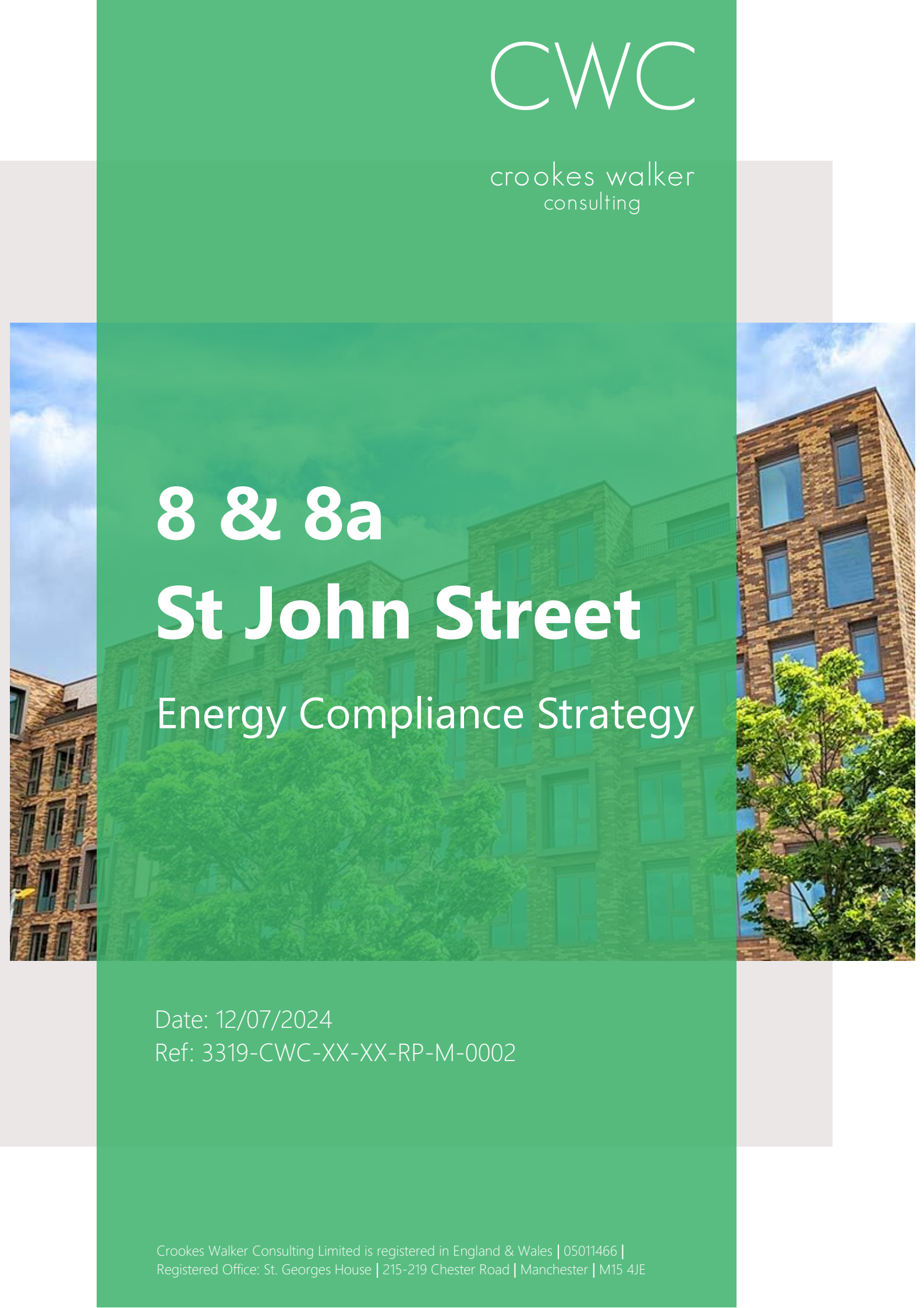




CWC

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consulting

8 & 8a St John Street

Energy Compliance Strategy

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Revision Record

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Contents

1.0	Introduction	4
1.1	Existing Site Location & Features	4
1.1.1	Manchester City Council Planning Objectives	5
2.0	Sustainable Design Approach	7
2.1	Energy Hierarchy	7
3.0	Energy Conservation ("Be Lean")	8
3.1	Sustainable Building Fabric Designs	8
3.2	Avoidance of Overheating	8
4.0	Energy Efficient Operation ("Be Clean")	10
4.1	Air To Water Heat Pump	11
4.2	Mechanical Ventilation with Heat Recovery	11
4.3	Intelligent Lighting	12
4.4	Low Flow Appliances	12
4.5	Metering Strategy	12
5.0	Implementation of Renewable and Low Carbon Technologies ("Be Green")	13
5.1	Air-to-Water Heat Pump Technology	13
5.2	Discounted Renewables and LZC Technologies	13

