



RIDGE

Energy Strategy Report
Ancoats Dispensary
Great Places Housing Group
7th May 2021

ENERGY STRATEGY, ANCOATS DISPENSARY



ANCOATS DISPENSARY GREAT PLACES HOUSING GROUP

7th May 2021

Prepared for

Great Places Housing Group
2A Derwent Avenue
Manchester
M21 7QP

Prepared by

Ridge and Partners LLP
5th Floor, Belvedere House
12 Booth Street
Manchester
M2 4AW
Tel: 0161 833 9579

Contact

Ben Pritchard
Assistant Building Services Engineer
bpritchard@ridge.co.uk
07813 697 333

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1. INTRODUCTION

Great Places Housing Group commissioned Ridge & Partners LLP to undertake an Energy Strategy Study and report to support the planning application for the redevelopment of the existing Ancoats Dispensary on Old Mill Street in Manchester. The proposal comprises the refurbishment of the existing building to provide a total of 39 apartments in a mixture of 1 bed and 2 bed configurations.

The purpose of the statement is to summarise the relevant policies both National and Local and demonstrate the ways Ridge & Partners have reviewed various options to promote policies set out in this report and subsequent design.

The report forms part of the Environment Statement co-ordinated by Ridge & Partners LLP with the Environmental Standards Statement and Sustainability Statement being prepared by Ridge & Partners LLP.

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2. DEVELOPMENT PROPOSALS

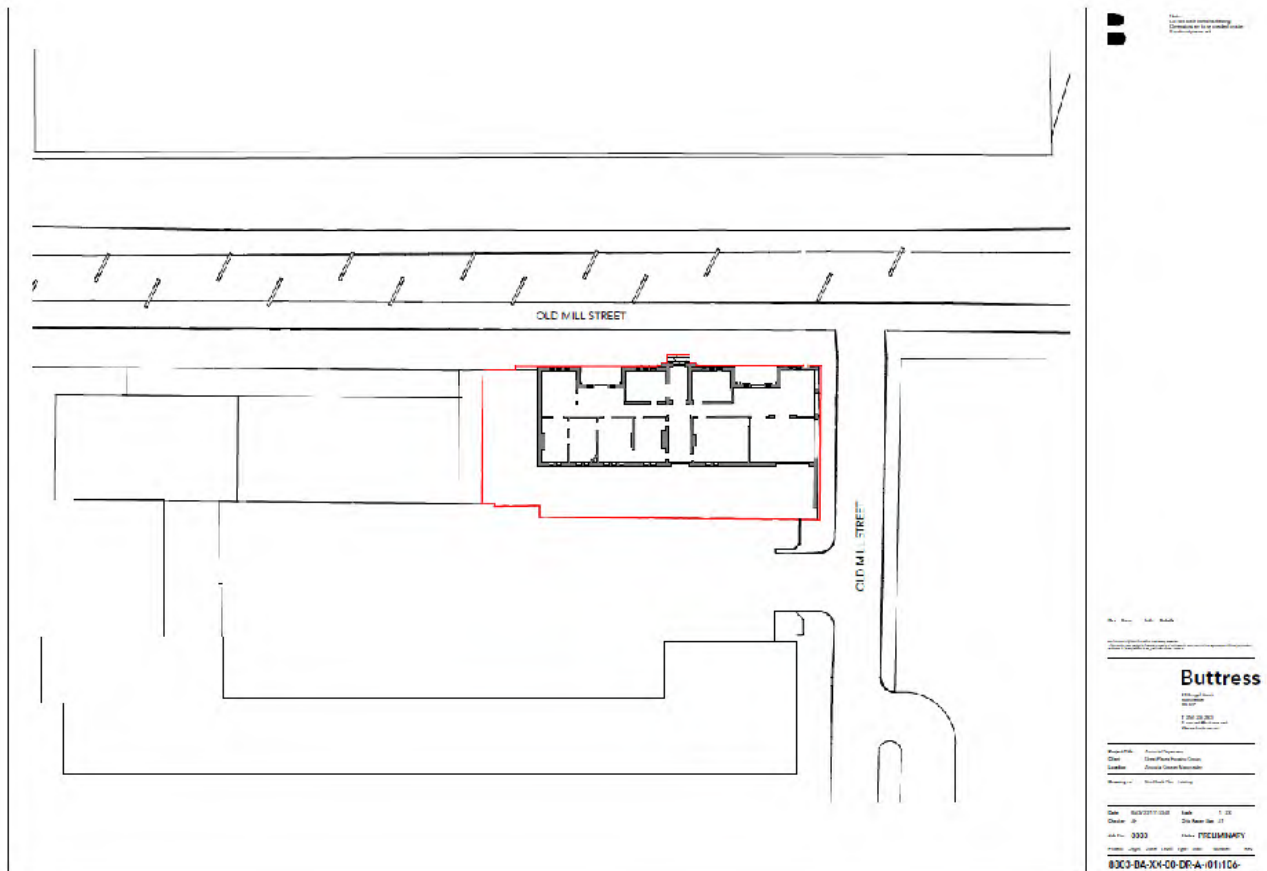
2.1. Description of Development Site

The site is located in Manchester at the junction of Old Mill Street and Lampwick Lane.



3D View of the site and the surrounding area

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The existing Ancoats Dispensary building is to be part retained and refurbished.

There is a residential development to the North West of the site, to the North East of the site is an office block and to the South West of the site is a residential development, currently under construction.

The site has all major services (gas, water, telecoms, and electricity) within the surrounding roads which do not present any risk in terms of requiring diverting or disconnections to develop the project.

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2.2. Development Proposals

The development is a *“Retention and refurbishment of the former dispensary building’s two principal facades, facilitated by: partial demolition works; extension of the building’s footprint southwards; and, extension to its height by 1.5 storeys, together with the removal of the entrance steps and lowering of the ground floor level, and the re-instatement of a central tower, to provide affordable housing units (Use Class C3), with creation of an external secure cycle store, bin store, boundary treatments and associated works”*

The development requires listed building consent for the *“Refurbishment, partial demolition and extension of the former dispensary building to increase the height by 1.5 storeys and extend the building footprint to the south, with the removal of the entrance steps and lowering of the ground floor level, and the re-instatement of a central tower with creation of external cycle store and bin store, boundary treatments and associated works”*.

In this Energy Strategy, the term ‘existing building elements’ relates to the refurbishment of the former dispensary building, and the term ‘new building elements’ relates to the rooftop extension, external cycle store and bin store.

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3. GOVERNMENT POLICY

3.1. Energy Hierarchy

In line with the draft definition of zero carbon an energy hierarchy has been created (see Figure 1 below). Under Policy EN4, developers will initially be expected to secure high levels of energy efficiency and low energy demand. This is followed by the incorporation of on-site measures where these exist, such as zero carbon energy technologies and directly connected heat (not necessarily on-site).



Figure 1. – Energy Hierarchy

However, in order to achieve the highest level of carbon reductions for the least cost, it is intended that developers will be able to contribute to or co-ordinate investment in near or off-site infrastructure. This could include, for example, the connection of existing buildings to district heating networks and investment in low or zero carbon technologies on buildings owned by the City or by public and community institutions. Further guidance on these 'allowable solutions', possibly in the form of a Supplementary Planning Document (SPD), will be given following further national guidance on this matter expected from the Government.

3.2. Decarbonisation of the Electricity Grid

The National Grid in the UK is decarbonising rapidly. This permits the electrification of heat and heralds the end to combustion of fossil fuels as the main source of heating. The attractive alternative to combustion is heat transfer using heat pumps linked to ground source energy.

The carbon factor of grid electricity was 495 grams of CO₂ for each kWh of electricity generated in 2014 according to Defra. This fell by 6.5% to 462 grams in 2015, and by a further 10.8% to 412 in 2016.

BEIS published its Energy and Emissions Projection (EEP) in January 2018 showing the projected Grid Carbon Factor falling dramatically from 212 grams in 2017 to just 66 grams in 2035. These projections, shown in the graph as a solid blue line, have fallen sharply from the BEIS predictions of a year ago, shown in a dotted blue line.

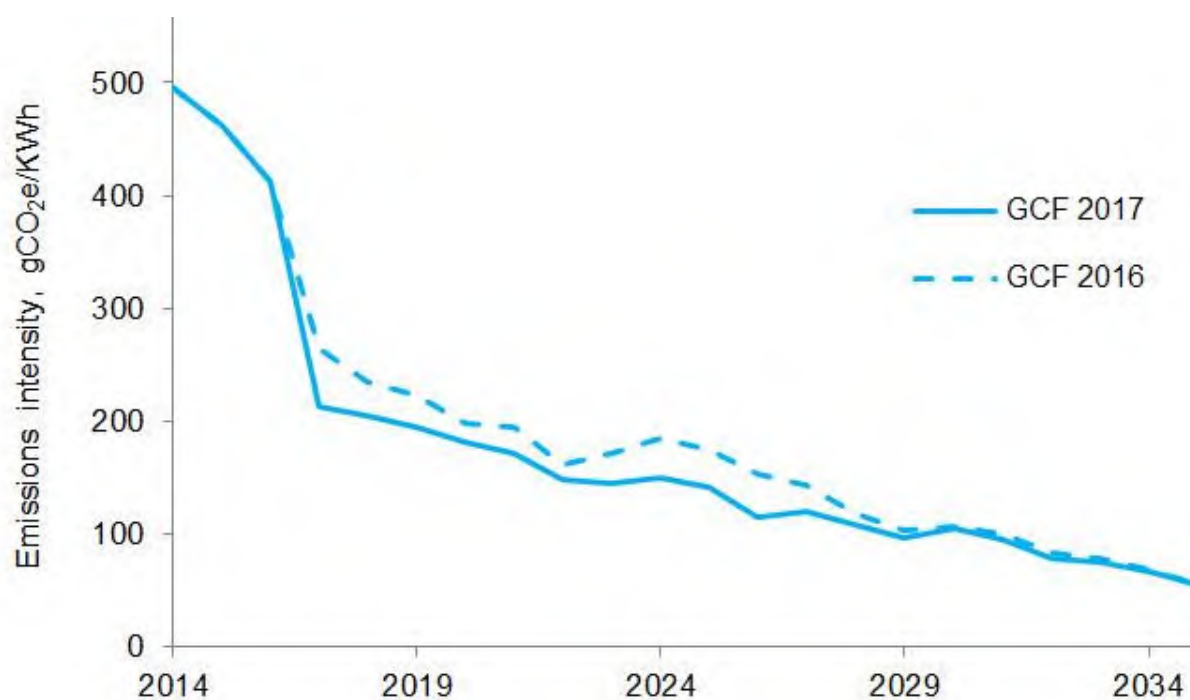


Figure 2. – Above indicates the predicted reduction in Carbon Emissions per kWhr up to 2034.

Furthermore, the UK Government has passed laws that require the country to reduce all greenhouse gas emissions to net zero by 2050 and have committed to the phasing out of natural gas as a source of heating with gas heating to be banned from 2025.

SAP 10 calculations have not been undertaken as the specification has not been formally agreed and is still under consultation.

4. POLICY REVIEW

4.1. The Greater Manchester Combined Authority (GMCA)

The GMCA declared a Climate Emergency in July 2019 and launched a plan in March 2020 following 12 months of collaboration and consultation with representatives from areas across the city region. The plan commits to action needed to achieve a reduction in direct CO₂ emissions by at least 50% between 2020-2025 and by 2038, to have zero carbon emissions.

4.2. Manchester Core Strategy

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 principal of the Energy Hierarchy, being designed:
 - To reduce the need for energy through design features that provide passive heating, natural light, 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 scheme and/or to incorporate provision to enable future connection to any existing/potential decentralised energy schemes
- The use of building material with low embodied carbon in new development and refurbishment schemes.

Policy EN 6

Target Framework for CO₂ reduction from low or zero carbon energy supplies

Application for residential development of 10 or more units and all other development over 1,000 sq. m will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO₂ emissions for all phases of the development.

Developments smaller than the above threshold, but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement.

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The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows:

- Target 1 Network development areas: locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling)
- Target 2 Electricity intense areas: location where predominant building type has an all-electric fit-out such as retail units and leisure complexes
- Target 3 Micro-generation areas: locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical

Domestic CO₂ emissions reduction targets

Table 12.1

Target	% Minimum Requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2: Electricity intense buildings	+15% increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

Where the CO₂ emissions reduction required under any future revision to Part L of the building regulations becomes greater than the '% Minimum requirement', the reduction required under building regulations would apply.

Where the Council identifies an 'allowable solution', for example within an energy proposals plan, that would produce higher carbon reductions at no extra cost than that of achieving the '% Minimum requirement' (or required under building regulations if greater) the higher percentage reduction will be required. The cost comparison is based on the cost of incorporating the 'allowable solution' at design stage.

The energy statement will be required to be submitted at the outset of any proposed development (outline application or before). Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation, subject to the energy statement incorporating evidence such as modelling to demonstrate compliance.

Policy EN8

Adaptation to Climate Change

All new developments will be expected to be adaptable to climate change in terms of the design, layout, sitting and function of both buildings and associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, although this is not an exhaustive list:

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rainwater permeability.
- Reduction in urban heat island effect through the use of Green Infrastructure such as green roofs, green walls, increased tree cover and waterways
- The need to control overheating of buildings through passive design

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- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation.

Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation under Policy EN6, subject to evidence to quantify their contribution to compliance.

4.3. Regulatory Framework

4.3.1. Building Regulations

Building Regulation, Part L – Conservation of fuel and Power sets the compliance standards for energy demand and carbon dioxide emissions from buildings.

Part L1A of the Government's 2010 building regulations applies to all domestic buildings in England. Specifically, with regards to energy and carbon compliance, all domestic buildings must meet the Building Regulations Part L 'Target Emission Rate' (TER) requirements for the Part L revision which is current at the time of initial construction works for each particular developmental phase. This includes the requirement for the dwellings to meet the new Target Fabric Energy Efficiency standards (TFEEs) as laid out in AD L1A.

Part L2A of the Government's 2010 building regulations applies to all new non-domestic buildings in England and Wales. These regulations refer to new commercial buildings including offices, restaurants, bars, storage spaces, industrial units, schools, and conference facilities.

The aim of Part L2A is to conserve fuel and power in all buildings, apart from dwellings where L1A / L1B applies instead. Typically, commercial buildings use more energy through lighting and auxiliary power than domestic properties, which is why greater emphasis is placed on reducing carbon emissions during the non-domestic building process.

Part L2A compliance involves bringing CO₂ emissions below a specific target based on the size and scope of your building. In the UK, being compliant in this area is a key factor in the design and building stages of any commercial building or outlet.

Part L2B of the Government's 2010 Building Regulations applies to all existing non-domestic buildings in England. These regulations refer to existing commercial buildings including offices, restaurants, bars, storage spaces, industrial units, schools, and conference facilities.

Part L2B features consequential improvements which apply *"to an existing building with a total useful floor area over 1000m² where the proposed building work consists of or includes:*

- a. *An extension*
- b. *The initial provision of any fixed building services*
- c. *An increase to the installed capacity of any fixed building services"*

Part L2B also provides a threshold U-value for which if elements are either at or are worse than the threshold U-value, they should be upgraded to the improved U-value.

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Table 5 Upgrading retained thermal elements		
Element ¹	U-value W/(m ² .K)	
	(a) Threshold	(b) Improved
Wall – cavity insulation	0.70	0.55 ²
Wall – external or internal insulation	0.70	0.30 ³
Floors ^{4,5}	0.70	0.25
Pitched roof – insulation at ceiling level	0.35	0.16
Pitched roof – insulation at rafter level ⁶	0.35	0.18
Flat roof or roof with integral insulation ⁷	0.35	0.18

Building Regulations Part L2A and L2B apply to all new and existing commercial buildings in England and Wales. These regulations outline the current target CO₂ emission rate (TER) for businesses.

CO₂ emissions are calculated using a number of factors, including:

- Building size
- Fabric energy efficiency
- Use of energy such as heating, cooling, ventilation, and lighting.

To be compliant with Part L2A, your target CO₂ emissions (based on 2010 regulations) should result in an aggregate 9% reduction in England, and a 20% reduction in Wales. A Target Primary Energy Consumption has also been introduced in Wales, setting a maximum kWh demand per m².

5. APPRAISAL OF SOLUTIONS

5.1. Summary

The strategic approach outlined follows a specific appraisal of technologies at each stage of the design and to achieve the overall goal of CO₂ reduction.

On the whole, it becomes more expensive to implement carbon reduction measures the further along the design process as the opportunities to reduce demand diminish.

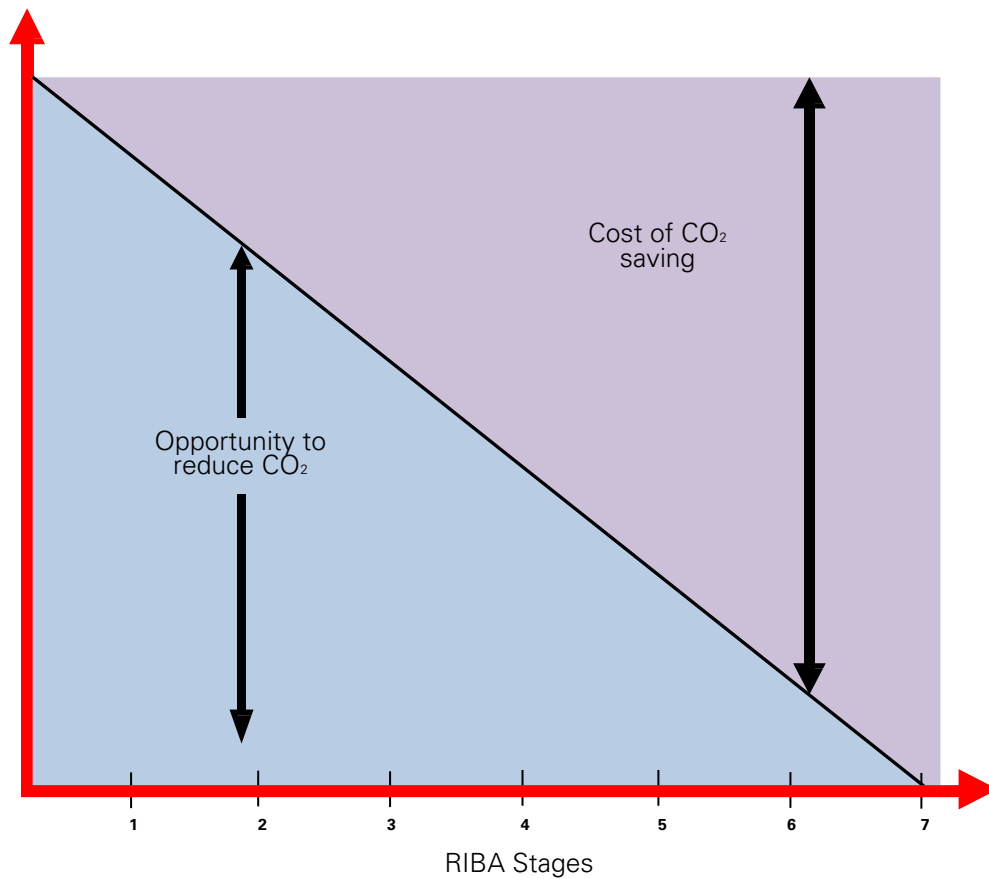


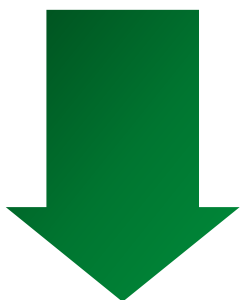
Figure 3. -

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5.2. Energy Hierarchy

Good design follows the following energy hierarchy, beginning with reducing the demand by optimising the passive measures followed by adopting 'efficient technologies' such as heat recovery to meet the demand efficiently with the final approach of applying 'renewable and low carbon' technologies accordingly.

