BRUNSWICK PLACE MANCHESTER

ENVIRONMENTAL STANDARDS, ENERGY & SUSTAINABILITY STATEMENT

Client: **Maryland Securities Ltd**

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Document Origin

Revision	Date	Description	Prepared	Checked	Approved
-	23/07/2018	First Issue	A Turl	S Howe	S Howe
1	23/02/2021	Scheme Update	A Turl	S Howe	S Howe
2	07/04/2021	Comment Incorporated	A Turl	S Howe	S Howe
3	07/05/2021	Comment Incorporated	A Turl	S Howe	S Howe

Contents

1. Executive Summary

The following document outlines the planning environmental strategy required for the proposed residential development at:

Brunswick Place, Manchester, M40 7EZ

1.1. Site description:

The site is located in the New Islington area of Manchester to the East of the city centre and close to the Etihad Campus.

The site currently consists of a listed mill building to the North East and a largely cleared plot to the South West. An existing 3 storey building currently sits on the corner of Beswick Street and Bradford Road.

The existing main Mill building consists of ground floor plus six storeys with a number of smaller structures attached. The building incorporates a central courtyard area.

The adjacencies to the proposed development site are as follows:

North East:	Existing buildings
South East:	Ashton Canal
North West:	Bradford Road
South West:	Beswick Street

1.2. Development description:

The proposed development comprises two parts as follows:

Brunswick Mill Conversion

The renovation and conversion of the existing listed Mill building into residential apartments, retail tenancy fitout areas, amenity space and car parking.

New Build

The construction of two purpose built multi storey residential building ranging from 4 storey to 7 storey. The proposed development will include residential apartments, retail tenancy areas, amenity space and car parking.

Both buildings will incorporate cycle storage, bin storage and plantroom space at ground floor level.

The project proposals have been reviewed and it is considered that both the refurbishment and new build elements of the scheme can be constructed utilising sustainable design methods to ensure that the Manchester City Council aspirations for good quality building stock are met.

- Table A outlines building fabric criteria which can be utilised to achieve compliance.
- Table B outlines system performance criteria which can be utilised to achieve compliance.

- Appendix A provides the rationale for the allocation of on-site Low and Zero Carbon technologies and renewables.

During the design period the proposals will be examined in detail and will be the subject of more refined SAP and thermal model analysis. This detailed analysis will be based on the actual details intended for construction to confirm and / or modify the information below. The final results can then be used to define the final EPC rating for the scheme.

The BREEAM standard to determine a buildings environmental impact has not been requested or defined as Manchester City Council Policy; however, we shall, for good environmental engineering practice, consider the guidance in our decision making during this proposed development.

2. Terms of Reference

This Environmental Standards Statement seeks to demonstrate that the design intent for the scheme as well as the commitment to aligning with Manchester City Council's aspirations and wishes to deliver sustainable developments. The environmental and energy strategy for the scheme has been developed using the following regulations and planning policies:

2.1. Regulations and Legislation

2.1.1. Building Regulations

The Building Regulations Approved Document Part L (Conservation of Fuel and Power) 2013 outline the requirements for reductions in carbon emissions required for new developments.

New Build domestic / residential elements of the scheme have been initially reviewed against the requirements of Building Regulations Part L1A utilising SAP assessment software.

New Build landlord and commercial elements of the scheme have been initially assessed against the requirements of Building Regulations Part L2A utilising the SBEM assessment software / IES dynamic thermal modelling software.

Refurbishment domestic and non-domestic areas are assessed against Building Regulations Part L1B and L2B respectively.

2.1.2. Future Homes Standard and Future Buildings Standard Consultation

The Future Homes Standards was the first stage of a two-part consultation on proposed changes to Part L (Conservation of fuel and power) of the Building Regulations. The consultation contained proposals for changes to the energy efficiency standards for new homes, as well as the wider impacts of Part L, including changes to Part F (Ventilation), its associated Approved Document guidance, airtightness and improving the 'as-built' performance of the constructed home.

The second stage of the two part consultation was published in January 2021 as the Future Buildings Standard. It builds on the Future Homes Standard consultation by setting out energy and ventilation standards for non-domestic buildings, existing homes and includes proposals to mitigate against overheating in residential buildings.

It sets out proposals for an overall Future Buildings Standard, which provides a pathway to highly efficient non-domestic buildings which are zero carbon ready, better for the environment and fit for the future.

The second consultation process closes in April 2021. Whilst the outcomes of the consultation processes will be incorporated into future regulations, the future homes standard and future building standard requirements are not currently required to be incorporated into new developments.

2.1.3. SAP 10 Consultation

SAP 10.1 was published in July 2018 to coincide with the publication of the Future Homes Standard regarding proposed changes to the thermal modelling process for dwellings.