1.0 Introduction

The report has been produced in order to demonstrate the proposed methodology in relation to the Mechanical & Electrical service strategy to achieve compliance with the Manchester City Council Core Strategy Documents for 8 & 8a St John Street, Manchester.

The project team has collaborated and explored various potential design solutions and has agreed upon an approach that will result in a sustainable and low energy building, as far as is practically possible given site, authority requirements / limitations and financial restraints etc.

This report clarifies the project teams' approach to sustainable design and summarises many of the measures that have been incorporated within designs, or considered, to achieve a sustainable and low energy/carbon building.

The design solutions are subject to development change, however, the fundamental approach described within this document, will not change.

1.1 Existing Site Location & Features

The proposed development is a new two-storey dwelling to the rear of the site fronting onto Artillery Street and Longworth Street and a change of use to No.8/8a St John Street from office to two number residential dwellings along with a 3-storey extension to the rear of the listed property.

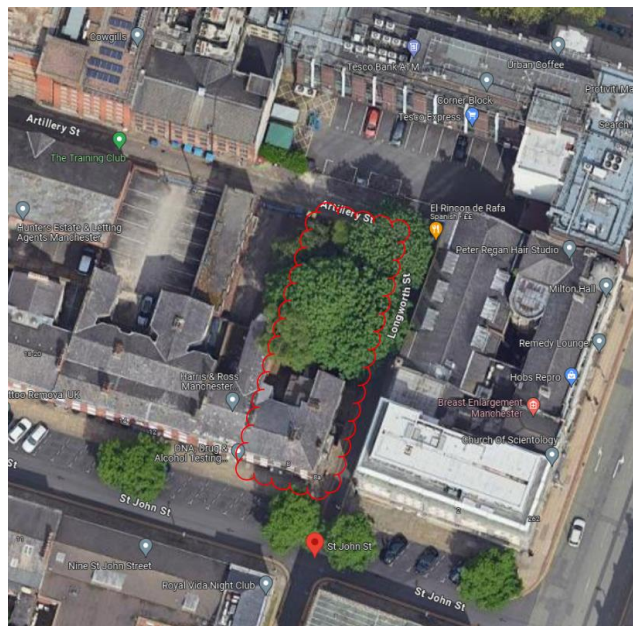


Figure 1 – Site Location in Manchester

1.1.1 Manchester City Council Planning Objectives

The design objectives for 8 & 8a St John Street are in harmony with the sustainability principles set out within Manchester City Council Core Strategy documents.

This report explains how the design principles in place and under development will meet the requirements of Manchester City Council for the new build element of the development.

Policy EN 4

Reducing CO2 Emissions by Enabling Low and Zero Carbon Development

The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO2 emissions, and rising fossil fuel prices, through the following actions:

- All development must follow the principle of the Energy Hierarchy, being designed:
 - to reduce the need for energy through design features that provide passive heating, natural lighting and cooling
 - to reduce the need for energy through energy efficient features such as improved insulation and glazing
 - to meet residual energy requirements through the use of low or zero carbon energy generating technologies
- Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.
- Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.
- Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.
- The use of building materials with low embodied carbon in new development and refurbishment schemes.

Core Strategy ENE 6 - Target Framework for CO₂ reductions from low or zero carbon energy supplies

Development must follow the principles of the **Energy Hierarchy**, being designed:

- to reduce the need for energy through design features;
- to reduce the need for energy through energy efficient features; and
- To meet residual energy requirements through the use of low or zero carbon energy generating technologies.

New residential development of 10 units or more, to achieve carbon emissions reduction standards **15% greater than Part L of the Building Regulations (2010)** depending on the type and location of the scheme, unless this can be shown not to be viable.

Non-domestic development over 1,000m² will be expected as a minimum to achieve **carbon emissions reduction standards between 10% and 15% greater than Part L of the Building Regulations (2010)** depending on the type and location of the scheme, unless this can be shown not to be viable.