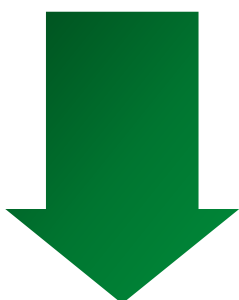
Reduce Demand



- Passive design
 - Thermal insulation
 - Natural ventilation
 - Natural daylight
 - Thermal mass
 - Air tightness
 - Solar shading / glass specification
- Low energy fit out



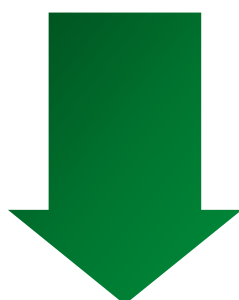
Meet demand efficiently



- Mechanical Ventilation with heat recovery
- Mixed mode ventilation
- Low energy lighting (LED)
- Power management
- Demand Operated Systems (PIR)
- Low Specific Fan Power



Supply energy from low and zero carbon technology



- Combined heat power/tri-generation
- Biomass/biofuels
- Solar thermal hot water
- Ground source heat pumps
 - Open Loop
 - Closed Loop
- Photovoltaics
- Fuel cells
- Air source heat pumps
- Wind
- Hydro



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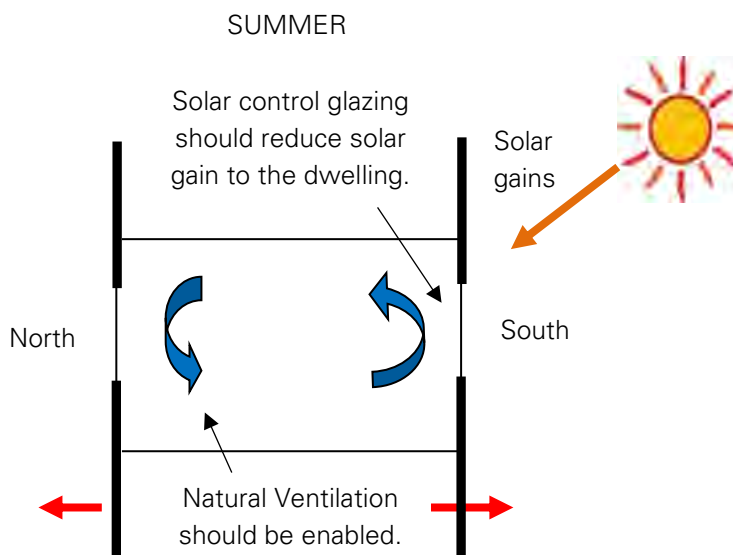
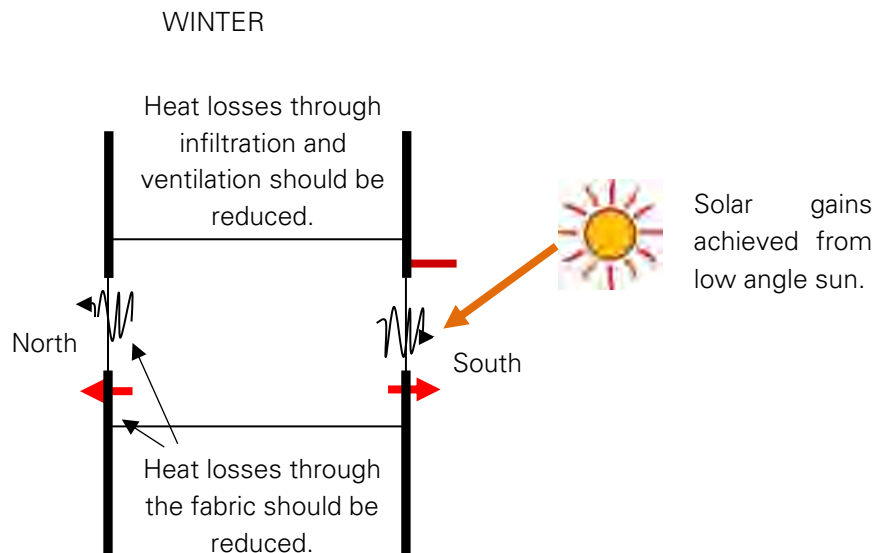
5.2.1. Reducing Demand (Passive Design)

Options have been reviewed for the use of passive technologies to reduce the carbon emissions from the building.

Reducing the initial demand is achieved by the adoption of passive measures which, if applied correctly, promote:

- Good natural daylight
- Avoid excessive heat losses
- Avoid overheating
- Good quality and controllable ventilation
- Acoustically sound environment

The aim of the passive design has been to reduce heating requirements, whilst ensuring that the units will be comfortable. The figures below illustrate the principles that have driven the design.



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Natural ventilation

Natural ventilation will be provided for purge ventilation to the space through the installation of occupant controlled openable windows. This will help reduce the risk of summer overheating through passive means.

Artificial cooling will be avoided by the use of passive measures such as:

- Natural ventilation purging
- Low energy fit out
- High performance glazing where required



Natural daylight

Good amount of natural daylight will reduce the lighting consumption. Where access to daylight is limited, the proportion of glazing may be increased.

Proportion of glazing

Typically, the percentage of glazing should represent approximately 40%-60% of the façade area. The level reduces the excess solar gains in summer (therefore reducing overheating risks) in addition to reducing winter heat losses (therefore reducing heating consumption)

Insulation

Heat losses and heat gains through the fabric should be limited by the optimisation of the building fabric. Reducing the buildings thermal transmittance by increasing the insulation will help to significantly reduce the heating demand and will result in lower heating energy consumption.



Air Tightness

The building is to be insulated in order to reduce air infiltration rates, leading to a greater heating efficiency in winter, as a result of the lower heat losses.

Although we cannot fundamentally affect the existing building elements, our main focus will be to significantly improve on the existing insulation levels.

The new building elements are designed and built to very high standards in order to reduce air infiltration rates through the incorporation of robust building detailing and high-quality construction techniques.

Low Energy Fit Out

A major contributing factor of the energy use of the building is what is deemed as 'unregulated loads' from electrical goods, such as:

- Fridges
- Freezers
- Dishwashers
- Washing Machines
- Toaster
- Cooker

It is intended that the highest efficiency rated goods will be installed to promote energy efficiency.

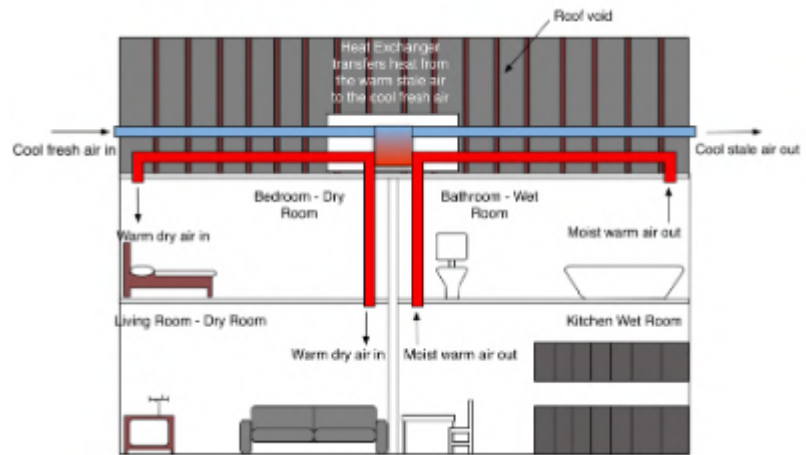
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5.2.2. Meeting Demand Efficiently

Mechanical Ventilation with Heat Recovery (MVHR)

Mechanical Ventilation with Heat Recovery will be installed in each apartment to provide ventilation to the occupants.

An MVHR system works by providing fresh filtered air into each apartment and recovers the heat from the exhaust/return air from the kitchen and bathrooms via a central heat exchanger to avoid having to reheat the fresh air again. This works both ways, so if the air temperature inside the apartment is cooler than the outside air, the cooler temperature is maintained.



Up to 85% of the heat from the extracted air is recovered to warm the incoming air. This greatly reduces heating cost compared to a natural ventilation system.

Low energy lighting (LED)

Where possible, natural light will be utilised and supplemented by artificial light when it fades.

Highly energy efficient LED lighting will be used throughout the development which are very efficient and will reduce energy use.

Demand Operated Systems

Where lighting is provided to a space that may not always be in use, occupancy sensors will be used. These will shut down the systems serving the spaces when they are not required, typically after a 20 minute period of inactivity, and turn them back on when instantly when they are required. This will utilise Passive Infrared sensors installed in the communal corridors

Low Specific Fan Power (SFP)

The Specific Fan Power (SFP) is a ratio of power consumed to the amount of air moved by a ventilation system. The lower the SFP, the less power is consumed by the fan.

5.2.3. Low to Zero Carbon Technologies

Options have been reviewed for the use of on-site Low or Zero Carbon Technology (LZT) in line with the Manchester City Council's policy aspirations.

This LZC energy statement/strategy reviews the technical and economic feasibility of the following technologies –

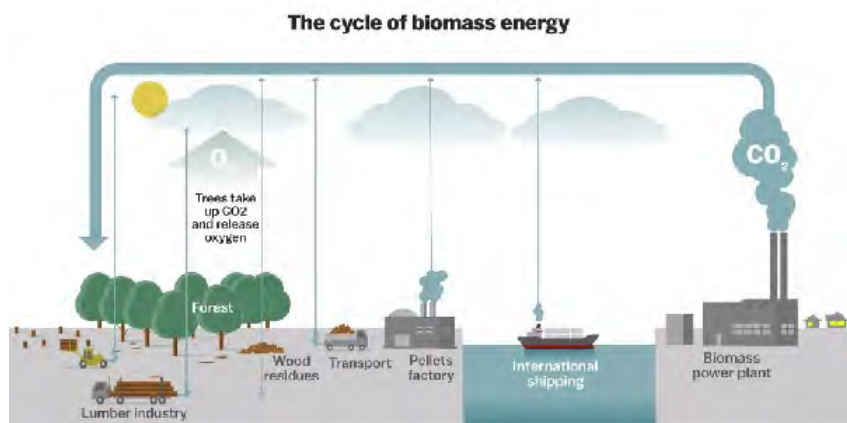
- Biomass
- Wind power
- Biogas/ Anaerobic Digestion
- Geothermal
- Ground Source Heat Pump
- Air Source Heat Pump
- Combined Heat & Power (CHP) [Natural gas and Biomass]
- Solar Hot Water
- Photovoltaic Panels

Biomass

Biomass is a generic name for any fuel produced from organic sources and falls into mainly two categories:

- Woody biomass- forest products, untreated wood products, energy crops and wood pellets
- Non-wood biomass – liquid biofuels (such as biodiesel, bioethanol) or animal waste, industrial municipal products, and high energy crops such as rape seed, sugar cane and maize.

For domestic properties, the fuel used is normally wood pellets, wood chips or wood logs. For larger applications, biomass boilers replace conventional fossil fuel boilers and come with an automated feed by screw drives from hoppers.



Biomass systems require more cleaning than gas or oil boilers and they must be capable of being taken out of service for cooling and cleaning whilst maintaining the building heating supply particularly in communal heating systems. Centralised gas boilers are therefore still required to support the biomass boiler, which would be the lead boiler. The size of the dedicated plant rooms is substantial. Fuel availability, delivery and storage are also important issues to consider.

Air quality issues are also an important factor when looking to install biomass, especially in the Manchester area.

The cost of the fuel depends on the type, delivery distances and whether it is obtained as simple waste product or from another organisation.

There is noise, transportation and delivery of fuel and air quality issues associated with biomass technology which could be problematic for a city centre development and for this reason biomass is discounted.

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Wind Power

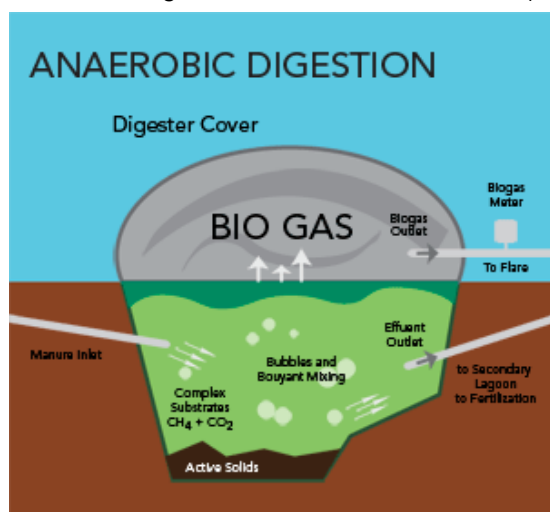
Wind power is one of the cleanest and safest methods of generating electricity. However, wind power is unfeasible due to the fact the development is in an urban area and local wind conditions would not be sufficient to provide enough power.

Furthermore, as this development is in an urban area with numerous tall buildings in close proximity, there will be obstacles which reduce wind speed. The average wind speed in this area is 2.4 m/s which is much less than the 6 m/s required. Therefore, wind is not a viable technology for this development.



Biogas / Anaerobic Digestion (AD)

Anaerobic Digestion (AD) is a collection of processes by which microorganisms break down biodegradable material in the absence of oxygen. The process is used for industrial or domestic purposes to manage waste and/or to produce fuels. Anaerobic digestion is widely used as a source of renewable energy. The process produces a biogas, consisting of methane, carbon dioxide and traces of other 'contaminant' gases. This biogas can be used directly as fuel, in combined heat and power gas engines or upgraded to natural gas-quality bio-methane. The nutrient-rich digestate also produced can be used as fertilizer.



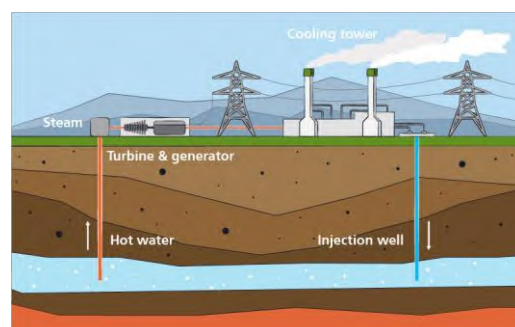
material, sewage, green waste or food waste. It is a renewable energy source and, in many cases, exerts a very small carbon footprint.

Biogas can be produced by anaerobic digestion with anaerobic bacteria, which digest material inside a closed system, or fermentation of biodegradable materials.

As the site is extremely efficient in terms of available space the anaerobic digestion solution is not deemed practical and discounted.

Geothermal

Geothermal energy is thermal energy generated and stored in the Earth. The geothermal energy of the Earth's crust originates from the original formation of the planet and from radioactive decay of materials. The geothermal gradient, which is the difference in temperature between the core of the planet and its surface, drives a continuous conduction of thermal energy in the form of heat from the core to the surface. Geothermal power is cost effective, reliable, sustainable, and environmentally friendly, but has historically been limited to areas near tectonic plate boundaries. Recent technological advances have dramatically expanded the range and size of viable resources, especially for applications such as home heating. As a result, geothermal power



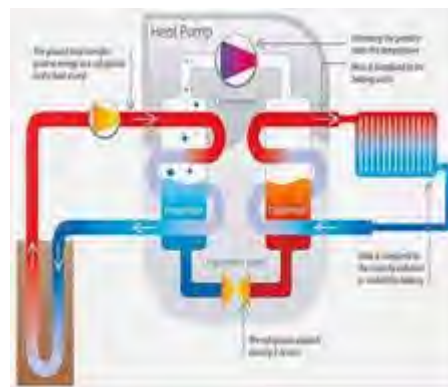
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has the potential to help mitigate global warming if widely deployed in place of fossil fuels. The geothermal energy can be used to heat homes directly or can be used to drive steam turbines to generate electricity.

Ground Source Heat Pump (GSHP)

GSHP's have been developed specifically for the housing market and are now considered to be an established reliable technology. The GSHP would be sized to cater for the heating and domestic hot water requirements. Typically, they are more suited to a centralised system with multiple bore holes to a depth of up to 150-250 metres depending on the ground conditions. GSHP's use a heat exchanger to extract heat from the earth.

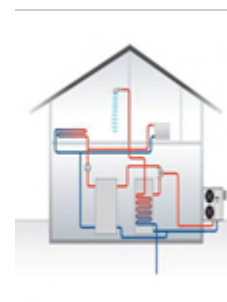
The efficiency of ground source heat pumps is measured by Co-efficient of Performance (CoP), this is the ratio of units of heat output for each unit of electricity used to drive the compressor and pump for the ground loop. Average CoP is around 3-5 although some systems may produce a greater rate of efficiency. This means that for every unit of electricity used to pump the heat, 3-5 units of heat are produced, making it an efficient way of heating a building. If grid electricity is used for the compressor and pump, then there is the opportunity to consider a range of energy suppliers to benefit from the lowest running costs, for example by choosing an economy 10 or economy 7 tariff.



Although they reduce CO₂ emissions, they rely directly on electricity for power and therefore are not fuel or energy efficient. The cost and practicalities to install GSHP's on this type of scheme is also prohibitive. GSHP are typically £20-30k per borehole. There is insufficient space at ground level to accommodate the number of boreholes to service the development, which makes this option unviable. GSHP's are not considered appropriate for this scheme.

Air Source Heat Pump (ASHP)

Air source heat pumps work in a similar way to GSHP. Air source heat pumps can be fitted, on the external façade or in the roof space. An air source heat pump uses small amounts of electricity to take in large quantities of air and extract heat. The efficiency of ASHP is measured by Coefficient of Performance (CoP); this is the ratio of units of heat output for each unit of electricity used to drive the system. Average CoP is around 2-4 although some systems may produce a greater rate of efficiency.



The ASHP system does offer an attractive solution in terms of the de-carbonisation of the grid and the omission of natural gas to the site. Air Source Heat Pumps have been discounted on this scheme as they require roof space in addition to lending themselves to a centralised system and not individual apartments.

Combined Heat & Power (CHP)

Combined heat and power (CHP) is a highly efficient process that captures and utilises the heat that is a by-product of the electricity generation process from an engine. By generating heat and power simultaneously (co-generation) CHP can reduce carbon emissions by up to 30% compared to the separate means of conventional generation via a boiler and power station. Typically, a CHP would use natural gas as the main fuel source, although other forms of fuel can also be considered.

ENERGY STRATEGY, ANCOATS DISPENSARY

The main components of a typical system are:

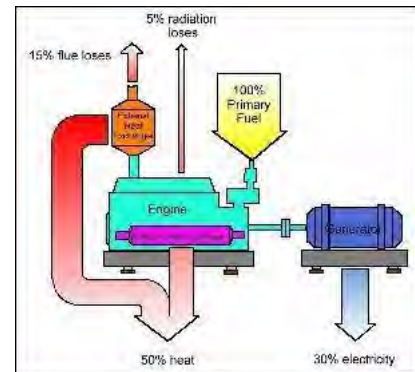
- the engine which drives the generator.
- the generator which produces electricity.
- the heat recovery system that recovers the waste heat from both the engine water cooling jacket and exhaust gases.
- the exhaust system to take away the products of combustion.
- the control panel to monitor the operation.

