

Environmental Standards Statement

Our Ref: Z43540 Rev A

**Proposed Change of Use and
Conversion of Existing Building
into 21No. Apartments
at**

**87 Great Western Street,
Manchester M16 7PA**

for

Create It Studio Architect



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Disclaimer

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Executive Summary

This Environmental Standards Statement has been developed in support of the planning application ref: 128813/FO/2020 for the proposed change of use of 87 Great Western Street, Manchester into 21No residential apartments. The residential proposal consists of 4No one-bedroom apartments, 12No two-bedroom apartments, 4No three-bedroom apartments and 1No. studio apartment.

This Environmental Standards Statement will evaluate the technical and economic feasibility of using both passive and low and zero carbon technologies and will assess the practical levels of CO₂ reduction possible for this development to comply with the following Manchester City Council planning requirements:

- Manchester City Council Core Strategy Policy EN 4
- Manchester City Council Core Strategy Policy EN 6
- Manchester City Council Core Strategy Policy DM 1
- Guide to Development in Manchester SPD (Chapter 4)
- National Planning Policy Framework (2019)
- Planning application ref: 128813/FO/2020

3) Further to your email of the 14th December and as outlined within the City Council's Guide to Development in Manchester SPD/SPG, (chapter 4) and Core Strategy policies EN4 and EN6 an Environmental Standards Statement should be submitted with your application, which addresses sustainability ratings and the provision of renewable energy within the development (Please refer to Appendix A of the Core Strategy for guidance on preparing this statement). This should include a BREEAM pre-assessment rating through the submission of a pre-estimator report which should demonstrate that a rating level of at least Very Good would be achieved. Where this standard is not achievable clear reasons why need to be set out within the submission. This statement must address the guidance within Chapter 4 of the 'Guide to Development in Manchester and policies EN4 and EN6 of the Core Strategy for the City of Manchester, confirm the proposals for the provision of onsite renewable energy to provide 20% of final site energy demand and CO₂ reduction

The following low and zero carbon technologies have been evaluated:

- | | |
|--|-------------------------------|
| • Biomass | • Geothermal |
| • Wind | • Combined Heat & Power (CHP) |
| • Biogas | • Solar Hot Water |
| • Air Source Heat Pumps & Exhaust Air Heat Pumps | • Solar Photovoltaic |

The approach for the development is to embed sustainability into the heart of the development through a range of design measures based on the 'Be Lean, Be Clean, Be Green' design hierarchy. Measures will include:

- 1) Significantly enhanced building fabric to meet Building Regulation Part L 2018

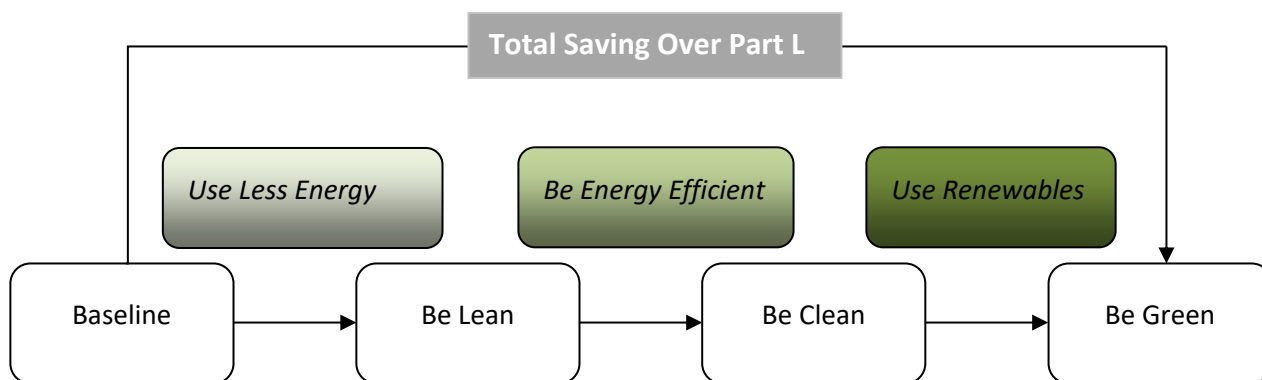
- 2) Efficient extract ventilation system
- 3) Heating and hot water will be provided a highly efficient electric system.
- 4) Efficient lighting strategy primarily using LED type fittings.

For the purpose of the Statement, we have evaluated the proposed development using SAP 2012 (Standard Assessment Procedure) to determine a baseline emissions rate and compared that to the actual emissions rate calculated to ensure compliance and uplift on ADL1B.

As set out in planning application ref: 128813/FO/2020 response 3. Manchester City Council have also requested a BREEAM pre-assessment rating to achieve a rating of at least 'Very Good' standard.

Summary

The development has been provided with energy savings through the use of passive improvement measures such as improved energy efficiency. This passive approach to compliance will complement the integrated approach to the sustainable energy objectives of the national and local policies.



A reduction of 15.18% is provided against Part L1B 2018. The requirements of Manchester City Council's Core Strategy have therefore been met as improvements have been made and the use of Low or Zero Carbon Technologies are present throughout.

Table 1 - Proposed development CO₂ emissions against Building Regulations Part L1B 2018

	Total CO ₂ Emissions (KgCO ₂ /Yr)	
Baseline Emissions of Development	61,455	
Be Lean, Be Clean, Be Green Emissions of Proposed Development	52,124	
Total Reduction in CO ₂ Emissions (KgCO ₂ /yr) Against Part L1B 2018		9,332
Percentage Improvement in Carbon Emissions Against Part L1B 2018		15.18%

1. Introduction

The proposed conversion is a residential apartment block consisting of 4 storeys of an existing building in Manchester. A new floor will be created in between the existing ground and first floor.

The proposed building will be assessed under Building Regulations Approved Document Part L1B (2018) for domestic areas.

Supporting information is provided within this report for the proposed energy strategy to be considered on site in accordance with the following planning policies:

- Manchester City Council Core Strategy Policy EN 4
- Manchester City Council Core Strategy Policy EN 6
- Manchester City Council Core Strategy Policy DM 1
- Guide to Development in Manchester SPD (Chapter 4)
- National Planning Policy Framework (2019)

Throughout this report, passive design techniques, energy efficient equipment and appropriate low carbon technologies will be appraised in line with the 'Be Lean, Be Clean, Be Green' philosophy of relevant planning documents and the Energy Hierarchy.

An assessment of CO₂ emissions will be made based on the calculation methodology dictated by the Standard Assessment Procedure (SAP), and in line with the requirements of Manchester City Councils planning policy.

1.1. Location

The area of land for the proposed development at 87 Great Western Street, Manchester is highlighted by the red line boundary shown in Figure 1.

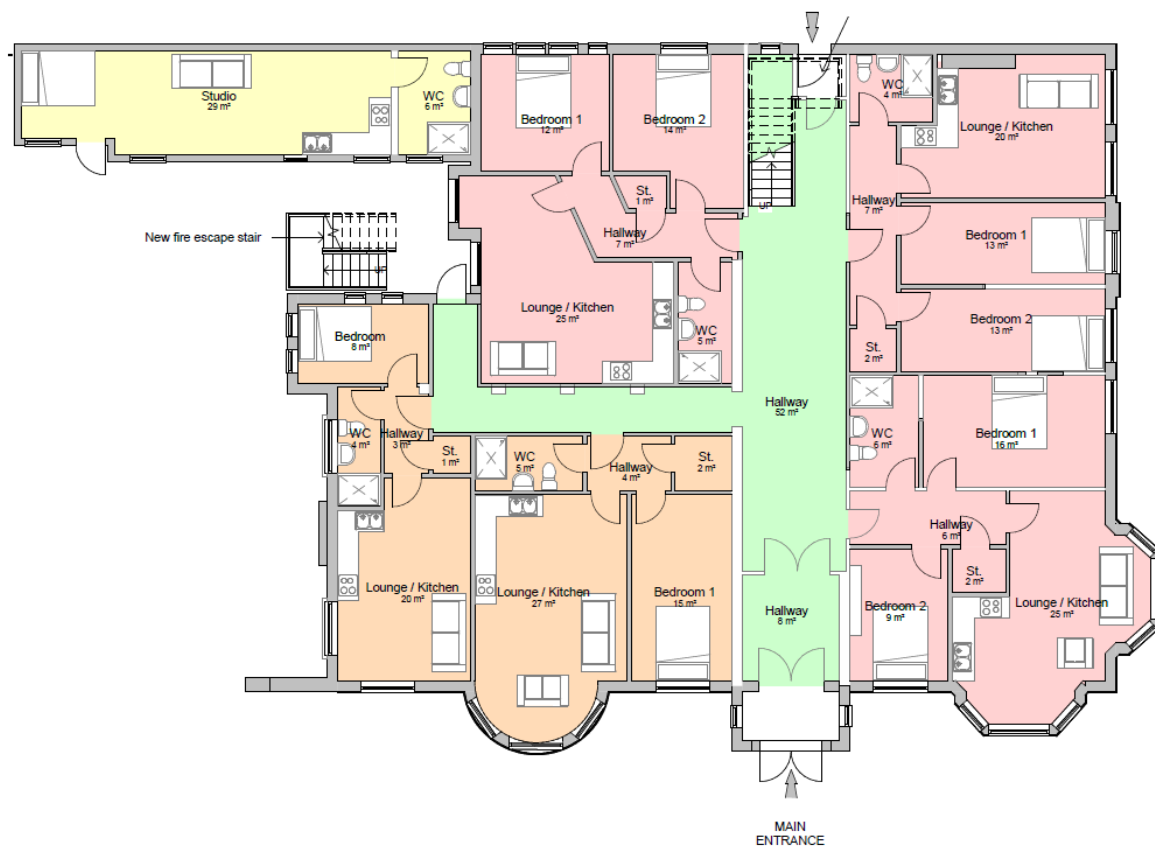


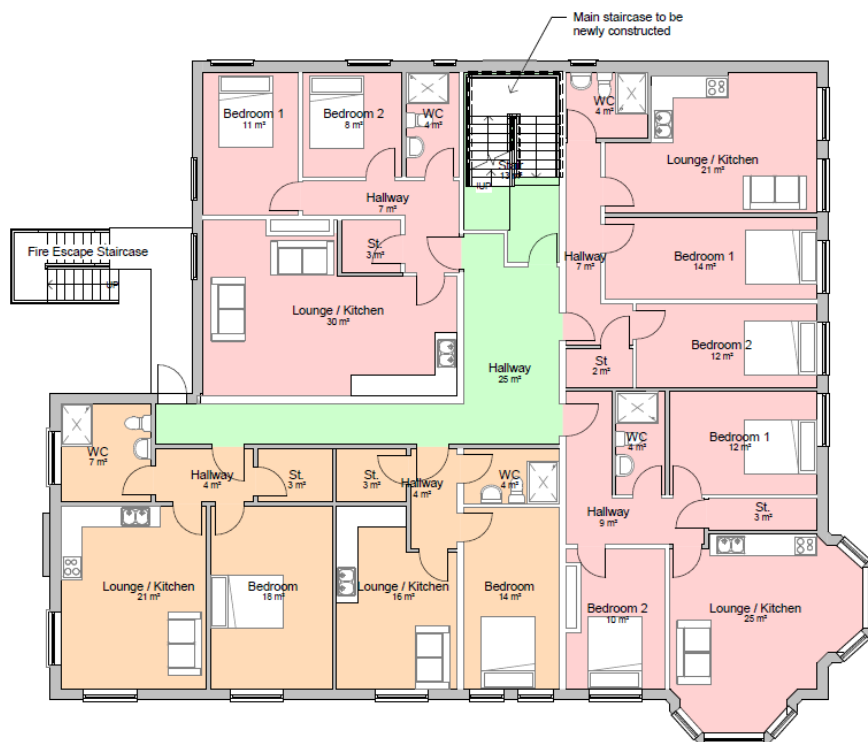
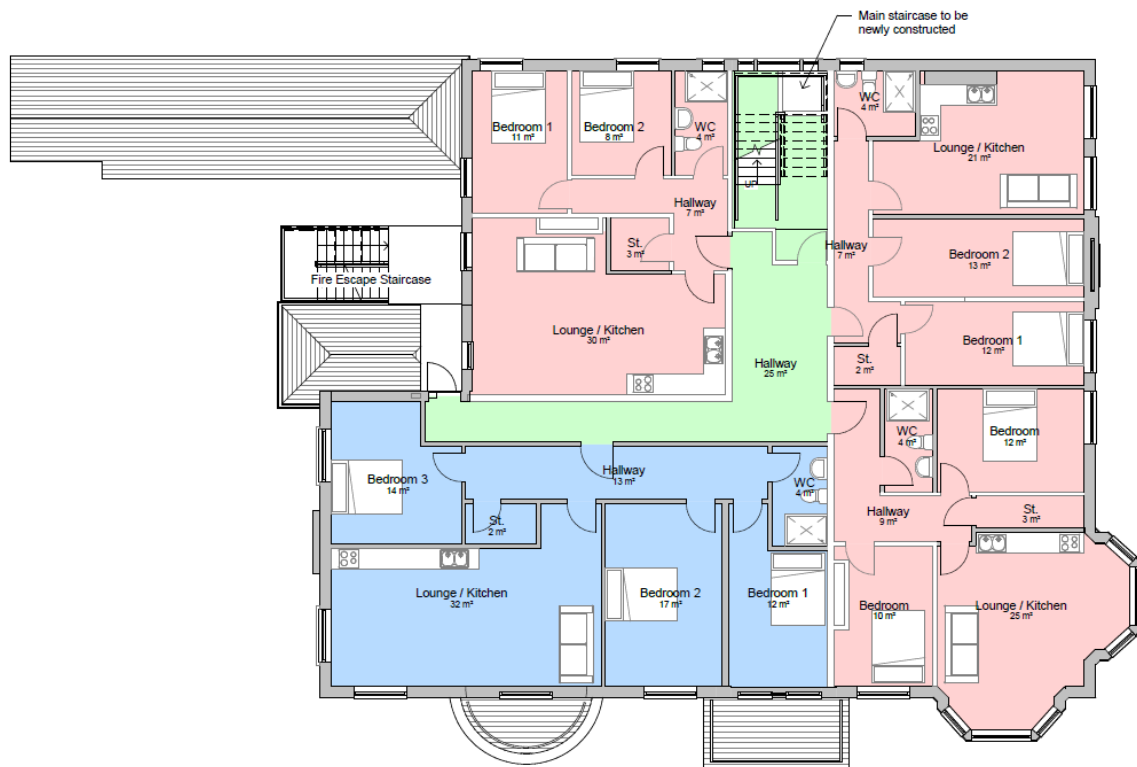
Figure 1 - Location and surrounding area of proposed development

