 0.2 | 0.2 | "General Retail - Entrance Lobby_R_12" |
| Windows***, roof windows, and rooflights | 2.2 | 1.5 | 1.5 | "General Retail - Entrance Lobby_G_8" |
| Personnel doors | 2.2 | 1.5 | 1.5 | "BOH - BOH_D_4" |
| Vehicle access & similar large doors | 1.5 | 1.4 | 1.4 | "BOH - BOH_D_5" |
| High usage entrance doors | 3.5 | - | - | "No external high usage entrance doors" |

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

* There might be more than one surface where the maximum U-value occurs.
** 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.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 10 | 4.46 |

## Building services

**The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.**

| | |
|---|---|
| **Whole building lighting automatic monitoring & targeting with alarms for out-of-range values** | NO |
| **Whole building electric power factor achieved by power factor correction** | <0.9 |

1- Indirectly Heated

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 0.91 | - | - | - | - |
| **Standard value** | 0.91* | N/A | 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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

2- Sales floor

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 0.91 | 4.2 | - | - | - |
| **Standard value** | 0.91* | N/A | 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 gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

1- Project DHW

| | **Water heating efficiency** | **Storage loss factor [kWh/litre per day]** |
|---|---|---|
| **This building** | 0.91 | 0.001 |
| **Standard value** | 0.9* | N/A |

* Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73.

### Local mechanical ventilation, exhaust, and terminal units

| **ID** | **System type in Non-domestic Building Services Compliance Guide** |
|---|---|
| A | Local supply or extract ventilation units serving a single area |
| 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 supply and extract ventilation units serving a single room or zone with heating and heat recovery |
| E | Local supply and extract ventilation system serving a single area with heating and heat recovery |
| F | Other local ventilation units |
| G | Fan-assisted terminal VAV unit |
| H | Fan coil units |
| I | Zonal extract system where the fan is remote from the zone with grease filter |

| **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 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | **Zone** | **Standard** |
| General Retail - Store | - | 1 | 0.5 | - | - | - | - | - | - | - | N/A |

### Shell and core configuration

| **Zone** | **Excluded from calculation?** |
|---|---|
| General Retail - Entrance Lobby | NO |
| BOH - BOH | NO |
| General Retail - Store | NO |
| General Retail - ATM Room | NO |

| General lighting and display lighting | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| **Zone name** | **Luminaire** | **Lamp** | **Display lamp** | **General lighting [W]** |
| **Standard value** | 60 | 60 | 22 | |
| General Retail - Entrance Lobby | - | 100 | - | 69 |
| BOH - BOH | 100 | - | - | 304 |
| General Retail - Store | - | 115 | 60 | 6717 |
| General Retail - ATM Room | 100 | - | - | 110 |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| General Retail - Store | NO (-89.4%) | NO |
| General Retail - ATM Room | N/A | N/A |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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 |
|---|---|---|
| Area [$m^2$] | 1327.8 | 1327.8 |
| External area [$m^2$] | 3388.9 | 3388.9 |
| Weather | LON | LON |
| Infiltration [$m^3/hm^2$@ 50Pa] | 4 | 3 |
| Average conductance [W/K] | 708.42 | 985.3 |
| Average U-value [$W/m^2K$] | 0.21 | 0.29 |
| Alpha value* [%] | 12 | 10.39 |

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

## Building Use

| % Area | Building Type |
|---|---|
| **100** | **A1/A2 Retail/Financial and Professional services** |
| | A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways |
| | B1 Offices and Workshop businesses |
| | B2 to B7 General Industrial and Special Industrial Groups |
| | B8 Storage or Distribution |
| | C1 Hotels |
| | C2 Residential Institutions: Hospitals and Care Homes |
| | C2 Residential Institutions: Residential schools |
| | C2 Residential Institutions: Universities and colleges |
| | C2A Secure Residential Institutions |
| | Residential spaces |
| | D1 Non-residential Institutions: Community/Day Centre |
| | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
| | D1 Non-residential Institutions: Education |
| | D1 Non-residential Institutions: Primary Health Care Building |
| | D1 Non-residential Institutions: Crown and County Courts |
| | D2 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 | 23.84 | 23.76 |
| Cooling | 30.16 | 41.75 |
| Auxiliary | 24.91 | 28.03 |
| Lighting | 23.52 | 38.52 |
| Hot water | 1.31 | 1.33 |
| Equipment* | 144.83 | 144.83 |
| **TOTAL**** | **103.74** | **133.38** |

* 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 |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 575.68 | 619.86 |
| Primary energy* [$kWh/m^2$] | 271.96 | 354.76 |
| Total emissions [$kg/m^2$] | 46.2 | 60.2 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## 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] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas** | | | | | | | | | | |
| | **Actual** | 174.3 | 36.1 | 59.6 | 0 | 2.6 | 0.81 | 0 | 0.91 | 0 |
| | **Notional** | 203.5 | 26.2 | 69 | 0 | 1.2 | 0.82 | 0 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 17.9 | 741.5 | 5.9 | 45.3 | 36.1 | 0.85 | 4.54 | 0.91 | 6.4 |
| | **Notional** | 3 | 813 | 1 | 62.7 | 41.5 | 0.82 | 3.6 | ---- | ---- |

### 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

# Key Features

**The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.**

**Building fabric**

| Element | $U_{i\text{-}Typ}$ | $U_{i\text{-}Min}$ | Surface where the minimum value occurs* |
|---|---|---|---|
| Wall | 0.23 | 0.18 | "General Retail - Entrance Lobby_W_7" |
| Floor | 0.2 | 0.14 | "General Retail - Entrance Lobby_S_3" |
| Roof | 0.15 | 0.2 | "General Retail - Entrance Lobby_R_12" |
| Windows, roof windows, and rooflights | 1.5 | 1.5 | "General Retail - Entrance Lobby_G_8" |
| Personnel doors | 1.5 | 1.5 | "BOH - BOH_D_4" |
| Vehicle access & similar large doors | 1.5 | 1.4 | "BOH - BOH_D_5" |
| High usage entrance doors | 1.5 | - | "No external high usage entrance doors" |

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

| Air Permeability | Typical value | This building |
|---|---|---|
| m³/(h.m²) at 50 Pa | 5 | 4.46 |

# GLA Carbon Emission Reporting Spreadsheet – Baseline

The applicant should complete all the light blue cells including information on the modelled units, the area per unit, the number of units, the baseline energy consumption figures, the TER and the TFEE.

SAP 2012 CO2 PERFORMANCE

SAP10 CO2 PERFORMANCE

## DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

DEMAND

| Unit identifier (e.g. plot number, dwelling type etc.) | Model total floor area ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - TER WORKSHEET | | | | | | | REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.) | | | | | | REGULATED CO2 EMISSIONS PER UNIT | | | | | | | Fabric Energy Efficiency (FEE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated TER 2012 (kgCO2 / m2) | TER Worksheet TER 2012 (kgCO2 / m2) | Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | Lighting | Auxiliary | Cooling | Space Heating | Domestic Hot Water | Lighting | Auxiliary | Cooling | 2012 CO2 emissions (kgCO2 p.a.) | Space Heating | Domestic Hot Water | Lighting | Auxiliary | Cooling | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated TER SAP10 (kgCO2 / m2) | Target Fabric Energy Efficiency (TFEE) (kWh/m²) |
| | TER Worksheet (Row 4) | | | | TER Worksheet (Row 273) | TER Worksheet (Row 211) | | TER Worksheet (Row 219) | | TER Worksheet (Row 232) | TER Worksheet (Row 231) | N / A | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sum | 0 | 0 | 0 | #DIV/0! | - | 0 | N/A | 0 | N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | *0* | #DIV/0! | #DIV/0! |

## NON-DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Building Use | Area per unit ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION BY END USE (kWh/m² p.a.) TER - SOURCE: BRUKL OUTPUT | | | | | | | REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m² p.a.) TER - SOURCE: BRUKL.INP or *SIM.CSV FILE | | | 2012 CO2 emissions (kgCO2 p.a.) | REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m² p.a.) - TER BRUKL | | | REGULATED CO2 EMISSIONS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated TER 2012 (kgCO2 / m2) | BRUKL TER 2012 (kgCO2 / m2) | Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | Lighting | Auxiliary | Cooling | Natural Gas | Grid Electricity | | | Natural Gas | Grid Electricity | | SAP10 CO2 emissions (kgCO2 p.a.) | BRUKL TER SAP10 (kgCO2 / m2) |
| | | | | | | | | | | | | | ################ | ################ | | | ################ | ################ | | | |
| Retail | *1327.8* | *1* | *1328* | 60.2 | 60.2 | *23.76* | *Natural Gas* | *1.33* | *Natural Gas* | *38.52* | *28.03* | *41.75* | 25 | 106 | | 79,963 | 25 | 106 | | 39,664 | 29.9 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sum | 1,328 | 1 | 1,328 | 60.2 | - | 31,549 | 31,549 | 0 | 0 | 0 | 0 | 0 | 25 | 106 | N/A | N/A | N/A | *79,963* | 25 | 106 | N/A | N/A | N/A | *39,664* | 29.9 |

## SITE-WIDE ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Use | Total Area ($m^2$) | | Calculated TER 2012 (kgCO2 / m2) | - | REGULATED ENERGY CONSUMPTION | | | | | | | REGULATED CO2 EMISSIONS | REGULATED CO2 EMISSIONS PER UNIT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Space Heating (kWh p.a.) | N/A | Domestic Hot Water (kWh p.a.) | N/A | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) | 2012 CO2 emissions (kgCO2 p.a.) | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated TER SAP10 (kgCO2 / m2) |
| Sum | 1,328 | | 60.2 | - | 31,549 | | 0 | | 0 | 0 | 0 | *79,963* | *39,664* | 29.9 |

# GLA Carbon Emission Reporting Spreadsheet – *Be Lean*

The applicant should complete all the light blue cells including information on the 'be lean' energy consumption figures, the 'be lean' DER, the DFEE and the regulated energy demand of the 'be lean' scenario.