The heat generated during this process is supplied to an appropriately matched heat demand that would otherwise be met by a conventional boiler. CHP systems are highly efficient, making use of the heat which would otherwise be wasted when generating electrical or mechanical power. This allows heat requirements to be met that would otherwise require additional fuel to be burnt.

For many developments CHP is the measure that offers the most significant single opportunity to reduce energy costs and to improve environmental performance with existing users of CHP typically saving around 20% of their energy costs. Advantages of CHP include:

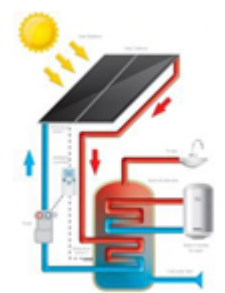
- CHP typically has an efficiency of 80-90%
- Operators typically saving around 20% on energy bills
- Significant carbon dioxide emission savings can be made
- Transmission and distribution losses are reduced
- Increases fuel supply security

However as the design intent and client brief is to have a strategy non reliant on fossil fuel and embrace the decarbonisation of the Electricity Grid, CHP is discounted.



Solar Thermal HW Panels

Solar panel heating uses the radiant energy from the sun to heat hot water, most commonly for domestic hot water needs. There are two types of collectors used for solar water heating – flat plate collectors and evacuated tubes collectors. The systems function successfully in all parts of the UK, as they can work in diffuse light conditions. The collector should be mounted on a 10-60 degrees pitch facing south, although other variations can be used, south is the most efficient.



The cost of installing the system is dependent on the distance between the solar collector and the hot water storage. The closer the collectors are to the hot water storage, the less pipe work is required. Annual maintenance checks are recommended. The solar collectors are connected to a condensing boiler via a HW cylinder with twin coil. A typical installation in the UK has a panel size of 3-5m² which is used in conjunction with a HW storage tank of 180-300litres, of which a minimum of 90-150 litres must be dedicated to solar hot water storage. For the reasons aforementioned this is not an appropriate option for this scheme.

They are a 'simple' and guaranteed technology which will act as a pre-heat for the Hot Water and Heating usage. Payback between capital cost and energy saving can normally be achieved within 12– 20 years, subject to usage and dwelling type. They work best on individual singular dwellings with a small HW cylinder. As the

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available roofspace for solar panels is limited and the use of photovoltaic panels is considered more effective in reducing carbon emissions, then solar thermal panels are discounted.

Photovoltaic Panels (PV)

Photovoltaic panels use cells to convert light into electricity. A PV cell normally consists of 1 or 2 layers of a semi conducting material such as silicon. When light shines on a cell it generates energy causing electricity to flow, the higher the light intensity is, the more electricity flows.

The amount of energy PV cells generate is referred to as Kilowatt Peak (KWp). PV arrays now come in a variety of shapes and colours, ranging from grey 'solar tiles' that look like roof tiles to panels and transparent cells that you can use on conservatories and glass to provide shading as well as generating electricity. Panels can be mounted flat or on A-frames to give the optimum angle. The optimum panel inclination for solar collection is 35° , oriented due south; however panels that are inclined between 35° and 45° and oriented south of west or east are also generally suitable. If solar collectors are oriented away from due south then a larger surface area will be required to generate a set amount of energy.



The use of photovoltaic panels is considered attractive as this system offers an effective method of offsetting carbon emissions.

Low / Zero Carbon Technologies (LZT) Discounted (Summary)

- Biomass has been discounted as it poses problems in terms of air quality, delivery of fuel, storage, and transportation for deliveries etc. It would require a larger plant space for storing fuel, which is not currently included and is not conducive to city centre developments.
- Wind turbines are not seen to work particularly well on this type of development as it is an urban development and due to problems with wind turbulence and mounting of the units. The wind speeds in the area are not conducive to wind power electricity generation and there would be issues with shading, noise, and air traffic.
- Biogas/ Anaerobic Digestion (AD). Emissions are likely to cause local air pollution and compliance with the Clean Air Act is problematic. Finding a secure supply of fuel can be difficult. The environmental impact of fuel transportation can be expensive. AD used to generate gas for heat or electricity requires pollution prevention and a control permit or waste management license. Digester, storage areas and delivery areas can cause problems via escape of odour and liquids. High installation costs make the technology unviable.
- Geothermal. Availability of suitable location poses serious problem in adopting a geothermal solution. Extensive research is required prior to investing to ensure the location is suitable and sites do not 'run out of power' over a period of time. It may release harmful gases from deep within the Earth. High installation and investigation costs make the technology unviable.
- Ground Source Heat Pump's (GSHP) are not viable for this site because of spatial constraints and financial costs. There is insufficient space on the site to install GSHP vertical bores.
- Air Source Heat Pump's (ASHP) are not viable for this scheme due to the required plant space at roof level and as the design approach is for each apartment to be 'standalone' and to not have any centralised plant.
- Biomass CHP. As with standard biomass, this technology's problems lie in air quality, delivery of fuel, storage, and transportation for deliveries etc. It would require a larger plant space for storing fuel, which is not currently included, and it is not conducive to city centre developments.
- Gas Fired CHP – Although a viable technology in terms of cost and carbon reductions the system is discounted on the basis of the move towards the decarbonisation of the Electrical Grid and the phasing out of Fossil fuels.
- Solar Thermal – Although a viable solution, the system is discounted in favour of the adoption of Photovoltaics at roof level which after a more reliable cost-effective method of carbon emissions reduction.

ENERGY STRATEGY, ANCOATS DISPENSARY

5.3. Summary of Technologies & Measures Considered & Adopted

Existing Building Element

Key:

Y – **Yes could be incorporated**

P – **Possible**

N – **Not appropriate**

REDUCE DEMAND	SUITABLE FOR CONSIDERATION	COMMENTARY
Natural ventilation	Y	Site mostly suitable to adopt natural ventilation for purge ventilation.
Good Natural daylight	Y	Essential to reduce the reliance on artificial lighting.
Thermal mass	Y	The existing building is a brick-built structure and so has high thermal mass.
Air tightness	Y	The existing listed building does not currently meet modern air tightness standards, but the fabric will be upgraded to improve the air tightness.
Solar shading/Low G Value Glass	P	Specific solar shading will be adopted, and low 'G' value glass adopted to reduce unwanted solar gain on specific elevations
Thermal Insulation That Exceeds Minimum Standards	Y	Essential to minimise heat losses however the building is listed, however, the insulation will be upgraded to meet Building Regulation U Values.
Low 'G Value' glass specification	Y	Important to limit summertime overheating. TM59 compliance and current targets G Value 0.4 - 0.5 on appropriate elevations
'A' Rated White Goods & Appliances	Y	Will be an integral part of the fit-out requirements to reduce electricity demand.
ENERGY EFFICIENCY		
Ventilation Heat recovery	Y	MVHR adopted on each individual apartment ventilation systems.
Low energy lighting	Y	Extensively adopted LED fittings throughout the scheme
Variable speed drive	Y	Variable speed drives can be adopted on fan and pump motors where possible to reduce energy consumption.
Demand Operated Systems	Y	The use of passive infra-red (PIR) for lighting within the corridors and entrance.
Electric heating and hot water generation	Y	Lot 20 compliant, fast response system heating
RENEWABLE AND LOW CARBON TECHNOLOGY		
Solar		
Solar hot water	P	Feasible but not as robust or effective as Photovoltaics
Photovoltaics (PV's)	Y	Can be used to offset electrical demand subject to financial appraisal. - but minimal roof space available

ENERGY STRATEGY, ANCOATS DISPENSARY

RENEWABLE AND TECHNOLOGIES	LZT	SUITABLE FOR CONSIDERATION	COMMENTARY
Water			
Small scale hydro power		N	Not feasible as no significant water source available
Tidal power		N	Not Applicable
Wave power		N	Not Applicable
Wind			
Wind turbines		N	Not suitable for city centre environment
Biomass			
Biomass single room heaters/stoves		N	Not appropriate for Application
Biomass boilers		P	Could be adopted to offset heating and hot water but high NO _x levels a concern in city centre environment therefore discounted.
Biomass community heating schemes		N	Could be adopted to offset heating and hot water but high NO _x levels a concern in urban environment/city centre.
Combined Heat and Power (CHP) for use with the following fuels:			
Biofuel		N	Gasification process too large for scale of site. Biodiesel considered immature feedstock and unreliable.
Gas Fired CHP		P	Feasible but not in line with government strategy for decarbonisation of electricity grid
Sewerage gas and other biogases		N	Scale of site too small.
Heat Pumps			
Ground source heat pumps		N	Extensive underground pipework difficult to install due to availability of land and listed building status.
Water source heat pumps		N	No significant water sources to reject / absorb heat.
Geothermal heating systems		N	Not considered appropriate.
Air source heat pumps		N	This technology is feasible to generate hot water & for heating, but is a centralised system and therefore discounted
For heat pumps to comply, the heat source (ground or water) must be from a renewable source, for example soil, outside air, ground water, or a river.			
Other			
Fuel cells using hydrogen generated from any of the above 'renewable' sources.		N	Technologies not yet mature enough for application.
Rainwater recycling		N	Rainwater collection system could be adopted to recycle rainwater for toilet flushing purposes but there is minimal space below ground to position the required tanks and is therefore discounted.
Green roofs		N	There is insufficient roof space for a green roof to be adopted

ENERGY STRATEGY, ANCOATS DISPENSARY

New Building

Key:

Y – **Yes could be incorporated**

P – **Possible**

N – **Not appropriate**

REDUCE DEMAND	SUITABLE FOR CONSIDERATION	COMMENTARY
Natural ventilation	Y	Site mostly suitable to adopt natural ventilation for purge ventilation.
Good Natural daylight	Y	Essential to reduce the reliance on artificial lighting.
Thermal mass	Y	The new elements will have a high thermal mass.
Air tightness	Y	Essential to minimise air leakage with the condition of the exposed site and reduce heat losses and exceed the minimum requirements of Part L 2013.
Solar shading/Low G Value Glass	Y	Specific solar shading adopted, and low 'G' value glass adopted to reduce unwanted solar gain on specific elevations
Thermal Insulation That Exceeds Minimum Standards	Y	Essential to minimise heat losses. Minimum standards Building Regulation U Values exceeded
Low 'G Value' glass specification	Y	Important to limit summertime overheating. TM59 compliance and current targets G Value 0.4 - 0.5 on appropriate elevations
'A' Rated White Goods & Appliances	Y	Will be an integral part of the fit-out requirements to reduce electricity demand.
ENERGY EFFICIENCY		
Ventilation Heat recovery	Y	MVHR adopted on each individual apartment ventilation systems.
Low energy lighting	Y	Extensively adopted LED fittings throughout the scheme
Variable speed drive	Y	Variable speed drives can be adopted on fan and pump motors where possible to reduce energy consumption.
Demand Operated Systems	Y	The use of passive infra-red (PIR) for lighting within the corridors and entrance.
Electric heating and hot water generation	Y	Lot 20 compliant, fast response system heating
RENEWABLE AND LOW CARBON TECHNOLOGY		
Solar		
Solar hot water	P	Feasible but not as robust or effective as Photovoltaics
Photovoltaics (PV's)	Y	Can be used to offset electrical demand subject to financial appraisal. - but minimal roof space available

ENERGY STRATEGY, ANCOATS DISPENSARY

RENEWABLE AND TECHNOLOGIES	LZT	SUITABLE FOR CONSIDERATION	COMMENTARY
Water			
Small scale hydro power		N	Not feasible as no significant water source available
Tidal power		N	Not Applicable
Wave power		N	Not Applicable
Wind			
Wind turbines		N	Not suitable for city centre environment
Biomass			
Biomass single room heaters/stoves		N	Not appropriate for Application
Biomass boilers		P	Could be adopted to offset heating and hot water but high NO _x levels a concern in city centre environment therefore discounted.
Biomass community heating schemes		N	Could be adopted to offset heating and hot water but high NO _x levels a concern in urban environment/city centre.
Combined Heat and Power (CHP) for use with the following fuels:			
Biofuel		N	Gasification process too large for scale of site. Biodiesel considered immature feedstock and unreliable.
Gas Fired CHP		P	Feasible but not in line with government strategy for decarbonisation of electricity grid
Sewerage gas and other biogases		N	Scale of site too small.
Heat Pumps			
Ground source heat pumps		N	Extensive underground pipework difficult to install due to availability of land and listed building status.
Water source heat pumps		N	No significant water sources to reject / absorb heat.
Geothermal heating systems		N	Not considered appropriate.
Air source heat pumps		N	This technology is feasible to generate hot water & for heating, but is a centralised system and therefore discounted
For heat pumps to comply, the heat source (ground or water) must be from a renewable source, for example soil, outside air, ground water, or a river.			
Other			
Fuel cells using hydrogen generated from any of the above 'renewable' sources.		N	Technologies not yet mature enough for application.
Rainwater recycling		P	Rainwater collection system could be adopted to recycle rainwater for toilet flushing purposes but minimal space to provide below ground tanks.
Green roofs		P	Could be adopted

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6. CARBON EMISSION CALCULATIONS

6.1. Existing Building Elements

A SAP model was developed to establish the energy use in the existing building element. The specific inputs being:

Building Fabric

Element	Existing U-value (w/m ² K)	Target U-Value (w/m ² K)	G-Value
Wall		0.35	
Glazing		1.40	TBA
Exposed Floors		0.70	
Roof		N/A	

Air Permeability	Worst acceptable standard	This building
M ³ /(h.m ²) at 50 Pa	N/A	N/A

Due to the existing condition of the building, the plots within the existing building are not currently being air tested.

The following building service parameters were used:

Main Heating	REA
Description	Panel Heater
Percentage of Heat	100
SAP Code	691
Efficiency	100

Water Heating	HEI Immersion
	Independent
SAP Code	903
Hot Water Cylinder	
Cylinder in Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150 L
Loss	1.14 kWh/day

Mechanical Ventilation	
Windows Open in Hot Weather	Trickle Vents Only
Air Change Rate	0.10
Mechanical Ventilation System Present	Yes
Type	Balanced Mechanical Ventilation with Heat Recovery
MV Reference	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93

ENERGY STRATEGY, ANCOATS DISPENSARY

No PV has been included for the apartments within the existing building.

6.1.1. SAP Results

Property Reference	SAP Rating	Environmental	CO2 Emissions (t/year)
00.001	58D	62D	2.82
00.002	59D	63D	2.25
00.003	59D	63D	2.25
00.004	61D	65D	2.05
00.005	49E	55D	2.80
00.006	45E	51E	3.60
00.007	55D	59D	2.40
00.008	53E	58D	2.48
00.009	47E	52E	3.49
01.010	69C	72C	1.95
01.011	74C	76C	1.34
01.012	74C	76C	1.34
01.013	71C	74C	1.79
02.014	69C	72C	1.67
02.015	74C	76C	1.36
02.016	74C	76C	1.36
02.017	70C	73C	1.53
02.018	70C	73C	1.85
02.019	75C	78C	1.27
02.020	75C	78C	1.27
02.021	71C	74C	1.79
03.022	69C	72C	1.67
03.023	74C	77C	1.34
03.024	74C	77C	1.34
03.025	70C	73C	1.53
03.026	71C	74C	1.84
03.027	75C	78C	1.27
03.028	75C	78C	1.27
03.029	71C	74C	1.79

The EPC results for the apartments within the existing building range from C to E.
Block compliance does not apply to existing buildings.

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6.2. New Building Elements

A SAP model was developed to establish the energy use in the new building. The specific inputs being:

Building Fabric

Element	Target U-Value (w/m ² K)	Limiting U-Value (w/m ² K)	G-Value
Wall	0.17		
Glazing	1.40		0.63
Exposed Floors	N/A	N/A	
Roof	0.15		

Air Permeability	Worst acceptable standard	This building
M ³ /(h.m ²) at 50 Pa	10	3

The following building service parameters were used:

Main Heating	REA
Description	Panel Heater
Percentage of Heat	100
SAP Code	691
Efficiency	100

Water Heating	HEI Immersion
	Independent
SAP Code	903
Hot Water Cylinder	
Cylinder in Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150 L
Loss	1.14 kWh/day

Mechanical Ventilation	
Windows Open in Hot Weather	Trickle Vents Only
Air Change Rate	0.10
Mechanical Ventilation System Present	Yes
Type	Balanced Mechanical Ventilation with Heat Recovery
MV Reference	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93

A PV array providing 300kWh/year, equating to 4 - 5kWp, was included on the roof.

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6.2.1. SAP Results

Property Reference	SAP Rating	Environmental	CO2 Emissions (t/year)
04.030	82B	86B	1.08
04.031	81B	85B	0.93
04.032	84B	87B	1.01
04.033	85B	88B	0.95
04.034	85B	89B	0.75
04.035	84B	87B	1.07
05.036	80C	84B	1.24
05.037	81B	85B	0.94
05.038	80C	84B	1.01
05.039	78C	82B	1.41

Under Manchester City Council Policy EN6, Table 12.1, the scheme is required to achieve a 15% betterment on Part L 2010.

The SAPs achieve an 11% pass on SAP 2012, which relates to an approximate 18% pass on SAP 2010. This is due to SAP 2012 having, on average, a 9% uplift on SAP 2010 included within the software.

SAP 10 calculations have not been undertaken as the specification has not been formally agreed and is still under consultation.

6.2.1.1. Block Compliance

Each apartment type was modelled to give the Design kgCO_2/m^2 to compare to the Target kgCO_2/m^2 and this was then multiplied by the number of apartments to give the overall emission rate for the building. Block compliance has been adopted where the results for all the apartments are summed to give an overall value as shown in the table below:

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BLOCK COMPLIANCE			 Design SAP elmhurst energy		
Calculation Type: New Build (As Designed)					
Block Reference	New Build	Issued on Date	07/04/2021		
Block Name					
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com		Assessor ID	e623-0001	
Client					
Block Compliance Report - DER					
Block Reference: New Build		Block Name:			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DER (kgCO ₂ /m ²)	TER (kgCO ₂ /m ²)	% DER/TER
Ancoats RP - 04.030-001	1	66.4	19.91	22.91	13.09 %
Ancoats RP - 04.031-001	1	46.9	24.55	28.00	12.31 %
Ancoats RP - 04.032-001	1	66.9	17.94	21.03	14.70 %
Ancoats RP - 04.033-001	1	66.9	15.50	18.97	18.27 %
Ancoats RP - 04.034-001	1	45.3	18.38	22.91	19.79 %
Ancoats RP - 04.035-001	1	69	17.78	20.75	14.29 %
Ancoats RP - 05.036-001	1	66.9	26.01	26.60	2.22 %
Ancoats RP - 05.037-001	1	45	25.37	26.91	5.74 %
Ancoats RP - 05.038-001	1	45.3	26.55	27.84	4.62 %
Ancoats RP - 05.039-001	1	69	24.87	25.50	2.45 %
Totals:	10	587.6	216.86	241.41	
Average DER = 21.39 kgCO ₂ /m ²		% DER/TER		PASS	
Average TER = 23.81 kgCO ₂ /m ²		10.16 %			
Block Compliance Report - DFEE					
Block Reference: New Build		Block Name:			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DFEE (kWh/m ² /yr)	TFEE (kWh/m ² /yr)	% DFEE/TFEE
Ancoats RP - 04.030-001	1	66.4	28.63	34.63	17.32 %
Ancoats RP - 04.031-001	1	46.9	35.71	43.13	17.19 %
Ancoats RP - 04.032-001	1	66.9	23.94	27.92	14.23 %
Ancoats RP - 04.033-001	1	66.9	17.83	19.21	7.21 %
Ancoats RP - 04.034-001	1	45.3	20.92	21.85	4.28 %
Ancoats RP - 04.035-001	1	69	23.84	27.65	13.76 %
Ancoats RP - 05.036-001	1	66.9	43.07	47.11	8.58 %
Ancoats RP - 05.037-001	1	45	36.13	36.69	1.54 %
Ancoats RP - 05.038-001	1	45.3	38.47	40.03	3.88 %
Ancoats RP - 05.039-001	1	69	38.13	43.50	12.36 %
Totals:	10	587.6	306.68	341.72	
Average DFEE = 30.37 kWh/m ² /yr		% DFEE/TFEE		PASS	
Average TFEE = 34.02 kWh/m ² /yr		10.73 %			

In summary the residential building passes the Part L1A requirements as below:

Average Design CO ₂ emission rate (DER), kgCO ₂ /m ² . annum	21.39
Average Target CO ₂ emission rate (TER), kgCO ₂ /m ² . annum	23.81
Are emission from the building less than or equal to the target?	DER=<TER
Average design fabric energy efficiency, kWh/m2/yr	30.37
Average target fabric energy efficiency, kWh/m2/yr	34.02
Is design fabric energy efficiency less than target?	DFEE=<TFEE

ENERGY STRATEGY, ANCOATS DISPENSARY

Under Manchester City Council Policy EN6, Table 12.1, the scheme is required to achieve a 15% betterment on Part L 2010.