The site is situated along the corner of Great Western Street and Grierson Street in the Moss Side area of Manchester. It is 2 miles South from Manchester City Centre. The site's former use was a three-storey public house that is being refurbished into a 4 storey apartment block, with a new floor being erected between the existing ground and first floors.

1.2. Floor Plans

There are four floors within the proposed development, consisting of a range of one-bed, two-bed and three-bed apartments and 2No proposed three-bed apartments to the outhouse.





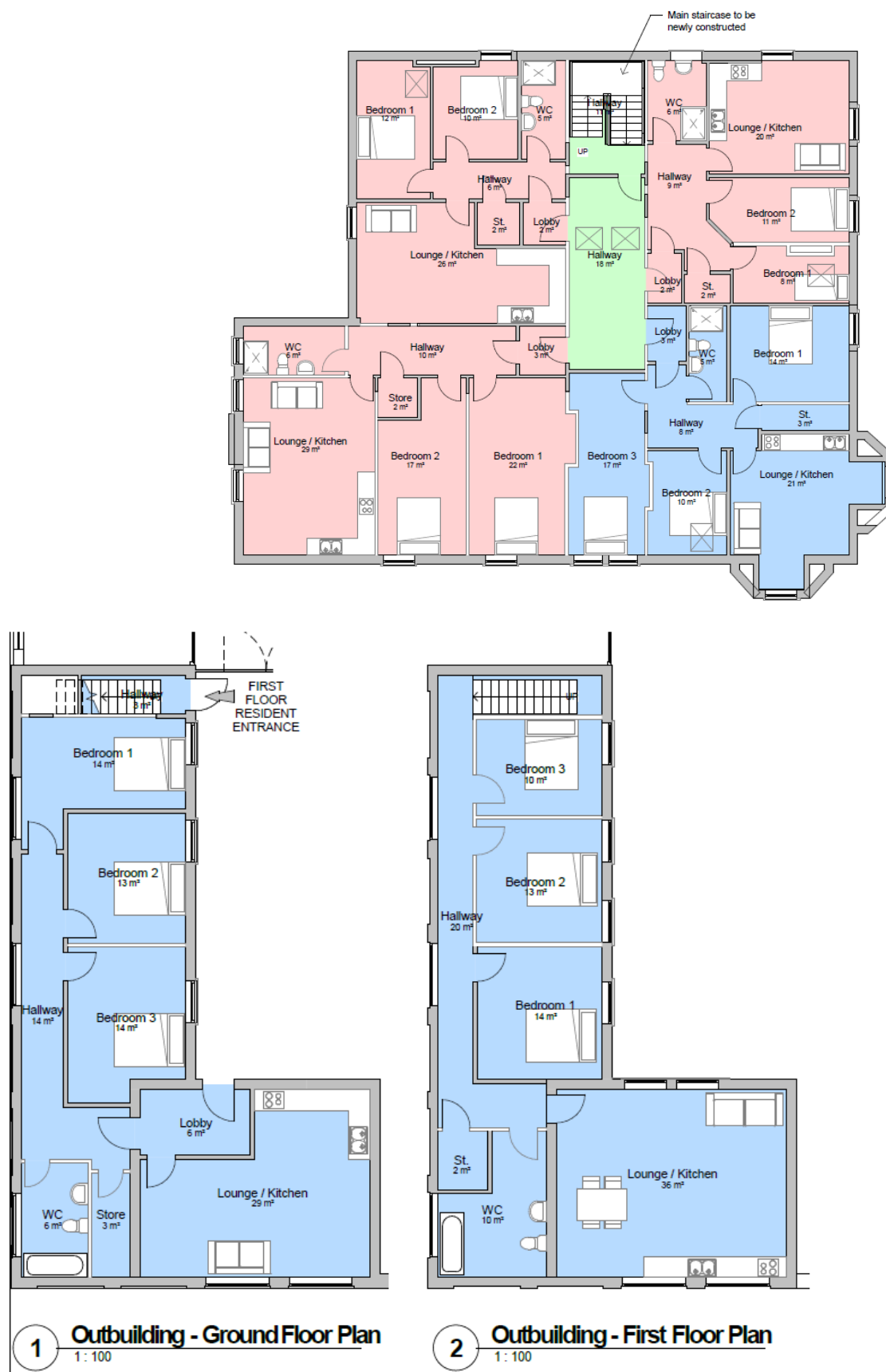


Figure 2 - Floor plans for the proposed development

2. Policy Drivers for Energy Efficiency and Renewable Energy

This section presents a range of planning policy that is applicable to the proposed development, at both a national and a local level.

2.1. National Policy

The National Planning Policy Framework was published in February 2019 and sets out the governments' planning policies for England and they should be applied. Table 2 sets out the relevant energy standards for new developments and provides an indication of the design response to be provided.

Table 2 – Key National Planning Policy Requirements and Design Responses

Section	Policy Requirements	Design Response
14. Meeting the challenge of climate change, flooding and coastal change	The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: Shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.	This development will follow the principles set out in the Manchester City Council Core Strategy using a 'Be Lean, Be Clean, Be Green' approach in reducing operational carbon emissions. An overview of current decentralised energy schemes in Manchester and an assessment on the potential for future schemes in relation to this development is provided in Section 6 of this report. This Environmental Standards Statement appraises site specific information to determine the most appropriate approach to minimise energy consumption.

2.2. Local Policy

The Manchester City Council Core Strategy (2012) provides a set of guidelines for new and refurbished developments. All relevant energy policy within these documents is provided within this section together with a design response.

Table 3 – Key Local Planning Policy Requirements and Design Responses

Manchester City Council Core Strategy (2012)		
Policy	Policy Requirements	Design Response
EN 4	Reducing CO2 Emissions by Enabling Low and Zero Carbon Development. The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO2 emissions, and rising fossil fuel prices, through the following actions: All development must follow the principle of the Energy Hierarchy, being designed: • to reduce the need for energy through design features that provide passive heating, natural lighting and cooling • to reduce the need for energy through energy efficient features such as improved insulation and glazing • to meet residual energy requirements through the use of low or zero carbon energy generating technologies Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies. Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings. Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.	This development will follow the principles set out in the Manchester City Council Core Strategy using a 'Be Lean, Be Clean, Be Green' approach in reducing operational carbon emissions. Each thermal element of the building is being upgraded to improve on the minimum values given within Part ADL1B. To ensure the policy EN4 the use of Low or zero carbon technologies have been explored within this report but not required to comply due to the significant upgrade of the thermal elements. An overview of the district heating network and its possibilities is provided within section 6 of this report.

	The use of building materials with low embodied carbon in new development and refurbishment schemes.					
EN 6	Target Framework for CO2 reductions from low or zero carbon energy supplies Applications 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 Environmental Standards 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 CO2emissions 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 Environmental Standards Statement. 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: Locations where the 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 <table><tr><th>Target</th><th>% Minimum requirement</th></tr><tr><td>Target 1: Network development area</td><td>CHP/district heating anchor or connection or where not</td></tr></table>	Target	% Minimum requirement	Target 1: Network development area	CHP/district heating anchor or connection or where not	The development consists of a conversion of an existing building into 21 apartments. With the proposal being electricity heavy the development must be as a minimum 15% improvement on Part L1B. The proposal is 15% improvement on the target. Further details on how this is achieved are given within this report. The energy strategy detailed within this document will adopt the be lean, be clean, be green methodology. An overview of the energy strategy is provided in Section 9.
Target	% Minimum requirement					
Target 1: Network development area	CHP/district heating anchor or connection or where not					

	<table><tr><td></td><td>feasible a 15% increase on Part L 2013</td></tr><tr><td>Target 2: Electricity intense buildings</td><td>+15% increase on Part L 2013</td></tr><tr><td>Target 3: Micro generation area</td><td>+15% increase on Part L 2013</td></tr></table> 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 Environmental Standards 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 Environmental Standards Statement incorporating evidence such as modelling to demonstrate compliance. Guidance on what the Environmental Standards Statement should contain and how to decide which target applies to a development proposal is given in Appendix A.		feasible a 15% increase on Part L 2013	Target 2: Electricity intense buildings	+15% increase on Part L 2013	Target 3: Micro generation area	+15% increase on Part L 2013	
	feasible a 15% increase on Part L 2013							
Target 2: Electricity intense buildings	+15% increase on Part L 2013							
Target 3: Micro generation area	+15% increase on Part L 2013							
DM1	Development Management All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:- • Appropriate siting, layout, scale, form, massing, materials and detail. • Impact on the surrounding areas in terms of the design, scale and appearance of the proposed	The development aims to maintain the overall look of the existing building following the conversion into apartments to ensure the existing appearance of the area remains the same.						

	development. Development should have regard to the character of the surrounding area. • Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise. • Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes. • Community safety and crime prevention. • Design for health. • Adequacy of internal accommodation and external amenity space. • Refuse storage and collection. • Vehicular access and car parking. • Effects relating to biodiversity, landscape, archaeological or built heritage. • Green Infrastructure including open space, both public and private. • The use of alternatives to peat-based products in landscaping/gardens within development schemes. • Flood risk and drainage. • Existing or proposed hazardous installations. • Subject to scheme viability, developers will be required to demonstrate that new development incorporates sustainable construction techniques as follows (In terms of energy targets this policy should be read alongside policy EN6 and the higher target will apply):- a) For conversion residential development meet as a minimum the BREEAM domestic refurbishment Very Good standard.	Vehicular access is provided via the existing car park on the site, along with a newly formed refuse store. The development will aim to meet the minimum targets specified in Building Regulations Part L 2018 by following the “Be Lean, Be Clean, Be Green” approach which prioritises passive fabric first and energy efficiency measures prior to the adoption of renewable energy. The use of solar photovoltaics is not required for this scheme as compliance with Building Regulations Part L 2018 is achieved with a passive improvement approach. This approach will ensure that a BREEAM Very Good is achieved for the development. BREEAM Pre Assessment is provided in Appendices of this report.
Guide to Development in Manchester Supplementary Planning Document (2007)		
Policy	Policy Requirements	Design Response
Ch 4	4.5 Part 1 Policy E1.5 encourages high standards of energy efficiency in new development. In the Environmental Standards Statement, developers should show how they have	The proposed design consists of a conversion from a commercial property to a residential property

	considered the steps necessary to reduce energy demand at the earliest stages of design. Developers should aim to reduce CO2 emissions by at least 15% more than the requirements of the current Building Regulations, which at present are Building Regulations: Approved Document L (2013) – ‘Conservation of Fuel and Power.’ The following design principles will assist developers in achieving energy efficiency targets: • Minimise reliance on energy-using equipment for heating, cooling, lighting and natural ventilation • Position trees and soft landscaping on and around the development and within buildings to provide natural shading, insulation and air conditioning • Integrate energy efficient micro-generation and community heating schemes, such as combined heat and power (CHP) • Site layout and building design principles should maximise the capture and use of daylight and passive solar energy, whilst avoiding excessive solar gain in summer • Specify energy and water efficient appliances and systems.	upgraded the thermal elements to be better than the minimum standards as set out in ADL1B. The guidance requires a minimum of 25% reduction in CO2 emissions compared to the 2006 Building Regulations. This report shows how the apartments achieve approx. 15% reduction on current Building regulations (2018) which is above and beyond the requirements set out in policy 4.5. Natural ventilation will be used to all habitable spaces within the apartments with the exception of the wet rooms which will be mechanically ventilated via extract fans. A CHP unit is not considered practical for this development due to the limited amount of water storage. The site layout cannot be changed to maximise daylight as the building is an existing building being upgraded,
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3. Methodology

The first step of the full energy strategy assessment has been to undertake a baseline energy assessment. The baseline energy assessment consists of calculating the total CO₂ emissions of the development to meet Building Regulations and then compare the proposed improvement measures against this baseline.