SAP 2012 CO2 PERFORMANCE

SAP10 CO2 PERFORMANCE

## DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

## DOMESTIC ENERGY DEMAND DATA

| Unit identifier (e.g. plot number, dwelling type etc.) | Model total floor area ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE LEAN' SAP DER WORKSHEET | | | | | | | REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.) | | | | | | REGULATED CO2 EMISSIONS PER UNIT | | | | | | | Fabric Energy Efficiency (FEE) | REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated DER 2012 (kgCO2 / m2) | DER Worksheet DER 2012 (kgCO2 / m2) | Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | Lighting | Auxiliary | Cooling | Space Heating | Domestic Hot Water | Lighting | Auxiliary | Cooling | 2012 CO2 emissions (kgCO2 p.a.) | Space Heating CO2 emissions (kgCO2 p.a.) | Domestic Hot Water CO2 emissions (kgCO2 p.a.) | Lighting CO2 emissions (kgCO2 p.a.) | Auxiliary CO2 emissions (kgCO2 p.a.) | Cooling CO2 emissions (kgCO2 p.a.) | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated DER SAP10 (kgCO2 / m2) | Dwelling Fabric Energy Efficiency (DFEE) (kWh/m²) | Space Heating (kWh p.a.) | Domestic Hot Water (kWh p.a.) | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) |
| | | | | | DER Sheet (Row 384) | DER Sheet [(Row 307a) ÷ (Row 367a x 0.01)] | Select fuel type | DER Sheet [(Row 310a) ÷ (Row 367a x 0.01)] | Select fuel type | DER Sheet Row 332 | DER Sheet (Row 313 + 331) | DER Sheet Row 315 | | | | | | | | | | | | | | | | | | | |
| Sum | 0 | 0 | 0 | #DIV/0! | - | 0 | N/A | 0 | N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | *0* | #DIV/0! | #DIV/0! | 0 | 0 | 0 | 0 | 0 |

## NON-DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

## NON-DOMESTIC ENERGY DEMAND

| Building Use | Area per unit ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION BY END USE (kWh/$m^2$ p.a.) 'BE LEAN' BER - SOURCE: BRUKL OUTPUT | | | | | | | LATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/$m^2$ p.a.) 'BE LEAN' BER - SOURCE: BRUKL.INP or *SIM.CSV | | | | | 2012 CO2 emissions (kgCO2 p.a.) | REGULATED CO2 EMISSIONS PER UNIT | | | | | SAP10 CO2 emissions (kgCO2 p.a.) | BRUKL BER SAP10 (kgCO2 / m2) | | REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated BER 2012 (kgCO2 / m2) | BRUKL BER 2012 (kgCO2 / m2) | Space Heating (kWh/$m^2$ p.a.) | Fuel type Space Heating | Domestic Hot Water (kWh/$m^2$ p.a.) | Fuel type Domestic Hot Water | Lighting (kWh/$m^2$ p.a.) | Auxiliary (kWh/$m^2$ p.a.) | Cooling (kWh/$m^2$ p.a.) | Natural Gas | Grid Electricity | | | | | Natural Gas | Grid Electricity | | | | | | | Space Heating (kWh p.a.) | Domestic Hot Water (kWh p.a.) | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) |
| | | | | | | | | | | | | | ############ | ############ | | | | | ############ | ############ | | | | | | | | | | |
| Retail | *1327.8* | *1* | *1327.8* | **46.2** | **46.2** | *23.84* | *Natural Gas* | *1.31* | *Natural Gas* | *23.52* | *24.91* | *30.16* | **25** | **79** | | | | **61,372** | **25** | **79** | | | | **31,327** | **23.6** | N/A | | | | | |
| Sum | 1,328 | 1 | 1,328 | 46.2 | - | 31,655 | N/A | 1,739 | N/A | 31,230 | 33,075 | 40,046 | 25 | 79 | N/A | N/A | N/A | *61,372* | 25 | 79 | | | | *31,327* | 23.6 | | 0 | 0 | 0 | 0 | 0 |

## SITE-WIDE ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Use | Total Area ($m^2$) | Calculated BER 2012 (kgCO2 / m2) | - | REGULATED ENERGY CONSUMPTION | | | | | | | REGULATED CO2 EMISSIONS | | REGULATED CO2 EMISSIONS | | | REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Space Heating (kWh p.a.) | N/A | Domestic Hot Water (kWh p.a.) | N/A | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) | | 2012 CO2 emissions (kgCO2 p.a.) | | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated BER SAP10 (kgCO2 / m2) | | Space Heating (kWh p.a.) | Domestic Hot Water (kWh p.a.) | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) |
| Sum | 1,328 | 46.2 | - | 31,655 | N/A | 1,739 | N/A | 31,230 | 33,075 | 40,046 | | *61,372* | | *31,327* | 23.6 | N/A | 0 | 0 | 0 | 0 | 0 |

**BRUKL – *Be Green***

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

**Project name** **Shell and Core**

## Petrol Filling Station

As built

**Date:** Fri Nov 27 12:04:38 2020

## Administrative information

### Building Details

**Address:** Petrol Filling Station, Camden Goods Yard, Chalk Farm Road, London, NW1 8EH

### Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v5.6.b.0

**Interface to calculation engine:** DesignBuilder SBEM

**Interface to calculation engine version:** v6.1.7

**BRUKL compliance check version:** v5.6.b.0

### Certifier details

**Name:** Nimco Ali

**Telephone number:** 02036031613

**Address:** Trinity Court Batchworth Island Church Street, Rickmansworth, WD3 1RT

## Criterion 1: The calculated $CO_2$ emission rate for the building must not exceed the target

| | |
|---|---|
| $CO_2$ emission rate from the notional building, $kgCO_2/m^2.annum$ | 59.1 |
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 59.1 |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 43.7 |
| Are emissions from the building less than or equal to the target? | BER =< TER |
| Are as built details the same as used in the BER calculations? | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

**Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.**

### Building fabric

| Element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | Surface where the maximum value occurs* |
|---|---|---|---|---|
| Wall** | 0.35 | 0.18 | 0.23 | "General Retail - ATM Room_W_4" |
| Floor | 0.25 | 0.14 | 0.14 | "General Retail - Entrance Lobby_S_3" |
| Roof | 0.25 | 0.2 | 0.2 | "General Retail - Entrance Lobby_R_12" |
| Windows***, roof windows, and rooflights | 2.2 | 1.5 | 1.5 | "General Retail - Entrance Lobby_G_8" |
| Personnel doors | 2.2 | 1.5 | 1.5 | "BOH - BOH_D_4" |
| Vehicle access & similar large doors | 1.5 | 1.4 | 1.4 | "BOH - BOH_D_5" |
| High usage entrance doors | 3.5 | - | - | "No external high usage entrance doors" |

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

* There might be more than one surface where the maximum U-value occurs.
** 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.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 10 | 4.46 |

## Building services

**The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.**

| | |
|---|---|
| **Whole building lighting automatic monitoring & targeting with alarms for out-of-range values** | NO |
| **Whole building electric power factor achieved by power factor correction** | <0.9 |

1- Indirectly Heated by heat pump

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 4.3 | - | - | - | - |
| **Standard value** | 2.5* | N/A | 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. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

2- Sales floor

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 4.3 | 4.2 | - | - | - |
| **Standard value** | 2.5* | N/A | 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. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

1- Project DHW

| | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|---|---|---|
| **This building** | 0.93 | 0.001 |
| **Standard value** | 0.9* | N/A |
| * Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73. | | |

### Local mechanical ventilation, exhaust, and terminal units

| ID | System type in Non-domestic Building Services Compliance Guide |
|---|---|
| A | Local supply or extract ventilation units serving a single area |
| 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 supply and extract ventilation units serving a single room or zone with heating and heat recovery |
| E | Local supply and extract ventilation system serving a single area with heating and heat recovery |
| F | Other local ventilation units |
| G | Fan-assisted terminal VAV unit |
| H | Fan coil units |
| I | Zonal extract system where the fan is remote from the zone with grease filter |

| 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 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | **Zone** | **Standard** |
| General Retail - Store | - | 1 | 0.5 | - | - | - | - | - | - | - | N/A |