The SAPs achieve an 11% pass on SAP 2012, which relates to an approximate 18% pass on SAP 2010. This is due to SAP 2012 having, on average, a 9% uplift on SAP 2010 included within the software.

To demonstrate the contribution that passive, energy efficiency measures and low to zero carbon technologies have on the new extension SAP results, below is a set of sample assessments that shows the impact of these different measures on the SAP calculations.

	Model 1 – Standard U-values	Model 2 – Improved U-values	Model 3 – Addition of MVHR	Model 4 – Improved Air Permeability	Model 5 - SAP model
Passive Measures					
Wall U-value	0.25	0.17	0.17	0.17	0.17
Roof U-value	0.20	0.15	0.15	0.15	0.15
Window U-value	1.40	1.40	1.40	1.40	1.40
Air Permeability	5	5	5	3	3
Energy Efficiency Measures					
Ventilation	Extract Fans	Extract Fans	MVHR	MVHR	MVHR
Space heating	Electric Panel Heaters	Electric Panel Heaters	Electric Panel Heaters	Electric Panel Heaters	Electric Panel Heaters
Water Heating	Immersion Heating	Immersion Heating	Immersion Heating	Immersion Heating	Immersion Heating
Renewable Technologies					
PV	None	None	None	None	300kWh/year, equating to 4 - 5kWp for the whole development

Model 1 uses Building Regulations standard U-values and does not include an MVHR unit (only allowing for an extract system) or any renewable technologies. There is a 33% fail on SAP 2012.

Model 2 builds on Model 1 by improving the U-values but leaving the air permeability and the systems as before. There is a 25% fail on SAP 2012

Model 3 introduces the Mechanical Ventilation with Heat Recovery in place of the previously used extract fans, leading to a fail of 9%.

Model 4 reduces the air infiltration from 5 to 3, whilst keeping the improved U-values and the MVHR unit. There is a fail of 1% on SAP 2012.

Model 5 is the SAP model used in the SAP results shown in this report and includes 300kWh PV (equating to 4 - 5kWp for the whole development) This passes SAP 2012 by 11%, which relates to an approximate 18% pass on SAP 2010. This is due to SAP 2012 having, on average, a 9% uplift on SAP 2010 included within the software.

A summary of results is shown in the table below:

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MODEL	BLOCK DER	BLOCK TER	% IMPROVEMENT
Model 1 – Standard U-values	31.52	23.64	- 33% (FAIL)
Model 2 – Improved U-values	29.61	23.64	- 25% (FAIL)
Model 3 – Addition of MVHR	25.86	23.64	- 9% (FAIL)
Model 4 – Improved Air Permeability	23.83	23.64	- 1% (FAIL)
Model 5 - SAP model	21.39	23.81	+ 11% (PASS)

ENERGY STRATEGY, ANCOATS DISPENSARY

7. CONCLUSION

This report has set out the methodology in which the design team have approached the design and how the strategies of Manchester City Council and the Government guidelines have been adopted.

7.1. Existing Building Elements

7.1.1. Passive Building Elements

Due to the building having a listed status, there is limited scope for improving the passive measures beyond upgrading the existing insulation.

- U values that exceed minimum Building Regulation Standards as below

Element	Target U-Value (w/m ² K)	Limiting U-Value (w/m ² K)	G-Value
Wall	0.35		
Glazing	1.40		TBA
Exposed Floors	0.70		
Roof	N/A		

- The plots are not currently being air tested.

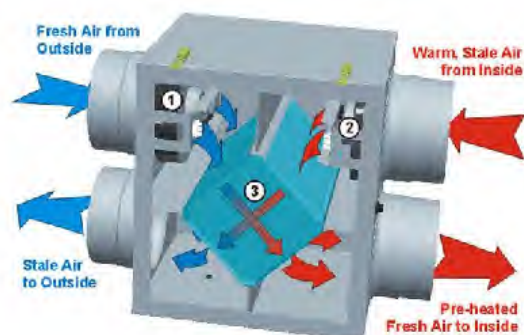
Air Permeability	Worst acceptable standard	This building
M ³ /(h.m ²) at 50 Pa	10	N/A

- Improved glazing specification (U-Value: 1.40) that limits the amount of unwanted solar gain to avoid overheating.
- The adoption of natural ventilation will make use of the existing tall windows that will promote good natural buoyancy stack effect within the room.

7.1.2. Energy Efficiency Measures - Mean

The existing building will be fitted with the same energy efficiency measures of the new building, these being:

- Heat recovery on the apartment ventilation systems, as shown in the image to the right.
- Low specific fan power ratings to ventilation fans
- High efficiency LED lighting throughout
- Demand operated lighting with the use of PIRs in the corridors and the entrance.
- Lot 20 compliant direct electric heating panels with a fast response time, with both local and app control and occupancy sensing and set point temperature.



7.1.3. Renewable & Low Carbon Technologies – Green

There is no intent to install renewable and low carbon technologies within the existing building elements.

7.1.4. Summary

In summary, for the existing building elements, we have upgraded the existing thermal fabric to meet the standards set out in Part L2B and are proposing building services which are the energy efficient systems proposed for the new building elements.

ENERGY STRATEGY, ANCOATS DISPENSARY

7.2. New Building Element

7.2.1. Passive Building Elements

In the new building, the team have maximised passive measures to reduce the initial load of the building in terms of heating and anticipated lighting loads with the following measures: -

- U values that exceed minimum Building Regulation Standards as below

• Element	Target U-Value (w/m ² K)	Limiting U-Value (w/m ² K)	G-Value
Wall	0.17		
Glazing	1.40		0.63
Exposed Floors	N/A		
Roof	0.15		

- Air leakage rates that exceed minimum Building Regulations:

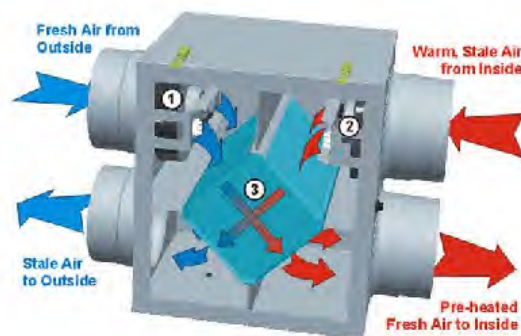
Air Permeability	Worst acceptable standard	This building
M ³ /(h.m ²) at 50 Pa	10	3

- Improved glazing specification (G Value 0.63) that limits the amount of unwanted solar gain to avoid overheating.

7.2.2. Energy Efficiency Measures - Mean

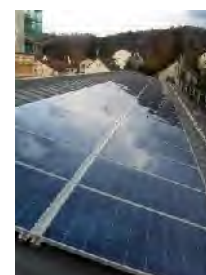
The next stage of the design development was to establish energy efficiency measures to meet the demand of the building, these being: -

- Heat recovery on the apartment ventilation systems, as shown in the image to the right.
- Low specific fan power ratings to ventilation fans
- High efficiency LED lighting throughout
- Demand operated lighting with the use of PIRs in the corridors and the entrance.
- Lot 20 compliant direct electric heating panels with a fast response time, with both local and app control and occupancy sensing and set point temperature.



7.2.3. Renewable Energy Efficiency Measures - Green

The final aspect of the design has been to establish what renewable and low carbon technologies can be adopted. Following the appraisal of the building and site, rooftop photovoltaic panels will be provided to generate zero carbon electricity for the development.



ENERGY STRATEGY, ANCOATS DISPENSARY

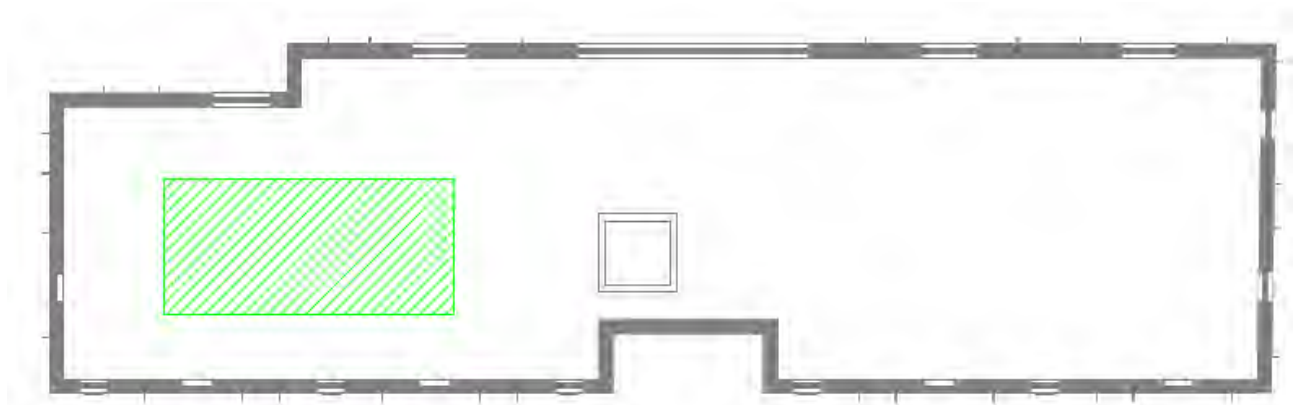


Figure 4. – Roof top level drawing showing the extent of the PV.

7.2.4. Summary

In summary, the new building elements meets the planning policy requirements of Manchester City Council Policy EN6 by having an approximate 18% pass on SAP 2010, exceeding the 15% betterment on Part L 2010 required by the policy. The SAPs achieve an 11% pass on Part L 2013.

APPENDIX 1

Existing Building Element SAP Results

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 00.001	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	58 D	DER	N/A	TER	N/A
Environmental	62 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.82	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	2
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground Floor:	10.69 m	26.20 m ²	2.40 m
	1st Storey:	19.41 m	44.50 m ²	2.40 m

7.0 Living Area	30.10	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	41.11	31.71
Sheltered Wall	Solid Wall	0.35	12.34	12.34
Sheltered Wall FF	Solid Wall	0.35	18.79	18.79

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Party Wall 1	Solid Wall	0.00	45.79
Heated Corridor	Solid Wall	0.00	36.80

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.0 Heat Loss Floors		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Heat Loss Floor 1	Ground Floor - Solid	0.70	26.20

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					7.42	
Side	Window	[1] External Wall 1	South West	None	0.00					1.98	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Default

Y-value

0.150 W/m²K

18.0 Pressure Testing

No

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather Windows slightly open

Cross ventilation possible No

Night Ventilation No

Air change rate 0.60

Mechanical Ventilation

Mechanical Ventilation System Present Yes

Approved Installation Yes

Mechanical Ventilation data Type Database

Type Balanced mechanical ventilation with heat recovery

MV Reference Number 500565

Configuration 2

MVHR Duct Insulated Yes

Manufacturer SFP 0.61

Duct Type Rigid

MVHR Efficiency 93.00

Wet Rooms 2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings 10

Total number of L.E.L. fittings 10

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Percentage of L.E.L. fittings	100.00	%
External		
External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 00.002	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	59 D	DER	N/A	TER	N/A
Environmental	63 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.25	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	2
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground Floor:	7.74 m	30.20 m ²	2.40 m
	1st Storey:	7.74 m	20.20 m ²	2.40 m

7.0 Living Area	28.00	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	37.15	31.58

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Party Wall 1	Solid Wall	0.00	36.40
Heated Corridor	Solid Wall	0.00	68.40

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.0 Heat Loss Floors		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Heat Loss Floor 1	Ground Floor - Solid	0.70	30.20

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					5.57	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 00.003	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	59 D	DER	N/A	TER	N/A
Environmental	63 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.25	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	2
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground Floor:	7.74 m	30.20 m ²	2.40 m
	1st Storey:	7.74 m	20.20 m ²	2.40 m

7.0 Living Area	28.00	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	37.15	31.58

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Party Wall 1	Solid Wall	0.00	36.40
Heated Corridor	Solid Wall	0.00	68.40

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.0 Heat Loss Floors		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Heat Loss Floor 1	Ground Floor - Solid	0.70	30.20

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					5.57	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 00.004	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			
SAP Rating	61 D	DER	N/A
Environmental	65 D	% DER<TER	N/A
CO ₂ Emissions (t/year)	2.05	DFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com		Assessor ID
Client	e623-0001		

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	2
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground Floor:	7.39 m	26.20 m ²	2.40 m
	1st Storey:	7.39 m	20.50 m ²	2.40 m

7.0 Living Area	22.00	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	35.47	28.05

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Party Wall 1	Solid Wall	0.00	61.00
Heated Corridor	Solid Wall	0.00	39.26

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.0 Heat Loss Floors		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Heat Loss Floor 1	Ground Floor - Solid	0.70	26.20

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					7.42	

14.0 Conservatory

15.0 Draught Proofing %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 00.005	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	49 E	DER	N/A	TER	N/A
Environmental	55 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.80	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	2
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements		Heat Loss Perimeter	Internal Floor Area	Average Storey Height
	Ground Floor:	14.86 m	30.80 m ²	2.40 m
	1st Storey:	14.86 m	18.80 m ²	2.40 m

7.0 Living Area	26.00	m ²
-----------------	-------	----------------

8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	71.33	58.34

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Solid Wall	0.00	54.00
Heated Corridor	Solid Wall	0.00	4.30

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.0 Heat Loss Floors		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Heat Loss Floor 1	Ground Floor - Solid	0.70	30.80

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					7.42	
Side	Window	[1] External Wall 1	North East	None	0.00					5.57	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External	
External lights fitted	Yes
Light and motion sensor	Yes
23.0 Electricity Tariff	Standard
24.0 Main Heating 1	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual
29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day
Recommendations	
Lower cost measures	
None	
Further measures to achieve even higher standards	
None	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 00.006	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	45 E	DER	N/A	TER	N/A
Environmental	51 E	% DER<TER	N/A		
CO ₂ Emissions (t/year)	3.60	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.56 m	Internal Floor Area 67.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	40.20	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	44.54	31.04

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	29.43
Heated Corridor	Solid Wall		0.00	22.46

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.0 Heat Loss Floors				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Heat Loss Floor 1	Ground Floor - Solid		0.70	67.90

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					7.38	
Side	Window	[1] External Wall 1	North East	None	0.00					6.12	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External	
External lights fitted	Yes
Light and motion sensor	Yes
23.0 Electricity Tariff	Standard
24.0 Main Heating 1	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual
29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day
Recommendations	
Lower cost measures	
None	
Further measures to achieve even higher standards	
None	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 00.007	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	55 D	DER	N/A	TER	N/A
Environmental	59 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.40	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 15.08 m	Internal Floor Area 45.30 m ²	Average Storey Height 2.40 m

7.0 Living Area	31.40	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	17.56	11.80
External Wall 2	Solid Wall	0.35	18.63	18.63

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	22.63
Heated Corridor	Solid Wall		0.00	20.65

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.0 Heat Loss Floors				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Heat Loss Floor 1	Ground Floor - Solid		0.70	45.30

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.76	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 00.008			Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref			
Property					
SAP Rating	53 E	DER	N/A	TER	N/A
Environmental	58 D	% DER<TER	N/A		
CO ₂ Emissions (t/year)	2.48	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com			Assessor ID	e623-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	15.08 m	45.30 m ²	2.40 m

7.0 Living Area	31.40	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	17.56	11.80
External Wall 2	Solid Wall	0.35	18.63	18.63

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	22.63
Heated Corridor	Solid Wall		0.00	20.65

10.1 Party Ceilings

Description	Construction	Area (m ²)
-------------	--------------	------------------------

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Heat Loss Floor 1	Ground Floor - Solid		0.70	45.30

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.76	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 00.009	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	47 E	DER	N/A	TER	N/A
Environmental	52 E	% DER<TER	N/A		
CO ₂ Emissions (t/year)	3.49	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.56 m	Internal Floor Area 67.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	40.20	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	44.54	37.16

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	29.43
Heated Corridor	Solid Wall		0.00	22.46

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.0 Heat Loss Floors				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Heat Loss Floor 1	Ground Floor - Solid		0.70	67.90

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					7.38	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Default

Y-value

0.150

W/m²K

18.0 Pressure Testing

No

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Trickle vents only

Cross ventilation possible

No

Night Ventilation

No

Air change rate

0.10

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

Yes

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500565

Configuration

2

MVHR Duct Insulated

Yes

Manufacturer SFP

0.61

Duct Type

Rigid

MVHR Efficiency

93.00

Wet Rooms

2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings

10

Total number of L.E.L. fittings

10

Percentage of L.E.L. fittings

100.00

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 01.010	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	69 C	DER	N/A	TER	N/A
Environmental	72 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.95	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.56 m	Internal Floor Area 67.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	40.20	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	44.54	31.05

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Solid Wall	0.00	29.43
Heated Corridor	Solid Wall	0.00	22.46

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					7.38	
Opening 2	Window	[1] External Wall 1	North East	None	0.00					6.11	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External	
External lights fitted	Yes
Light and motion sensor	Yes
23.0 Electricity Tariff	Standard
24.0 Main Heating 1	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual
29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day
Recommendations	
Lower cost measures	
None	
Further measures to achieve even higher standards	
None	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 01.011	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	74 C	DER	N/A	TER	N/A
Environmental	76 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.34	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 15.08 m	Internal Floor Area 45.30 m ²	Average Storey Height 2.40 m

7.0 Living Area	31.40	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	17.56	11.80
External Wall 2	Solid Wall	0.35	18.63	18.63

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	22.63
Heated Corridor	Solid Wall		0.00	20.65

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.76	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 01.012			Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref			
Property					
SAP Rating	74 C	DER	N/A	TER	N/A
Environmental	76 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.34	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com			Assessor ID	e623-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	15.08 m	45.30 m ²	2.40 m