Building Regulations Part L1B 2018 (SAP) applies to domestic. These methodologies provide an estimate of carbon emissions from regulated energy.

The building can then be benchmarked/thermally modelled using the following energy hierarchy:

1. Be Lean <i>A reduction in energy use as a result of passive design and energy efficiency</i>
Thermal performance of the existing and upgraded envelope and new build envelope (U-values) Glazing design Airtight construction Efficient mechanical ventilation Variable speed fans and pumps Energy efficient lighting
2. Be Clean <i>A focus on supplying energy to the development through efficient means</i>
Connect to low carbon heat networks Develop site wide heat network from single energy centre Provide energy efficient individual heating
3. Be Green <i>The installation of renewable technologies to meet energy demand where possible</i>
Consider the feasibility of renewable energy technologies Assess the integration of renewable technologies based on the above measures

The development must be provided with energy savings through the use of thermal improvements to fabric (a 'fabric first' approach), followed by other clean energy solutions (energy efficiency

improvements, district heating, etc.) and finally the use of renewable energy technologies, where practical. This hierarchy complements the integrated approach to the sustainable energy objectives of the Manchester City Council Core Strategy (2012).

The planning policies require a full review of the technical and economic feasibility of the following renewable technologies:

- Biomass heating
- Biomass combined heat and power
- Solar hot water
- Solar photovoltaic
- Ground source heat pumps
- Air source heat pumps / exhaust air heat pumps
- Wind power

To achieve the targets set the development must achieve a balance between fabric, heating and control, ventilation and air leakage improvements, the amount of zero or low carbon technology installed and the capital, life cycle and running costs, maintenance and operation.

Feasible renewable energy technologies have been considered during the assessment to ensure the most suitable renewable energy is chosen for the demands of this scheme. The pros and cons of each technology with respect to this site are considered as part of this statement.

4. Baseline Energy Assessment

Energy Council have based the analysis on current Building Regulations ADL1B 2018 (SAP) taking into account solutions that must not only be energy efficient but also practical, reliable and user friendly.

To meet compliance with Building Regulations Part L1B 2016, the Dwelling Emissions Rate (DER) must be lower than or equal to the calculated Target Emissions Rate (TER). SAP 2012 is the Governments Standard Assessment Procedure (SAP) for calculating the energy aspects of a dwelling.

To assess the baseline carbon emissions, we must make an estimation of the energy demands based on current Building regulations in order to set a target upon which the actual development can be compared, as shown below.

4.1. Predicted Baseline Energy Requirements

The predicted baseline CO₂ emission demands for the development:

Table 4 - Baseline carbon emissions for the proposed development

Ref.	Dwelling Type	No. of Type	TER	Total Carbon Emissions (Kg CO ₂ /yr)
Z43450	Studio Apartment	1	83.44	2,931
Z43451	Type B – 2Bed Grnd Flr Flat	1	45.07	2,998
Z43452	Type C – 2Bed Grnd Flr Flat	1	47.66	2,984
Z43453	Type D – 2Bed Grnd Flr Flat	1	46.95	3,152
Z43454	Type E – 1Bed Grnd Flr Flat	1	45.94	2,472
Z43455	Type F – 1Bed Grnd Flr Flat	1	64.89	2,411
Z43456	Type G – 2Bed Mid Flr Flat	2	36.97	4,922
Z43457	Type H – 2Bed Mid Flr Flat	2	39.91	5,055
Z43458	Type I – 2Bed Mid Flr Flat	2	38.39	5,110
Z43459	Type J – 3Bed Mid Flr Flat	2	34.45	6,820
Z43460	Type K – 2Bed Top Flr Flat	1	47.65	3,196
Z43461	Type L – 2Bed Top Flr Flat	1	48.73	2,962
Z43462	Type M – 3Bed Top Flr Flat	1	38.40	3,196
Z43463	Type N – 2Bed Top Flr Flat	1	41.14	3,773
Z43464	Outbuild Grnd Flr 3Bed Flat	1	45.00	4,691
Z43465	Outbuild First Flr 3Bed Flat	1	43.47	4,782
Total		21		61,455

The baseline carbon emissions for the proposed new-build development is **61,455 KgCO₂/yr**.

5. Passive Design and Energy Efficiency

The approach of the development is to embed sustainability into the heart of the design from the outset of the project design process. The design will be developed with sustainable solutions, taking into account the relevant policies and strategies of the Manchester City Councils Core Strategy (2012).

The development will seek to consider all aspects and principles of sustainable development, taking into account environmental, social and economic impacts.

5.1. Passive Design Measures

The philosophy for the site is to achieve as much of the necessary reduction in carbon emissions through a fabric first energy efficient design approach using passive design techniques and energy efficient measures, before the use of LZCs. This ensures that the highest standards of building fabric and energy efficiency are achieved.

5.2. Energy Efficient Systems

Options have been reviewed for improving the energy efficiency of the development by installing an efficient heating system. The apartments will utilise high efficiency electric panel heaters. Efficient electric hot water storage with low heat losses are proposed to each apartment to supply hot water. Highly efficient LED-lighting will also be installed throughout the development

6. District & Communal Heating Networks

This section outlines how consideration of energy supplied efficiently from a district heating network can be provided to the development in line with the Energy Hierarchy.

6.1. Decentralised Heating Networks

The energy policy reaffirms the view that energy generated by centralised power stations and transmitted through the national grid is highly inefficient and wasteful.

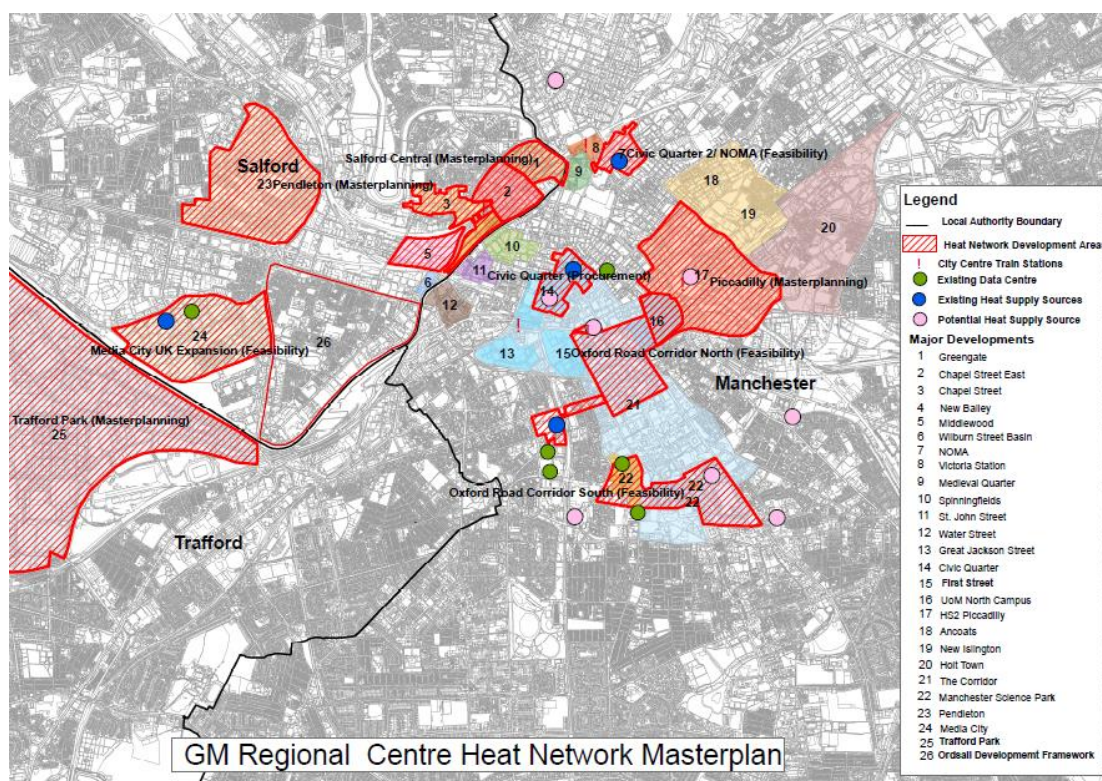
One of priorities for reducing CO₂ emissions is to reduce reliance on centralised power stations. This means increasing the use of local, low-carbon energy supplies through de-centralised energy systems.

De-centralised plant generally means any heating and hot water and/or electricity generation provided on a district wide (DHN) or site wide (CHN) basis. DHN and CHN can typically include combined heat and power equipment (CHP). CHP is an engine which, when running, generates electricity and heats water which can then be distributed around a development.

Benefits of district heating networks can include:

- Provision of low carbon / lower cost heat to domestic and commercial customers
- Diversification of the energy mix
- Reductions in region-wide carbon emissions
- Targeting and reduction of fuel poverty
- Potential long-term revenue streams for local authorities
- Alignment with regeneration programmes
- Driving the growth of the low carbon services sector

The diagram below is the current heat map and analysis of proposed and existing district heating networks in the Manchester area. The development is located close to the proposed Manchester DHN, which will incorporate a Combined Heating and Power (CHP) plant.



6.2. New Heating Networks –Options

Consideration has been given to adopting a centralised or decentralised energy strategy. A decentralised energy option would typically be an energy centre distributing heat, hot water and electricity to the development from a single source. This typically would include boilers and a CHP type unit sized to provide the whole development. Sometimes multiple energy centres are used to split the loads, provide resilience and to serve different buildings. A sufficiently sized plant room is not provided to accommodate gas boilers. Furthermore, due to the development being within an existing building; it will not provide space to locate CHP units.

The recommended energy strategy has taken into account the numbers of properties to be connected, LA carbon and LZC targets, orientation, location, surrounding features – buildings, roadways, traffic etc, build quality and potential for other zero or low carbon options.

6.3. Existing DHN

The development sits close to an area designated as having an existing DHN. We will consider the possibility of connecting to Manchester City Council's existing DHN; however due to the lack of information we cannot commit as it may not be commercially feasible. Further details would be needed to determine exactly where a DHN connection could be taken from to service the buildings, and the logistics and timing of connections etc. Further info would be needed to investigate viability, Notwithstanding these aspects we will be connecting into the proposed development's new DHN.

The scheme can consider the connection to Manchester's DHN after planning and at detailed design stages.

6.4. Private Wire Connection

Private wire systems are localised electricity grids that although connected to the local distribution networks they have privately owned central plant that produces electricity. This enables it to operate a stand-alone supply in the event of the national grid failing and provides localised energy security.

Electricity and heat generated on-site may be consumed on-site, at neighbouring premises owned by the developer or third parties, or, in the case of electricity, exported to the local distribution network. The applicable scenario will affect the network requirements of the project.

Where a private network is to be relied on to transmit the electricity (or heat) to the end consumer(s), consideration will need to be given to various factors, including the network design or route, infrastructure and installation costs, land availability, planning constraints, and operation and maintenance requirements.

6.5. Energy Efficient Heating System

Options have been reviewed for improving the energy efficiency of the development by installing an efficient heating system. The scheme will benefit from:

- Heating and hot water provided by individual highly efficient electric heating
- Dwellings will be provided with metering to provide a charge system link to use

7. Renewable Energy Technologies

Energy Council have reviewed options for the use of on-site renewable energy/Low or Zero Carbon Technology (LZT) in line with the policy aspirations of the Adopted Birmingham Development Plan (2017).

