

## Project name

Littlehampton PIX

As designed

Date: Tue Apr 21 23:28:21 2015

## Administrative information

## Building Details

**Address:** Roundstone Lane, East Preston,  
LITTLEHAMPTON, BN16 1EB

## Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v5.2.d.2

**Interface to calculation engine:** Virtual Environment

**Interface to calculation engine version:** v7.0.2

**BRUKL compliance check version:** v5.2.d.2

## Owner Details

**Name:** Whitbread Plc

**Telephone number:** [REDACTED]

**Address:** Whitbread Court, Houghton Hall Business Park,  
Porz Avenue, DUNSTABLE, LU5 5XE

## Certifier details

**Name:** Andrew John Kay

**Telephone number:** [REDACTED]

**Address:** Eventus Centre, Sunderland Road, Northfields  
Industrial Estate, Market Deeping,  
PETERBOROUGH, PE6 8FD

Criterion 1: The calculated CO<sub>2</sub> emission rate for the building should not exceed the target

|                                                                                                    |                     |
|----------------------------------------------------------------------------------------------------|---------------------|
| CO <sub>2</sub> emission rate from the notional building, kgCO <sub>2</sub> /m <sup>2</sup> .annum | 68.5                |
| Target CO <sub>2</sub> emission rate (TER), kgCO <sub>2</sub> /m <sup>2</sup> .annum               | 68.5                |
| Building CO <sub>2</sub> emission rate (BER), kgCO <sub>2</sub> /m <sup>2</sup> .annum             | 59.5                |
| 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 the building services should achieve reasonable overall standards of energy efficiency

Values not achieving standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

## Building fabric

| Element                                  | U <sub>a</sub> -Limit | U <sub>a</sub> -Calc | U <sub>i</sub> -Calc | Surface where the maximum value occurs* |
|------------------------------------------|-----------------------|----------------------|----------------------|-----------------------------------------|
| Wall**                                   | 0.35                  | 0.15                 | 0.15                 | BD000014_W0_-1                          |
| Floor                                    | 0.25                  | 0.15                 | 0.15                 | NS000011_F_-1                           |
| Roof                                     | 0.25                  | 0.1                  | 0.1                  | NS000000_C_-1                           |
| Windows***, roof windows, and rooflights | 2.2                   | 0.9                  | 0.9                  | BD000014_W0-W0                          |
| Personnel doors                          | 2.2                   | 2.19                 | 2.19                 | GF000007_W1-W0                          |
| Vehicle access & similar large doors     | 1.5                   | -                    | -                    | "No external vehicle access doors"      |
| High usage entrance doors                | 3.5                   | -                    | -                    | "No external high usage entrance doors" |

U<sub>a</sub>-Limit = Limiting area-weighted average U-values [W/(m<sup>2</sup>K)]

U<sub>a</sub>-Calc = Calculated area-weighted average U-values [W/(m<sup>2</sup>K)]

U<sub>i</sub>-Calc = Calculated maximum individual element U-values [W/(m<sup>2</sup>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 <sup>3</sup> /(h.m <sup>2</sup> ) at 50 Pa | 10                        | 5             |

## 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.

|                                                                                                         |             |
|---------------------------------------------------------------------------------------------------------|-------------|
| <b>Whole building lighting automatic monitoring &amp; targeting with alarms for out-of-range values</b> | NO          |
| <b>Whole building electric power factor achieved by power factor correction</b>                         | 0.9 to 0.95 |

### 1- VRF

|                                                                                                                                                                   | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>                                                                                                                                                | 5.43               | 4.4                | -                  | -             | -             |
| <b>Standard value</b>                                                                                                                                             | 2.5*               | 2.6                | N/A                | N/A           | N/A           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b>                                                              |                    |                    |                    |               | 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- Stairwell

|                                                                                                      | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|---------------|---------------|
| <b>This system</b>                                                                                   | 1                  | -                  | -                  | -             | -             |
| <b>Standard value</b>                                                                                | N/A                | N/A                | N/A                | N/A           | N/A           |
| <b>Automatic monitoring &amp; targeting with alarms for out-of-range values for this HVAC system</b> |                    |                    |                    |               | NO            |