7.0 Living Area	31.40	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	17.56	11.80
External Wall 2	Solid Wall	0.35	18.63	18.63

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	22.63
Heated Corridor	Solid Wall		0.00	20.65

10.1 Party Ceilings

Description	Construction	Area (m ²)
-------------	--------------	------------------------

11.1 Party Floors

Description	Construction	Area (m ²)
-------------	--------------	------------------------

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.76	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 01.013	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	71 C	DER	N/A	TER	N/A
Environmental	74 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.79	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.56 m	Internal Floor Area 67.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	40.20	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	44.54	37.16

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Solid Wall	0.00	29.43
Heated Corridor	Solid Wall	0.00	22.46

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					7.38	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Default

Y-value

0.150

W/m²K

18.0 Pressure Testing

No

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Trickle vents only

Cross ventilation possible

No

Night Ventilation

No

Air change rate

0.10

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

Yes

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500565

Configuration

2

MVHR Duct Insulated

Yes

Manufacturer SFP

0.61

Duct Type

Rigid

MVHR Efficiency

93.00

Wet Rooms

2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings

10

Total number of L.E.L. fittings

10

Percentage of L.E.L. fittings

100.00

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 02.014			Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref			
Property					
SAP Rating	69 C	DER	N/A	TER	N/A
Environmental	72 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.67	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com			Assessor ID	e623-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	19.16 m	49.00 m ²	2.40 m

7.0 Living Area	38.20	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	45.98	38.43

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	33.90
Heated Corridor	Solid Wall		0.00	5.54

10.1 Party Ceilings

Description	Construction	Area (m ²)
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11.1 Party Floors

Description	Construction	Area (m ²)
-------------	--------------	------------------------

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					5.57	
Side	Window	[1] External Wall 1	South West	None	0.00					1.98	

14.0 Conservatory

None

15.0 Draught Proofing

100 %

16.0 Draught Lobby

No

17.0 Thermal Bridging

Default

Y-value

0.150 W/m²K

18.0 Pressure Testing

No

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather Trickle vents only

Cross ventilation possible No

Night Ventilation No

Air change rate 0.10

Mechanical Ventilation

Mechanical Ventilation System Present Yes

Approved Installation Yes

Mechanical Ventilation data Type Database

Type Balanced mechanical ventilation with heat recovery

MV Reference Number 500565

Configuration 2

MVHR Duct Insulated Yes

Manufacturer SFP 0.61

Duct Type Rigid

MVHR Efficiency 93.00

Wet Rooms 2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings 10

Total number of L.E.L. fittings 10

Percentage of L.E.L. fittings 100.00 %

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External	
External lights fitted	Yes
Light and motion sensor	Yes
23.0 Electricity Tariff	Standard
24.0 Main Heating 1	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual
29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day
Recommendations	
Lower cost measures	
None	
Further measures to achieve even higher standards	
None	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 02.015	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	74 C	DER	N/A	TER	N/A
Environmental	76 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.36	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 12.60 m	Internal Floor Area 46.00 m ²	Average Storey Height 2.40 m

7.0 Living Area	30.79	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	30.24	23.46

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	12.55
Heated Corridor	Solid Wall		0.00	33.62

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					6.78	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 02.016	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	74 C	DER	N/A	TER	N/A
Environmental	76 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.36	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 12.60 m	Internal Floor Area 46.00 m ²	Average Storey Height 2.40 m

7.0 Living Area	30.79	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	30.24	23.46

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	12.55
Heated Corridor	Solid Wall		0.00	33.62

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					6.78	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

 %

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 02.017			Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref			
Property					
SAP Rating	70 C	DER	N/A	TER	N/A
Environmental	73 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.53	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com			Assessor ID	e623-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	18.47 m	44.90 m ²	2.40 m

7.0 Living Area	30.79	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	44.33	33.17

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	21.62
Heated Corridor	Solid Wall		0.00	16.92

10.1 Party Ceilings

Description	Construction	Area (m ²)
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11.1 Party Floors

Description	Construction	Area (m ²)
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12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					5.57	
Opening 2	Window	[1] External Wall 1	South West	None	0.00					5.59	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External	
External lights fitted	Yes
Light and motion sensor	Yes
23.0 Electricity Tariff	Standard
24.0 Main Heating 1	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual
29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day
Recommendations	
Lower cost measures	
None	
Further measures to achieve even higher standards	
None	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 02.018	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	70 C	DER	N/A	TER	N/A
Environmental	73 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.85	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.56 m	Internal Floor Area 67.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	40.20	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	44.54	31.05

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Solid Wall	0.00	29.43
Heated Corridor	Solid Wall	0.00	22.46

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					7.38	
Opening 2	Window	[1] External Wall 1	North East	None	0.00					6.11	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External	
External lights fitted	Yes
Light and motion sensor	Yes
23.0 Electricity Tariff	Standard
24.0 Main Heating 1	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual
29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day
Recommendations	
Lower cost measures	
None	
Further measures to achieve even higher standards	
None	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 02.019	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	75 C	DER	N/A	TER	N/A
Environmental	78 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.27	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 15.08 m	Internal Floor Area 45.30 m ²	Average Storey Height 2.40 m

7.0 Living Area	31.40	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	17.56	11.80
External Wall 2	Solid Wall	0.35	18.63	18.63

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Party Wall 1	Solid Wall	0.00	22.63
Heated Corridor	Solid Wall	0.00	20.65

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.76	

14.0 Conservatory

15.0 Draught Proofing %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 02.020			Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref			
Property					
SAP Rating	75 C	DER	N/A	TER	N/A
Environmental	78 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.27	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com			Assessor ID	e623-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	15.08 m	45.30 m ²	2.40 m

7.0 Living Area	31.40	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	17.56	11.80
External Wall 2	Solid Wall	0.35	18.63	18.63

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	22.63
Heated Corridor	Solid Wall		0.00	20.65

10.1 Party Ceilings

Description	Construction	Area (m ²)
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11.1 Party Floors

Description	Construction	Area (m ²)
-------------	--------------	------------------------

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.76	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

 %

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 02.021	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	71 C	DER	N/A	TER	N/A
Environmental	74 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.79	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.56 m	Internal Floor Area 67.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	40.20	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	44.54	37.16

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Solid Wall	0.00	29.43
Heated Corridor	Solid Wall	0.00	22.46

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					7.38	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 03.022	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	69 C	DER	N/A	TER	N/A
Environmental	72 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.67	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
Client			

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 19.16 m	Internal Floor Area 49.00 m ²	Average Storey Height 2.40 m

7.0 Living Area	38.20	m ²
8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	45.98	38.43

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Solid Wall	0.00	33.90
Heated Corridor	Solid Wall	0.00	5.54

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					5.57	
Side	Window	[1] External Wall 1	South West	None	0.00					1.98	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External	
External lights fitted	Yes
Light and motion sensor	Yes
23.0 Electricity Tariff	Standard
24.0 Main Heating 1	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual
29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day
Recommendations	
Lower cost measures	
None	
Further measures to achieve even higher standards	
None	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 03.023	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	74 C	DER	N/A	TER	N/A
Environmental	77 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.34	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 12.60 m	Internal Floor Area 46.00 m ²	Average Storey Height 2.40 m

7.0 Living Area	30.79	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall	0.35	30.24	25.15

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall		0.00	12.55
Heated Corridor	Solid Wall		0.00	33.62

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					5.09	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 03.024	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	74 C	DER	N/A	TER	N/A
Environmental	77 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.34	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 12.60 m	Internal Floor Area 46.00 m ²	Average Storey Height 2.40 m

7.0 Living Area	30.79	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	30.24	25.15

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Solid Wall	0.00	12.55
Heated Corridor	Solid Wall	0.00	33.62

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					5.09	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 03.025	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	70 C	DER	N/A	TER	N/A
Environmental	73 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.53	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.47 m	Internal Floor Area 44.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	30.79	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	44.33	33.17

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Solid Wall	0.00	21.62
Heated Corridor	Solid Wall	0.00	16.92

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					5.57	
Opening 2	Window	[1] External Wall 1	South West	None	0.00					5.59	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External	
External lights fitted	Yes
Light and motion sensor	Yes
23.0 Electricity Tariff	Standard
24.0 Main Heating 1	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual
29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day
Recommendations	
Lower cost measures	
None	
Further measures to achieve even higher standards	
None	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 03.026	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	71 C	DER	N/A	TER	N/A
Environmental	74 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.84	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.56 m	Internal Floor Area 67.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	40.20	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	44.54	33.82

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Solid Wall	0.00	29.43
Heated Corridor	Solid Wall	0.00	22.46

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					6.46	
Opening 2	Window	[1] External Wall 1	North East	None	0.00					4.26	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

 W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External	
External lights fitted	Yes
Light and motion sensor	Yes
23.0 Electricity Tariff	Standard
24.0 Main Heating 1	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603
25.0 Main Heating 2	None
Community Heating	None
28.0 Water Heating	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual
29.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day
Recommendations	
Lower cost measures	
None	
Further measures to achieve even higher standards	
None	

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 03.027	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	75 C	DER	N/A	TER	N/A
Environmental	78 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.27	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 15.08 m	Internal Floor Area 45.30 m ²	Average Storey Height 2.40 m

7.0 Living Area	31.40	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	17.56	11.80
External Wall 2	Solid Wall	0.35	18.63	18.63

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Party Wall 1	Solid Wall	0.00	22.63
Heated Corridor	Solid Wall	0.00	20.65

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.76	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 03.028			Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref			
Property					
SAP Rating	75 C	DER	N/A	TER	N/A
Environmental	78 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.27	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com			Assessor ID	e623-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 15.08 m	Internal Floor Area 45.30 m ²	Average Storey Height 2.40 m
7.0 Living Area	31.40	m ²		
8.0 Thermal Mass Parameter	Simple calculation - High			
Thermal Mass	450.00	kJ/m ² K		

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Solid Wall	0.35	17.56	11.80
External Wall 2	Solid Wall	0.35	18.63	18.63

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type		
Party Wall 1	Solid Wall	0.00	22.63
Heated Corridor	Solid Wall	0.00	20.65

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.76	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

Y-value

W/m²K

18.0 Pressure Testing

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Cross ventilation possible

Night Ventilation

Air change rate

Mechanical Ventilation

Mechanical Ventilation System Present

Approved Installation

Mechanical Ventilation data Type

Type

MV Reference Number

Configuration

MVHR Duct Insulated

Manufacturer SFP

Duct Type

MVHR Efficiency

Wet Rooms

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings

 %

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Property Reference	Ancoats RP - 03.029			Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref			
Property					
SAP Rating	71 C	DER	N/A	TER	N/A
Environmental	74 C	% DER<TER	N/A		
CO ₂ Emissions (t/year)	1.79	DFEE	N/A	TFEE	N/A
General Requirements Compliance	N/A	% DFEE<TFEE	N/A		
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com			Assessor ID	e623-0001
Client					

SUMMARY FOR INPUT DATA FOR: Conversion (As Designed)

Orientation	North West				
Property Tenure	Owner-occupied				
Transaction Type	New dwelling				
Terrain Type	Urban				
1.0 Property Type	Flat, Mid-Terrace				
2.0 Number of Storeys	1				
3.0 Date Built	2021				
4.0 Sheltered Sides	2				
5.0 Sunlight/Shade	Average or unknown				
6.0 Measurements					
Ground Floor:		Heat Loss Perimeter	Internal Floor Area		Average Storey Height
		18.56 m	67.90 m ²		2.40 m
7.0 Living Area	40.20		m ²		
8.0 Thermal Mass Parameter	Simple calculation - High				
Thermal Mass	450.00		kJ/m ² K		
9.0 External Walls					
Description	Type		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Solid Wall		0.35	44.54	37.16
9.1 Party Walls					
Description	Type	Construction		U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Solid Wall			0.00	29.43
Heated Corridor	Solid Wall			0.00	22.46
10.1 Party Ceilings					
Description	Construction				Area (m ²)
11.1 Party Floors					
Description	Construction				Area (m ²)
12.0 Opening Types					

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					7.38	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Default

Y-value

0.150

W/m²K

18.0 Pressure Testing

No

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Trickle vents only

Cross ventilation possible

No

Night Ventilation

No

Air change rate

0.10

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

Yes

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500565

Configuration

2

MVHR Duct Insulated

Yes

Manufacturer SFP

0.61

Duct Type

Rigid

MVHR Efficiency

93.00

Wet Rooms

2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings

10

Total number of L.E.L. fittings

10

Percentage of L.E.L. fittings

100.00

%

External

SUMMARY FOR INPUT DATA

Calculation Type: Conversion (As Designed)

External lights fitted	Yes	
Light and motion sensor	Yes	
23.0 Electricity Tariff	Standard	
24.0 Main Heating 1	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	
25.0 Main Heating 2	None	
Community Heating	None	
28.0 Water Heating	HEI Immersion	
Water Heating	Independent	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	Yes	
SAP Code	903	
Immersion Heater	Dual	
29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

APPENDIX 2

New Building Element SAP Results

BLOCK COMPLIANCE

Calculation Type: New Build (As Designed)

Block Reference	New Build	Issued on Date	07/04/2021
Block Name			
Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com		Assessor ID e623-0001
Client			

Block Compliance Report - DER

Block Reference: New Build		Block Name:			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DER (kgCO ₂ /m ²)	TER (kgCO ₂ /m ²)	% DER/TER
Ancoats RP - 04.030-001	1	66.4	19.91	22.91	13.09 %
Ancoats RP - 04.031-001	1	46.9	24.55	28.00	12.31 %
Ancoats RP - 04.032-001	1	66.9	17.94	21.03	14.70 %
Ancoats RP - 04.033-001	1	66.9	15.50	18.97	18.27 %
Ancoats RP - 04.034-001	1	45.3	18.38	22.91	19.79 %
Ancoats RP - 04.035-001	1	69	17.78	20.75	14.29 %
Ancoats RP - 05.036-001	1	66.9	26.01	26.60	2.22 %
Ancoats RP - 05.037-001	1	45	25.37	26.91	5.74 %
Ancoats RP - 05.038-001	1	45.3	26.55	27.84	4.62 %
Ancoats RP - 05.039-001	1	69	24.87	25.50	2.45 %
Totals:	10	587.6	216.86	241.41	
Average DER = 21.39 kgCO ₂ /m ²		% DER/TER	PASS		
Average TER = 23.81 kgCO ₂ /m ²		10.16 %			

Block Compliance Report - DFEE

Block Reference: New Build		Block Name:			
Property-Assessment Reference	Multiplier	Floor Area (m ²)	DFEE (kWh/m ² /yr)	TFEE (kWh/m ² /yr)	% DFEE/TFEE
Ancoats RP - 04.030-001	1	66.4	28.63	34.63	17.32 %
Ancoats RP - 04.031-001	1	46.9	35.71	43.13	17.19 %
Ancoats RP - 04.032-001	1	66.9	23.94	27.92	14.23 %
Ancoats RP - 04.033-001	1	66.9	17.83	19.21	7.21 %
Ancoats RP - 04.034-001	1	45.3	20.92	21.85	4.28 %
Ancoats RP - 04.035-001	1	69	23.84	27.65	13.76 %
Ancoats RP - 05.036-001	1	66.9	43.07	47.11	8.58 %
Ancoats RP - 05.037-001	1	45	36.13	36.69	1.54 %
Ancoats RP - 05.038-001	1	45.3	38.47	40.03	3.88 %
Ancoats RP - 05.039-001	1	69	38.13	43.50	12.36 %
Totals:	10	587.6	306.68	341.72	
Average DFEE = 30.37 kWh/m ² /yr		% DFEE/TFEE	PASS		
Average TFEE = 34.02 kWh/m ² /yr		10.73 %			

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 04.030	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	82 B	DER	19.91	TER	22.91
Environmental	86 B	% DER<TER	13.09		
CO ₂ Emissions (t/year)	1.08	DFEE	28.63	TFEE	34.63
General Requirements Compliance	Fail	% DFEE<TFEE	17.32		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 23.60 m	Internal Floor Area 66.40 m ²	Average Storey Height 2.40 m

7.0 Living Area	33.15	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Low	
Thermal Mass	100.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Steel Frame	0.17	56.64	48.74

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	20.70
Heated Corridor	Filled Cavity with Edge Sealing		0.00	51.74

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					7.90	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	3.48	0.300	No
Table K1 - Approved	E3 Sill	3.48	0.040	No
Table K1 - Approved	E4 Jamb	9.08	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	47.19	0.070	No
Table K1 - Approved	E16 Corner (normal)	2.70	0.090	No
Table K1 - Approved	E17 Corner (inverted – internal area greater than external area)	5.40	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	2.70	0.060	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	53.66	0.000	No

Y-value	0.086	W/m²K
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18.0 Pressure Testing

Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Trickle vents only
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	0.10

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93.00
Wet Rooms	2

20.0 Fans, Open Fireplaces, Flues

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

22.0 Lighting

Internal

Total number of light fittings

Total number of L.E.L. fittings

Percentage of L.E.L. fittings %

External

External lights fitted

Light and motion sensor

23.0 Electricity Tariff

24.0 Main Heating 1

Percentage of Heat %

Main Heating

SAP Code

Efficiency (SAP Table) %

Controls

Sap Code

25.0 Main Heating 2

Community Heating

28.0 Water Heating

Water Heating

Flue Gas Heat Recovery System

Waste Water Heat Recovery Instantaneous System 1

Waste Water Heat Recovery Instantaneous System 2

Waste Water Heat Recovery Storage System

Solar Panel

Water use <= 125 litres/person/day

SAP Code

Immersion Heater

29.0 Hot Water Cylinder

Cylinder In Heated Space

Insulation Type

Cylinder Volume L

Loss kWh/day

32.0 Photovoltaic Unit

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)



Apportioned kWh/Year

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 04.031	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	81 B	DER	23.97	TER	27.52
Environmental	85 B	% DER<TER	12.91		
CO ₂ Emissions (t/year)	0.93	DFEE	34.58	TFEE	41.56
General Requirements Compliance	Fail	% DFEE<TFEE	16.80		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twcconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South East
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 19.75 m	Internal Floor Area 46.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	28.89	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Low	
Thermal Mass	100.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Steel Frame	0.17	47.40	39.50

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	21.22
Heated Corridor	Filled Cavity with Edge Sealing		0.00	32.21

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	North West	None	0.00					7.90	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	3.48	0.300	No
Table K1 - Approved	E3 Sill	3.48	0.040	No
Table K1 - Approved	E4 Jamb	18.16	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	39.50	0.070	No
Table K1 - Approved	E16 Corner (normal)	5.40	0.090	No
Table K1 - Approved	E18 Party wall between dwellings	2.70	0.060	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	27.65	0.000	No

Y-value	0.116	W/m²K
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18.0 Pressure Testing

Yes

Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Trickle vents only
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	0.10

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93.00
Wet Rooms	2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Number of open flues	0	0	0
Number of intermittent fans			0
Number of passive vents			0
Number of flueless gas fires			0

21.0 Fixed Cooling System

	No
--	----

22.0 Lighting

Internal

Total number of light fittings	10
Total number of L.E.L. fittings	10
Percentage of L.E.L. fittings	100.00 %