The most significant proposals within the SAP 10 consultation documents are as follows:

- **Changes to fuel factors**: a significant reduction in the electricity fuel factor (from 0.519 kgCO2/kWh to 0.233 kgCO2/kWh). The revised figure is equivalent to the natural gas fuel factor operating at a 90% efficiency (0.21 kgCO2/kWh / 0.9 = 0.233 kgCO2/kWh).
- **Heating patterns:** heating profiles adjusted to operate consistently for all days of the week
- **Lighting Energy**: Allowance for more accurate lighting inputs to be used.
- **Thermal Bridging**: removal of Accredited Construction Details
- **Hot Water Demand**: standardised usage changed to more specific flow rate for actual fittings.
- **PV Panel Details**: PV panels will only be accounted for when directly connected to apartments.
- **Overheating**: natural ventilation sources consider the associated acoustic and security issues.
- **Thermal Mass**: thermal mass needs to be calculated for each development in lieu of previous default options.

Whilst the guidance has been published and adopted by some planning authorities (i.e. the Greater London Authority via the London Plan), the requirements will not come into force nationally until the Building Regulations are revised. In the meantime, SAP 2012 remains the incumbent protocol for assessing Building Regulations compliance for dwellings.

2.2. National Planning Policy

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally-prepared plans for housing and other developments can be produced. The latest revision of the policy document was presented to parliament by the Secretary of State for Housing, Communities and Local Government in February 2019, replacing the previous March 2012 revision and previously published revisions from July 2018. This policy covers the following sections to be considered alongside local policies:

- 1 Introduction.
- 2 Achieving sustainable development.
- 3 Plan-making.
- 4 Decision-making.
- 5 Delivering a sufficient supply of homes.
- 6 Building a strong, competitive economy.
- 7 Ensuring the vitality of town centres.
- 8 Promoting healthy and safe communities.
- 9 Promoting sustainable transport.
- 10 Supporting high quality communications.
- 11 Making effective use of land.

- 12 Achieving well-designed places.
- 13 Protecting Green Belt land.
- 14 Meeting the challenge of climate change, flooding and coastal change.
- 15 Conserving and enhancing the natural environment.
- 16 Conserving and enhancing the historic environment.
- 17 Facilitating the sustainable use of minerals.

The policy seeks to pursue economic, social and environmental objectives to achieve sustainable design.

Section 14 seeks to promote the reduction of carbon emissions through the implementation of Renewable and Low to Zero Carbon technologies.

Section 15 seeks to minimise pollution sources including air pollution taking consideration of Air Quality Management Areas (AQMAs) and Clean Air Zones.

2.3. Manchester City Council Core Strategy

The Manchester City Council, Manchester Core Strategy 2012 to 2027 document and planning policies have been utilised for assessment as follows. The following policies are extracted from the Manchester Core Strategy Document:

2.3.1. Policy EN 4 - Reducing CO2 Emissions by Enabling Low and Zero Carbon Development

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

- All development must follow the principle of the Energy Hierarchy, being designed:
    - to reduce the need for energy through design features that provide passive heating, natural lighting and cooling.
    - to reduce the need for energy through energy efficient features such as improved insulation and glazing
    - to meet residual energy requirements through the use of low or zero carbon energy generating technologies

- Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.
- Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.

- Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.
- The use of building materials with low embodied carbon in new development and refurbishment schemes.

2.3.2. Policy 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 energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated 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 energy 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 CO_2 emissions reduction targets (Table 12.1)

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

Non-domestic CO_2 emissions reduction targets (Table 12.2)

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible, a 15% increase on Part L 2010
Target 2: Electricity intense buildings (Applies to commercial uses with a high proportion of emissions from electricity use (>45 kg CO_2/m^2))	+10%increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

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

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

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

Guidance on what the energy statement should contain and how to decide which target applies to a development proposal is given in Appendix A of the policy.

2.3.3. Policy EN 6 implementation and precedents

Policy EN6 sets out details of the carbon reduction targets to be aimed for within the design of new developments. These are indicated above in Table 12.1 and 12.2 extracted from the Core Strategy Document. These targets are set out as improvements over basic compliance with the Approved Document Part L 2010.

As part of the government's long term carbon reduction strategy, Approved Document Part L of the Building Regulations was significantly revised in 2013. The implications of the 2013 revisions were to impose more stringent criteria for compliance. As a result of this, buildings which achieve compliance with the 2013 Part L requirements are widely considered to be achieving the following improvements over the original 2010 Part L criteria:

- Domestic: 6% improvement over 2010 Part L criteria
- Non-domestic: 9% improvement over 2010 Part L criteria

Additional carbon performance improvements between these base line levels and those set out in Policy EN6 (Tables 12.1 and 12.2) are considered within the building assessment.