- Commercial buildings with a high proportion of emissions from electricity use (>45 kg CO₂/m²) to achieve +10%increase on Part L 2010.
- Other buildings to achieve +15%increase on Part L 2010

The existing portion of the development at No.8 and No.8a would be assessed under Part L Volume 1 and therefore not be expected to demonstrate 20% renewable energy. The proposed strategy for the existing buildings would be gas fired boiler heating and hot water with Mechanical Ventilation Heat Recovery.

An alternative approach could be considered as comfort cooling will be a requirement for the existing refurbished properties therefore the strategy could be ASHP heating/hot water within the existing properties.

2.0 Sustainable Design Approach

The proposed building has been designed in a manner that is consistent with the ethos of Manchester City Council.

Whilst design solutions have been determined, there are ongoing design developments that seek to further optimise value for the scheme and further enhance sustainability credentials.

2.1 Energy Hierarchy

The progression of the project design solutions has adopted an approach in which the need for energy use is reduced in the first instance and then energy efficient measures are explored and then the use of low / zero carbon technologies are considered.

This approach is summarised within the below diagram and the following sections of this report, elaborate on each element of this hierarchical approach.

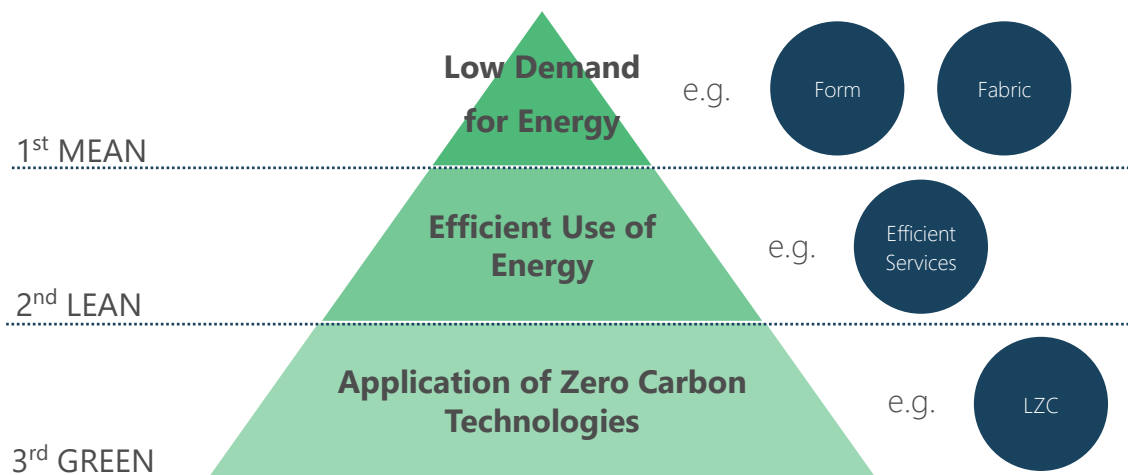


Figure 2 Energy Hierarchy Diagram

3.0 Energy Conservation ("Be Lean")

This section provides an overview of the current strategy for designing Zurich House in a manner that will reduce the energy demand of the building by passive design measures.

3.1 Sustainable Building Fabric Designs

The buildings "fabric" (e.g. façade, roof, glazing etc) will be designed in a manner that meets the minimum requirements which are defined within Approved Document Part L Volume 1.

	Minimum Fabric Values (For Building Regulation Part L Compliance 2021)	Proposed Fabric Values for the New Build
External Wall	0.26 W/m ² K	0.11 W/m ² K
Window/ Doors	1.60 W/m ² K No limiting g-value	1.30 W/m ² K 0.56 G Value
Roof	0.16 W/m ² K	0.12 W/m ² K
Ground/ Exposed Floor	0.18 W/m ² K	0.12 W/m ² K
Thermal Bridging	K1 Default	Improved Values
Air permeability	8.0 m ³ /hr/m ² @ 50 Pa	3.0 m ³ /hr/m ² @ 50 Pa

Note 1: Final values for the new build element are subject to ongoing design and construction development but as a minimum will be the minimum Building Regulation Requirements.

3.2 Avoidance of Overheating

A dynamic thermal model will be used to assess the risk of overheating as defined within Part 'O' of the Building Regulations. This assessment has taken place to ensure comfortable/sustainable design environments are in place.