### Shell and core configuration

| Zone | Excluded from calculation? |
|---|---|
| General Retail - Entrance Lobby | NO |
| BOH - BOH | NO |
| General Retail - Store | NO |
| General Retail - ATM Room | NO |

| General lighting and display lighting | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| **Zone name** | **Luminaire** | **Lamp** | **Display lamp** | **General lighting [W]** |
| **Standard value** | 60 | 60 | 22 | |
| General Retail - Entrance Lobby | - | 100 | - | 69 |
| BOH - BOH | 100 | - | - | 304 |
| General Retail - Store | - | 115 | 60 | 6717 |
| General Retail - ATM Room | 100 | - | - | 110 |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| General Retail - Store | NO (-89.4%) | NO |
| General Retail - ATM Room | N/A | N/A |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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 |
|---|---|---|
| Area [$m^2$] | 1327.8 | 1327.8 |
| External area [$m^2$] | 3388.9 | 3388.9 |
| Weather | LON | LON |
| Infiltration [$m^3/hm^2$@ 50Pa] | 4 | 3 |
| Average conductance [W/K] | 708.42 | 985.3 |
| Average U-value [$W/m^2K$] | 0.21 | 0.29 |
| Alpha value* [%] | 12 | 10.39 |

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

## Building Use

| % Area | Building Type |
|---|---|
| **100** | **A1/A2 Retail/Financial and Professional services** |
| | A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways |
| | B1 Offices and Workshop businesses |
| | B2 to B7 General Industrial and Special Industrial Groups |
| | B8 Storage or Distribution |
| | C1 Hotels |
| | C2 Residential Institutions: Hospitals and Care Homes |
| | C2 Residential Institutions: Residential schools |
| | C2 Residential Institutions: Universities and colleges |
| | C2A Secure Residential Institutions |
| | Residential spaces |
| | D1 Non-residential Institutions: Community/Day Centre |
| | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
| | D1 Non-residential Institutions: Education |
| | D1 Non-residential Institutions: Primary Health Care Building |
| | D1 Non-residential Institutions: Crown and County Courts |
| | D2 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 | 5.05 | 8.01 |
| Cooling | 30.16 | 41.75 |
| Auxiliary | 24.91 | 28.03 |
| Lighting | 23.52 | 38.52 |
| Hot water | 1.28 | 1.33 |
| Equipment* | 144.83 | 144.83 |
| **TOTAL**** | **84.92** | **117.63** |

* 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 |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 575.68 | 619.86 |
| Primary energy* [$kWh/m^2$] | 258.32 | 349.74 |
| Total emissions [$kg/m^2$] | 43.7 | 59.1 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## 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] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Natural Gas** | | | | | | | | | | |
| | **Actual** | 174.3 | 36.1 | 12.6 | 0 | 2.6 | 3.84 | 0 | 4.3 | 0 |
| | **Notional** | 203.5 | 26.2 | 23.3 | 0 | 1.2 | 2.43 | 0 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 17.9 | 741.5 | 1.2 | 45.3 | 36.1 | 4.01 | 4.54 | 4.3 | 6.4 |
| | **Notional** | 3 | 813 | 0.3 | 62.7 | 41.5 | 2.43 | 3.6 | ---- | ---- |

### 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

# Key Features

**The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.**

**Building fabric**

| Element | $U_{i\text{-}Typ}$ | $U_{i\text{-}Min}$ | Surface where the minimum value occurs* |
|---|---|---|---|
| Wall | 0.23 | 0.18 | "General Retail - Entrance Lobby_W_7" |
| Floor | 0.2 | 0.14 | "General Retail - Entrance Lobby_S_3" |
| Roof | 0.15 | 0.2 | "General Retail - Entrance Lobby_R_12" |
| Windows, roof windows, and rooflights | 1.5 | 1.5 | "General Retail - Entrance Lobby_G_8" |
| Personnel doors | 1.5 | 1.5 | "BOH - BOH_D_4" |
| Vehicle access & similar large doors | 1.5 | 1.4 | "BOH - BOH_D_5" |
| High usage entrance doors | 1.5 | - | "No external high usage entrance doors" |

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

| Air Permeability | Typical value | This building |
|---|---|---|
| m³/(h.m²) at 50 Pa | 5 | 4.46 |

# GLA Carbon Emission Reporting Spreadsheet – *Be Green*

The applicant should complete all the light blue cells including information on the 'be green' energy consumption figures and the 'be green' DER.

SAP 2012 CO2 PERFORMANCE

SAP10 CO2 PERFORMANCE

## DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Unit identifier (e.g. plot number, dwelling type etc.) | Model total floor area ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK: Calculated DER 2012 (kgCO2 / m2) | VALIDATION CHECK: DER Worksheet DER 2012 (kgCO2 / m2) | REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE GREEN' SAP DER WORKSHEET: Space Heating (Heat Source 1) | Fuel type Space Heating | Domestic Hot Water (Heat Source 1) | Fuel type Domestic Hot Water | Space Heating (Heat source 2) if applicable | Fuel type Space Heating | Domestic Hot Water (Heat source 2) if applicable | Fuel type Domestic Hot Water | Space and Domestic Hot Water from CHP if applicable | Fuel type CHP if applicable | Total Electricity generated by CHP (-) if applicable | Electricity generated by renewable (-) if applicable | Lighting | Auxiliary | Cooling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | DER Sheet (Row 384) | DER Sheet [Row 307b ÷ (Row 367b x 0.01)] | Select fuel type | DER Sheet [Row 310b ÷ (Row 367b x 0.01)] | Select fuel type | DER Sheet [Row 307c ÷ (Row 367c x 0.01)] | Select fuel type | DER Sheet [Row 310c ÷ (Row 367c x 0.01)] | Select fuel type | DER Sheet [(Row 307a + 310a) ÷ (Row 362 x 0.01)] | Select fuel type | DER Sheet [(Row 307a + 310a) × (Row 361 ÷ 362)] | DER Sheet Row 380 | DER Sheet Row 332 | DER Sheet (Row 313 + 331) | DER Sheet Row 315 |
| Sum | 0 | 0 | 0 | #DIV/0! | - | 0 | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 | 0 | 0 | 0 | 0 |

| REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.): Space Heating | Domestic Hot Water | Space Heating and DHW from CHP if applicable | Electricity generated by CHP if applicable | Electricity generated by renewable if applicable | Lighting | Auxiliary | Cooling | 2012 CO2 emissions (kgCO2 p.a.) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* |

| REGULATED CO2 EMISSIONS PER UNIT: Space Heating | Domestic Hot Water | Space Heating and DHW from CHP if applicable | Electricity generated by CHP if applicable | Electricity generated by renewable if applicable | Lighting | Auxiliary | Cooling | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated DER SAP10 (kgCO2 / m2) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* | #DIV/0! |

## NON-DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Use | Area per unit ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK: Calculated BER 2012 (kgCO2 / m2) | VALIDATION CHECK: BRUKL BER 2012 (kgCO2 / m2) | REGULATED ENERGY CONSUMPTION BY END USE (kWh/m² p.a.) 'BE GREEN' BER - SOURCE: BRUKL OUTPUT: Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | | | | | | | Electricity generated by CHP (-) if applicable | Electricity generated by renewable technology (-) if applicable | Lighting | Auxiliary | Cooling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Retail | *1327.8* | *1* | *1327.8* | **43.7** | **43.7** | *5.05* | *Grid Electricity* | *1.28* | *Natural Gas* | N/A | N/A | N/A | N/A | N/A | N/A | *0* | | *23.52* | *24.91* | *30.16* |
| Sum | 1,328 | 1 | 1,328 | 43.7 | - | 6,705 | N/A | 1,700 | N/A | | | | | | | 0 | 0 | 31,230 | 33,075 | 40,046 |

| REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m² p.a.) 'BE GREEN' BER - SOURCE: BRUKL.INP or *SIM.CSV FILE: Natural Gas | Grid Electricity | Bespoke DH Factor | Electricity generated by CHP (-) if applicable | Electricity generated by renewable technology (-) if applicable | Enter Carbon Factor 1 | Enter Carbon Factor 2 | Enter Carbon Factor 3 | 2012 CO2 emissions (kgCO2 p.a.) |
|---|---|---|---|---|---|---|---|---|
| 1 | 84 | | | 0 | | | | 58,006 |
| 1 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | *58,006* |

| REGULATED CO2 EMISSIONS PER UNIT: Natural Gas | Grid Electricity | Bespoke DH Factor | Electricity generated by CHP (-) if applicable | Electricity generated by renewable technology (-) if applicable | Enter Carbon Factor 1 | Enter Carbon Factor 2 | Enter Carbon Factor 3 | SAP10 CO2 emissions | BRUKL BER SAP10 (kgCO2 / m2) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 84 | | | | | | | 26,233 | 19.8 |
| 1 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | *26,233* | 19.8 |