This renewable Environmental Standards Statement/strategy reviews the technical and economic feasibility of the following technologies –

- Solar Photovoltaic
- Solar Hot Water
- Ground Source Heat Pumps
- Air Source Heat Pumps / Exhaust Air Heat Pumps
- Micro Wind Power
- Biomass

7.1. Photovoltaics (PV)

Photovoltaic panels convert sunlight into electricity to run lights and appliances. 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. Solar panels are not light and the roof must be strong enough to take their weight, especially if the panel is placed on top of existing tiles. For flat roofs the panels can be mounted 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 generally suitable. If solar

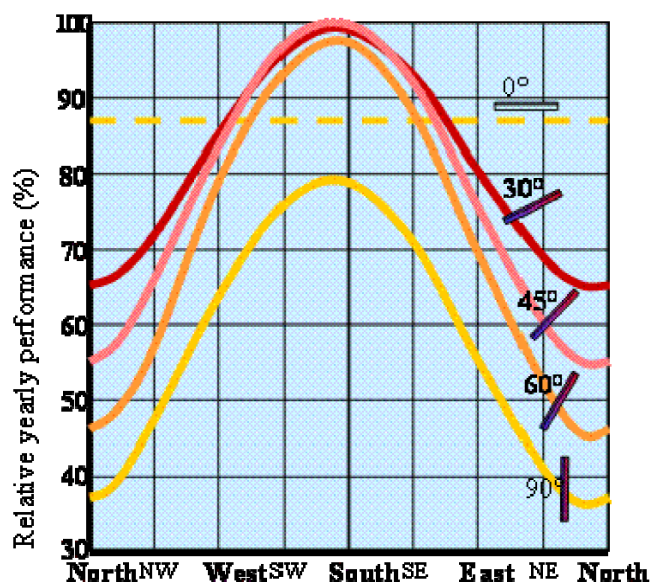


Figure 3 - Performance of photovoltaic panel orientation

collectors are oriented away from due South then a larger surface area will be required to generate a set amount of energy. The effect of non-optimal orientation is illustrated by the graph to the right:

The cost to install PV is typically £1,000 - £1,500 per kWp for 'on-roof' panel systems.

Photovoltaic panels are viable for this development, but we are focussing on passive improvements to achieve compliance with planning policy.

7.2. 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 and therefore costs vary. 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.



Figure 4 - Photovoltaic array on a pitched roof

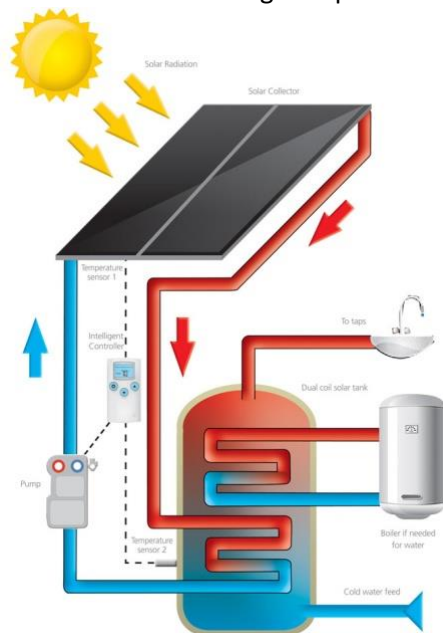


Figure 5 - The principles of a solar thermal system

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.

The use of solar thermal panels work best in conjunction with individual heating systems in dwellings. The orientation of the development is fine for the utilisation of solar water heating to provide domestic hot water however it will not achieve significant carbon savings. Carbon savings of approximately 4-5% are achievable with this technology. The proposed development is unlikely to require sufficient hot water storage to deem solar thermal a feasible technology for this site. Furthermore, the use of PV panels on the roof significantly reduces the space available for solar hot water panels. For the reasons aforementioned this is not an appropriate option for this scheme.

7.3. Ground Source Heat Pump (GSHP)

GSHPs 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 apartments as a centralised system would be installed with multiple bore holes to a depth of up to 125 metres depending on the ground conditions. GSHPs use a heat exchanger to extract heat from the earth.

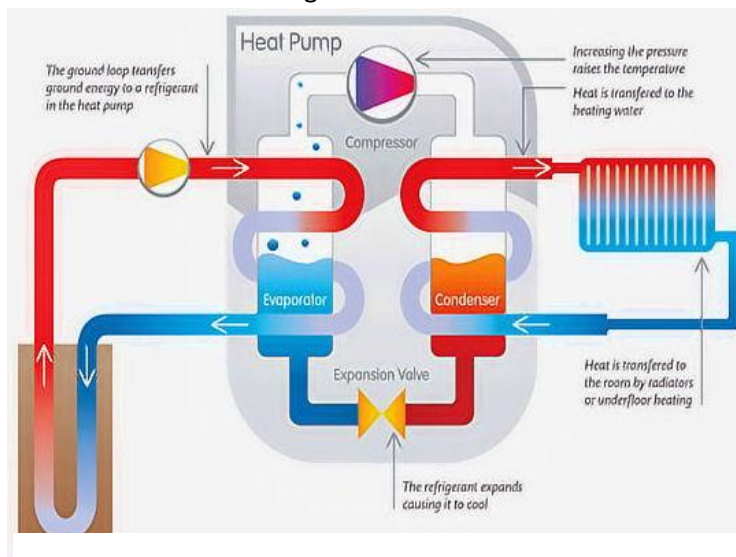


Figure 6 - Principles of a GSHP system

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 2-4 although some systems may produce a greater rate of efficiency. This means that for every unit of electricity used to pump the heat, 2-

4 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.

Due to the the development being a conversion from an existing commercial building into apartments, GSHPs are not considered an appropriate design solution.

7.4. Air Source Heat Pump/Exhaust Air Heat Pump

Air source heat pumps (ASHP) and exhaust air heat pumps (EAHP) 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.

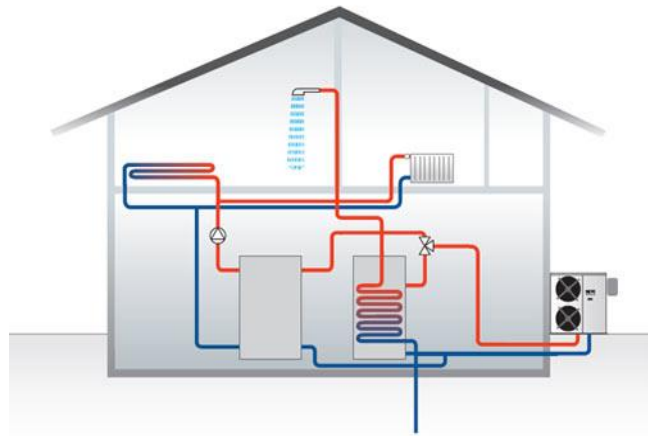


Figure 7 - Principles of an ASHP system

Exhaust air heat pumps such as the NIBE F370 work in a similar manner to ASHP units but have only indoor units (no outdoor compressors) and in addition they also recover heat from their integral exhaust air ventilation system. These units work well on apartment blocks and dwellings where mains gas is unavailable or unsuitable for a development. They are expensive in terms of capital cost of the equipment, installation and the enhanced structural requirements.

ASHPs are not considered appropriate for this scheme due to the limited space available for the outdoor units.

7.5. Micro 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. Most small wind turbines generate Direct Current (DC) electricity. Systems that are not connected to the national grid require battery storage and an inverter to convert DC electricity into Alternating Current (AC) which is mains electricity.

There are two types of wind turbine available:

- Roof mounted – These are mounted on the roof of dwellings
- Mast mounted – Which are free standing

Important issues to consider when using wind turbines are:

- Wind speed increases with height so it's best to have the turbine high on a mast or tower.
- Generally speaking, the ideal site is a smooth top hill with a flat, clear exposure, free from excessive turbulence and obstructions such as large trees, dwellings or other buildings.
- Small scale wind power is particularly suitable for remote off grid locations where conventional methods of supply are expensive or impractical.
- Where the local annual average wind speed is 6 m/s or more.
- Where there are no significant nearby obstacles such as buildings, trees or hills that are likely to reduce the wind speed or increase turbulence



Figure 8 - Mounted wind turbine

As this development is in an urban area there will be obstacles which reduce wind speed. The average wind speed in this area is 4.6 m/s at a height of 10 metres, which is less than the 6 m/s required. Therefore, micro wind is not a viable technology for this development.

7.6. 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. The cost of the fuel depends on the type, delivery distances and whether it is obtained as simple waste product or from another organisation. The cost of wood pellets is currently a little more expensive than mains gas, and woodchip is approx. 30% cheaper, however prices are fluctuating rapidly in the bio-fuel market at the present time creating uncertainty over their take up.

Biomass CHP is still relatively new to the UK market and is more suitable to large developments where energy demand does not require significant modulation. There are technical issues with small scale Biomass CHP and until these can be resolved and proven the take up of these systems in the UK and Europe has been slow.



Figure 9 - Biomass boiler and hopper

Overall carbon savings of 40%+ are achievable with biomass technology. However, as biomass is more suited to a communal heating system, there is insufficient space to accommodate the equipment and fuel storage to facilitate a biomass boiler. Furthermore, there are noise and air quality issues associated with this type of technology. For this reason, biomass is discounted.

8. Sustainable Design & Construction

The design currently includes a number of components that gives the scheme a solid grounding in relation to sustainability. The list below is not exhaustive but spans a range of areas covered by the BREEAM Domestic Refurbishment pre-assessment as follows:

8.1. Management

- The contractor will utilise the Considerate Constructors Scheme and aim for a best practise standard, which is a score of 35+ with a minimum score of 7 in each category, at the final CCS visit.
- The contractor will manage and monitor environmental issues during construction process. This will include the monthly monitoring and management of energy and water consumption of site activities, separation, streaming and recycling of waste, the reduction of air, dust and ground pollution.

8.2. Health and Wellbeing

- External lighting to the proposed development will be highly efficient and will comply with all current guidelines and regulations.
- Safety issues will incorporate recommendations from a CPDA or ALO input no later than RIBA stage 2, wherever practicable.

8.3. Energy

- The development will be designed and constructed to achieve low energy and carbon dioxide emissions, improving upon current Building Regulations Part L1B 2018 using the Be Lean, Be Clean, Be Green energy hierarchy.
- Sub-metering of all major energy consuming systems will be provided to differentiate between energy loads for heating and hot water, lighting and small power consumption.
- Dedicated energy efficient lighting will be installed internally and externally. Movement and daylight-controlled lighting will be introduced, where practicable. The efficacy and colour rendering index ratings will be considered.
- Unregulated energy demand will be assessed and minimised where possible through the selection of energy-efficient appliances and systems.

8.4. Transport

- A travel plan will be considered at the preliminary stages of the Project although due to the small scale and low trip rates of the development the impact is not likely to be significant.

8.5. Water

- The proposed development will be fitted with a water meter and units will incorporate water saving and efficiency measures that comply with Regulation 36(2)(b) of Part G2 of the Building Regulations to ensure that a maximum of 105 litres of water is consumed per person per day. Suggested water appliance details are shown in Table 5.
- Internal water consumption will be reduced using low flush/ flow appliances. This will include appliances such as aerated/ flow regulated taps, low-flow showers, low-flush WC's, low-flush urinals, PIR control on main water supply to all toilet areas, etc. and where practicable.
- Flow control devices will be installed to sanitary fittings, where practicable.
- Where areas use more than 10% of the buildings predicted total water usage, sub-metered pulsed output meters will be considered.

Table 5 - Recommend water consumption for residential fittings.

Sanitary fittings	Flow rate or capacity		Consumption (L/person/day)
WC (Full Flush)	4	L/flush	13.53
WC (Half Flush)	2.6	L/flush	
Hand Basin Tap	3	L/min	6.32
Shower	6	L/min	43.7
Bath	140	L/capacity	15.40
Kitchen Tap	4	L/min	12.12
Washing Machine	8.17	L/kg dry load	17.16
Dishwasher	1.25	L/place setting	4.50
Total	Incl. normalization factor 0.91		104.18

8.6. Materials

- All building and construction materials used on the schemes will aim to be sought from environmentally managed accreditation schemes, (such as EMAS/ ISO 14001 accreditation). All timber will be sourced from a certified chain of custody. All other building materials on this project will be responsibly sourced, where practicable.
- The building will incorporate suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements.

- Insulation will have low environmental impact in use and during manufacture. This is measured via the insulation index rating.

8.7. Waste

- A SWMP will be used on this site, with at least 80% of all waste being diverted from landfill.
- Construction waste will be minimised where possible, with a target of >8 tonnes/100m² GIFA. Where possible, initiatives to maximise the re-use or recycling of waste will be encouraged.