The ventilation systems shall be designed with the input of an acoustic specialist.

4.0 Energy Efficient Operation ("Be Clean")

In-line with the UKGBC framework for net zero carbon buildings, the strategy for 8 & 8a St John Street has been reduce the energy demand of the building and design the building in such a way that will benefit from grid supplied electricity, which is continuously becoming "greener" (i.e. less CO₂ per kWh). This is demonstrated within figure 3 below.

The new build element of 8 & 8a St John Street looks to achieve the principles set out within the UKGBC framework by:

- Selecting space and water heating technologies which are electrically powered (i.e. no fossil fuels on site) such that the building can benefit from the ongoing trend of greener electricity supplied form the grid,
- Make use of energy efficient fabric and efficiency building services systems to significantly reduce the demand for energy on site (described within this report in further detail), and
- Provide on-site energy generation from renewables and / or use low carbon technologies (e.g. heat pumps) so far as is reasonably and economically practical.

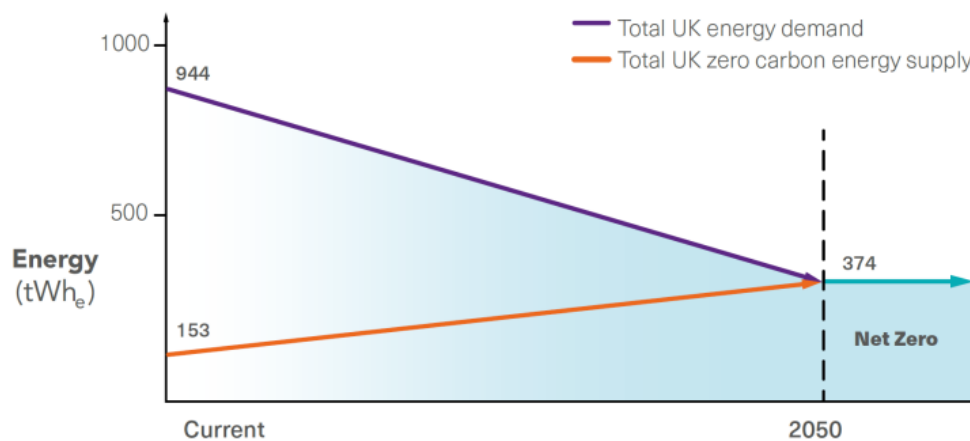


Figure 3 - In 2050, the UK's total energy demand will need to be supplied by low carbon energy ('Paris Proof' Targets)

An overview of the proposed sustainable and low energy design solutions is described on the following pages.

4.1 Air To Water Heat Pump

It is proposed that the new build element of the development to comply with planning requirements 20% of the energy demand (kwh) of the dwelling shall be from a renewable energy contribution, for this to be achieved, Air-to-water heat pumps is proposed to provide the domestic hot water generation and heating for the dwelling.

Air-to-water heat pumps transfer energy from the outside air into your house. The outdoor unit will exchange energy from the outdoor air and with the help of the refrigerant cycle, it releases the energy at a higher (or lower) temperature to generate space heating (or cooling) and hot water.

The space heating will be served by the air-to-water heat pumps which will deliver the required heat via an underfloor heating system.

4.2 Mechanical Ventilation with Heat Recovery

It is proposed that each dwelling is provided with a 'mechanical ventilation with heat recovery' (MVHR) unit. This has several benefits from a sustainability perspective as follows.

In the majority of domestic bathrooms and kitchens, a local dedicated fan is provided which exhausts warm air to the outside; this is essentially "dumping" useful room heat to outside and is thus wasted energy.

With the proposed MVHR unit, circa 85% of the heat extracted from bathrooms and kitchens will be captured (during colder months) and used to heat the incoming supply air. As such this is a very energy efficient solution relative to alternative solutions. This strategy is the same strategy for dwellings complying with the widely recognised Passivhaus standard.

The MVHR unit is also provided with an intelligent integral control system which enables the heat recovery device to be bypassed during the warmer months. The MVHR unit flow rates can be increased during the summer months to also provide “free cooling”.

The alternative ventilation solution presently under review, is the use of a combined air to water heat pump system that works in conjunction with the ventilation system.