### 1- SYST0001-DHW

|                                                                                                             | Water heating efficiency | Storage loss factor [kWh/litre per day] |
|-------------------------------------------------------------------------------------------------------------|--------------------------|-----------------------------------------|
| <b>This building</b>                                                                                        | 0.98                     | 0.015                                   |
| <b>Standard value</b>                                                                                       | 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 |      |               |     |
| En-Suite Bathroom | 0.9           | -   | -   | -   | -   | -   | -   | -   | - | -    | -             | N/A |
| Bedroom           | -             | -   | -   | 0.9 | -   | -   | -   | -   | - | 0.85 | 0.5           |     |
| En-Suite Bathroom | 0.9           | -   | -   | -   | -   | -   | -   | -   | - | -    | -             | N/A |
| Bedroom           | -             | -   | -   | 0.9 | -   | -   | -   | -   | - | 0.85 | 0.5           |     |
| En-Suite Bathroom | 0.9           | -   | -   | -   | -   | -   | -   | -   | - | -    | -             | N/A |
| Bedroom           | -             | -   | -   | 0.9 | -   | -   | -   | -   | - | 0.85 | 0.5           |     |
| En-Suite Bathroom | 0.9           | -   | -   | -   | -   | -   | -   | -   | - | -    | -             | N/A |
| Bedroom           | -             | -   | -   | 0.9 | -   | -   | -   | -   | - | 0.85 | 0.5           |     |





| General lighting and display lighting |                | Luminous efficacy [lm/W] |      |              | General lighting [W] |
|---------------------------------------|----------------|--------------------------|------|--------------|----------------------|
| Zone name                             |                | Luminaire                | Lamp | Display lamp |                      |
|                                       | Standard value | 60                       | 60   | 22           |                      |
| Bedroom                               |                | -                        | 211  | -            | 35                   |
| En-Suite Bathroom                     |                | -                        | 37   | -            | 52                   |
| Bedroom                               |                | -                        | 211  | -            | 35                   |
| GF Corridor 1                         |                | -                        | 127  | -            | 48                   |
| GF Corridor 2                         |                | -                        | 121  | -            | 54                   |
| GF Fire Escape                        |                | -                        | 93   | -            | 84                   |
| GF Linen Room                         |                | -                        | 100  | -            | 53                   |
| GF Rear Stairs                        |                | -                        | 55   | -            | 28                   |
| GF Plantroom                          |                | 21                       | -    | -            | 37                   |
| GF Store                              |                | 13                       | -    | -            | 16                   |
| FF Corridor 1                         |                | -                        | 127  | -            | 48                   |
| FF Fire Escape                        |                | -                        | 93   | -            | 84                   |
| FF Linen Room                         |                | -                        | 100  | -            | 53                   |
| FF Corridor 2                         |                | -                        | 111  | -            | 54                   |
| FF Store                              |                | -                        | 24   | -            | 16                   |
| FF Rear Stairs                        |                | -                        | 119  | -            | 28                   |

**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? |
|-------------------|--------------------------------|-----------------------|
| Bedroom           | NO (-82.9%)                    | NO                    |
| En-Suite Bathroom | N/A                            | N/A                   |
| Bedroom           | NO (-61%)                      | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-87.7%)                    | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-81.3%)                    | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-90.7%)                    | NO                    |
| Bedroom           | NO (-82.9%)                    | NO                    |
| En-Suite Bathroom | N/A                            | N/A                   |
| Bedroom           | NO (-61%)                      | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-87.7%)                    | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-81.3%)                    | NO                    |
| Bedroom           | NO (-74.8%)                    | NO                    |
| Bedroom           | NO (-90.7%)                    | NO                    |

#### **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**

|                                                                                               |    |
|-----------------------------------------------------------------------------------------------|----|
| <b>Were alternative energy systems considered and analysed as part of the design process?</b> | 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 <sup>2</sup> ]                                | 659    | 659      |
| External area [m <sup>2</sup> ]                       | 1187.1 | 1187.1   |
| Weather                                               | SOU    | SOU      |
| Infiltration [m <sup>3</sup> /hm <sup>2</sup> @ 50Pa] | 5      | 3        |
| Average conductance [W/K]                             | 211.98 | 558.07   |
| Average U-value [W/m <sup>2</sup> K]                  | 0.18   | 0.47     |
| Alpha value* [%]                                      | 30.75  | 17.02    |