## *SITE-WIDE ENERGY CONSUMPTION AND $CO_2$ ANALYSIS*

| Use | Total Area ($m^2$) | Calculated BER 2012 (kgCO2 / m2) | - | REGULATED CO2 EMISSIONS: Space Heating (kWh p.a.) | N/A | Domestic Hot Water (kWh p.a.) | N/A | Space Heating (kWh p.a.) | N/A | Domestic Hot Water (kWh p.a.) | N/A | Space and Domestic Hot Water from CHP (kWh p.a.) | N/A | Electricity generated by CHP (kWh p.a.) if applicable | Electricity generated by renewable (kWh p.a.) if applicable | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sum | 1,328 | 0.0 | - | 6,705 | N/A | 1,700 | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 | 0 | 31,230 | 33,075 | 40,046 |

| REGULATED CO2 EMISSIONS: Space Heating CO2 emissions | Domestic Hot Water CO2 emissions | Space Heating and DHW from CHP CO2 emissions if applicable | Electricity generated by CHP CO2 savings if applicable | Electricity generated by renewable CO2 savings if applicable | Lighting CO2 emissions | Auxiliary CO2 emissions | Cooling CO2 emissions | 2012 CO2 emissions |
|---|---|---|---|---|---|---|---|---|
| 1 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | *58,006* |

| REGULATED CO2 EMISSIONS PER UNIT: Space Heating CO2 emissions | Domestic Hot Water CO2 emissions | Space Heating and DHW from CHP CO2 emissions if applicable | Electricity generated by CHP CO2 savings if applicable | Electricity generated by renewable CO2 savings if applicable | Lighting CO2 emissions | Auxiliary CO2 emissions | Cooling CO2 emissions | SAP10 CO2 emissions | Calculated BER SAP10 (kgCO2 / m2) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | *26,233* | 19.8 |

| Table 1: Regulated $CO_2$ Emissions using SAP 10 Carbon Factors from GLA Carbon Emission Reporting Spreadsheet | | | | | | |
|---|---|---|---|---|---|---|
| | **TFA ($m^2$)** | **BER ($kg/CO_2/m^2$)** | **BER*TFA ($kg/CO_2$)** | **TER ($kg/CO_2/m^2$)** | **TER*TFA ($kg/CO_2$)** | **$CO_2$ Reduction (%)** |
| Baseline | 1327.8 | N/A | N/A | 29.9 | 39701 | 0 |
| Be Lean | | 23.6 | 31336 | | | 21% |
| Be Green | | 19.8 | 26290 | | | 16% |
| **Overall $CO_2$ Reduction** | | | | | | **33.8%** |

| Table 2: Regulated $CO_2$ Emissions in tonnes | | | |
|---|---|---|---|
| | | | |
| | **$TCO_2$** | **$TCO_2$ Reduction** | **$CO_2$ Reduction (%)** |
| Baseline | 39.7 | N/A | N/A |
| Be Lean | 31.3 | 8.4 | 21.1% |
| Be Green | 26.3 | 5.0 | 16.1% |
| **Total** | | **13.4** | **33.8%** |

# APPENDIX B: AS BUILT STAGE BRUKLS AND GLA CARBON EMISSION REPORTING SPREADSHEET – SHELL AND CORE SBEM ASSESSMENT

**BRUKL – *Be Lean***

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

**Project name**

# Morrison's Camden Temp. Store - Gas Boiler

As built

**Date:** Thu Feb 18 11:47:01 2021

## Administrative information

### Building Details

**Address:** Morrison's, 93 Juniper Crescent, Camden Town, LONDON, NW1 8HQ

### Certification tool

**Calculation engine:** TAS

**Calculation engine version:** "v9.5.1"

**Interface to calculation engine:** TAS

**Interface to calculation engine version:** v9.5.1

**BRUKL compliance check version:** v5.6.b.0

### Certifier details

**Name:** Andrew Parry

**Telephone number:** 01924 265757

**Address:** RCM Business Centres, Dewsbury Road, Ossett, Wakefield, WF5 9ND

## Criterion 1: The calculated $CO_2$ emission rate for the building must not exceed the target

| | |
|---|---|
| $CO_2$ emission rate from the notional building, $kgCO_2/m^2.annum$ | 33.7 |
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 33.7 |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 20.4 |
| Are emissions from the building less than or equal to the target? | BER =< TER |
| Are as built details the same as used in the BER calculations? | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

**Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.**

**Building fabric**

| Element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | Surface where the maximum value occurs* |
|---|---|---|---|---|
| Wall** | 0.35 | 0.2 | 0.2 | External Wall |
| Floor | 0.25 | 0.2 | 0.2 | Ground Floor |
| Roof | 0.25 | 0.18 | 0.18 | Roof |
| Windows***, roof windows, and rooflights | 2.2 | 1.37 | 1.5 | Service Hatch |
| Personnel doors | 2.2 | 1.5 | 1.5 | Solid Door - Door |
| Vehicle access & similar large doors | 1.5 | 1.4 | 1.4 | Roller Shutter |
| High usage entrance doors | 3.5 | 1.5 | 1.5 | Main Entrance Door - Door |

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

* There might be more than one surface where the maximum U-value occurs.
** 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.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 10 | 4.46 |

## Building services

**The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.**

| | |
|---|---|
| **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- VRF with Mech. Vent - Sales Floor (Sales Floor - RetWareSales 1)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 0.91 | 7 | - | 1.21 | - |
| **Standard value** | 0.91* | 2.6 | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |
| * Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

2- VRF With Mech. Vent (Canteen - EatDrink 1)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 0.91 | 7.3 | - | 1.5 | 0.75 |
| **Standard value** | 0.91* | 2.6 | N/A | N/A | 0.5 |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |
| * Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

3- VRF With Mech. Vent (3 Zones)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 0.91 | 7.85 | - | 1.5 | 0.75 |
| **Standard value** | 0.91* | 2.6 | N/A | N/A | 0.5 |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |
| * Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

4- Extract Only - Grease Filter (Market Kitchen - FoodPrep 1)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 0 | - | - | - | - |
| **Standard value** | N/A | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

5- Bake-Off Mech. Vent. (Bake Off - FoodPrep 3)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 1 | - | - | 1.71 | - |
| **Standard value** | N/A | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

6- Natural Ventilation

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 1 | - | - | - | - |
| **Standard value** | 0.86 | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

7- Mechanical Ventilation (4 Zones)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 1 | - | - | 0.75 | 0.75 |
| **Standard value** | N/A | N/A | N/A | N/A | 0.5 |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

8- Extract Only (Staff Change - Store 2)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 1 | - | - | 0.3 | - |
| **Standard value** | N/A | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

1- ece380/1220

| | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|---|---|---|
| **This building** | 0.91 | 0 |
| **Standard value** | 0.9* | N/A |
| * Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73. | | |

**Local mechanical ventilation, exhaust, and terminal units**

| ID | System type in Non-domestic Building Services Compliance Guide |
|---|---|
| A | Local supply or extract ventilation units serving a single area |
| 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 supply and extract ventilation units serving a single room or zone with heating and heat recovery |
| E | Local supply and extract ventilation system serving a single area with heating and heat recovery |
| F | Other local ventilation units |
| G | Fan-assisted terminal VAV unit |
| H | Fan coil units |
| I | Zonal extract system where the fan is remote from the zone with grease filter |

| 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 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | Zone | Standard |
| Admin Corridor - Circulation 2 | - | - | - | 0.8 | - | - | - | - | - | - | N/A |
| Market Kitchen - FoodPrep 1 | - | - | - | - | - | - | - | - | 0.8 | - | N/A |
| Canteen - EatDrink 1 | - | - | - | 1.5 | - | - | - | - | - | - | N/A |
| Training Room - Office 1 | - | - | - | 1.5 | - | - | - | - | - | - | N/A |
| General Office - Office 2 | - | - | - | 1.5 | - | - | - | - | - | - | N/A |
| WC 1 - Toilet 1 | - | - | - | 0.8 | - | - | - | - | - | - | N/A |
| WC 2 - Toilet 2 | - | - | - | 0.8 | - | - | - | - | - | - | N/A |
| Acc. WC - Toilet 4 | - | - | - | 0.8 | - | - | - | - | - | - | N/A |
| Office 2 - Office 3 | - | - | - | 1.5 | - | - | - | - | - | - | N/A |
| Staff Change - Store 2 | 0.3 | - | - | - | - | - | - | - | - | - | N/A |