2.3.4. Policy DM 1 - 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 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 new residential development (note that the requirement to meet Code for Sustainable homes targets has been removed from planning policy)
  b) For new commercial developments to demonstrate best practice which will include the application of the BREEAM (Building Research Establishment Environmental Assessment Method) standards. By 2019 provisions similar to the Code for Sustainable Homes will also apply to all new non-domestic buildings.

2.3.5. Guide to Development in Manchester 2007 Supplementary Planning Document

The Core Strategy requires that all new residential developments should accord with the design guidance set out in the Supplementary Planning Documents (SPD). The Guide to Development in Manchester SPD was adopted on 11th April 2007 and supports and enhances the ongoing shaping of the City by providing a set of reasoned principles which will guide developers, designers, and residents.

2.3.6. Greater Manchester Spatial Framework Revised Draft 2019

Greater Manchester Spatial Framework Revised Draft 2020 supports the council's strategies which include underpinning the ambition to become a carbon neutral city 2038.

Objective 7 of the document ensures Greater Manchester is a more resilient and carbon neutral city region which will:

- Promote carbon neutrality of new development by 2028.
- Promote sustainable patterns of development that minimise the need to travel and contribute to cleaner air.
- Locate and design development to reduce car dependency.
- Facilitate provision of infrastructure for cleaner vehicles.
- Improve energy efficiency and the generation of renewable and low carbon energy.

Policy GM-S2 is a policy that supports objective 7 and has the aim of delivering a carbon neutral Greater Manchester no later than 2038. Part of this policy is to take a positive approach to renewable and low carbon energy schemes. Keeping fossil fuels in the ground. It also provides an energy an energy hierarchy as follows:

i. Minimise energy demand.
ii. Maximise energy efficiency.
iii. Utilise renewable energy.
iv. Utilise low carbon energy; and
v. Utilise other energy sources.

The policy has an interim requirement that all new dwellings should seek a 19% carbon reduction against Part L of the 2013 Building Regulations, along with a minimum 20% reduction in carbon emissions (based on the dwelling emission or building emissions rates) through the use of on site or nearby renewable and / or low carbon technologies.

Policy GM-S4 considers increasing resilience so that development of Greater Manchester will be managed so as to increase considerably the capacity of its citizens, communities, businesses and infrastructure to survive, adapt and grow in the face of physical, social, economic and environmental challenges.

One of the measures includes designing indoor and outdoor environments to provide a reduction and respite from more extreme temperatures and winds associated with climate change and greater urbanisation.

Policy GM-S6 tackles air pollution and improving air quality focusing particularly on locations where people live, where children learn and play, and where air quality targets are not being met.

One of the measures includes restricting and carefully regulating developments that would generate significant point source pollution such as some types of industrial activity and energy generation.

2.3.7. Manchester City Councils Climate Emergency Declaration 10th July 2019

Manchester City Council unanimously declared a climate emergency in July 2019 and has committed to the goal of reducing the city's climate emissions to net zero by 2038, or earlier if possible, which is at least 12 years ahead of the current national target.

For the purpose of this document regulated carbon emission metrics will be reviewed and analysed, however; the trends shown will also apply to unregulated carbon emissions.

2.3.8. Manchester City Council Climate Change Framework

Manchester Climate Change Framework for 2020-2025, builds on the Draft Manchester Zero Carbon Framework 2020-38, which was published in February 2019 and Manchester City Council's declaration of a climate emergency in July 2019. This gives a target for the 2020-25 period to reduce direct CO2 emissions by at least 50% to stay within carbon budget targets. This is to support Objective 1 of the document which includes staying within our 15 million tonne carbon budgets for 2018-2100.

The Framework recognises that the UK gas supply will take a long time for decarbonisation with biogas and / or hydrogen and that to stop using gas will promote decarbonisation because of the opportunity available for reducing carbon emissions associated with grid electricity. Therefore, moving buildings to electric heating, air source heat pumps and zero carbon district heating provide a more immediate carbon reduction benefit.

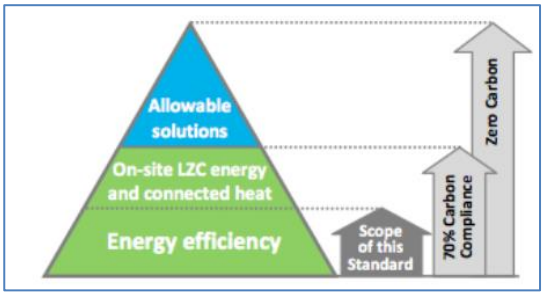
The Framework wants to ensure new developments in the city do not eat into our limited carbon budgets and add to the already significant retrofit challenge. This means that we need them to be built and operated to zero carbon standards as soon as possible.