8.8. Ecology and Land-use

- The contractor will enlist the help of a suitably qualified ecologist to recommend appropriate ecological features that will positively enhance the ecology of the site.
- Protection and mitigation measures will be introduced, where practicable, to reduce the impact of the development on the existing site and to enhance the development.
- Ecological improvement will be undertaken to enhance the ecological value of the site once the development is built, wherever practicable.

8.9. Pollution

- A flood risk assessment shall be undertaken, with the results of which guiding a drainage design that ensures surface water run-off, flooding in the case of drainage failure and watercourse pollution are minimised.
- A surface drainage plan and report will also be provided.
- Reduction of night-time light pollution using ILE compliant light fittings will be installed, where practicable.

9. Energy Assessment of Proposed Scheme

The proposed development has adopted the principles of the 'Be Lean, Be Clean, Be Green' approach.

The most practical and economically feasible solution for the development is a good quality thermally upgraded fabric, passive improvements and the use of highly efficient space and hot water heating. An efficient ventilation extract system for wet areas can be provided with additional carbon emission savings through on-site renewable technologies.

Table 6 - Proposed carbon emissions from the development

Ref.	Dwelling Type	No. of Type	TER (kgCO ₂ /m ² /yr)	DER (kgCO ₂ /m ² /yr)	Improv. Factor (%)	Total Carbon Emissions (Kg CO ₂ /yr)
Z43450	Studio Apartment	1	83.44	71.93	13.79%	2,527
Z43451	Type B – 2Bed Grnd Flr Flat	1	45.07	38.28	15.07%	2,546
Z43452	Type C – 2Bed Grnd Flr Flat	1	47.66	40.59	14.83%	2,542
Z43453	Type D – 2Bed Grnd Flr Flat	1	46.95	40.01	14.78%	2,686
Z43454	Type E – 1Bed Grnd Flr Flat	1	45.94	38.33	16.57%	2,063
Z43455	Type F – 1Bed Grnd Flr Flat	1	64.89	55.76	14.07%	2,071
Z43456	Type G – 2Bed Mid Flr Flat	2	36.97	32.30	12.63%	4,300
Z43457	Type H – 2Bed Mid Flr Flat	2	39.91	32.85	17.69%	4,161
Z43458	Type I – 2Bed Mid Flr Flat	2	38.39	32.27	15.94%	4,295
Z43459	Type J – 3Bed Mid Flr Flat	2	34.45	28.05	18.58%	5,553
Z43460	Type K – 2Bed Top Flr Flat	1	47.65	40.78	14.42%	2,736
Z43461	Type L – 2Bed Top Flr Flat	1	48.73	41.68	14.47%	2,533
Z43462	Type M – 3Bed Top Flr Flat	1	38.40	33.05	13.93%	2,751
Z43463	Type N – 2Bed Top Flr Flat	1	41.14	35.62	13.42%	3,266
Z43464	Outbuild Grnd Flr 3Bed Flat	1	45.00	38.18	15.16%	3,980
Total					15.18%	52,124

The carbon emissions for the proposed development is 52,124 Kg/CO₂/yr. This is a total carbon reduction of 9,332 Kg/CO₂/yr from the baseline emissions of 61,455 Kg/CO₂/yr. This equates to a 15.18% carbon reduction across the development.

A reduction of 15.18% is provided for the development against Part L1B 2018, therefore complying with the requirements of the Manchester City Council's Core Strategy (2012).

The development proposal meets local policy through passive improvements such as efficient lighting and ventilation, improved thermal bridging, and highly efficient space and water heating.

10. Conclusion

Following the 'Be Lean, Be Clean, Be Green' hierarchy, carbon emissions for the new build development is 52,124 Kg/CO₂/yr. This is a total carbon reduction of 9,332 Kg/CO₂/yr from the baseline emissions of 61,455 Kg/CO₂/yr this equates to 15.18% carbon reduction.

The calculated baseline regulated energy emissions, confirm compliance with the requirements of the Manchester City Council's Core Strategy (2012).

The approach for the proposed development is to embed sustainability into the heart of the development through a range of design measures based on the 'Be Lean, Be Clean, Be Green' design hierarchy. Measures will include:

- 1) Significantly enhanced building fabric to meet Building Regulation Part L 2018
- 2) Efficient extract ventilation system to wet rooms
- 3) Highly efficient local electric heating and hot water to apartments
- 4) Efficient lighting strategy primarily using LED type fittings
- 5) Dwellings to be air leakage tested.
- 6) A BREEAM domestic refurbishment pre-assessment has been undertaken which confirms that a Very Good rating is achievable.

10.1. Low/ Zero Carbon Technologies (LZT) Review

- Photovoltaic (PV) panels are not required for the development to achieve the local planning policies. The approach is following a passive improvement methodology.
- Solar Thermal Hot Water is not a viable option as roof space will be utilised for photovoltaic panels, which can provide significant benefits as proposed within this report.
- 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 centralised larger plant space for storing fuel, which on this constrained site is not viable.
- Micro-wind turbines do not work on this type of development 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 turbulence, wind shading, noise and air traffic.
- GSHPs are not viable for site because of spatial and financial costs. There is no room to accommodate a GSHP vertical bore and associated communal plant room, ground conditions are unknown and systems are very costly.

- ASHP units have not been included due to there not being a requirement for cooling to the ground floor commercial units. A thermally efficient fabric with electric panel heaters and natural ventilation aims to provide thermal comfort with no requirement for ASHP. A full overheating assessment is required to confirm. This will be completed during the design process.

A more detailed overview of LZT technologies is provided in the appendices of this report.

10.2. Summary Headlines

- The energy hierarchy has been applied to reduce the energy demand of the proposed development. By focusing on high levels of fabric efficiency and energy efficient systems, the project offers an efficient and sustainable solution for the life of the building.
- A reduction of 15.18 % is provided against Part L1B 2018
- The requirements of the Manchester City Council's Core Strategy (2012) have been met
- Overall, the development provides a 15.18% improvement over current Building Regulations Part L1B 2018, as per the table below.
- A BREEAM domestic refurbishment pre-assessment has been undertaken which confirms that a Very Good rating is achievable.

Table 7 - Proposed development CO₂ emissions against Building Regulations Part L 2018

	Total CO ₂ Emissions (KgCO ₂ /Yr)	
Baseline Emissions of Development	61,455	
Be Lean, Be Clean, Be Green Emissions of Proposed Development	52,124	
Total Reduction in CO ₂ Emissions (KgCO ₂ /yr) Against Part L1B 2018		9,332
Percentage Improvement in Carbon Emissions Against Part L1B 2018		15.18%

11. Appendices

11.1. LZT Feasibility Table

Technology	Technical Feasibility	Carbon Savings	Estimated Costs	Financial Viability
Solar photovoltaics	A PV array is not required due to complying with building regs and local planning policies by following a passive improvement approach.	A 3.5kWp system could save around 2,480 kg of CO ₂ per year per dwelling	Average cost for such a system is around £5K.	Current potential income generation is around £230 per annum per dwelling, with a fuel cost saving of around £60 per year per dwelling.
Wind	Average wind speeds on the site according to the <u>NOABL</u> Wind Speed Database are 4.6m/s. To be technically feasible a minimum of 6m/s is required, therefore this site is not considered feasible.	N/A	N/A	N/A
Micro Hydro	There is no capacity for micro hydro on this site since there are no local water courses available.	N/A	N/A	N/A
District Heating	There are currently no existing or planned district heating networks to facilitate connection at this stage.	N/A	N/A	N/A
Solar Hot Water	This technology has been discounted as the level of hot water usage for this development does not merit a storage system, which poses space issues.	Around 270 kg of CO ₂ per year per dwelling.	£3-5K per dwelling	Income generation from RHI in a 4-person household would be in the region of £340 / year (per dwelling) with a fuel saving of around £65 per year per dwelling
Heat Pumps	GSHP: Ground conditions on site are unknown, and installation of coils are likely not economically viable for this project. ASHP: ASHP are not required. Natural ventilation with intermittent extract to wet rooms is preferred to the upper floors.	GSHP: 2,100 to 3,300 kg CO ₂ per year per dwelling ASHP: 1,700 to 2,700 kg CO ₂ per year per dwelling.	GSHP @ £13-20K per dwelling ASHP: £7-11K per dwelling	GSHP: £2,590 minimum annual RHI income generation per dwelling with fuel saving of £440 per year minimum per dwelling ASHP: £920 minimum annual RHI income generation per dwelling with fuel saving of £335 per year minimum per dwelling
Biomass	The small scale of this development would not facilitate the installation of biomass boilers due to the space required for pellet storage.	N/A	N/A	N/A

11.2. Specification for Baseline SAP Calcs (Part L1B 2018)

Item	Brief Description	Notes	Confirm
	The following information is required for the design submission (as per requirements of ADL1B).	Please note submission is now in two stages. A) Design B) As installed	
1. Building Details			
1.1	Building Regulations Part L1B 2018 apply.		
1.2	Postcode for the site is	M16 7PA	
1.3	Thermal Mass is assumed as Low	Assumed internal insulated plasterboards to upgrade walls	
2. Floor Construction Details			
2.1	Ground floor upgraded with insulation to achieve the U-value stated opposite.	U-Value = 0.25 W/m ² K As required under ADL1B Table 3	
3. Wall Construction Details			
3.1	Main external walls are upgraded with insulation to achieve the U-value stated opposite.	U-Value = 0.30 W/m ² K As required under ADL1B Table 3	
4. Roof Construction Details			
4.1	Warm Pitched Roof is upgraded with insulation to achieve the U-value indicated opposite.	U-Value = 0.16 W/m ² K As required under ADL1B Table 3	
5. Openings			
5.1	External solid personnel doors are installed to achieve the U-value opposite.	U-Value = 1.8 W/m ² K As required under ADL1B Table 1	
5.2	All double-glazed windows are to achieve the U-Value indicated opposite.	U-value = 1.60 W/m ² K G-Value = 0.63 As required under ADL1B Table 1	
6. Ventilation			
6.1	This Design Stage SAP calculation assumes the default air permeability of 15m ³ /hr.m ² at 50Pa		
6.2	All wet rooms have system 1 intermittent extract fans.		
6.4	All other areas of the dwelling are naturally ventilated.		
7. Space Heating and Cooling			
7.1	Heating is to be provided via efficient electric panel heaters		
7.2	The heating system is provided with a programmer and appliance thermostat.		
8. Water Heating			
8.1	Water heating is provided through an electric hot water storage heater	1Bed = 150l storage with 100mm insulation 2 and 3 Bed =200l storage with 100mm insulation	
9. Lighting and Lighting Controls			
9.1	All light fittings will be LED type low energy		
10. Renewables			
10.1	No PV required		

11.3. Specification for Proposed Development (Part L1B 2018)

Item	Brief Description	Notes	Confirm
	The following information is required for the design submission (as per requirements of ADL1B).	Please note submission is now in two stages. A) Design B) As installed	
1. Building Details			
1.1	Building Regulations Part L1B 2018 apply.		
1.2	Postcode for the site is	M16 7PA	
1.3	Thermal Mass is assumed as Low	Assumed internal insulated plasterboards to upgrade walls	
2. Floor Construction Details			
2.1	Ground floor upgraded with insulation to achieve the U-value stated opposite.	U-Value = 0.20 W/m ² K	
3. Wall Construction Details			
3.1	Main external walls are upgraded with insulation to achieve the U-value stated opposite.	U-Value = 0.25 W/m ² K	
4. Roof Construction Details			
4.1	Warm Pitched Roof is upgraded with insulation to achieve the U-value indicated opposite.	U-Value = 0.16 W/m ² K	
5. Openings			
5.1	External solid personnel doors are installed to achieve the U-value opposite.	U-Value = 1.40 W/m ² K	
5.2	All double-glazed windows are to achieve the U-Value indicated opposite.	U-value = 1.40 W/m ² K G-Value = 0.63	
6. Ventilation			
6.1	This Design Stage SAP calculation assumes the air permeability of 6m ³ /hr.m ² at 50Pa	No air test is required for ADL1B projects. However with BREEAM it is beneficial to Air Test. ALR of 6 to be achieved on all plots	
6.2	All wet rooms have system 1 intermittent extract fans.		
6.4	All other areas of the dwelling are naturally ventilated.		
7. Space Heating and Cooling			
7.1	Heating is to be provided via efficient electric panel heaters		
7.2	The heating system is provided with a programmer and appliance thermostat.		
8. Water Heating			
8.1	Water heating is provided through an electric hot water storage heater	1Bed = 150l storage with 100mm insulation 2 and 3Bed = 200l storage with 100mm insulation	
9. Lighting and Lighting Controls			
9.1	All light fittings will be LED type low energy		
10. Renewables			
10.1	No PV required		

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11.5. BREEAM Domestic Refurbishment Pre-Assessment

BREEAM Assessment undertaken by licensed BREEAM assessor and BREEAM AP Mr M. Gibson BRE License No. ENE-MG-04.