**General lighting and display lighting**

| Zone name | Luminous efficacy [lm/W] | | | General lighting [W] |
|---|---|---|---|---|
| | Luminaire | Lamp | Display lamp | |
| Standard value | 60 | 60 | 22 | |
| Sales Floor - RetWareSales 1 | - | 128 | 117 | 5566 |

| General lighting and display lighting | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| **Zone name** | **Luminaire** | **Lamp** | **Display lamp** | **General lighting [W]** |
| **Standard value** | 60 | 60 | 22 | |
| Entrance Lobby - Circulation 1 | - | 138 | - | 48 |
| Admin Corridor - Circulation 2 | - | 132 | - | 30 |
| Market Kitchen - FoodPrep 1 | - | 122 | - | 417 |
| Bake Off - FoodPrep 3 | - | 105 | - | 406 |
| BOH Warehouse - Store 1 | 155 | - | - | 108 |
| Canteen - EatDrink 1 | - | 132 | 22 | 34 |
| Training Room - Office 1 | 124 | - | - | 77 |
| General Office - Office 2 | 124 | - | - | 51 |
| Plant Room - Plant 1 | 132 | - | - | 55 |
| WC 1 - Toilet 1 | - | 132 | - | 15 |
| WC 2 - Toilet 2 | - | 132 | - | 15 |
| Acc. WC - Toilet 4 | - | 132 | - | 16 |
| Office 2 - Office 3 | 124 | - | - | 46 |
| Plant deck - Plant 2 | 60 | - | - | 238 |
| Staff Change - Store 2 | 132 | - | - | 5 |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| Sales Floor - RetWareSales 1 | NO (-94%) | NO |
| Canteen - EatDrink 1 | N/A | N/A |
| Training Room - Office 1 | N/A | N/A |
| General Office - Office 2 | N/A | N/A |
| Office 2 - Office 3 | N/A | N/A |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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? | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

| | Actual | Notional |
|---|---|---|
| Area [$m^2$] | 1315 | 1315 |
| External area [$m^2$] | 3457 | 3457 |
| Weather | LON | LON |
| Infiltration [$m^3/hm^2$@ 50Pa] | 4 | 5 |
| Average conductance [W/K] | 781 | 881 |
| Average U-value [$W/m^2K$] | 0.23 | 0.25 |
| Alpha value* [%] | 4.27 | 4.27 |

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

## Building Use

| % Area | Building Type |
|---|---|
| **100** | **A1/A2 Retail/Financial and Professional services** |
| | A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways |
| | B1 Offices and Workshop businesses |
| | B2 to B7 General Industrial and Special Industrial Groups |
| | B8 Storage or Distribution |
| | C1 Hotels |
| | C2 Residential Institutions: Hospitals and Care Homes |
| | C2 Residential Institutions: Residential schools |
| | C2 Residential Institutions: Universities and colleges |
| | C2A Secure Residential Institutions |
| | Residential spaces |
| | D1 Non-residential Institutions: Community/Day Centre |
| | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
| | D1 Non-residential Institutions: Education |
| | D1 Non-residential Institutions: Primary Health Care Building |
| | D1 Non-residential Institutions: Crown and County Courts |
| | D2 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 | 20.15 | 6.95 |
| Cooling | 2.08 | 11.44 |
| Auxiliary | 6.74 | 4.51 |
| Lighting | 18.27 | 45.29 |
| Hot water | 3.74 | 3.74 |
| Equipment* | 35.23 | 35.23 |
| **TOTAL**** | **50.99** | **71.94** |

* 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 |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 125.1 | 177.66 |
| Primary energy* [$kWh/m^2$] | 119.23 | 195.88 |
| Total emissions [$kg/m^2$] | 20.4 | 33.7 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## 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] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 15.4 | 86.9 | 4.8 | 3.5 | 5.7 | 0.89 | 7 | 0.91 | 7 |
| | **Notional** | 11 | 247 | 3.7 | 19.1 | 4.4 | 0.82 | 3.6 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 42.6 | 54.5 | 13.3 | 2 | 8.1 | 0.89 | 7.7 | 0.91 | 7.7 |
| | **Notional** | 50.4 | 110.5 | 17.1 | 8.5 | 5 | 0.82 | 3.6 | ---- | ---- |
| **[ST] No Heating or Cooling** | | | | | | | | | | |
| | **Actual** | 0 | 0 | 0 | 0 | 50.5 | 0 | 0 | 0 | 0 |
| | **Notional** | 0 | 0 | 0 | 0 | 25.3 | 0 | 0 | ---- | ---- |
| **[ST] No Heating or Cooling** | | | | | | | | | | |
| | **Actual** | 3.9 | 0 | 1.1 | 0 | 15.2 | 1 | 0 | 1 | 0 |
| | **Notional** | 0.1 | 0 | 0 | 0 | 9.9 | 0.82 | 0 | ---- | ---- |
| **[ST] Other local room heater - unfanned, [HS] Unflued radiant heater, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 83.7 | 0 | 23.3 | 0 | 0 | 1 | 0 | 1 | 0 |
| | **Notional** | 77.3 | 0 | 26.2 | 0 | 0 | 0.82 | 0 | ---- | ---- |
| **[ST] Central heating using air distribution, [HS] Air heater, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 21 | 0 | 5.8 | 0 | 3.6 | 1 | 0 | 1 | 0 |
| | **Notional** | 22.7 | 0 | 7.7 | 0 | 7 | 0.82 | 0 | ---- | ---- |
| **[ST] No Heating or Cooling** | | | | | | | | | | |
| | **Actual** | 83.5 | 0 | 23.2 | 0 | 5.8 | 1 | 0 | 1 | 0 |
| | **Notional** | 88.5 | 0 | 30 | 0 | 7.7 | 0.82 | 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

# Key Features

**The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.**

**Building fabric**

| Element | $U_{i\text{-}Typ}$ | $U_{i\text{-}Min}$ | Surface where the minimum value occurs* |
|---|---|---|---|
| Wall | 0.23 | 0.2 | External Wall |
| Floor | 0.2 | 0.2 | Ground Floor |
| Roof | 0.15 | 0.18 | Roof |
| Windows, roof windows, and rooflights | 1.5 | 1.37 | Sales Floor Main Window - Glazing |
| Personnel doors | 1.5 | 1.5 | Solid Door - Door |
| Vehicle access & similar large doors | 1.5 | 1.4 | Roller Shutter |
| High usage entrance doors | 1.5 | 1.5 | Main Entrance Door - Door |

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

| Air Permeability | Typical value | This building |
|---|---|---|
| m³/(h.m²) at 50 Pa | 5 | 4.46 |

# GLA Carbon Emission Reporting Spreadsheet – Baseline

The applicant should complete all the light blue cells including information on the modelled units, the area per unit, the number of units, the baseline energy consumption figures, the TER and the TFEE.

SAP 2012 CO2 PERFORMANCE

SAP10 CO2 PERFORMANCE

## DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

DEMAND

| Unit identifier (e.g. plot number, dwelling type etc.) | Model total floor area ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - TER WORKSHEET | | | | | | | REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.) | | | | | | REGULATED CO2 EMISSIONS PER UNIT | | | | | | | Fabric Energy Efficiency (FEE) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated TER 2012 (kgCO2 / m2) | TER Worksheet TER 2012 (kgCO2 / m2) | Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | Lighting | Auxiliary | Cooling | Space Heating | Domestic Hot Water | Lighting | Auxiliary | Cooling | 2012 CO2 emissions (kgCO2 p.a.) | Space Heating | Domestic Hot Water | Lighting | Auxiliary | Cooling | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated TER SAP10 (kgCO2 / m2) | Target Fabric Energy Efficiency (TFEE) (kWh/m²) |
| | TER Worksheet (Row 4) | | | | TER Worksheet (Row 273) | TER Worksheet (Row 211) | | TER Worksheet (Row 219) | | TER Worksheet (Row 232) | TER Worksheet (Row 231) | N / A | | | | | | | | | | | | | | |
| Sum | 0 | 0 | 0 | #DIV/0! | - | 0 | N/A | 0 | N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | *0* | #DIV/0! | #DIV/0! |

## NON-DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Building Use | Area per unit ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION BY END USE (kWh/$m^2$ p.a.) TER - SOURCE: BRUKL OUTPUT | | | | | | | REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/$m^2$ p.a.) TER - SOURCE: BRUKL.INP or *SIM.CSV FILE | | | 2012 CO2 emissions (kgCO2 p.a.) | REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/$m^2$ p.a.) - TER BRUKL | | | REGULATED CO2 EMISSIONS | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated TER 2012 (kgCO2 / m2) | BRUKL TER 2012 (kgCO2 / m2) | Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | Lighting | Auxiliary | Cooling | Natural Gas | Grid Electricity | | | Natural Gas | Grid Electricity | | SAP10 CO2 emissions (kgCO2 p.a.) | BRUKL TER SAP10 (kgCO2 / m2) |
| | | | | | | | | | | | | | ########## | ########## | | | ########## | ########## | | | |
| Retail | *1315* | *1* | *1315* | 33.3 | 33.3 | *6.95* | *Natural Gas* | *3.74* | *Natural Gas* | *45.29* | *4.51* | *11.44* | 11 | 60 | | 43,787 | 11 | 60 | | 21,247 | 16.2 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sum | 1,315 | 1 | 1,315 | 33.3 | - | 9,139 | 9,139 | 0 | 0 | 0 | 0 | 0 | 11 | 60 | N/A | N/A | N/A | *43,787* | 11 | 60 | N/A | N/A | N/A | *21,247* | 16.2 |

## SITE-WIDE ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Use | Total Area ($m^2$) | | Calculated TER 2012 (kgCO2 / m2) | - | REGULATED ENERGY CONSUMPTION | | | | | | | | | | REGULATED CO2 EMISSIONS | | | REGULATED CO2 EMISSIONS PER UNIT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Space Heating (kWh p.a.) | N/A | Domestic Hot Water (kWh p.a.) | N/A | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) | | | | 2012 CO2 emissions (kgCO2 p.a.) | | | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated TER SAP10 (kgCO2 / m2) |
| Sum | 1,315 | | 33.3 | - | 9,139 | | 0 | | 0 | 0 | 0 | | | | *43,787* | | | *21,247* | 16.2 |

# GLA Carbon Emission Reporting Spreadsheet – *Be Lean*

The applicant should complete all the light blue cells including information on the 'be lean' energy consumption figures, the 'be lean' DER, the DFEE and the regulated energy demand of the 'be lean' scenario.