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

	Standard
--	----------

24.0 Main Heating 1

	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603

25.0 Main Heating 2

	None
--	------

28.0 Water Heating

Community Heating	None
	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

29.0 Hot Water Cylinder

	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day

32.0 Photovoltaic Unit

	More Dwellings, One Block
Apportioned	300.00 kWh/Year

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 04.032	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	84 B	DER	17.59	TER	20.73
Environmental	87 B	% DER<TER	15.13		
CO ₂ Emissions (t/year)	1.01	DFEE	23.17	TFEE	26.88
General Requirements Compliance	Fail	% DFEE<TFEE	13.78		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.77 m	Internal Floor Area 66.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	39.19	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Low	
Thermal Mass	100.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Steel Frame	0.17	45.05	38.16

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	42.89
Heated Corridor	Filled Cavity with Edge Sealing		0.00	8.07

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Side	Window	[1] External Wall 1	South East	None	0.00					6.89	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	2.61	0.300	No
Table K1 - Approved	E3 Sill	2.61	0.040	No
Table K1 - Approved	E4 Jamb	11.88	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	37.54	0.070	No
Table K1 - Approved	E16 Corner (normal)	2.70	0.090	No
Table K1 - Approved	E18 Party wall between dwellings	5.40	0.060	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	37.75	0.000	No

Y-value	0.104	W/m²K
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18.0 Pressure Testing

Yes

Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Trickle vents only
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	0.10

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93.00
Wet Rooms	2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Number of open flues	0	0	0
Number of intermittent fans			0
Number of passive vents			0
Number of flueless gas fires			0

21.0 Fixed Cooling System

	No
--	----

22.0 Lighting

Internal

Total number of light fittings	10
Total number of L.E.L. fittings	10
Percentage of L.E.L. fittings	100.00 %

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

	Standard
--	----------

24.0 Main Heating 1

	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603

25.0 Main Heating 2

	None
--	------

28.0 Water Heating

Community Heating	None
	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

29.0 Hot Water Cylinder

	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day

32.0 Photovoltaic Unit

	More Dwellings, One Block
Apportioned	300.00 kWh/Year

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 04.033	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	85 B	DER	15.39	TER	18.84
Environmental	88 B	% DER<TER	18.31		
CO ₂ Emissions (t/year)	0.95	DFEE	17.49	TFEE	17.98
General Requirements Compliance	Fail	% DFEE<TFEE	2.71		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 8.25 m	Internal Floor Area 66.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	39.19	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Low	
Thermal Mass	100.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Steel Frame	0.17	19.80	14.63

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	22.30
Heated Corridor	Filled Cavity with Edge Sealing		0.00	38.55

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.17	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	2.61	0.300	No
Table K1 - Approved	E3 Sill	2.61	0.040	No
Table K1 - Approved	E4 Jamb	11.88	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	16.51	0.070	No
Table K1 - Approved	E16 Corner (normal)	2.70	0.090	No
Table K1 - Approved	E18 Party wall between dwellings	2.70	0.060	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	45.08	0.000	No

Y-value	0.154	W/m²K
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18.0 Pressure Testing

Yes

Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Trickle vents only
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	0.10

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93.00
Wet Rooms	2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Number of open flues	0	0	0
Number of intermittent fans			0
Number of passive vents			0
Number of flueless gas fires			0

21.0 Fixed Cooling System

	No
--	----

22.0 Lighting

Internal

Total number of light fittings	10
Total number of L.E.L. fittings	10
Percentage of L.E.L. fittings	100.00 %

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

	Standard
--	----------

24.0 Main Heating 1

	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603

25.0 Main Heating 2

	None
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28.0 Water Heating

Community Heating	None
	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

29.0 Hot Water Cylinder

	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day

32.0 Photovoltaic Unit

	More Dwellings, One Block
Apportioned	300.00 kWh/Year

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 04.034	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	85 B	DER	18.21	TER	22.74
Environmental	89 B	% DER<TER	19.93		
CO ₂ Emissions (t/year)	0.75	DFEE	20.44	TFEE	21.21
General Requirements Compliance	Fail	% DFEE<TFEE	3.63		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 8.26 m	Internal Floor Area 45.30 m ²	Average Storey Height 2.40 m

7.0 Living Area	25.00	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Low	
Thermal Mass	100.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Steel Frame	0.17	19.82	14.65

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	22.63
Heated Corridor	Filled Cavity with Edge Sealing		0.00	38.55

10.1 Party Ceilings			
Description	Construction		Area (m ²)

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.17	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	2.61	0.300	No
Table K1 - Approved	E3 Sill	2.61	0.040	No
Table K1 - Approved	E4 Jamb	11.88	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	16.51	0.070	No
Table K1 - Approved	E16 Corner (normal)	2.70	0.090	No
Table K1 - Approved	E18 Party wall between dwellings	2.70	0.060	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	45.08	0.000	No

Y-value	0.153	W/m²K
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18.0 Pressure Testing

Yes

Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Trickle vents only
Cross ventilation possible	No
Night Ventilation	No
Air change rate	0.10

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93.00
Wet Rooms	2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Number of open flues	0	0	0
Number of intermittent fans			0
Number of passive vents			0
Number of flueless gas fires			0

21.0 Fixed Cooling System

	No
--	----

22.0 Lighting

Internal

Total number of light fittings	10
Total number of L.E.L. fittings	10
Percentage of L.E.L. fittings	100.00 %

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

	Standard
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24.0 Main Heating 1

	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603

25.0 Main Heating 2

	None
--	------

28.0 Water Heating

Community Heating	None
	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

29.0 Hot Water Cylinder

	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day

32.0 Photovoltaic Unit

	More Dwellings, One Block
Apportioned	300.00 kWh/Year

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 04.035	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	84 B	DER	17.45	TER	20.45
Environmental	87 B	% DER<TER	14.68		
CO ₂ Emissions (t/year)	1.03	DFEE	23.10	TFEE	26.65
General Requirements Compliance	Fail	% DFEE<TFEE	13.30		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 18.55 m	Internal Floor Area 69.00 m ²	Average Storey Height 2.40 m

7.0 Living Area	39.19	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Low	
Thermal Mass	100.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Steel Frame	0.17	44.52	37.63

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Filled Cavity with Edge Sealing	0.00	44.93
Heated Corridor	Filled Cavity with Edge Sealing	0.00	7.02

10.1 Party Ceilings		Area (m ²)
Description	Construction	

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacture	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					6.89	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	3.48	0.300	No
Table K1 - Approved	E3 Sill	3.48	0.040	No
Table K1 - Approved	E4 Jamb	15.84	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	37.10	0.070	No
Table K1 - Approved	E16 Corner (normal)	2.70	0.090	No
Table K1 - Approved	E18 Party wall between dwellings	5.40	0.060	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	38.48	0.000	No

Y-value

0.115

W/m²K

18.0 Pressure Testing

Yes

Designed AP₅₀

3.00

m³/(h.m²) @ 50 Pa

Property Tested ?

As Built AP₅₀

m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather

Trickle vents only

Cross ventilation possible

No

Night Ventilation

No

Air change rate

0.10

Mechanical Ventilation

Mechanical Ventilation System Present

Yes

Approved Installation

Yes

Mechanical Ventilation data Type

Database

Type

Balanced mechanical ventilation with heat recovery

MV Reference Number

500565

Configuration

2

MVHR Duct Insulated

Yes

Manufacturer SFP

0.61

Duct Type

Rigid

MVHR Efficiency

93.00

Wet Rooms

2

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Number of open flues	0	0	0
Number of intermittent fans			0
Number of passive vents			0
Number of flueless gas fires			0

21.0 Fixed Cooling System

	No
--	----

22.0 Lighting

Internal

Total number of light fittings	10
Total number of L.E.L. fittings	10
Percentage of L.E.L. fittings	100.00 %

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

	Standard
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24.0 Main Heating 1

	SAP table
Percentage of Heat	100 %
Main Heating	REA
SAP Code	691
Efficiency (SAP Table)	100.0 %
Controls	CRC Programmer and appliance thermostats
Sap Code	2603

25.0 Main Heating 2

	None
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28.0 Water Heating

Community Heating	None
	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

29.0 Hot Water Cylinder

	Hot Water Cylinder
Cylinder In Heated Space	Yes
Insulation Type	Measured Loss
Cylinder Volume	150.00 L
Loss	1.13 kWh/day

32.0 Photovoltaic Unit

	More Dwellings, One Block
Apportioned	300.00 kWh/Year

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 05.036	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	80 C	DER	25.34	TER	26.15
Environmental	84 B	% DER<TER	3.09		
CO ₂ Emissions (t/year)	1.24	DFEE	41.77	TFEE	45.62
General Requirements Compliance	Fail	% DFEE<TFEE	8.44		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 26.40 m	Internal Floor Area 66.90 m ²	Average Storey Height 2.40 m

7.0 Living Area	39.19	m ²
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8.0 Thermal Mass Parameter	Simple calculation - High	
Thermal Mass	450.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Steel Frame	0.17	63.36	54.74

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	22.30
Heated Corridor	Filled Cavity with Edge Sealing		0.00	8.07

10.0 External Roofs				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Roof 1	External Flat Roof	0.15	66.90	66.90

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Side	Window	[1] External Wall 1	South East	None	0.00					5.17	
Opening 2	Window	[1] External Wall 1	North West	None	0.00					3.45	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	4.35	0.300	No
Table K1 - Approved	E3 Sill	4.35	0.040	No
Table K1 - Approved	E4 Jamb	19.80	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	26.40	0.070	No
Table K1 - Default	E14 Flat roof	26.40	0.080	No
Table K1 - Approved	E16 Corner (normal)	8.10	0.090	No
Table K1 - Approved	E18 Party wall between dwellings	2.70	0.060	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	11.25	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	11.25	0.240	No

Y-value	0.077	W/m²K
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18.0 Pressure Testing

Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
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Property Tested ?		
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As Built AP ₅₀		m³/(h.m²) @ 50 Pa
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19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Trickle vents only
Cross ventilation possible	No
Night Ventilation	No
Air change rate	0.10

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93.00
Wet Rooms	2

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings	10	
Total number of L.E.L. fittings	10	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	

25.0 Main Heating 2

None

Community Heating None

28.0 Water Heating

	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

29.0 Hot Water Cylinder

	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

32.0 Photovoltaic Unit

Apportioned

More Dwellings, One Block

300.00

kWh/Year

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 05.037	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	81 B	DER	25.12	TER	26.71
Environmental	85 B	% DER<TER	5.95		
CO ₂ Emissions (t/year)	0.94	DFEE	35.63	TFEE	36.00
General Requirements Compliance	Fail	% DFEE<TFEE	1.03		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 8.26 m	Internal Floor Area 45.00 m ²	Average Storey Height 2.40 m

7.0 Living Area	31.40	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Low	
Thermal Mass	100.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Steel Frame	0.17	19.82	14.65

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	22.63
Heated Corridor	Filled Cavity with Edge Sealing		0.00	38.55

10.0 External Roofs				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Roof 1	External Flat Roof	0.15	45.00	45.00

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.17	

14.0 Conservatory

15.0 Draught Proofing

 %

16.0 Draught Lobby

17.0 Thermal Bridging

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	2.61	0.300	No
Table K1 - Approved	E3 Sill	2.61	0.040	No
Table K1 - Approved	E4 Jamb	11.88	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	8.26	0.070	No
Table K1 - Default	E14 Flat roof	8.26	0.080	No
Table K1 - Approved	E16 Corner (normal)	2.70	0.090	No
Table K1 - Approved	E18 Party wall between dwellings	2.70	0.060	No
Table K1 - Default	E25 Staggered party wall between dwellings	2.70	0.120	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	22.54	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	22.54	0.240	No

Y-value	0.137	W/m²K
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18.0 Pressure Testing

Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Trickle vents only
Cross ventilation possible	No
Night Ventilation	No
Air change rate	0.10

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93.00
Wet Rooms	2

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings	10	
Total number of L.E.L. fittings	10	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	

25.0 Main Heating 2

None

Community Heating None

28.0 Water Heating

	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

29.0 Hot Water Cylinder

	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

32.0 Photovoltaic Unit

Apportioned

More Dwellings, One Block

300.00

kWh/Year

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 05.038	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	80 C	DER	26.71	TER	27.96
Environmental	84 B	% DER<TER	4.48		
CO ₂ Emissions (t/year)	1.01	DFEE	38.77	TFEE	40.45
General Requirements Compliance	Fail	% DFEE<TFEE	4.14		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 15.08 m	Internal Floor Area 45.30 m ²	Average Storey Height 2.40 m

7.0 Living Area	31.40	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Low	
Thermal Mass	100.00	kJ/m ² K

9.0 External Walls		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Wall 1	Steel Frame	0.17	36.19	31.02

9.1 Party Walls		U-Value (W/m ² K)	Area (m ²)
Description	Type Construction		
Party Wall 1	Filled Cavity with Edge Sealing	0.00	22.30
Heated Corridor	Filled Cavity with Edge Sealing	0.00	38.55

10.0 External Roofs		U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
Description	Type			
External Roof 1	External Flat Roof	0.15	45.30	45.30

11.1 Party Floors		Area (m ²)
Description	Construction	

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Rear	Window	[1] External Wall 1	South East	None	0.00					5.17	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	2.61	0.300	No
Table K1 - Approved	E3 Sill	2.61	0.040	No
Table K1 - Approved	E4 Jamb	11.88	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	8.26	0.070	No
Table K1 - Default	E14 Flat roof	8.26	0.080	No
Table K1 - Approved	E16 Corner (normal)	2.70	0.090	No
Table K1 - Approved	E18 Party wall between dwellings	2.70	0.060	No
Table K1 - Default	E25 Staggered party wall between dwellings	2.70	0.120	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	22.54	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	22.54	0.240	No

Y-value	0.109	W/m²K
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18.0 Pressure Testing

Designed AP ₅₀	Yes	
Property Tested ?	3.00	m³/(h.m²) @ 50 Pa
As Built AP ₅₀		
		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Trickle vents only
Cross ventilation possible	No
Night Ventilation	No
Air change rate	0.10

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93.00
Wet Rooms	2

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings	10	
Total number of L.E.L. fittings	10	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

	SAP table	
Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	

25.0 Main Heating 2

None

Community Heating None

28.0 Water Heating

	HEI Immersion
Water Heating	Independent
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

29.0 Hot Water Cylinder

	Hot Water Cylinder	
Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

32.0 Photovoltaic Unit

Apportioned

More Dwellings, One Block

300.00

kWh/Year

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Ancoats RP - 05.039	Issued on Date	07/04/2021
Assessment Reference	001	Prop Type Ref	
Property			

SAP Rating	78 C	DER	25.07	TER	25.66
Environmental	82 B	% DER<TER	2.30		
CO ₂ Emissions (t/year)	1.41	DFEE	38.51	TFEE	44.05
General Requirements Compliance	Fail	% DFEE<TFEE	12.57		

Assessor Details	Mr. Steven Johnson, Steven Johnson, Tel: 0795607219, steven.johnson@twccconsulting.com	Assessor ID	e623-0001
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Client	
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SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South West
Property Tenure	Owner-occupied
Transaction Type	New dwelling
Terrain Type	Urban
1.0 Property Type	Flat, Mid-Terrace
2.0 Number of Storeys	1
3.0 Date Built	2021
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements				
	Ground Floor:	Heat Loss Perimeter 29.48 m	Internal Floor Area 69.00 m ²	Average Storey Height 2.40 m

7.0 Living Area	39.19	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Low	
Thermal Mass	100.00	kJ/m ² K

9.0 External Walls				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Wall 1	Steel Frame	0.17	70.75	63.86

9.1 Party Walls				
Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	22.48
Heated Corridor	Filled Cavity with Edge Sealing		0.00	12.15

10.0 External Roofs				
Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Roof 1	External Flat Roof	0.15	69.00	69.00

11.1 Party Floors			
Description	Construction		Area (m ²)

12.0 Opening Types

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Window	Manufacturer	Window	Double Low-E Soft 0.1			0.63		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Side	Window	[1] External Wall 1	South East	None	0.00					6.89	

14.0 Conservatory

None

15.0 Draught Proofing

100

%

16.0 Draught Lobby

No

17.0 Thermal Bridging

Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	3.48	0.300	No
Table K1 - Approved	E3 Sill	3.48	0.040	No
Table K1 - Approved	E4 Jamb	15.84	0.050	No
Table K1 - Approved	E7 Party floor between dwellings (in blocks of flats)	29.48	0.070	No
Table K1 - Default	E14 Flat roof	29.48	0.080	No
Table K1 - Approved	E16 Corner (normal)	8.10	0.090	No
Table K1 - Approved	E17 Corner (inverted – internal area greater than external area)	2.70	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	2.70	0.060	No
Table K1 - Default	P3 Party wall - Intermediate floor between dwellings (in blocks of flats)	12.82	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	12.82	0.240	No

Y-value	0.072	W/m²K
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18.0 Pressure Testing

Yes

Designed AP ₅₀	3.00	m³/(h.m²) @ 50 Pa
Property Tested ?		
As Built AP ₅₀		m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Trickle vents only
Cross ventilation possible	No
Night Ventilation	No
Air change rate	0.10

Mechanical Ventilation

Mechanical Ventilation System Present	Yes
Approved Installation	Yes
Mechanical Ventilation data Type	Database
Type	Balanced mechanical ventilation with heat recovery
MV Reference Number	500565
Configuration	2
MVHR Duct Insulated	Yes
Manufacturer SFP	0.61
Duct Type	Rigid
MVHR Efficiency	93.00
Wet Rooms	2

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				0
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings	10	
Total number of L.E.L. fittings	10	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	Yes
Light and motion sensor	Yes

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

Percentage of Heat	100	%
Main Heating	REA	
SAP Code	691	
Efficiency (SAP Table)	100.0	%
Controls	CRC Programmer and appliance thermostats	
Sap Code	2603	

25.0 Main Heating 2

None

Community Heating None

28.0 Water Heating

Water Heating	HEI Immersion
Flue Gas Heat Recovery System	Independent
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	903
Immersion Heater	Dual

29.0 Hot Water Cylinder

Cylinder In Heated Space	Yes	
Insulation Type	Measured Loss	
Cylinder Volume	150.00	L
Loss	1.13	kWh/day

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

32.0 Photovoltaic Unit

Apportioned

More Dwellings, One Block

300.00

kWh/Year

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

None

APPENDIX 3

Broadband Connectivity Assessment

GTech Surveys Limited

Broadband Connectivity Assessment

Ancoats Dispensary

CHANGE HISTORY

Issue	Date	Details of Changes
0.0	25/03/2021	Working draft
0.1	31/03/2021	First draft issue
1.0	01/04/2021	First issue - minor editing
Author: G Phillips		Reviewer: O Lloyd

Contents	Page
GTech Surveys Limited	
Executive Summary	
1 - Introduction	4
2 - External Infrastructure Telecommunications Utility Providers	6
3 - BT Openreach External Infrastructure Availability	7
4 - Virgin Media External Infrastructure Availability	9
5 - Developer's Guidance and Responsibility	10
6 - Conclusions	13
Appendix	14
Broadband Connection Definitions	
Planning Policies	
Data Ducting Infrastructure for New Homes - Guidance Note, March 2008, Department for Communities and Local Government	

GTech Surveys Limited

GTech Surveys Limited is a Midlands based broadcast and telecommunications consultancy conducting projects throughout the entire UK. We undertake mobile phone network, television and radio reception surveys (pre- and post-construction signal surveys), conduct broadcast interference and reception investigations, and support telecommunications planning work for wind energy developers, construction companies, architects, broadcasters and Local Planning Authorities.