BREEAM Domestic Refurbishment 2012 Pre-Assessment Estimator v0.7

This assessment and indicative BREEAM rating is not a formal certified BREEAM assessment or rating and must not be communicated as such. The score presented is indicative of a dwelling's potential performance and is based on a simplified pre-formal BREEAM assessment and unverified commitments given at an early stage in the design process.

Commitments generated at early stages of the design process:						
Building name				87 Great Western Street		
Indicative building score (%)				56.88%		
Indicative BREEAM rating				BREEAM Very Good		
Management	Health & Wellbeing	Energy	Water	Materials	Waste	Pollution

	Minimum Standards				
	Pass	Good	Very Good	Excellent	Outstanding
Ene 02	✓	✓	✓	✗	✗
Wat 01	✓	✓	✓	✓	✗
Hea 05	✓	✓	✓	✓	✓
Hea 06	✓	✓	✓	✓	✓
Pol 03	✓	✓	✓	✓	✓
Mat 02	✓	✓	✓	✓	✓

INNOVATION

Section Weighting: 10%

Indicative Section Score: 2.00%

Comments

MANAGEMENT

Section Weighting: 12%

Indicative Section Score: 9.82%

Man 01 Home Users Guide

No. of BREEAM credits available	3	Available contribution to overall score:	3.27%
No. of BREEAM innovation credits	0	Minimum Standards applicable:	No

Assessment Criteria

Where a Home Users Guide be provided to all dwellings, covering all issues set out in the 'Users Guide Contents list', three credits may be awarded

Indicative Credits
3

Comments

Man 02 Responsible Construction Practices

No. of BREEAM credits available	2	Available contribution to overall score:	2.18%
No. of BREEAM innovation credits	1	Minimum Standards applicable:	No

Assessment Criteria

Where a compliant considerate construction scheme will be used, credits are awarded depending the score achieved as outlined below:

Indicative Credits
1

Large Scale - project with more than 5 units

	One Credit	Two Credits
	Score of 25-34 with a score of 5 in each section	Score of 35-39 with a score of 7 in each section
Considerate Constructors Scheme	Score of 25-34 with a score of 5 in each section	Score of 35-39 with a score of 7 in each section
Alternative Compliant Scheme	Compliance	Beyond Compliance

Small Scale - project with 5 units or fewer

	One Credit	Two Credits
	Score of 25-34 with a score of 5 in each section	Score of 35-39 with a score of 7 in each section
Considerate Constructors Scheme	Score of 25-34 with a score of 5 in each section	Score of 35-39 with a score of 7 in each section
Alternative Compliant Scheme	Compliance	Beyond Compliance
Checklist A-3	50% of the optional items	80% of the optional items

Exemplary Credit

Considerate Constructors Scheme	Score of 40 or more with a score of 7 in each section
Alternative Compliant Scheme	Exemplary Level Compliance
Checklist A-3*	All Items (Optional & Mandatory)

* Small Scale Project Only

Indicative Innovation
Credits Achieved
0

Comments

Man 03 Construction Site Impacts

No. of BREEAM credits available	1	Available contribution to overall score:	1.09%
No. of BREEAM innovation credits	0	Minimum Standards applicable:	No

Assessment Criteria

Where evidence demonstrate that site impacts will be monitored, as detailed below:

Indicative Credits
1

	One Credit
	Where there is evidence to demonstrate that 2 or more of the sections in Checklist A-4 are completed
Large Scale	Where there is evidence to demonstrate that 2 or more of the sections in Checklist A-4 are completed
Small Scale	Where there is evidence to demonstrate that 2 or more of the sections in Checklist A-5 are completed

Sections of Checklist	
Large Scale - Checklist A-4	Small Scale - Checklist A-5
Monitor, report and set targets for CO2 production of energy use arising from site activities	Set objectives for reducing CO2 production from energy use arising from site activities
Monitor, report and set targets for water consumption arising from site activities	Set objectives for reducing water use arising from site activities
A main contractor with an environmental materials policy	Main contractor environmental materials statement
A main contractor that operates an Environmental Management System	80% of site timber is reclaimed, re-used or responsibly sourced
80% of site timber is reclaimed, re-used or responsibly sourced	

Same definition of small and large scale as in Man 02

Comments

Man 04 Security				
No. of BREEAM credits available	2	Available contribution to overall score:	2.18%	
No. of BREEAM innovation credits	0	Minimum Standards applicable:	No	
Assessment Criteria				Indicative Credits
Where the following requirements will be met:				1
One Credit Secure windows and doors	External doors and accessible windows meet minimum standards and appropriately certified			
	Principles and guidance of Secured by Design Section 2 are complied with			
Two Credits Secured by design	A suitably qualified security consultant is consulted at the design stage and their recommendations are incorporated into the refurbishment			
Comments				
review and obtain info from SBD officer. Provide spec confirming compliance with windows and doors and possible extra credit for SBD section 2.				
Man 05 Protection and Enhancement of Ecological Features				
No. of BREEAM credits available	1	Available contribution to overall score:	1.09%	
No. of BREEAM innovation credits	1	Minimum Standards applicable:	No	
Assessment Criteria				Indicative Credits
Where the following requirements will be met:				1
One Credit Protecting Ecological Features	Site survey carried out to determine presence of ecological features			
	Statutory Nature Conservation Organisation notified of protected species			
	Features of ecological value protected during refurbishment works			
Exemplary Credit Ecological enhancement	A suitably qualified ecologist recommends features to enhance ecology of the site			Indicative Innovation Credits Achieved
	adopts all general ecological recommendations			
	adopts 30% of additional recommendations			
Comments				
undertake the ecological report and work				
Man 06 Project Management				
No. of BREEAM credits available	2	Available contribution to overall score:	2.18%	
No. of BREEAM innovation credits	2	Minimum Standards applicable:	No	
Assessment Criteria				Indicative Credits
Where the following requirements will be met:				2
One Credit Project Roles and Responsibilities	Where all of the project team are involved in the project decision making			
	Small Scale - the project manager assigns individual and shared responsibilities amongst the project team including all trades on site			
	Large Scale - the project manager assigns individual and shared responsibilities across the following key design and refurbishment stages: i. Planning and Building control notification ii. Design iii. Refurbishment iv. Commissioning and handover v. Occupation			
Small Scale projects: five units or fewer and less than £100k		Large Scale projects: more than five units and more than £100k		
One Credit Handover and Aftercare	Handover meeting arranged			
	2 or more of the following committed to: - A site inspection within 3 months of occupation - Conduct post occupancy interviews with building occupants or a survey via phone or posted information within 3 months of occupation - Longer term after care e.g. a helpline, nominated individual or other appropriate system to support building users for at least the first 12 months of occupation			
Exemplary Credits				Indicative Innovation Credits Achieved
One Exemplary Credit Early Design Input	Where A BREEAM Accredited Professional has been appointed to oversee key stages within the project. OR Where a BREEAM Domestic Refurbishment Assessor has been appointed at an early stage of the project, prior to the production of a refurbishment specification			1
One Exemplary Credit Thermographic Surveying and Airtightness Testing	Where Thermographic surveying and Airtightness testing have been carried out at both pre and post refurbishment stages			
	Where an improved air tightness target has been set at design stage and testing demonstrates that this has been achieved post refurbishment			
Comments				
extra credit possible -pre-refurb air tightness testing could be done on any plots with envelope intact. Thermographic imaging will probably not be undertaken pre-development as the existing buildings may be unheated so there is no temp difference for imaging to be effective. Post development air tightness testing of xxm3/m2.hr could be achieved and thermographic imaging to be undertaken. only 1 credit taken at present time for Energy Council input via BREEAM AP.				

HEALTH & WELLBEING		Section Weighting: 17%		Indicative Section Score 9.92%	
Hea 01 Daylighting					
No. of BREEAM credits available	2	Available contribution to overall score		2.83%	
No. of BREEAM innovation credits	0	Minimum Standards applicable		No	
Assessment Criteria					Indicative Credits
Where the refurbishment results in a neutral impact on daylighting or where minimum daylighting standards are met, up to two credits may be awarded as follows:					1
For Existing Dwellings and Change of Use Projects					
First Credit Maintaining Good Daylighting	The refurbishment results in a neutral impact on the dwellings daylighting levels in the kitchen, living room, dining room and study				
Where the property is being extended		New spaces achieve minimum daylighting levels			
First Credit Maintaining Good Daylighting	The extension does not significantly reduce daylighting levels in the kitchen, living room, dining room or study of neighbouring properties				
For All Properties					
Second Credit Minimum Daylighting	The dwelling achieves minimum daylighting levels in the kitchen, living room, dining room and study				
Comments					
neutral daylighting to achieve 1 credit.					
Hea 02 Sound Insulation					
No. of BREEAM credits available	4	Available contribution to overall score		5.67%	
No. of BREEAM innovation credits	0	Minimum Standards applicable		No	
Assessment Criteria					Indicative Credits
To ensure the provision of acceptable sound insulation standards and so minimise the likelihood of noise complaints.					2
Properties where sound testing has been carried out:					
Up to Four Credits	Four credits awarded according to the improvement over building regulations. See table in additional information in Technical Manual				
Properties where sound testing is not feasible and not required by the appointed Building Control body					
Two Credits	Where existing separating walls and floors are designed to meet the requirements of Building Regulations with compliant construction details				
Up to Four Credits	Where a Suitably Qualified Acoustician (SQA) provides recommendations for the specification of all existing separating walls and floors				
	SQA confirms in their professional opinion that they have the potential to meet or exceed the sound insulation credit requirements				
	Where these recommendations are implemented				
	See table in additional information in Technical Manual				
Historic Buildings					
Up to Four Credits	Where the dwelling is a Historic Building and sound testing results demonstrate existing separating walls and floor meet the Historic Building credit requirements				
	See table in additional information in Technical Manual				
	Where sound testing is not feasible and not required by the appointed Building Control body meeting criteria 2 and 3 using Table 12				
	Properties where sound testing has been carried out, credits awarded according to the improvement over building regulations. See table in additional information in Technical Manual				
	Where the dwelling is a detached property				
	Where the dwelling is a property with separating walls or floors only between non habitable rooms OR Testing not required by building control body				
Detached Properties					
Four Credits	By Default				
Properties with separating walls or floors only between non habitable rooms OR Testing not required by building control body					
Four Credits	By Default				
Comments					
possible two credits available. EC reviewing to see if worth pursuing.					
Hea 03 Volatile Organic Compounds					
No. of BREEAM credits available	1	Available contribution to overall score		1.42%	
No. of BREEAM innovation credits	0	Minimum Standards applicable		No	
Assessment Criteria					Indicative Credits
Where the refurbishment avoids the use of VOCs with new products meeting the following requirements:					0
One Credit Avoiding the use of VOCs	Where all decorative paints and varnishes used in the refurbishment have met the requirement listed in table 5.4 in the Technical Manual				
	Where at least five of the eight remaining product categories listed in table 5.4 have met the testing requirements and emission levels for Volatile Organic Compound (VOC) emissions against the relevant standards identified within table 5.4 in the Technical Manual				
	Where five or less products are specified within the refurbishment, all must meet the requirements in order to achieve this credit.				
Comments					