SAP 2012 $CO_2$ PERFORMANCE

SAP10 $CO_2$ PERFORMANCE

## DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

## DOMESTIC ENERGY DEMAND DATA

| Unit identifier (e.g. plot number, dwelling type etc.) | Model total floor area ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE LEAN' SAP DER WORKSHEET | | | | | | | REGULATED $CO_2$ EMISSIONS PER UNIT (kgCO2 p.a.) | | | | | | REGULATED $CO_2$ EMISSIONS PER UNIT | | | | | | | Fabric Energy Efficiency (FEE) | REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated DER 2012 (kgCO2 / m2) | DER Worksheet DER 2012 (kgCO2 / m2) | Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | Lighting | Auxiliary | Cooling | Space Heating | Domestic Hot Water | Lighting | Auxiliary | Cooling | 2012 CO2 emissions (kgCO2 p.a.) | Space Heating CO2 emissions (kgCO2 p.a.) | Domestic Hot Water CO2 emissions (kgCO2 p.a.) | Lighting CO2 emissions (kgCO2 p.a.) | Auxiliary CO2 emissions (kgCO2 p.a.) | Cooling CO2 emissions (kgCO2 p.a.) | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated DER SAP10 (kgCO2 / m2) | Dwelling Fabric Energy Efficiency (DFEE) (kWh/$m^2$) | Space Heating (kWh p.a.) | Domestic Hot Water (kWh p.a.) | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) |
| | | | | | DER Sheet (Row 384) | DER Sheet [(Row 307a) ÷ (Row 367a x 0.01)] | Select fuel type | DER Sheet [(Row 310a) ÷ (Row 367a x 0.01)] | Select fuel type | DER Sheet Row 332 | DER Sheet (Row 313 + 331) | DER Sheet Row 315 | | | | | | | | | | | | | | | | | | | |
| Sum | 0 | 0 | 0 | #DIV/0! | - | 0 | N/A | 0 | N/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* | 0 | 0 | 0 | 0 | 0 | *0* | #DIV/0! | #DIV/0! | 0 | 0 | 0 | 0 | 0 |

## NON-DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

## NON-DOMESTIC ENERGY DEMAND

| Building Use | Area per unit ($m^2$) | Number of units | Total area represented by model ($m^2$) | VALIDATION CHECK | | REGULATED ENERGY CONSUMPTION BY END USE (kWh/$m^2$ p.a.) 'BE LEAN' BER - SOURCE: BRUKL OUTPUT | | | | | | | LATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/$m^2$ p.a.) 'BE LEAN' BER - SOURCE: BRUKL.INP or *SIM.CS | | | | | | REGULATED $CO_2$ EMISSIONS PER UNIT | | | | | | | | REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Calculated BER 2012 (kgCO2 / m2) | BRUKL BER 2012 (kgCO2 / m2) | Space Heating (kWh/$m^2$ p.a.) | Fuel type Space Heating | Domestic Hot Water (kWh/$m^2$ p.a.) | Fuel type Domestic Hot Water | Lighting (kWh/$m^2$ p.a.) | Auxiliary (kWh/$m^2$ p.a.) | Cooling (kWh/$m^2$ p.a.) | Natural Gas | Grid Electricity | | | | 2012 CO2 emissions (kgCO2 p.a.) | Natural Gas | Grid Electricity | | | | SAP10 CO2 emissions (kgCO2 p.a.) | BRUKL BER SAP10 (kgCO2 / m2) | | Space Heating (kWh p.a.) | Domestic Hot Water (kWh p.a.) | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) |
| | | | | | | | | | | | | | ############ | ############ | | | | | ############ | ############ | | | | | | N/A | | | | | |
| Retail | *1315* | *1* | *1315* | **19.3** | **19.3** | *20.61* | *Natural Gas* | *3.74* | *Natural Gas* | *18.27* | *6.74* | *2.08* | **24** | **27** | | | | **25,405** | **24** | **27** | | | | **15,024** | **11.4** | | | | | | |
| Sum | 1,315 | 1 | 1,315 | 19.3 | - | 27,102 | N/A | 4,918 | N/A | 24,025 | 8,863 | 2,735 | 24 | 27 | N/A | N/A | N/A | *25,405* | 24 | 27 | | | | *15,024* | 11.4 | | 0 | 0 | 0 | 0 | 0 |

## SITE-WIDE ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Use | Total Area ($m^2$) | Calculated BER 2012 (kgCO2 / m2) | - | REGULATED ENERGY CONSUMPTION | | | | | | | | REGULATED $CO_2$ EMISSIONS | | | | REGULATED $CO_2$ EMISSIONS | | | REGULATED ENERGY DEMAND PER UNIT PER ANNUM (kWh p.a.) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Space Heating (kWh p.a.) | N/A | Domestic Hot Water (kWh p.a.) | N/A | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) | | | | 2012 CO2 emissions (kgCO2 p.a.) | | | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated BER SAP10 (kgCO2 / m2) | N/A | Space Heating (kWh p.a.) | Domestic Hot Water (kWh p.a.) | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) |
| Sum | 1,315 | 19.3 | - | 27,102 | | 4,918 | | 24,025 | 8,863 | 2,735 | | | | *25,405* | | | *15,024* | 11.4 | | 0 | 0 | 0 | 0 | 0 |

**BRUKL – *Be Green***

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

**Project name**

## Morrison's Camden Temp. Store

As built

**Date:** Mon Feb 08 10:05:19 2021

## Administrative information

### Building Details

**Address:** Morrison's, 93 Juniper Crescent, Camden Town, LONDON, NW1 8HQ

### Certification tool

**Calculation engine:** TAS

**Calculation engine version:** "v9.5.1"

**Interface to calculation engine:** TAS

**Interface to calculation engine version:** v9.5.1

**BRUKL compliance check version:** v5.6.b.0

### Certifier details

**Name:** Andrew Parry

**Telephone number:** 01924 265757

**Address:** RCM Business Centres, Dewsbury Road, Ossett, Wakefield, WF5 9ND

## Criterion 1: The calculated $CO_2$ emission rate for the building must not exceed the target

| | |
|---|---|
| $CO_2$ emission rate from the notional building, kg$CO_2$/m$^2$.annum | 33.6 |
| Target $CO_2$ emission rate (TER), kg$CO_2$/m$^2$.annum | 33.6 |
| Building $CO_2$ emission rate (BER), kg$CO_2$/m$^2$.annum | 18.5 |
| Are emissions from the building less than or equal to the target? | BER =< TER |
| Are as built details the same as used in the BER calculations? | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

**Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.**

**Building fabric**

| Element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | Surface where the maximum value occurs* |
|---|---|---|---|---|
| Wall** | 0.35 | 0.2 | 0.2 | External Wall |
| Floor | 0.25 | 0.2 | 0.2 | Ground Floor |
| Roof | 0.25 | 0.18 | 0.18 | Roof |
| Windows***, roof windows, and rooflights | 2.2 | 1.37 | 1.5 | Service Hatch |
| Personnel doors | 2.2 | 1.5 | 1.5 | Solid Door - Door |
| Vehicle access & similar large doors | 1.5 | 1.4 | 1.4 | Roller Shutter |
| High usage entrance doors | 3.5 | 1.5 | 1.5 | Main Entrance Door - Door |

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

* There might be more than one surface where the maximum U-value occurs.
** 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.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|---|---|---|
| m$^3$/(h.m$^2$) at 50 Pa | 10 | 4.46 |

## Building services

**The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.**

| | |
|---|---|
| **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- VRF with Mech. Vent - Sales Floor (Sales Floor - RetWareSales 1)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 4.4 | 7 | - | 1.21 | - |
| **Standard value** | 2.5* | 2.6 | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

2- VRF With Mech. Vent (Canteen - EatDrink 1)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 4.3 | 7.3 | - | 1.5 | 0.75 |
| **Standard value** | 2.5* | 2.6 | N/A | N/A | 0.5 |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

3- VRF With Mech. Vent (3 Zones)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 4.71 | 7.85 | - | 1.5 | 0.75 |
| **Standard value** | 2.5* | 2.6 | N/A | N/A | 0.5 |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards. | | | | | |

4- Extract Only - Grease Filter (Market Kitchen - FoodPrep 1)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 0 | - | - | - | - |
| **Standard value** | N/A | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