In addition to radio interference modelling services and television reception surveys, we produce EIA and ES Telecommunications Chapters (also known as an 'Electronic Interference Chapter'); satisfying the requirements of Part 5, Regulation 18 (Parts 5a and 5b) of The Town and Country Planning EIA Regulations 2017. We peer review ES and EIA work, liaising with telecommunications providers (Arqiva, BT etc.) and advise developers with respect to associated Section 106 (Town and Country Planning Act 1990) and Section 75 (Town and Country Planning (Scotland) Act 1997) agreements.

GTech Surveys Limited is a consultant member of the Trade Association for Content Delivery - (Confederation of Aerial Industries Ltd - CAI) and the RDI - the digital sector's professional body and trade organisation. We are listed on Constructionline and verified as a Safety Schemes in Procurement (SSIP) member by Safety Management Advisory Services (SMAS), making us compliant with the industry standard PAS 91:2013 + A1:2017.

Professional broadcast trained project engineers deliver, and supply QBE insured technical products to support planning applications, discharge planning conditions (including S106 Agreements) and for due diligence. For more information about GTech Surveys Limited please visit our website - www.gtechsurveys.com



GTech Surveys Ltd.
Accountancy House,
4 Priory Road,
Kenilworth,
Warwickshire,
CV8 1LL.

T: +44(0) 1926 744771



Executive Summary

A desk-based assessment has been undertaken to determine the current availability of broadband services near to and adjacent to the proposed Ancoats Dispensary development. Under Manchester City Council (MCC) planning guidance, certain sized developments require a broadband connectivity assessment. Further guidance can be found in this document; "*Full, Outline, Reserved Matters & Variation/Removal of Conditions Planning Applications - Is Your Application Valid?*", September 2018, MCC. The requirement states;

Broadband Connectivity Assessment

All new build residential developments must incorporate measures to facilitate digital connectivity for all new build residential properties having regard to the Data Ducting Infrastructure Guidance produced by the Department for Communities and Local Government. (Section 10 - National Planning Policy Framework (NPPF))

The findings of the assessment indicate that existing infrastructure and good connectivity is already available, with existing fibre installed along streets adjacent to the proposed development. Excellent download speeds are available. It is suggested that the developer engages with BT Openreach to facilitate a connection to their fibre network.

The developer will commit to enable the Proposed Development for robust connectivity and future-proof upgrading by following the guidance presented in *Data Ducting Infrastructure for New Homes - Guidance Note*, March 2008, Department for Communities and Local Government.

This report can be used for reference and to support the planning application submission.

1 - Introduction

This report is prepared in support of an application for planning permission for the proposed Ancoats Dispensary development. The proposal comprises of the redevelopment of the existing Ancoats Dispensary site to include 39 No. Apartments. This report has been prepared by GTech Surveys Limited for the applicant.

Under Manchester City Council (MCC) planning guidance, certain sized developments require a broadband connectivity assessment. Further guidance can be found in this document; "*Full, Outline, Reserved Matters & Variation/Removal of Conditions Planning Applications - Is Your Application Valid?*", September 2018, MCC. The requirement states;

Broadband Connectivity Assessment

All new build residential developments must incorporate measures to facilitate digital connectivity for all new build residential properties having regard to the Data Ducting Infrastructure Guidance produced by the Department for Communities and Local Government. (Section 10 - National Planning Policy Framework (NPPF)¹)

The assessment details the results of licensed and other available information to address requirements regarding potential broadband connectivity. Figure 1 shows the location of the site.

¹ NPPF Section 10, February 2019, (Ministry of Housing, Communities & Local Government);

10. Supporting high quality communications

112. Advanced, high quality and reliable communications infrastructure is essential for economic growth and social well-being. Planning policies and decisions should support the expansion of electronic communications networks, including next generation mobile technology (such as 5G) and full fibre broadband connections. Policies should set out how high-quality digital infrastructure, providing access to services from a range of providers, is expected to be delivered and upgraded over time; and should prioritise full fibre connections to existing and new developments (as these connections will, in almost all cases, provide the optimum solution).

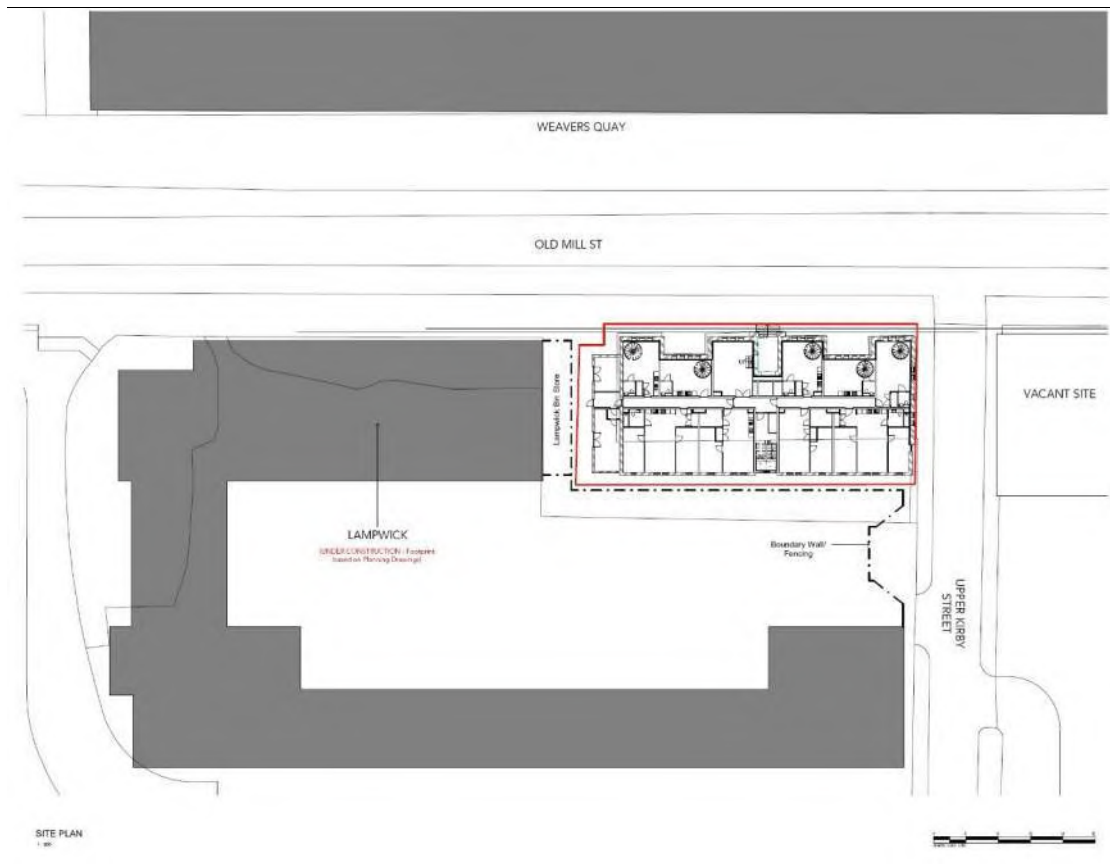


Figure 1 – The Location of the Application Site

This report follows the following structure:

Chapter 1 introduces the work and the scheme

Chapter 2 lists which external infrastructure telecommunications utility providers are operating in the area, with which technology and what likely upload and download speeds are available

Chapter 3 describes the existing local BT Openreach infrastructure around the site (as of 31st March 2021)

Chapter 4 describes the existing local Virgin Media infrastructure around the site (as of 31st March 2021)

Chapter 5 provides guidance for the developer at various phases of the planning process to facilitate an understanding of potential connectivity

Chapter 6 presents the conclusion

This study was undertaken during March 2021 to provide information regarding the connectivity around the site and the availability of local broadband services. This report can be used for reference and to support the planning application submission.

2 - External Infrastructure Telecommunications Utility Providers

A number of telecommunications companies and providers exist and operate in the Manchester area. Not all will currently have any infrastructure in operation near the site. Database integration indicates that the following providers are active at the postcode centroid.

Provider	Type of Service ²
BT Wholesale	ADSL
BT Wholesale	ADSL Max
BT Wholesale	WBC (21CN)
BT	FTTC
Vodafone	LLU
TalkTalk (CPW) ³	LLU
Sky Broadband	
Virgin Media (Cable)	

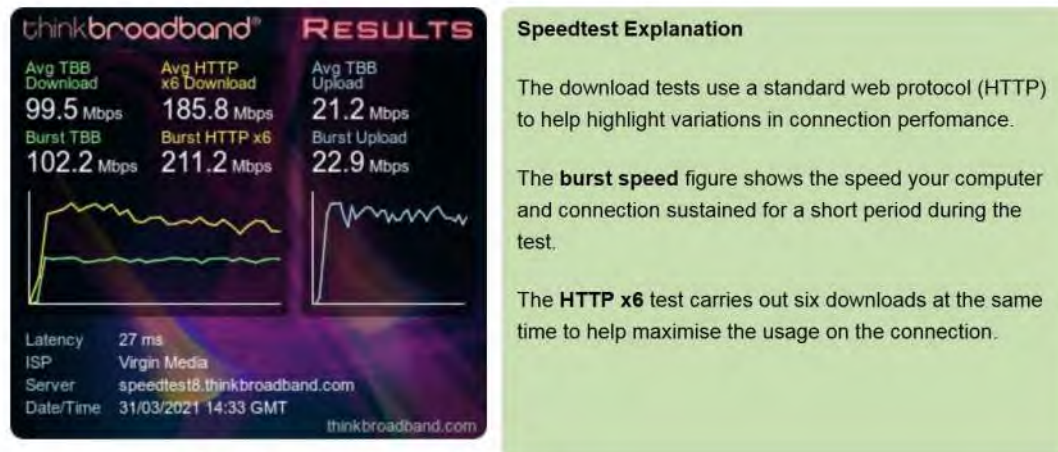
Potential Download Speeds

The postcode centroid is well served with download speeds up to 186 megabits per second available.

We have tested the speed of the connection and have recorded an average download speed of:

185.80 Mbps

We have performed a number of tests looking at your download speed, upload speed and latency. You can see the results of these in the graph below.

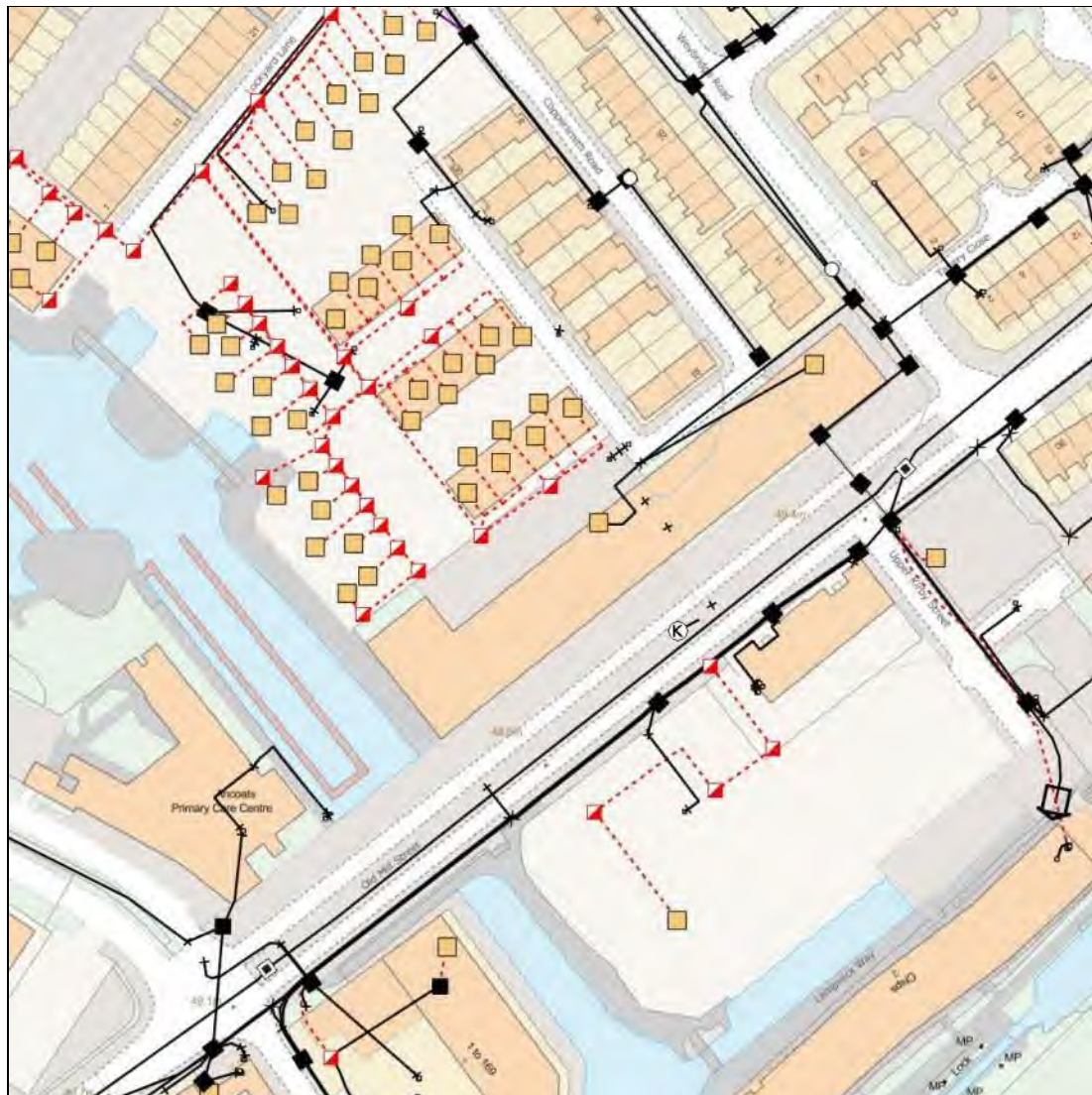


Your average upload speed was recorded as: 21.23 Mbps.

² Appendix - Broadband Connection Definitions for definitions

³ Car Phone Warehouse (CPW)

3 - BT Openreach External Infrastructure Availability



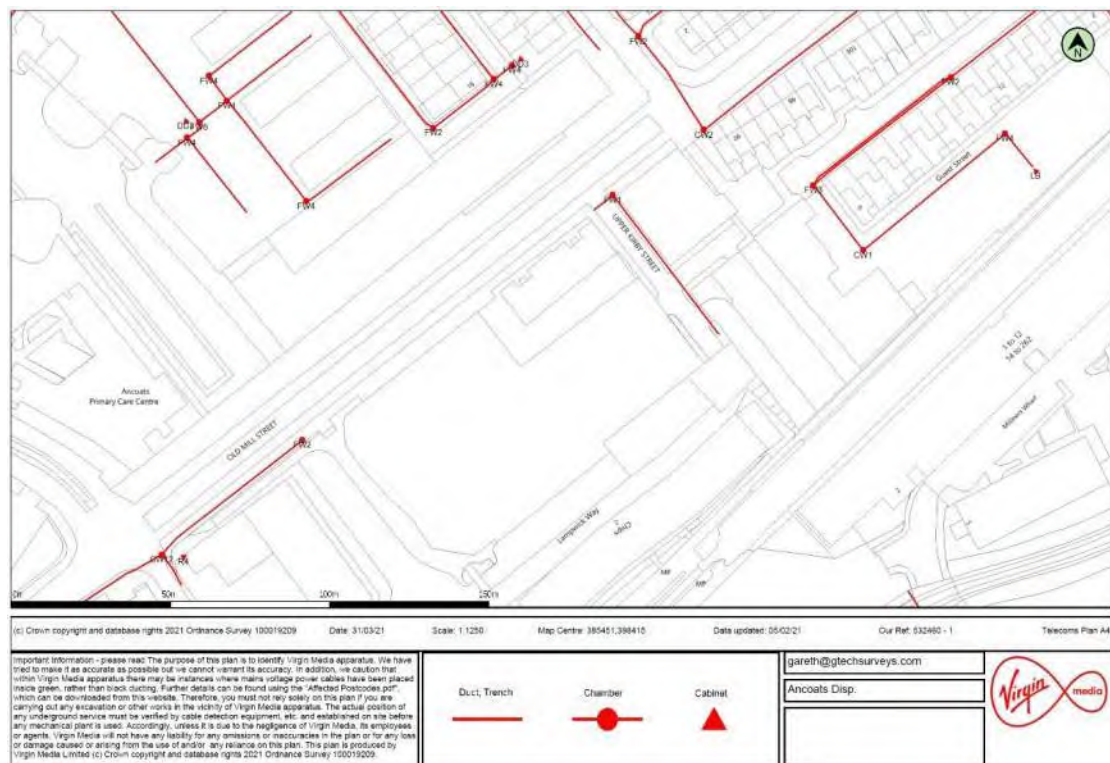
KEY TO BT SYMBOLS			Change Of State	+	Hatchings	
	<i>Planned</i>	<i>Live</i>	Split Coupling		Built	
PCP			Duct Tee		Planned	
Pole			Building		Inferred	
Box			Kiosk		Duct	
Manhole			Other proposed plant is shown using dashed lines. BT Symbols not listed above may be disregarded. Existing BT Plant may not be recorded. Information valid at time of preparation. Maps are only valid for 90 days after the date of publication.			
Cabinet						
	<i>Pending Add</i>	<i>In Place</i>	<i>Pending Remove</i>	<i>Not In Use</i>		
Power Cable						
Power Duct				N/A.		

BT Ref : HCR03484V
 Map Reference : (centre) SJ8538998444
 Easting/Northing : (centre) 385389,398444
 Issued : 31/03/2021 15:48:16

BT Openreach has a universal service obligation (USO) granting remote households the right to request broadband speeds of at least 10 Mbit/s by 2020. As part of their obligation, BT Openreach are aggressively installing new fibre and infrastructure throughout the UK and enhancing coverage in major cities.

Based on BT database interrogation on 31st March 2021, there is existing good BT Openreach infrastructure surrounding the site and to the site, with existing fibre installed along streets adjacent to the application site.

4 - Virgin Media External Infrastructure Availability



Based on Virgin Media's reply on 31st March 2021, there is existing infrastructure surrounding the site, however, not directly to the site.

5 - Developer's Guidance and Responsibility

At the Pre-Application Stage

Broadband connectivity is most helpfully and effectively raised at the earliest possible stage of the planning process. This can help to ensure that the need to provide superfast broadband connectivity is considered in prospective applicants' layout planning and costings before proposals reach the planning application stage. At the pre-application stage, prospective applicants:

- Will be reminded of the requirements of local guidance and Section 10 (NPPF) concerning broadband connectivity, i.e. the provision of superfast broadband connectivity;
- Will be advised that occupiers of the proposed development should be able to arrange access to superfast broadband immediately at the point of occupation;
- Will be encouraged to liaise with broadband providers at an early stage to identify whether the proposed development could be connected to existing infrastructure or whether additional infrastructure would be required, and how this would be provided.

For larger developments of 30 or more new homes, the council will also remind developers of the aspiration for full fibre technology and the benefits to future occupiers. Although this is not currently a requirement of local policy, this is the level at which some providers will consider providing full fibre solutions free-of-charge to the developer, if given sufficient notice.

