Building User's Manual
Environmental and Technical Guide

Unit 1
Wellington Lane
Bristol
BS6 5PY

Prepared by Lawrence Duck
27th February 2017

LAWRENCE DUCK
ARCHITECTURE DESIGN

Centrespace, 6 Leonard Lane, Bristol, BS1 1EA

Contents

1.0 Introduction

This manual has been prepared as an overview of the environmental and technical systems in place at Wellington Lane. It will assist the user's of this building with daily operation of the systems help to maintain them in the future.

It will provide reference to further documentation, manuals and resources available for more detailed technical guidance.

2.0 Environmental Features

2.1 Insulation

The building has been designed with very high insulation levels to reduce the transfer of heat through conduction from the internal environment to the outside.

A range of different insulation products have been used in areas around the building fabric (marked on architect's final detailed drawings) which have particular qualities and characteristics for that location. User's should understand specific maintenance and after-care procedures for these products. If any significant alterations are made to the building in the future, appropriate insulation products should be used and installed to manufacturers instructions.

External Wall Insulation

The Outer face of all external walls are clad with Diffitherm Woodfibre Boards supplied by Natural Building Technologies (NBT) which carry the render finish visible from the exterior. These are 'breathable' boards which allow any trapped or ingressed moisture to evaporate to the outside of the building. User should conduct regular visual survey to identify any cracks which may appear in the render and repair with a lime based render according to NBTs instructions. Similar care should be taken with alterations such as repainting or any new external fixings.

In areas where the insulation may be exposed to high levels of moisture (for example ground level up to 300mm or around roof terrace) woodfibre has been replaced with extruded polystyrene (XPS) supplied by NBT.

Internal Wall Insulation

Some of the internal walls are also lined with NBT (Pavatex) wood fibre boards. These can be identified on the architect's detailed drawings and are located on the inner face of Party Walls which boarder both sides of the building and rise from ground to roof level. Any alterations, new fixings cleaning or repainting should be conducted in a simiar manner to above, as per NBTs instructions.

Consult NBT's Maintenance Sheets included in the appendix.
NBT Diffitherm System: Care and Maintenance
Fixing into and through Pavatex Diffutherm and Pavadentro Insulation Boards

Contact NBT via email – info@natural-building.co.uk or telephone, 01844 338 338

2.2 Thermal Bridges

The design of the building has been carefully detailed to ensure that there is a uninterrupted layer of insulation running outside of the structural envelope of the building, which is continuous at all key junctions of building elements eg. Floor and walls, roof and walls. This reduces energy loss in these areas and reduces the risk of condensation. any alterations to the building fabric in the future must ensure the continuity of this layer.

2.3 Airtightness

The building fabric has been deigned to reduce unplanned movement of air through the building's thermal envelope to help improve the energy performance and maintain comfort levels in the house. The building has proved to achieve and airtightness rating of **0.66 AC/hr @ 50 Pa.** This was certified on 6th December 2016.

To ensure that this level is maintained throughout the lifetime of the building, users should be aware of the need not to penetrate the airtightness layer when installing any fittings or fixtures to the internal fabric. Any structural alterations in the future should aim to avoid disrupting this layer where possible or remediate the layer to ensure a continuous seal.

The location of the airtightness layer within the build-up of building elements can be found marked on the detailed drawings (plans and sections) shown in the Appendix.

Internal Walls:

The airtightness layer for external walls is maintained by a layer of high performance plywood (SMART PLY) which provides an integrated vapour barrier over the entire surface. This layer is located behind the plasterboard approximately 50mm back from the internal finish.

Ceilings at First Floor

The airtight layer at roof level is provided by a membrane which is located on the outer face of the roof structure on the warm face of the insulation. This means that penetrations of the plasterboard will not damage this layer which is set back approx 250mm from the inner finish. At the junction with the walls this membrane is wrapped around at eaves level and taped on the inner face of the ply layer described above.
Care should be taken to ensure integrity of this membrane when conducting any future alterations to the roof such as additions of roof lights or external fixings at eaves level.

Repair of Airtight layer

Expanding foams will generally not provide an airtight seal and will not be appropriate for remediation measures. Users would be advised to remove enough of the plasterboard to provide adequate visual inspection and access to any damage of the airtightness layer. Then high performance airtightness tape should be applied as per manufacturers instructions.