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

## Building Use

| % Area | Building Type                                               |
|--------|-------------------------------------------------------------|
|        | 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                                  |
| 100    | <b>C1 Hotels</b>                                            |
|        | C2 Residential Inst.: Hospitals and Care Homes              |
|        | C2 Residential Inst.: Residential schools                   |
|        | C2 Residential Inst.: Universities and colleges             |
|        | C2A Secure Residential Inst.                                |
|        | Residential spaces                                          |
|        | D1 Non-residential Inst.: Community/Day Centre              |
|        | D1 Non-residential Inst.: Libraries, Museums, and Galleries |
|        | D1 Non-residential Inst.: Education                         |
|        | D1 Non-residential Inst.: Primary Health Care Building      |
|        | D1 Non-residential Inst.: 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<sup>2</sup>]

|                | Actual        | Notional   |
|----------------|---------------|------------|
| Heating        | 16.33         | 35.07      |
| Cooling        | 1.34          | 3.3        |
| Auxiliary      | 10.08         | 6.3        |
| Lighting       | 13.4          | 13.08      |
| Hot water      | 177.58        | 198.26     |
| Equipment*     | 17.28         | 17.28      |
| <b>TOTAL**</b> | <b>218.73</b> | <b>256</b> |

\* Energy used by equipment does not count towards the total for calculating emissions.

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

## Energy Production by Technology [kWh/m<sup>2</sup>]

|                       | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems  | 0      | 0        |
| Wind turbines         | 0      | 0        |
| CHP generators        | 0      | 0        |
| Solar thermal systems | 0      | 0        |

## Energy & CO<sub>2</sub> Emissions Summary

|                                               | Actual | Notional |
|-----------------------------------------------|--------|----------|
| Heating + cooling demand [MJ/m <sup>2</sup> ] | 149.51 | 304.4    |
| Primary energy* [kWh/m <sup>2</sup> ]         | 341.71 | 378.92   |
| Total emissions [kg/m <sup>2</sup> ]          | 59.5   | 68.5     |

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

## HVAC Systems Performance

| System Type                                                                                                           | Heat dem<br>MJ/m2 | Cool dem<br>MJ/m2 | Heat con<br>kWh/m2 | Cool con<br>kWh/m2 | Aux con<br>kWh/m2 | Heat<br>SSEFF | Cool<br>SSEER | Heat gen<br>SEFF | Cool gen<br>SEER |
|-----------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------|---------------|------------------|------------------|
| [ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity         |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual                                                                                                                | 79.5              | 32.7              | 4.4                | 1.8                | 12.7              | 5.06          | 4.98          | 5.43             | 7.02             |
| Notional                                                                                                              | 192.9             | 58.4              | 22                 | 4.5                | 8.4               | 2.43          | 3.6           | ----             | ----             |
| [ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity |                   |                   |                    |                    |                   |               |               |                  |                  |
| Actual                                                                                                                | 141.7             | 110.1             | 49.2               | 0                  | 0.3               | 0.8           | 0             | 1                | 0                |
| Notional                                                                                                              | 208.8             | 241.5             | 70.8               | 0                  | 0.4               | 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 BCO can give particular attention to items with specifications that are better than typically expected.

## Building fabric

| Element                                                                  | U <sub>i-Typ</sub> | U <sub>i-Min</sub> | Surface where the minimum value occurs*                            |
|--------------------------------------------------------------------------|--------------------|--------------------|--------------------------------------------------------------------|
| Wall                                                                     | 0.23               | 0.15               | BD000014_W0_-1                                                     |
| Floor                                                                    | 0.2                | 0.15               | NS000011_F_-1                                                      |
| Roof                                                                     | 0.15               | 0.1                | NS000000_C_-1                                                      |
| Windows, roof windows, and rooflights                                    | 1.5                | 0.9                | BD000014_W0-W0                                                     |
| Personnel doors                                                          | 1.5                | 2.19               | GF000007_W1-W0                                                     |
| Vehicle access & similar large doors                                     | 1.5                | -                  | "No external vehicle access doors"                                 |
| High usage entrance doors                                                | 1.5                | -                  | "No external high usage entrance doors"                            |
| U <sub>i-Typ</sub> = Typical individual element U-values [W/(m²K)]       |                    |                    | U <sub>i-Min</sub> = 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             | 5             |