5- Bake-Off Mech. Vent. (Bake Off - FoodPrep 3)

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 1 | - | - | 1.71 | - |
| **Standard value** | N/A | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

6- Natural Ventilation

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 1 | - | - | - | - |
| **Standard value** | 0.86 | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

7- Mechanical Ventilation (4 Zones)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 1 | - | - | 0.75 | 0.75 |
| **Standard value** | N/A | N/A | N/A | N/A | 0.5 |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

8- Extract Only (Staff Change - Store 2)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 1 | - | - | 0.3 | - |
| **Standard value** | N/A | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |

1- ece380/1220

| | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|---|---|---|
| **This building** | 0.97 | 0 |
| **Standard value** | 0.9* | N/A |
| * Standard shown is for gas boilers >30 kW output. For boilers <=30 kW output, limiting efficiency is 0.73. | | |

**Local mechanical ventilation, exhaust, and terminal units**

| ID | System type in Non-domestic Building Services Compliance Guide |
|---|---|
| A | Local supply or extract ventilation units serving a single area |
| 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 supply and extract ventilation units serving a single room or zone with heating and heat recovery |
| E | Local supply and extract ventilation system serving a single area with heating and heat recovery |
| F | Other local ventilation units |
| G | Fan-assisted terminal VAV unit |
| H | Fan coil units |
| I | Zonal extract system where the fan is remote from the zone with grease filter |

| 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 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | Zone | Standard |
| Admin Corridor - Circulation 2 | - | - | - | 0.8 | - | - | - | - | - | - | N/A |
| Market Kitchen - FoodPrep 1 | - | - | - | - | - | - | - | - | 0.8 | - | N/A |
| Canteen - EatDrink 1 | - | - | - | 1.5 | - | - | - | - | - | - | N/A |
| Training Room - Office 1 | - | - | - | 1.5 | - | - | - | - | - | - | N/A |
| General Office - Office 2 | - | - | - | 1.5 | - | - | - | - | - | - | N/A |
| WC 1 - Toilet 1 | - | - | - | 0.8 | - | - | - | - | - | - | N/A |
| WC 2 - Toilet 2 | - | - | - | 0.8 | - | - | - | - | - | - | N/A |
| Acc. WC - Toilet 4 | - | - | - | 0.8 | - | - | - | - | - | - | N/A |
| Office 2 - Office 3 | - | - | - | 1.5 | - | - | - | - | - | - | N/A |
| Staff Change - Store 2 | 0.3 | - | - | - | - | - | - | - | - | - | N/A |

**General lighting and display lighting**

| Zone name | Luminous efficacy [lm/W] | | | General lighting [W] |
|---|---|---|---|---|
| | Luminaire | Lamp | Display lamp | |
| Standard value | 60 | 60 | 22 | |
| Sales Floor - RetWareSales 1 | - | 128 | 117 | 5566 |

| General lighting and display lighting | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| **Zone name** | **Luminaire** | **Lamp** | **Display lamp** | **General lighting [W]** |
| **Standard value** | 60 | 60 | 22 | |
| Entrance Lobby - Circulation 1 | - | 138 | - | 48 |
| Admin Corridor - Circulation 2 | - | 132 | - | 30 |
| Market Kitchen - FoodPrep 1 | - | 122 | - | 417 |
| Bake Off - FoodPrep 3 | - | 105 | - | 406 |
| BOH Warehouse - Store 1 | 155 | - | - | 108 |
| Canteen - EatDrink 1 | - | 132 | 22 | 34 |
| Training Room - Office 1 | 124 | - | - | 77 |
| General Office - Office 2 | 124 | - | - | 51 |
| Plant Room - Plant 1 | 132 | - | - | 55 |
| WC 1 - Toilet 1 | - | 132 | - | 15 |
| WC 2 - Toilet 2 | - | 132 | - | 15 |
| Acc. WC - Toilet 4 | - | 132 | - | 16 |
| Office 2 - Office 3 | 124 | - | - | 46 |
| Plant deck - Plant 2 | 60 | - | - | 238 |
| Staff Change - Store 2 | 132 | - | - | 5 |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| Sales Floor - RetWareSales 1 | NO (-94%) | NO |
| Canteen - EatDrink 1 | N/A | N/A |
| Training Room - Office 1 | N/A | N/A |
| General Office - Office 2 | N/A | N/A |
| Office 2 - Office 3 | N/A | N/A |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of 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? | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

| | Actual | Notional |
|---|---|---|
| Area [$m^2$] | 1315 | 1315 |
| External area [$m^2$] | 3457 | 3457 |
| Weather | LON | LON |
| Infiltration [$m^3/hm^2$@ 50Pa] | 4 | 5 |
| Average conductance [W/K] | 781 | 881 |
| Average U-value [$W/m^2K$] | 0.23 | 0.25 |
| Alpha value* [%] | 4.27 | 4.27 |

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

## Building Use

| % Area | Building Type |
|---|---|
| **100** | **A1/A2 Retail/Financial and Professional services** |
| | A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways |
| | B1 Offices and Workshop businesses |
| | B2 to B7 General Industrial and Special Industrial Groups |
| | B8 Storage or Distribution |
| | C1 Hotels |
| | C2 Residential Institutions: Hospitals and Care Homes |
| | C2 Residential Institutions: Residential schools |
| | C2 Residential Institutions: Universities and colleges |
| | C2A Secure Residential Institutions |
| | Residential spaces |
| | D1 Non-residential Institutions: Community/Day Centre |
| | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
| | D1 Non-residential Institutions: Education |
| | D1 Non-residential Institutions: Primary Health Care Building |
| | D1 Non-residential Institutions: Crown and County Courts |
| | D2 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 | 7.06 | 5.13 |
| Cooling | 2.08 | 11.44 |
| Auxiliary | 6.74 | 4.51 |
| Lighting | 18.27 | 45.29 |
| Hot water | 3.51 | 3.74 |
| Equipment* | 35.23 | 35.23 |
| **TOTAL**** | **37.66** | **70.12** |

* 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 |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 125.1 | 177.66 |
| Primary energy* [$kWh/m^2$] | 109.12 | 195.3 |
| Total emissions [$kg/m^2$] | 18.5 | 33.6 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## 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] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 15.4 | 86.9 | 1 | 3.5 | 5.7 | 4.4 | 7 | 4.4 | 7 |
| | **Notional** | 11 | 247 | 1.3 | 19.1 | 4.4 | 2.43 | 3.6 | ---- | ---- |
| **[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 42.6 | 54.5 | 2.6 | 2 | 8.1 | 4.6 | 7.7 | 4.6 | 7.7 |
| | **Notional** | 50.4 | 110.5 | 5.8 | 8.5 | 5 | 2.43 | 3.6 | ---- | ---- |
| **[ST] No Heating or Cooling** | | | | | | | | | | |
| | **Actual** | 0 | 0 | 0 | 0 | 50.5 | 0 | 0 | 0 | 0 |
| | **Notional** | 0 | 0 | 0 | 0 | 25.3 | 0 | 0 | ---- | ---- |
| **[ST] No Heating or Cooling** | | | | | | | | | | |
| | **Actual** | 3.9 | 0 | 1.1 | 0 | 15.2 | 1 | 0 | 1 | 0 |
| | **Notional** | 0.1 | 0 | 0 | 0 | 9.9 | 0.82 | 0 | ---- | ---- |
| **[ST] Other local room heater - unfanned, [HS] Unflued radiant heater, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 83.7 | 0 | 23.3 | 0 | 0 | 1 | 0 | 1 | 0 |
| | **Notional** | 77.3 | 0 | 26.2 | 0 | 0 | 0.82 | 0 | ---- | ---- |
| **[ST] Central heating using air distribution, [HS] Air heater, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 21 | 0 | 5.8 | 0 | 3.6 | 1 | 0 | 1 | 0 |
| | **Notional** | 22.7 | 0 | 7.7 | 0 | 7 | 0.82 | 0 | ---- | ---- |
| **[ST] No Heating or Cooling** | | | | | | | | | | |
| | **Actual** | 83.5 | 0 | 23.2 | 0 | 5.8 | 1 | 0 | 1 | 0 |
| | **Notional** | 88.5 | 0 | 30 | 0 | 7.7 | 0.82 | 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

# Key Features

**The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.**

**Building fabric**

| Element | $U_{i\text{-}Typ}$ | $U_{i\text{-}Min}$ | Surface where the minimum value occurs* |
|---|---|---|---|
| Wall | 0.23 | 0.2 | External Wall |
| Floor | 0.2 | 0.2 | Ground Floor |
| Roof | 0.15 | 0.18 | Roof |
| Windows, roof windows, and rooflights | 1.5 | 1.37 | Sales Floor Main Window - Glazing |
| Personnel doors | 1.5 | 1.5 | Solid Door - Door |
| Vehicle access & similar large doors | 1.5 | 1.4 | Roller Shutter |
| High usage entrance doors | 1.5 | 1.5 | Main Entrance Door - Door |

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

| Air Permeability | Typical value | This building |
|---|---|---|
| m³/(h.m²) at 50 Pa | 5 | 4.46 |

# GLA Carbon Emission Reporting Spreadsheet – *Be Green*

The applicant should complete all the light blue cells including information on the 'be green' energy consumption figures and the 'be green' DER.