3.0 Building Services

3.1 Heating and Hot Water

The building has been fitted with 2 trench radiators (Model: Jaga mini canal 150x26x19cm) recessed into the floor finish at first floor. These units will provide 587W of space heating each. Catalogue and technical manual for these radiators is located here
https://www.jaga.co.uk//assets/downloads/docs/Catalogue-Jaga.pdf

Potterton Promax 24 Floor Standing 150L Storage Boiler has been commissioned upon completion of the building. This is a floor standing integrated hot water storage and central heating 24kW boiler which is suitable for fully pumped, sealed systems. This boiler and storage cylinder is compatible with solar hot-water systems which may be installed in the future.

For operation and maintenance instructions please see the user manual.
http://www.potterton.co.uk/literature-library.htm

Thermostat

The building has been commissioned with a Nest Thermostat which is a wirelessly connected thermostat allowing temperature to be controlled remotely. The nest will monitor daily usage in the house and adapt the running of the boiler to work most efficiently and reduce unnecessary energy usage. The thermostat allows energy consumption to be recorded which will help with the monitoring and review of the building's performance.

Consult the user manual and technical guidance for daily operation of this device and for any future smart technology which can link to this product.
https://nest.com/support/thermostat/

3.2 Cooling

Results from the PPHP model show that the anticipated frequency of overheating (>25 degrees internal temperature) is %5. Whilst this is relatively small, the design intends to accommodate this with a strategy for natural cooling and ventilation. High level open-able roof-lights when opened together with French doors located in the downstairs lower courtyard will allow cool shaded air to be drawn up through the house and exhausted at high level. Two large sliding doors allow hot air to be quickly purged from the living space at first floor.

3.2 Mechanical Ventilation

MVHR *or Mechanical ventilation with heat recovery* system extracts air out of the bathrooms, WC's, Utility rooms & kitchens and supplies air into the living space such as living rooms, bedrooms and studies. The heat from the extract air is put into the supply air via a heat

exchanger, thus keeping the house warm.

-The model installed in your building is PAUL FOCUS (F) 200 supplied by Green Building Store. The Unit was commissioned by Green Building Store on 02/11/2016. For information about ducting routes see installation drawings supplied by Green Building Store

Daily Operation

The MVHR unit remains turned on 24/7 and will continue to operate in the background with minimal input from users necessary. The control panel for the unit allows for alteration to internal conditions. For example Boost mode can be used when cooking or fan speed can be increased when there are more people using the building. Refer to PAUL Original Operating Instructions on how to customise your system.

The operation of the MVHR unit does not stop you from opening windows. This will cause a reduction in efficiency during cold periods.

Maintenance

There are several filters which need to be changed to keep the air flowing properly. How frequently depends on where you live and how clean the air is. Normally filters need to be changed every 4-6 months. Changing the filters is not complicated but please refer to the installer manual. The system should be serviced by a qualified person every 5 years.

At least the following filter types should be provided for protection from pollutants:

Outdoor Air filter at least F7
Extract Air filter at least G4

If the device is not operated during the summer, the filter should be replaced before the next operation. The manufacturer is responsible for ensuring indoor air hygiene based on the latest findings, either by means of device components or by providing the obligatory equipment with the device.

Purge Ventilation

If you experience unusually high outdoor temperatures and your home is too hot, it is recommended that you 'summer purge'. (This is standard practice in hot climates).

1. Open windows during the night so that the cool air can enter and reduce indoor temperatures.
2. During the hot day close your windows to keep the warmth out.

4.0 Monitoring and Review

The principle designer will undertake a period of monitoring to evaluate the actual energy usage of the building against the predicted levels. This will help to review the design of the building and inform any alterations to be made in the future.

This analysis will be conducted during winter 2017-18 when the heating and insulation will be tested most and efficient usage of the thermostat has been established by the user. Exact internal temperatures and humidity will be recorded using wireless devises located in key areas of the house. This will be plotted against local weather conditions (temperature data gathered from online) and exact energy usage for the heating and hot water system recorded by the Nest thermostat.