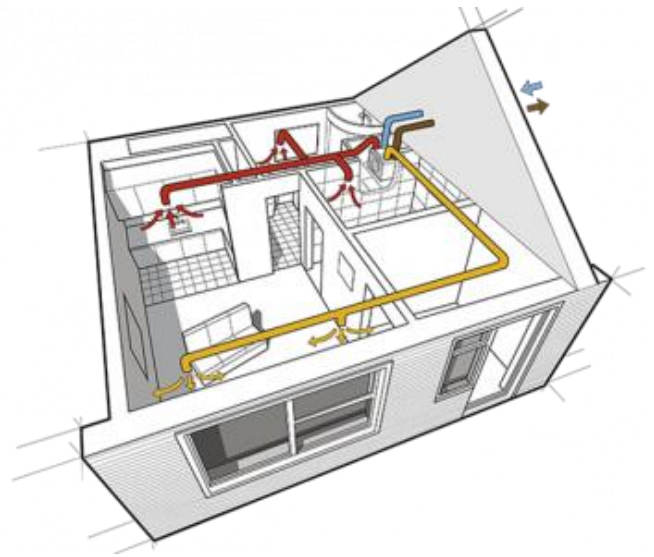


Figure 4 Example of MVHR System (Image Courtesy of Xpelair)

4.3 Intelligent Lighting

Low-energy LED luminaires is to be proposed throughout the dwelling.

4.4 Low Flow Appliances

It is proposed that sanitary appliances and white goods such as dishwashers and washing machines are selected to achieve low water flow rates without compromising on comfort or functionality.

4.5 Metering Strategy

CWC proposes all dwellings utility meters are located within the dwelling and in a location that is easily accessible to the tenants (e.g. within the utility store, on the wall). This will enable tenants to monitor their ongoing energy/water usage and consider how to better manage their consumption.

5.0 Implementation of Renewable and Low Carbon Technologies ("Be Green")

Once energy demand has been reduced to a minimum by implementing measures described within this report, additional renewables are proposed to offset the site energy consumption.

The below summarises potential solutions for use within the new build dwelling.

5.1 Air-to-Water Heat Pump Technology

The currently proposed solution for providing hot water and space heating to apartments is the use of air-to-water heat pumps.

Air-to-water heat pumps transfer energy from the outside air into your house. The outdoor unit will exchange energy from the outdoor air and with the help of the refrigerant cycle, it releases the energy at a higher (or lower) temperature to generate space heating (or cooling) and hot water.

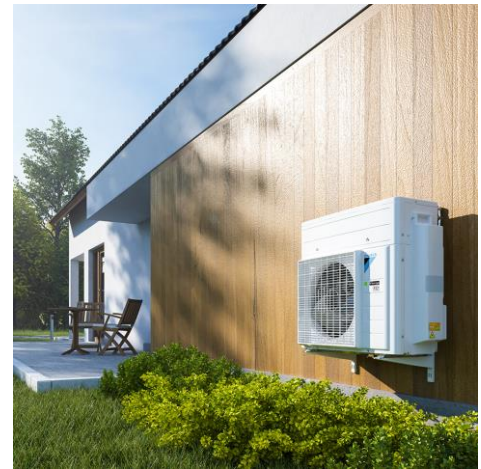


Figure 5 - Air to Water Heat Pump

5.2 Discounted Renewables and LZC Technologies

The following summarises other renewable and low carbon technologies which have been considered and discounted.

Low and Zero Carbon Technology Appraisal	
Ground Source Heat Pump (GSHP)	No external spaces available for boreholes / "slinky" pipework.
Solar Photovoltaics	Whilst this technology is a viable option the location of the equipment on the roof of the properties could cause planning issues particularly due to the sites location within a Conservation Area. As such, this technology would not be viable.

Low and Zero Carbon Technology Appraisal	
Solar Thermal	There is no centralised hot water storage proposed as hot water pipework would need to be either distributed over long distances which is inefficient due to significant heat loss from pipework. This also leads to significant upfront embodied carbon resulting from the additional construction material and is therefore not favoured for this development.
Combined Heat & Power (CHP)	There is no low temperature hot water heating system within the proposed design. If one were to be provided, there would not be an adequate constant base heating load to provide suitable payback for this technology.
Biomass	Site location, logistics and storage preclude this technology
Wind Turbines	The strobing effect and noise issues associated with this technology are not acceptable in this location
District Heat Network	No local District Heating Network is available.