SAP 2012 CO2 PERFORMANCE

SAP10 CO2 PERFORMANCE

## DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Unit identifier (e.g. plot number, dwelling type etc.) | Model total floor area (m²) | Number of units | Total area represented by model (m²) | VALIDATION CHECK: Calculated DER 2012 (kgCO2 / m2) | VALIDATION CHECK: DER Worksheet DER 2012 (kgCO2 / m2) | REGULATED ENERGY CONSUMPTION PER UNIT (kWh p.a.) - 'BE GREEN' SAP DER WORKSHEET: Space Heating (Heat Source 1) | Fuel type Space Heating | Domestic Hot Water (Heat Source 1) | Fuel type Domestic Hot Water | Space Heating (Heat source 2) if applicable | Fuel type Space Heating | Domestic Hot Water (Heat source 2) if applicable | Fuel type Domestic Hot Water | Space and Domestic Hot Water from CHP if applicable | Fuel type CHP if applicable | Total Electricity generated by CHP (-) if applicable | Electricity generated by renewable (-) if applicable | Lighting | Auxiliary | Cooling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | DER Sheet (Row 384) | DER Sheet [Row 307b ÷ (Row 367b x 0.01)] | Select fuel type | DER Sheet [Row 310b ÷ (Row 367b x 0.01)] | Select fuel type | DER Sheet [Row 307c ÷ (Row 367c x 0.01)] | Select fuel type | DER Sheet [Row 310c ÷ (Row 367c x 0.01)] | Select fuel type | DER Sheet [(Row 307a + 310a) ÷ (Row 362 x 0.01)] | Select fuel type | DER Sheet [(Row 307a + 310a) × (Row 361 ÷ 362)] | DER Sheet Row 380 | DER Sheet Row 332 | DER Sheet (Row 313 + 331) | DER Sheet Row 315 |
| Sum | 0 | 0 | 0 | #DIV/0! | - | 0 | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 | 0 | 0 | 0 | 0 |

| REGULATED CO2 EMISSIONS PER UNIT (kgCO2 p.a.): Space Heating | Domestic Hot Water | Space Heating and DHW from CHP if applicable | Electricity generated by CHP if applicable | Electricity generated by renewable if applicable | Lighting | Auxiliary | Cooling | 2012 CO2 emissions (kgCO2 p.a.) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* |

| REGULATED CO2 EMISSIONS PER UNIT: Space Heating | Domestic Hot Water | Space Heating and DHW from CHP if applicable | Electricity generated by CHP if applicable | Electricity generated by renewable if applicable | Lighting | Auxiliary | Cooling | SAP10 CO2 emissions (kgCO2 p.a.) | Calculated DER SAP10 (kgCO2 / m2) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | *0* | #DIV/0! |

## NON-DOMESTIC ENERGY CONSUMPTION AND $CO_2$ ANALYSIS

| Use | Area per unit (m²) | Number of units | Total area represented by model (m²) | VALIDATION CHECK: Calculated BER 2012 (kgCO2 / m2) | VALIDATION CHECK: BRUKL BER 2012 (kgCO2 / m2) | REGULATED ENERGY CONSUMPTION BY END USE (kWh/m² p.a.) 'BE GREEN' BER - SOURCE: BRUKL OUTPUT: Space Heating | Fuel type Space Heating | Domestic Hot Water | Fuel type Domestic Hot Water | | | | | | | Electricity generated by CHP (-) if applicable | Electricity generated by renewable technology (-) if applicable | Lighting | Auxiliary | Cooling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Retail | *1315* | *1* | *1315* | 18.5 | 18.5 | *7.06* | *Grid Electricity* | *3.51* | *Natural Gas* | N/A | N/A | N/A | N/A | N/A | N/A | *0* | | *18.27* | *6.74* | *2.08* |
| Sum | 1,315 | 1 | 1,315 | 18.5 | - | 9,284 | N/A | 4,616 | N/A | | | | | | | 0 | 0 | 24,025 | 8,863 | 2,735 |

| REGULATED ENERGY CONSUMPTION BY FUEL TYPE (kWh/m² p.a.) 'BE GREEN' BER - SOURCE: BRUKL.INP or *SIM.CSV FILE: Natural Gas | Grid Electricity | Bespoke DH Factor | Electricity generated by CHP (-) if applicable | Electricity generated by renewable technology (-) if applicable | Enter Carbon Factor 1 | Enter Carbon Factor 2 | Enter Carbon Factor 3 | 2012 CO2 emissions (kgCO2 p.a.) |
|---|---|---|---|---|---|---|---|---|
| ############ | ############ | ############ | ############ | ############ | ############ | ############ | ############ | |
| 4 | 34 | | | *0* | | | | 24,304 |
| 4 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | *24,304* |

| REGULATED CO2 EMISSIONS PER UNIT: Natural Gas | Grid Electricity | Bespoke DH Factor | Electricity generated by CHP (-) if applicable | Electricity generated by renewable technology (-) if applicable | Enter Carbon Factor 1 | Enter Carbon Factor 2 | Enter Carbon Factor 3 | SAP10 CO2 emissions | BRUKL BER SAP10 (kgCO2 / m2) |
|---|---|---|---|---|---|---|---|---|---|
| ############ | ############ | ############ | ############ | ############ | ############ | ############ | ############ | | |
| 4 | 34 | | | | | | | 11,433 | 8.7 |
| 4 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | *11,433* | 8.7 |

## *SITE-WIDE ENERGY CONSUMPTION AND $CO_2$ ANALYSIS*

| Use | Total Area (m²) | Calculated BER 2012 (kgCO2 / m2) | - | REGULATED CO2 EMISSIONS: Space Heating (kWh p.a.) | N/A | Domestic Hot Water (kWh p.a.) | N/A | Space Heating (kWh p.a.) | N/A | Domestic Hot Water (kWh p.a.) | N/A | Space and Domestic Hot Water from CHP (kWh p.a.) | N/A | Electricity generated by CHP (kWh p.a.) if applicable | Electricity generated by renewable (kWh p.a.) if applicable | Lighting (kWh p.a.) | Auxiliary (kWh p.a.) | Cooling (kWh p.a.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sum | 1,315 | 0.0 | - | 9,284 | N/A | 4,616 | N/A | 0 | N/A | 0 | N/A | 0 | N/A | 0 | 0 | 24,025 | 8,863 | 2,735 |

| REGULATED CO2 EMISSIONS: Space Heating CO2 emissions | Domestic Hot Water CO2 emissions | Space Heating and DHW from CHP CO2 emissions if applicable | Electricity generated by CHP CO2 savings if applicable | Electricity generated by renewable CO2 savings if applicable | Lighting CO2 emissions | Auxiliary CO2 emissions | Cooling CO2 emissions | 2012 CO2 emissions |
|---|---|---|---|---|---|---|---|---|
| 4 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | *24,304* |

| REGULATED CO2 EMISSIONS PER UNIT: Space Heating CO2 emissions | Domestic Hot Water CO2 emissions | Space Heating and DHW from CHP CO2 emissions if applicable | Electricity generated by CHP CO2 savings if applicable | Electricity generated by renewable CO2 savings if applicable | Lighting CO2 emissions | Auxiliary CO2 emissions | Cooling CO2 emissions | SAP10 CO2 emissions | Calculated BER SAP10 (kgCO2 / m2) |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 34 | 0 | 0 | 0 | 0 | 0 | 0 | *11,433* | 8.7 |

| Table 1: Regulated $CO_2$ Emissions using SAP 10 Carbon Factors from GLA Carbon Emission Reporting Spreadsheet | | | | | | |
|---|---|---|---|---|---|---|
| | TFA ($m^2$) | BER ($kg/CO_2/m^2$) | BER*TFA ($kg/CO_2$) | TER ($kg/CO_2/m^2$) | TER*TFA ($kg/CO_2$) | $CO_2$ Reduction (%) |
| Baseline | 1315 | N/A | N/A | 16.2 | 21303 | 0 |
| Be Lean | | 11.4 | 14991 | | | 30% |
| Be Green | | 8.7 | 11441 | | | 24% |
| **Overall $CO_2$ Reduction** | | | | | | **46.3%** |

| Table 2: Regulated $CO_2$ Emissions in tonnes | | | |
|---|---|---|---|
| | | | |
| | $TCO_2$ | $TCO_2$ Reduction | $CO_2$ Reduction (%) |
| Baseline | 21.3 | N/A | N/A |
| Be Lean | 15.0 | 6.3 | 29.6% |
| Be Green | 11.4 | 3.6 | 23.7% |
| **Total** | | **9.9** | **46.3%** |

# APPENDIX C: AS BUILT STAGE BRUKLS AND GLA CARBON EMISSION REPORTING SPREADSHEET – FIT-OUT SBEM ASSESSMENT