Hea 04 Inclusive Design				
No. of BREEAM credits available	2	Available contribution to overall score	2.83%	
No. of BREEAM innovation credits	1	Minimum Standards applicable	No	
Assessment Criteria				Indicative Credits
Where an access statement has been carried out using Checklist A-8 of the Technical Manual to optimise the accessibility of the home as follows:				1
Checklist A-8 of the Technical Manual				
One Credit Minimum Accessibility		Section 1 Completed with Evidence	Section 2	
Two Credits Advanced Accessibility		Completed with Evidence	Completed with Evidence	
Exemplary Performance				Indicative Innovation Credits Achieved
One Credit	Where an access expert suitably qualified member of the design team has completed sections 1, 2 and 3 of Checklist A-8, access statement template with evidence provided of the measures implemented in the refurbishment			0
Comments				
review checklist A8. 1 credit possible.				
Hea 05 Ventilation				
No. of BREEAM credits available	2	Available contribution to overall score	2.83%	
No. of BREEAM innovation credits	0	Minimum Standards applicable	Yes	
Assessment Criteria				Indicative Credits
Where the dwelling meets the following ventilation requirements:				2
One Credit Minimum Ventilation Requirements		A minimum level of background ventilation is provided (with trickle ventilators or other means of ventilation) for all habitable rooms, kitchens, utility rooms and bathrooms compliant with section 7, Building Regulations Approved Document Part F, 2010		
		A minimum level of extract ventilation is provided in all wet rooms (e.g. kitchen, utility and bath-rooms), compliant with section 5, Building Regulations Approved Document Part F 2010.		
		A minimum level of purge ventilation is provided in all habitable rooms and wet rooms, compliant with section 7, Building Regulations Approved Document Part F, 2010.		
		It is an historic building and meets historic building requirements in CN4 of the technical manual		
Two Credits Advanced Requirements		Ventilation is provided for the dwelling that meets the requirements of Section 5 of Building Regulations Part F in full		
		Where the building is a historic building and meets the requirements for Historic Buildings in compliance note 4 of the technical manual		
Comments				
Part F : Mechancial extract to wet rooms to be installed.				
Hea 06 Safety				
No. of BREEAM credits available	1	Available contribution to overall score	1.42%	
No. of BREEAM innovation credits	0	Minimum Standards applicable	Yes	
Assessment Criteria				Indicative Credits
Where a fire and carbon monoxide (CO) detection and alarm system is specified as follows:				1
One Credit Fire and Carbon Monoxide (CO) Detection and Alarm Systems		Where a compliant fire detection and fire alarm system is provided		
		Carbon Monoxide detector installed if dwelling is supplied with mains gas or other fossil fuel		
		Mains supplied fire detection and alarm system if project involves re-wiring*		
		Battery operated fire detection and alarm system if no re-wiring* is to take place		
* see CN9 in Hea 06 for the definition of re-wiring				
Comments				
check CO detectors				

ENERGY		Section Weighting: 43%		Indicative Section Score 19.28%	
Ene 01 Improvement in Energy Efficiency Rating					
No. of BREEAM credits available		6	Available contribution to overall score		8.90%
No. of BREEAM innovation credits		0	Minimum Standards applicable		No
Assessment Criteria					Indicative Credits
Where the following targets are met for the improvement in Energy Efficiency Rating achieved as a result of refurbishment:					3
		Improvement in EER	Credits		
		≥ 5	0.5		
		≥ 9	1		
		≥ 13	1.5		
		≥ 17	2		
		≥ 21	2.5		
		≥ 26	3		
		≥ 31	3.5		
		≥ 36	4		
		≥ 42	4.5		
		≥ 48	5		
		≥ 54	5.5		
		≥ 60	6		
Comments					
Scoring is estimated. Full SAP calcs required to confirm.					
Ene 02 Energy Efficiency Rating Post Refurbishment					
No. of BREEAM credits available		4	Available contribution to overall score		5.93%
No. of BREEAM innovation credits		2	Minimum Standards applicable		Yes
Assessment Criteria					Indicative Credits
Where the following Energy Efficiency Rating benchmarks will be met as a result of refurbishment:					2
		EER post refurbishment	Credits	Minimum requirements	
		≥50	0.5	'Pass' level EER of 50	
		≥55	1	'Good' level EER of 58	
		≥60	1.5		
		≥65	2	'Very Good level' EER of 65	
		≥70	2.5	'Excellent' level EER of 70	
		≥75	3		
		≥80	3.5	'Outstanding' level EER of 81	
		≥85	4		
		Exemplary	Credits		
		≥90	1		
		≥100	2		
					Indicative Innovation Credits Achieved
					0
Comments					
Scoring is estimated. Full SAP calcs required to confirm.					
Ene 03 Primary energy demand					
No. of BREEAM credits available		7	Available contribution to overall score		10.38%
No. of BREEAM innovation credits		0	Minimum Standards applicable		No
Assessment Criteria					Indicative Credits
Where the following Primary Energy Demand benchmarks will be met as a result of refurbishment:					3
		Primary Energy Demand Post Refurbishment (kWh/m ² /year)	Credits		
		≤ 400	0.5		
		≤ 370	1		
		≤ 340	1.5		
		≤ 320	2		
		≤ 300	2.5		
		≤ 280	3		
		≤ 260	3.5		
		≤ 240	4		
		≤ 220	4.5		
		≤ 200	5		
		≤ 180	5.5		
		≤ 160	6		
		≤ 140	6.5		
		≤ 120	7		
Comments					
Scoring is estimated. Full SAP calcs required to confirm.					
Ene 04 Renewable Technologies					
No. of BREEAM credits available		2	Available contribution to overall score		2.97%
No. of BREEAM innovation credits		0	Minimum Standards applicable		No
Assessment Criteria					Indicative Credits
Where the dwelling will meet the following % contribution from renewables and primary energy demand targets as a result of refurbishment					0
Dwelling Type		Primary Energy Demand	Percentage from Renewables		
			1 Credit	2 Credits	
Detached		≤ 250 kWh/m ² /year	≥10%	≥20%	
Semi-Detached			≥10%	≥20%	
Bungalow			≥10%	≥20%	
End of Terrace			≥10%	≥20%	
Mid Terrace		≤ 220 kWh/m ² /year	≥10%	≥20%	
Low Rise Flat			≥10%	≥20%	
Mid Rise Flat			≥10%	≥15%	
High Rise Flat			≥10%	≥15%	
Comments					

Ene 05 Energy Labelled White Goods				
No. of BREEAM credits available	2	Available contribution to overall score	2.97%	
No. of BREEAM innovation credits	0	Minimum Standards applicable	No	
Assessment Criteria				Indicative Credits
Where Energy Efficiency White goods are to be provided as follows:				1
First Credit				
Appliance	Appliance provided	Appliance not to be provided		
Fridges, Freezers and Fridge-Freezers	Energy Saving Trust Recommended appliances specified	EU Energy Efficiency Labelling Scheme Information Leaflet provided to all dwellings		
Second Credit				
Appliance	Appliance provided	Appliance not to be provided		
Washing Machines and Dishwashers	Energy Saving Trust Recommended appliances specified	Second credit not achieved		
Washer-Dryers and Tumble Dryers	Appliances specified with B Rating under EU Energy Efficiency Labelling Scheme	EU Energy Efficiency Labelling Scheme Information Leaflet provided to all dwellings		
Comments				
Currently assumed fridge/ freezers, washing machine, dishwasher and washer dryers will be installed to meet the BREEAM criteria.				
Ene 06 Drying Space				
No. of BREEAM credits available	1	Available contribution to overall score	1.48%	
No. of BREEAM innovation credits	0	Minimum Standards applicable	No	
Assessment Criteria				Indicative Credits
Where adequate, secure internal or external space with posts and footings or fixings is provided with the following:				1
1 Credit				
Number of bedrooms	Drying line required			
1-2	4m+			
3+	6m+			
Comments				
Credits not currently included.				
Ene 07 Lighting				
No. of BREEAM credits available	2	Available contribution to overall score	2.97%	
No. of BREEAM innovation credits	0	Minimum Standards applicable	No	
Assessment Criteria				Indicative Credits
Where energy efficient internal and external lighting is provided as follows:				2
External Lighting - 1 Credit				
Energy Efficient Space Lighting of more than 45 lumens per circuit watt and Energy Efficient Security Lighting OR Where Energy Efficient Space Lighting is provided ONLY				
Internal Lighting - 1 Credit				
Maximum average wattage across the total floor area of the dwelling of 9 watts/m2				
Comments				
maximum wattage /m2 has been included as an additional credit.				
Ene 08 Display Energy Devices				
No. of BREEAM credits available	2	Available contribution to overall score	2.97%	
No. of BREEAM innovation credits	1	Minimum Standards applicable	No	
Assessment Criteria				Indicative Credits
Where consumption data is displayed to occupants by a compliant energy display device				0
Electricity usage data displayed		Primary Heating Fuel		
Electricity usage data displayed		Electricity	Other	
Primary Heating Fuel usage data displayed		2 credits awarded	1 credit awarded	
Electricity & Primary Heating Fuel usage displayed		N/A	1 credit awarded	
Electricity & Primary Heating Fuel usage displayed		N/A	2 credits awarded	
Exemplary Credits				
One credit		Where the first two credits are achieved		
Recording consumption data		Where any compliant Energy Display Device is capable of recording consumption data		
Indicative Innovation Credits Achieved				0
Comments				
Ene 09 Cycle Storage				
No. of BREEAM credits available	2	Available contribution to overall score	2.97%	
No. of BREEAM innovation credits	0	Minimum Standards applicable	No	
Assessment Criteria				Indicative Credits
Where individual or communal compliant cycle storage is provided as follows:				0
Dwelling Size	One Credit	Two Credits		
Studios/ 1 bedroom	1 per two dwellings	1 per dwelling		
2-3 bedrooms	1 per dwelling	2 per dwelling		
4 bedrooms	2 per dwelling	4 per dwelling		
Comments				
Credits not included.				
Ene 10 Home Office				
No. of BREEAM credits available	1	Available contribution to overall score	1.48%	
No. of BREEAM innovation credits	0	Minimum Standards applicable	No	
Assessment Criteria				Indicative Credits
Where sufficient space and services will be provided to allow occupants to set up a home office in a suitable room with adequate ventilation				1
Comments				

WATER		Section Weighting: 11%		Indicative Section Score 6.60%	
Wat 01 Internal Water Use					
No. of BREEAM credits available	3	Available contribution to overall score	6.60%		
No. of BREEAM innovation credits	1	Minimum Standards applicable	Yes		
Assessment Criteria				Indicative Credits	
Where the dwellings water consumption meets the following consumption benchmarks, or where terminal fittings meet the following water consumption standards:				2	
Calculated Water Consumption (litres/person/day)	Equivalent terminal fitting standards	Minimum Standard	Credits		
>150	Typical baseline performance	N/A	0		
from 140 to ≤ 150	All showers specified to 'Good' OR All taps and WC's to 'Good' OR Kitchen fittings specified to 'Excellent'	N/A	0.5		
from 129 to < 140	All showers specified to 'Excellent' OR All showers and bathroom taps to 'Good'	BREEAM Very Good	1		
from 118 to < 129	All bathroom and WC room fittings specified to 'Good' OR All bathroom fittings specified to 'Excellent'	N/A	1.5		
from 107 to < 118	All Bathroom and WC room fittings specified to 'Excellent' OR All Bathroom fittings Specified to 'Excellent' and WC room fitting specified to 'Good' OR All Bathroom fittings, kitchen and utility fittings specified to 'Good'	BREEAM Excellent	2		
from 96 to < 107	All kitchen, bathroom, utility room and WC room fittings specified to 'Good' OR All bathrooms, kitchens and utility rooms specified to 'Excellent'	N/A	2.5		
< 96	All bathroom fittings specified to 'Excellent' and WC room, kitchen and utility room fittings specified to 'Good'	BREEAM Outstanding	3		
NOTE: 'Good' fittings are equivalent to good practice fittings with "Excellent" fittings equivalent to best practice fittings (see the technical manual for full details).					
		Exemplary Credit	If the water consumption is less than 80l/person/day	Indicative Innovation Credits Achieved	
				0	
Comments					
current EC suggested spec is 4/2.6l WC, 140l bath, 3l/min taps excl. kitchen, 4l/min kitchen taps, 8l/min showers. This achieves at least 3 credits.					
Wat 02 External Water Use					
No. of BREEAM credits available	1	Available contribution to overall score	2.20%		
No. of BREEAM innovation credits	0	Minimum Standards applicable	No		
Assessment Criteria				Indicative Credits	
Where the following requirements will be met:				0	
		Requirements:			
		One Credit	Where a compliant rainwater collection system for external/internal irrigation use has been provided to dwellings. OR Where dwellings have no individual or communal garden space.		
Comments					
credit are not achievable as downpipes required on all propertie. Downpipes are internal within building structure. water butts could be subject to spatial constraints locating and vandalism.					
Wat 03 Water Meter					
No. of BREEAM credits available	1	Available contribution to overall score	2.20%		
No. of BREEAM innovation credits	0	Minimum Standards applicable	No		
Assessment Criteria				Indicative Credits	
Where an appropriate water meter for measuring usage of mains potable water meter has been provided to dwelling(s), one credit may be awarded				1	
Comments					