At the Application Stage

Applications for planning permission for major development should be accompanied by evidence of the superfast broadband connectivity of the site, such as this report. This should take the form of a connectivity assessment, or similar proof, from one or more broadband infrastructure providers evidencing the availability of at least superfast broadband speeds. This can be submitted as part of a sustainability statement accompanying the application.

Where superfast broadband connectivity is available, the development should include the infrastructure to connect to this service and make it available to occupiers.

Where superfast broadband connectivity is not currently available:

- Applications should be accompanied by evidence that discussions have been held with a range of providers to upgrade infrastructure to deliver superfast broadband or, for developments of 30 or more homes, full fibre connections.

- Where one or more providers have agreed to provide superfast broadband connectivity, the development should be designed to connect to this service and make it available to occupiers.
- Where no provider has agreed to provide superfast broadband connectivity, the development should incorporate additional dedicated telecommunications ducting to enable the provision of superfast broadband in future.

Internal Infrastructure

With respect to the internal layouts and necessary infrastructure to provide connectivity in the proposed development, guidance has been published. The recommendations presented to the developer are specified in “Data Ducting Infrastructure for New Homes - Guidance Note”, March 2008, Department for Communities and Local Government. Section 2.3 is presented in the Appendix.

This presentation by Virgin Media provides an excellent guide to how installations should be planned -

<https://www.virginmedia.com/content/dam/virginmedia/dotcom/images/shop/downloads/New-Build-Handbook-v1-63.pdf>

Contacting Broadband Providers

Superfast broadband connectivity is often available from broadband providers free of charge for development over a certain scale, provided that sufficient notice is given, typically at least 12 months prior to first occupation. In some cases, providers may request a contribution from the developer.

The developer is recommended to visit the following websites and arrange suitable connection to a superfast broadband provider and to discuss full fibre connection for the propose development.

Provided they have enough notice, telecoms providers will typically cover the cost of fibre to the premises (FTTP) for developments of 30+ homes. This is not an exhaustive list of broadband providers in the city.

BT Openreach -

<https://www.ournetwork.openreach.co.uk/>

Virgin Media -

<http://www.virginmedia.com/lightning/network-expansion/property-developers>

In summary, Virgin Media are able to assist further with planning a full fibre connection, *“Should the request be in relation to a Residential New Development, Virgin Media would like the opportunity to assist with your diversionary quote and serve your site free of charge, offering your customers the fastest widely available broadband speeds on the market up to 500Mbps.*

For Commercial New Developments our team can also be reached through the below link, ensuring future businesses to your site are connected to our fibre network.

Simply head over to www.virginmedia.com/developer to fill in the enquiry form, and a member of our New Developments team will be in touch within 48 hours, or call the Diversionary Team on: 0800 408 0088 Option 1.

6 - Conclusions

A desktop study has been undertaken to assess the potential for broadband connectivity to the proposed Ancoats Dispensary development in Manchester. The study has utilised licensed information and current technical data regarding availability from a number of sources.

The area already has very good download speeds (locally up to 185 megabits per second). Both BT Openreach and Virgin Media both have existing fibre infrastructure in place around the application site, however BT is better placed to enable a full fibre to the premises connection.

It is recommended that the developer engage with a broadband infrastructure provider in order to establish the most optimal data infrastructure solution for the Proposed Development. It is considered that BT Openreach offers the easiest connection due to the proximity of their nearest nodes to the application site.

Full fibre connections represent the most future-proof form of infrastructure. New development should look to increase the spread of full fibre connections, which have the potential to boost the city's economy; help businesses grow and be more productive; help Manchester compete with other cities and provide more symmetrical upload / download speeds for residents and businesses. Full fibre connections also offer greater reliability and lower energy / maintenance costs.

The developer ensures that the Proposed Development has the correct data ducting infrastructure in place to facilitate future-proof connectivity for all potential occupants, as presented in *Data Ducting Infrastructure for New Homes - Guidance Note*, March 2008, Department for Communities and Local Government.

This report can be used for reference and to support the planning application submission.

APPENDIX

Broadband Connection Definitions

Planning Policies

Data Ducting Infrastructure for New Homes - Guidance Note, March 2008,
Department for Communities and Local Government

Broadband Connection Definitions

ADSL - Asymmetric Digital Subscriber Line broadband is a connection provided over home telephone lines. Openreach owns the UK's landline infrastructure, so when you have an ADSL connection, you need to rent your phone line from Openreach. If you already have an existing phone line, the broadband is added onto the package. Openreach was previously owned by BT, but ADSL packages can be sold by providers other than BT through a process known as local loop unbundling (LLU). This means that a secondary provider, for example Plusnet or TalkTalk, put their own software in the telephone exchanges and rent line and exchange space from Openreach. Although not as fast as fibre broadband, ADSL provides a high-quality, reliable connection. But if you live far away from your telephone exchange, or if the cable has degraded, then speeds can drop dramatically.

FTTB (fibre to the building/basement) - Fibre-optic cables run all the way to your premises, which is why this is sometimes called **FTTP** (fibre to the premises). For those in flats in a large building, the fibre terminates at the building rather than the individual dwelling. It still provides very fast speeds.

FTTC (fibre to the cabinet) - Fibre-optic cables run all the way to the cabinet in the street, which can be up to 300m away. The cabinet is connected to the property with regular copper wires, which results in a loss of speed. This is the most common connection.

FTTH (fibre to the home) - Fibre-optic cables run all the way to the outside of the property. This is the quickest service, delivering speeds of up to 900Mbps, but it's not widely available.

FTTN (fibre to the node) - Roughly the same as above, only the street cabinet can be further away; up to several km away, with the rest of the distance to the property being covered by regular copper wiring.

LLU - LLU stands for local loop unbundling and applies to ADSL (BT line) internet connections. A 'local loop' is another term for the actual cable through which a user will receive broadband and telephone calls.

SDSL - A symmetric digital subscriber line is a digital subscriber line that transmits digital data over the copper wires of the telephone network, where the bandwidth in the downstream direction, from the network to the subscriber, is identical to the bandwidth in the upstream direction, from the subscriber to the network.

21CN wholesale broadband products - There are two main flavours of 21CN broadband product, which are summarised below:

IPStream Connect - A 21CN variant of the existing IPStream product, with all of the same options and pricing.

Wholesale Broadband Connect (WBC) - The broadband product offers up to 24Mbps ADSL2+, QoS and considerably more flexibility for ISPs. In addition to WBC, there also exists WBMC (Wholesale Broadband Managed Connect) and WBCC (Wholesale Broadband Connect Converge).

Planning Policies

National Planning Policies

National Planning Policy Framework (NPPF), Ministry of Housing, Communities & Local Government, February 2019

10. Supporting high quality communications

112. Advanced, high quality and reliable communications infrastructure is essential for economic growth and social well-being. Planning policies and decisions should support the expansion of electronic communications networks, including next generation mobile technology (such as 5G) and full fibre broadband connections. Policies should set out how high quality digital infrastructure, providing access to services from a range of providers, is expected to be delivered and upgraded over time; and should prioritise full fibre connections to existing and new developments (as these connections will, in almost all cases, provide the optimum solution).

Regional and Local Planning Policies and Guidance

Manchester City Council (MCC), "Full, Outline, Reserved Matters & Variation/Removal of Conditions Planning Applications - Is Your Application Valid?", September 2018, MCC

Broadband Connectivity Assessment

All new build residential developments must incorporate measures to facilitate digital connectivity for all new build residential properties having regard to the Data Ducting Infrastructure Guidance produced by the Department for Communities and Local Government. (Section 10 NPPF, above)

Data Ducting Infrastructure for New Homes - Guidance Note, March 2008, Department for Communities and Local Government

2.3 Internal Infrastructure

2.3.1 Understanding the needs

Although this document is intended to provide guidance with respect to data services it is important that the support of such services within the dwelling be considered in the wider context of other cable distribution requirements. Appendix C.2 identifies some of the equipment that may require cabling within a typical dwelling. In summary these may be considered as:

- Communications, entertainment and other equipment that require broadband or at least basic internet connectivity. The connection of such equipment is the prime focus of this guidance
- Other equipment that may require an external network connection other than the internet
- Systems and equipment that require cabling within the dwelling but may or may not have any need for external connectivity.

Equipment within the dwelling may employ a wide range of cabling of both a standard and proprietary type. Some may also connect using a wireless technology. Both cabling and wireless solutions are evolving, and any internal infrastructure will need to offer sufficient capacity and flexibility to meet future requirements.

It should be noted that some of the data connectivity requirements within a dwelling may be met using a wireless rather than cabled solution. The use of wireless technologies is outside the scope of this document. However, ducting is still required to support cabling to wireless hardware.

It is clearly impossible to pre-cable a dwelling to support all possible applications. Indeed, the current provision of telephone and television sockets in homes is often inadequate and lacking in flexibility. The result is that many dwellings have extensive cabling that is often surface mounted or trailed across floors.

2.3.2 What is required

Occupants of dwellings are likely to require:

- Data sockets at 'useful locations' throughout the dwelling
- A 'readily accessible' location where network equipment can be installed with a simple 'user-friendly' method of connecting the network equipment to 'live' data sockets

- Mains electricity sockets that are located near the data sockets.

The possibility of installing data sockets at ‘useful locations’ will depend on the nature of the dwellings and the type of occupancy. However, diverse user needs can only be met by a flexible infrastructure that will allow sockets to be readily installed as and where required.

Such a flexible infrastructure would also offer the potential for supporting other cabling distribution requirements. It is not envisaged that developers install data sockets, data cabling or the associated network equipment although some may choose to do so. Rather developers should install internal ducting that enable the later installation of data cabling, faceplates and sockets, and network equipment with minimal disturbance to either previously installed cables or the fabric of the building. The aim should be to facilitate cable installation by an electrician or a qualified competent person.

The internal infrastructure should be limited to the supporting faceplates and sockets at ‘normal height’ but consideration should be given for sockets and faceplates that maybe located at a higher location within the dwelling to facilitate a wireless solution or wall mounted media systems such as a flat screen television. The internal infrastructure should also be designed to support the installation of devices at ceiling level such as sensors for home security and telecare and ceiling mounted loudspeakers.

2.3.3 Topology and layout

The following issues need be considered in determining the topology and layout of the internal infrastructure for a dwelling:

- Access to the external infrastructure via an external terminal box
- The possible requirement to later accommodate a joint between external and internal grade cabling
- The location of an equipment cabinet that may later accommodate equipment to support the distribution of data services within the dwelling (see Appendix C.2)
- The likely location of any television aerials/dishes, coax and primary sockets of the type often installed by developers. Such consideration should include the needs of digital television and the possible use of a shared television reception system (see Appendix C.2)
- The likely location of any standard telephone sockets and wiring of the type often installed by developers

- Locations where users may realistically be expected to require a data connection. This needs to be considered in determining the size of the ducting to the areas within a dwelling
- The cable installation requirements (which are likely to be not fully known at the time of infrastructure design and construction) including:
 - the number of cables per duct (can be estimated as noted in previous point)
 - the length of cable runs – a maximum of 90m from the equipment cabinet is recommended for ‘standard’ data cables (reference Appendix B.2)
 - cable installation requirements including the minimum bending radius (see guidance based on cabling in Appendix D.2) will impact of duct sizing, types of bends and access requirements.

From the above it can be seen that ducts should be routed from an equipment cabinet (located near to the external infrastructure) to at least the main living areas, kitchen and the bedrooms. The ducts should not be restricted to data network use and suitable access points should be included to enable the ducts to be used for other cabling applications (excluding power).

2.3.4 Terminal box

An external terminal box should be installed at each dwelling house or multi occupancy dwelling to facilitate cable. The terminal box may also be required to accommodate joints between internal and external grade cables. The terminal box should be located such that cables can readily pass through the wall to the equipment cabinet.

The terminal box should have minimum dimensions of 300mm height by 300mm width by 150mm depth. The terminal box should have a full-size door (i.e. 300mm by 300mm) that should be lockable, ideally with a standard service key. The terminal box should be designed for external mounting and constructed to withstand minor impacts. In some developments, depending on the location, ‘terminal boxes’ may be installed as a matter of course to aid in the delivery of local telecommunications and TV-based services. They may be installed by service providers or developers. This document does not rule out the use of these ‘terminal boxes’ for the above use, but it is recommended that minimum specifications in this guidance be adhered to and ownership and access rights considered.

2.3.5 Equipment cabinet

An equipment cabinet should be installed in each dwelling. The equipment cabinet may be required to later accommodate network termination and network distribution equipment installed by a data service provider and/or resident. This is considered further in Appendix C.2. The equipment cabinet should be located in a dry area that will not be subject to environmental extremes. This essentially dictates a location within the dwelling. Ideally the equipment cabinet should be located to align with the entry into the dwelling of

the duct from the terminal box. The equipment cabinet should also be easily accessible by residents including those with disabilities (in accordance with the appropriate Building Regulations/ Standards). The equipment cabinet should have minimum dimensions of 300mm height by 300mm width by 150mm depth. However, a larger size equipment cabinet would be preferable and may indeed be essential to support the cable patching requirements in larger dwellings.

The equipment cabinet should have a full-size door (i.e. 300mm by 300mm) that allows easy access for residents or suppliers to draw cables from. The equipment cabinet should be lockable using a manual locking mechanism that is easy to use by residents. It is not recommended that the equipment cabinet is locked using a key that can be removed.

The equipment cabinet should be specifically designed to accommodate network equipment, patch panels and a mains power strip. It should be constructed to facilitate the connection of the ducting detailed above and should be ventilated. Any mains distribution strip must be installed by a qualified competent person in compliance with the appropriate regulation/standard.

The equipment cabinet should be constructed to withstand minor impacts. The equipment cabinet may be required to house wireless network equipment and therefore should not be constructed from a material that will impact the performance of the wireless network.

2.3.6 Building ducts

This document is not intended to provide guidance on specific types of ducts in new and existing buildings. There is likely to be a compromise between cost, aesthetics, flexibility and ease of access. Options that developers may consider, include:

- Vertical duct concealed with other services in riser
- Ducts in-wall with possibly predefined access and socket positions
- Dado ducting
- Skirting ducting (if not intended for sockets)
- Simple surface mounted ducting.

The ducts should be installed such that later cabling, and associated faceplates and sockets, can be installed with minimal disturbance to either previously installed cables or the fabric of the building. The aim should be to facilitate cable installation by an electrician or a qualified competent person. Developers should note that the type and specification of cabling used in dwellings may change. The cable specification upon which this guidance is based (Appendix D.2) should therefore be confirmed with the cable installer or cable vendor. The size of ducts required would depend on the number and diameter of cables that are likely to be installed at any point. This in turn will be impacted on by the topology of the infrastructure which itself will depend on the design of the building and the availability of duct routes. It is therefore not considered

appropriate to specify duct sizes in this document. However, for guidance the following duct cable capacities are offered:

- Main ducts (that run from the equipment cabinet both vertically and horizontally) should have a minimum cross-sectional area of 800mm², with the smallest dimension being 20mm (i.e. a 20mm x 40mm duct)
- Other ducts that spur from main ducts to each room should have a minimum cross sectional area of 400mm², with the smallest dimension being 20mm (i.e. a 20mm x 20mm duct).

Developers are advised to employ larger ducts than specified above where space and / or dwelling construction permits giving consideration to the maximum number of sockets that may be wired in each area/room served. The ducts should enable cables to be installed with a minimum (long term) bending radius of 60mm.

Bends in the ducts should be kept to a minimum. Access points should be provided where there are multiple bends or bends greater than 45 degrees. Access points to under floor horizontal ducting should remain available through floorboards or other floor components. The ducts for data services should be separate from main electricity cables and comply with cable separation and routing standards. Where a vertical duct runs between floors the relevant provisions of the Building Regulations/ Standards should be followed, notably with respect to fire safety, resistance to moisture and resistance to sound.

Ducts should be positioned in such a way that damage from 'DIY' is minimised. A similar approach to the best practice installation of electrical cables and sockets should be considered. The ducts should enable 'standard size' face plates and data sockets to be readily installed for example:

- By removing/cutting a section of ducting to directly insert a faceplate – using ducting that has ideally been designed for the purpose
- Locating faceplates (with appropriate back boxes) adjacent to accessible ducting.

Data sockets (and other sockets supported by the internal infrastructure) must be located at a height above finished level floor that is in accordance with Building Regulations/Standards. Any data sockets located in the loft area should be located in such a position as not to put the resident at risk from trailing cables etc. This document does not provide any guidance on the installation of mains electricity cabling and sockets. However, developers need to recognise that the quantity and location of power sockets may be an issue given the provision of a flexible data services infrastructure. Developers should therefore consider options for a more flexible power provision in accordance with Building Regulations/ Standards.

2.3.7 Multi-dwelling buildings

The above guidance for a dwelling house also applies to multi-dwelling buildings such as flats or maisonettes with the following exceptions. Each dwelling within the building could have a separate equipment cabinet or a cabinet per floor in a public area. The dwelling ducting from the equipment cabinet should not be routed outside of the dwelling served. The duct(s) from the terminal chamber should be routed to the equipment cabinets in a common duct with controlled access and restrictions allowing only authorised person's access. The common duct may be routed vertically and/ or horizontally. The common duct should have a minimum cross-sectional area of 2000mm², with the smallest dimension being 40mm (i.e. a 40mm x 50mm duct). This size should serve up to 15 dwellings, but larger duct should be employed if space permits. The common duct cross sectional area should be increased by 2000mm² for each additional 15 dwellings.

Where a common duct runs between floors, or horizontally between dwellings, the relevant provisions of the Building Regulations/ Standards should be followed. This is especially important with respect to fire safety, resistance to moisture, gas leaks, air tightness and resistance to sound.

2.3.8 Boundaries

At each dwelling the boundary between the external and internal infrastructure should be adjacent to the place where the data service providers' cable may later enter the building. The resident would remain the owner of the ducting that houses the data cable from the service provider. In a multi-dwelling building the boundary between the external and internal infrastructure should be adjacent to the place where the data service providers' cable may later enter the building. The landlord shall therefore have responsibility for a part of the internal infrastructure (including the terminal box and common duct) that may accommodate cables and network equipment that is owned by a data service provider. Subject to the terms of the lease of multi-dwelling buildings, the landlord may also be responsible for the equipment cabinet and ducting within each dwelling. Boundaries for ducting between two premises start and end at the dividing wall. The ownership of the infrastructure within the ducting may remain with the service provider or the original infrastructure owner.

DISCLAIMER

This Report was completed by GTech Surveys Limited on the basis of a defined programme of work and terms and conditions agreed with the Client. We confirm that in preparing this Report we have exercised all reasonable skill and care considering the project objectives, the agreed scope of works, prevailing site conditions and the degree of manpower and resources allocated to the project.

The findings in this document were correct and accurate on the day of draft issue (31st March 2021) but cannot be guaranteed to remain the same for any defined period. This report assumes that there will be changes to telecommunications networks and other surrounding structures, which may result in different broadband technologies becoming unavailable or degraded. GTech Surveys Limited will not be held liable for costs of any requirement to conduct more diagnostic assessments due to changes within the surveyed environment, or due to changes in networks in the study area. BT Openreach information is valid only for 90 days from issue.

GTech Surveys Limited accepts no responsibility to any parties whatsoever, following the issue of the Report, for any matters arising outside the agreed scope of the works. This work was conducted under GTech Surveys Limited's standard terms and conditions which can be found on our website.

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