MATERIALS		Section Weighting: 8%		Indicative Section Score 4.62%																																																						
Mat 01 Environmental Impact of Materials																																																										
No. of BREEAM credits available	25	Available contribution to overall score	4.44%																																																							
No. of BREEAM innovation credits	0	Minimum Standards applicable	No																																																							
Assessment Criteria				Indicative Credits																																																						
Up to 25 credits can be awarded, with credits calculated using the Mat 01 calculator tool. The table below shows the maximum number of credits available for each element:				12																																																						
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Assessment Criteria				Indicative Credits																																																						
Where new materials are responsibly sourced, up to 12 credits may be awarded where 80% of new materials for an element are responsibly sourced. The credits achieved are dependent on % of point achieved which is based upon the responsible sourcing tier level of each material sourced as detailed below:				6																																																						
Table 1 <table border="1"> <thead> <tr> <th>Tier level</th> <th>Points</th> </tr> </thead> <tbody> <tr><td>1</td><td>4</td></tr> <tr><td>2</td><td>3.5</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>4</td><td>2.5</td></tr> <tr><td>5</td><td>2</td></tr> <tr><td>6</td><td>1.5</td></tr> <tr><td>7</td><td>1</td></tr> <tr><td>8</td><td>0</td></tr> </tbody> </table>		Tier level	Points	1	4	2	3.5	3	3	4	2.5	5	2	6	1.5	7	1	8	0	Table 2 <table border="1"> <thead> <tr> <th>BREEAM credits</th> <th>% of available points achieved</th> </tr> </thead> <tbody> <tr><td>12</td><td>≥54%</td></tr> <tr><td>10</td><td>≥45%</td></tr> <tr><td>8</td><td>≥36%</td></tr> <tr><td>6</td><td>≥ 27%</td></tr> <tr><td>4</td><td>≥ 18%</td></tr> <tr><td>2</td><td>≥ 9%</td></tr> </tbody> </table>		BREEAM credits	% of available points achieved	12	≥54%	10	≥45%	8	≥36%	6	≥ 27%	4	≥ 18%	2	≥ 9%	Will all new timber used in the project be sourced in accordance with the UK Government's Timber Procurement Yes																						
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Mat 03 Insulation																																																										
No. of BREEAM credits available	8	Available contribution to overall score	1.42%																																																							
No. of BREEAM innovation credits	0	Minimum Standards applicable	No																																																							
Assessment Criteria				Indicative Credits																																																						
Where any new insulation specified for use within external walls, ground floor, roof and buildings services meet the following requirements:				8																																																						
Requirements <table border="1"> <tr> <td rowspan="2">4 Credits</td> <td>Where the Insulation Index for new insulation used in the buildings is ≥2</td> </tr> <tr> <td>Where Green Guide ratings are determined using the Green Guide to specification tool</td> </tr> </table>		4 Credits	Where the Insulation Index for new insulation used in the buildings is ≥2	Where Green Guide ratings are determined using the Green Guide to specification tool																																																						
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Comments																																																										

WASTE		Section Weighting: 3%		Indicative Section Score 2.40%	
Was 01 Household Waste					
No. of BREEAM credits available	2	Available contribution to overall score		1.20%	
No. of BREEAM innovation credits	0	Minimum Standards applicable		No	
Assessment Criteria					Indicative Credits
Where compliant recycling and composting facilities are provided, up to two credits may be awarded as follows					2
First Credit - Recycling Facilities					
Scenario		Internal recycling storage requirements			
Compliant collection scheme in place	3 internal recycling containers provided where recycling is not sorted post collection				
	1 internal recycling container provided where recycling is sorted post collection				
	Minimum 30 litre total capacity, no single container less than 7 litre capacity				
	Dedicated position in accordance with compliance note 1				
No compliant collection scheme in place No adequate external storage	3 internal recycling containers provided				
	Minimum 60 litre total capacity				
	Dedicated position in accordance with compliance note 1				
No compliant collection scheme in place Adequate external storage provided	3 internal recycling containers provided				
	Minimum 30 litre total capacity, no single container smaller than 7 litre capacity				
	Dedicated position in accordance with compliance note 1				
Second credit - Composting facilities					
With external space		Without external space			
Where a composting service or facility is provided for green/garden waste		Where a composting service or facility is provided for kitchen waste			
Where a composting service or facility is provided for kitchen waste		Where an interior container is provided for kitchen composting waste of at least 7 litres			
Where an interior container is provided for kitchen composting waste of at least 7 litres					
Comments					
kitchens will accommodate bins. Credits achieved subject to further review.					
Was 02 Refurbishment Site Waste Management					
No. of BREEAM credits available	3	Available contribution to overall score		1.80%	
No. of BREEAM innovation credits	1	Minimum Standards applicable		No	
Assessment Criteria					Indicative Credits
Up to three credits are available depending on the site waste management plan to be implemented as follows					2
Projects up to £100k					
Three Credits		Where waste generated through the refurbishment process is managed in accordance with Checklist A-9			
Exemplary Credit		Where a compliant Level 1; Site Waste Management Plan (SWMP) is in place			
Projects up to £300k					
Three Credits		Where a compliant Level 1; Site Waste Management Plan (SWMP) is in place			
Exemplary Credit	Where a compliant Level 2; Site Waste Management Plan (SWMP) is in place				
	Non-hazardous construction waste generated by the dwellings refurbishment meets or exceeds the resource efficiency benchmark				
	The percentage of non-hazardous construction waste and demolition waste generated by the project has been diverted from landfill and meets or exceeds the refurbishment & demolition waste diversion benchmarks				
Projects over £300k					
First Credit Management Plan		Where a compliant Level 2; Site Waste Management Plan (SWMP) is in place			
Second Credit Good Practice Waste Benchmarks	First credit achieved				
	Non-hazardous construction waste generated by the dwellings refurbishment meets or exceeds the resource efficiency benchmark				
	Amount of waste generated against £100,000 of project value is recorded in the SWMP				
	Pre-refurbishment audit of the existing building is completed				
Third Credit Best Practice Waste Benchmarks	If demolition is included as part of the refurbishment programme, then the audit should also cover demolition materials				
	Where the first two credits have been achieved achieved				
Exemplary Credit	Where Non-hazardous demolition waste generated by the dwellings refurbishment meets or exceeds the refurbishment & demolition waste diversion benchmarks				
	Where non-hazardous construction waste generated by the dwellings refurbishment meets or exceeds the exemplary level resource efficiency benchmark				
Where Non-hazardous demolition waste generated by the dwellings refurbishment meets or exceeds the exemplary level diversion benchmarks					
Comments					
credits could be increased.					

POLLUTION		Section Weighting: 6%		Indicative Section Score 2.25%									
Pol 01 NOx Emissions													
No. of BREEAM credits available	3	Available contribution to overall score	2.25%										
No. of BREEAM innovation credits	0	Minimum Standards applicable	No										
Assessment Criteria				Indicative Credits									
Credits are awarded on the basis of NOx emissions arising from the operation of space heating and hot water systems for each refurbished dwelling as follows:				0									
		<table border="1"> <thead> <tr> <th colspan="2">Dry NOx Emissions</th> </tr> </thead> <tbody> <tr> <td>One Credit</td> <td>≤100 mg/kWh (NOx class 4 boiler)</td> </tr> <tr> <td>Two Credits</td> <td>≤70 mg/kWh (NOx class 5 boiler)</td> </tr> <tr> <td>Three Credits</td> <td>≤40 mg/kWh</td> </tr> </tbody> </table>				Dry NOx Emissions		One Credit	≤100 mg/kWh (NOx class 4 boiler)	Two Credits	≤70 mg/kWh (NOx class 5 boiler)	Three Credits	≤40 mg/kWh
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Two Credits	≤70 mg/kWh (NOx class 5 boiler)												
Three Credits	≤40 mg/kWh												
Comments		elec heating will not meet the criteria.											
Pol 02 Surface Water Runoff													
No. of BREEAM credits available	3	Available contribution to overall score	2.25%										
No. of BREEAM innovation credits	1	Minimum Standards applicable	No										
Assessment Criteria				Indicative Credits									
Where impacts of the refurbishment on surface water runoff are neutralised or where runoff is reduced as a result of refurbishment, up to three credits can be awarded as follows:				1									
Requirements													
One Credit		New hard standing areas must be permeable											
Neutral Impact on Surface Water		If building on to previously permeable area additional run-off must be managed on site											
		Calculations should be carried out by an appropriately qualified professional											
Requirements													
OR Second Credits		Where the criteria needed for One Credit has been achieved											
Reducing Run-Off From Site: Basic		Where all run-off from the roof for rainfall depths up to 5 mm, have been managed on site using source control methods											
		Include runoff from all existing and new parts of the roof.											
		An appropriately qualified professional should be used to design an appropriate drainage strategy for the site											
Requirements													
OR Three Credits		Where run-off as a result of the refurbishment is managed on site using source control											
Reducing Run-Off From Site: Advanced		An appropriately qualified professional should be used to design an appropriate drainage strategy for the site.											
		The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event has been reduced by 75% from the existing site.											
		The total volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration has been reduced by 75%.											
		An allowance for climate change must be included for all of the above calculations, in accordance with current best practice (PPS25, 2010).											
Requirements													
Exemplary Credit		Where all run-off from the developed site is managed on site using source control											
		The peak rate of run-off as a result of the refurbishment for the 1 in 1 year event is reduced to zero.											
		The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event is reduced to zero.											
		There is no volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration.											
		An allowance for climate change must be included for all of the above calculations, in accordance with current best practice (PPS25, 2010).											
Comments		Indicative Innovation Credits Achieved 0											
credits possible subject to drainage review and calculations. Currently 1 credits possible. The other credits will not be practical													
Pol 03 Flooding													
No. of BREEAM credits available	2	Available contribution to overall score	1.50%										
No. of BREEAM innovation credits	0	Minimum Standards applicable	Yes										
Assessment Criteria				Indicative Credits									
Where the dwelling is located in a low flood risk zone, or where in a medium to high flood risk zone and a flood resilience/resistance strategy has been implemented, up to two credits can be awarded as follows:				2									
Minimum Standards		A minimum of two credits must be achieved for this issue at the Excellent and Outstanding levels											
Option 1 - Low Flood Risk													
Two Credits		Where a Flood Risk Assessment (FRA) has been carried out and the assessed dwellings are defined as having a low annual probability of flooding.											
Option 2 - Medium / High Flood Risk													
Two Credits		Where a Flood Risk Assessment (FRA) has been carried out and the assessed dwellings are defined as having a medium or high annual probability of flooding.											
		Two credits are awarded where as a result of the dwellings floor level or measures to keep water away the dwelling is defined as achieving avoidance from flooding by following Checklist A-10; Decision Strategy Flow Chart.											
		Where avoidance is not possible, two credits are achieved where a full flood resilience/resistance strategy is implemented for the dwellings in accordance with recommendations made by a Suitably Qualified Building Professional											
Comments		FRA required.											

Building name	87 Great Western Street
Indicative Building Score	56.88%
Indicative Building Rating	BREEAM Very Good

This assessment and indicative BREEAM rating is not a formal certified BREEAM assessment or rating and must not be communicated as such. The score presented is indicative of a dwelling's potential performance and is based on a simplified pre-formal BREEAM assessment and unverified commitments given at an early stage in the design process.

	Issue	Credits Available	Indicative Credits Achieved	Weighting	Section Score
Management	Man 01	3	3	12%	9.82%
	Man 02	2	1		
	Man 03	1	1		
	Man 04	2	1		
	Man 05	1	1		
	Man 06	2	2		

Health and Wellbeing	Hea 01	2	1	17%	9.92%
	Hea 02	4	2		
	Hea 03	1	0		
	Hea 04	2	1		
	Hea 05	2	2		
	Hea 06	1	1		

Energy	Ene 01	6	3	43%	19.28%
	Ene 02	4	2		
	Ene 03	7	3		
	Ene 04	2	0		
	Ene 05	2	1		
	Ene 06	1	1		
	Ene 07	2	2		
	Ene 08	2	0		
	Ene 09	2	0		
	Ene 10	1	1		

Water	Wat 01	3	2	11%	6.60%
	Wat 02	1	0		
	Wat 03	1	1		

Materials	Mat 01	25	12	8%	4.62%
	Mat 02	12	6		
	Mat 03	8	8		

Waste	Was 01	2	2	3%	2.40%
	Was 02	3	2		

Pollution	Pol 01	3	0	6%	2.25%
	Pol 02	3	1		
	Pol 02	2	2		

Innovation	10	2	N/A	2.00%
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	Minimum Standards				
	Pass	Good	Very Good	Excellent	Outstanding
Ene 02	✓	✓	✓	✗	✗
Wat 01	✓	✓	✓	✓	✗
Hea 05	✓	✓	✓	✓	✓
Hea 06	✓	✓	✓	✓	✓
Pol 03	✓	✓	✓	✓	✓
Mat 02	✓	✓	✓	✓	✓