3. Confirmation of Scope and Route to Compliance

3.1. Energy Hierarchy

This development follows the principles to make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

- Be lean: use less energy
- Be clean: supply energy efficiently
- Be green: use renewable energy



The new build and refurbishment elements of the scheme will be considered separately as follows:

- New build residential – Building Regulations Approved Document Part L1A
- New built landlord areas and shared accommodation / circulation – Building Regulations Approved Document Part L2A
- Refurbishment residential – Building Regulations Approved Document Part L1B
- Refurbishment landlord areas, shared accommodation / circulation and commercial tenancies – Building Regulations Approved Document Part L2B

3.2. Be Lean - Building Fabric

The intention is to adopt an enhanced building fabric for the **new build** areas based on values which are better than the minimum required for compliance with Building Regulations AD Part L1A 2013 as outlined in Table A below. This will minimise the building energy demand and contribute towards Building Regulations compliance.

Description	Part L minimum	Minimum requirement for this building	Performance Relative to Part L Requirement
External Wall U-Value	*0.35 W/m^2.K area-weighted average*	**0.22 W/m^2.K**	Improvement
Ground Floor U-Value	*0.25 W/m^2.K area-weighted average*	**0.15 W/m^2.K**	Improvement
Roof U-Value	*0.25 W/m^2.K area-weighted average*	**0.15 W/m^2.K**	Improvement
Window / Door glazing U-Value	*2.2 W/m^2.K area-weighted average*	**1.4 W/m^2.K** (Double Glazing with some solar protection –glass G-value 0.49 – Example Planitherm One T)	Improvement
Building Air Permeability	*10 m^3/(h.m^2) @ 50 Pa*	**3.0 m^3/(h.m^2) @ 50 Pa**	Improvement
Thermal Bridging	**Accredited Construction Details - YES**		**-**

Table A – Proposed new build and upgraded fabric performance

The upgrading of the **existing listed fabric** within the Mill Conversion has been reviewed in terms of feasibility. The envisaged strategy is as follows:

- External walls will remain as existing.
- Windows and doors will be replaced to the standards identified above in table A.
- Roof elements will be upgraded subject to heritage constraints.

3.3. Be Clean - Energy Efficiency Measures

Efficient systems will be adopted for **both the new build and refurbishment** elements as outlined in Table B below to minimise the building energy consumption and contribute further towards a passive and sustainable building which is compliant with Building Regulations.

Domestic & Landlord Areas	
Description	**System**
Ventilation	**High Performing MVHR (Building Regulations Part F - System 4) – Example Sentinel Kinetic Advance S**
Main Heating	**Electric**
Emitters	**Panel Heaters**
Controls	**Time, Temperature and Zone Control – Lot 20**
Hot Water	**High Performing Hot Water Electric Cylinders - Example Tempest Indirect Plus (2Bed 150L, 1 Bed 125L)**
Secondary Heating	**None**
Renewable Energy	**Total area of PV Panel: 120 m^2 (Approx. 24 kWp total)** (full feasibility and requirement for building regulations and planning condition compliance to be reviewed during detail design)
Lighting	**100% Low Energy Lighting**

Table B – Proposed efficient building services system inputs

The above parameters (outlined in Table A and Table B) offer a Building Regulations / SAP compliant solution for the proposed new build element of the development which also meets the current Core Strategy target of 15.5 over Part L 2010 (Equivalent to 9.6% over Part L 2013 for domestic buildings and 6.6% over part L 2013 for non-domestic buildings).

The double-glazing proposal has incorporated some solar protection to assist in summertime temperature mitigation, this is required as the acoustic report requires that windows are not to be used for controlling summer overheating. This glass will reduce the solar gain by almost 1/3 when compared to standard clear double glazing, but the trade-off will be additional PV due to reduced light penetration into the apartment.

This solution also supports the use of MVHR style ventilation as it requires a maximum ventilation rate to 1.9 ac/hr. Further reductions are being progressed utilising improvement in solar protection particularly the on exposed facades.

The corridors are currently proposed as being electrically heated, this is both capital and carbon efficient solution as electricity is an increasingly more sustainable form of power as a result of the decarbonisation of the grid. The corridors therefore would be assessed under Part L2A (SBEM). We have included 81m2 of PV to be used in the SBEM calculation to achieve the necessary 6.6% improvement for planning.

It is estimated that the area of PV panels outlined in Table B will require a flat roof area as follows to allow for access and prevent self-shading of panels:

Block	Panel Area (m^2)	Panel Array Output (kWe peak)	Approximate Roof Area (m^2)	Nominal number of panels
Corner Block	40.3	8.4	65.0	26
Mid Block A	41.0	8.4	65.0	26
Mid Block B	41.0	8.4	65.0	26

During the design stage, the proposals will be subject to more refined modelling based on the final building form, construction details and building services systems to optimise the design. It is proposed to fully review the scale of the photovoltaic panels to best suit the scheme. The current provision is based on maximising the panel array to fit the non-public roof areas.

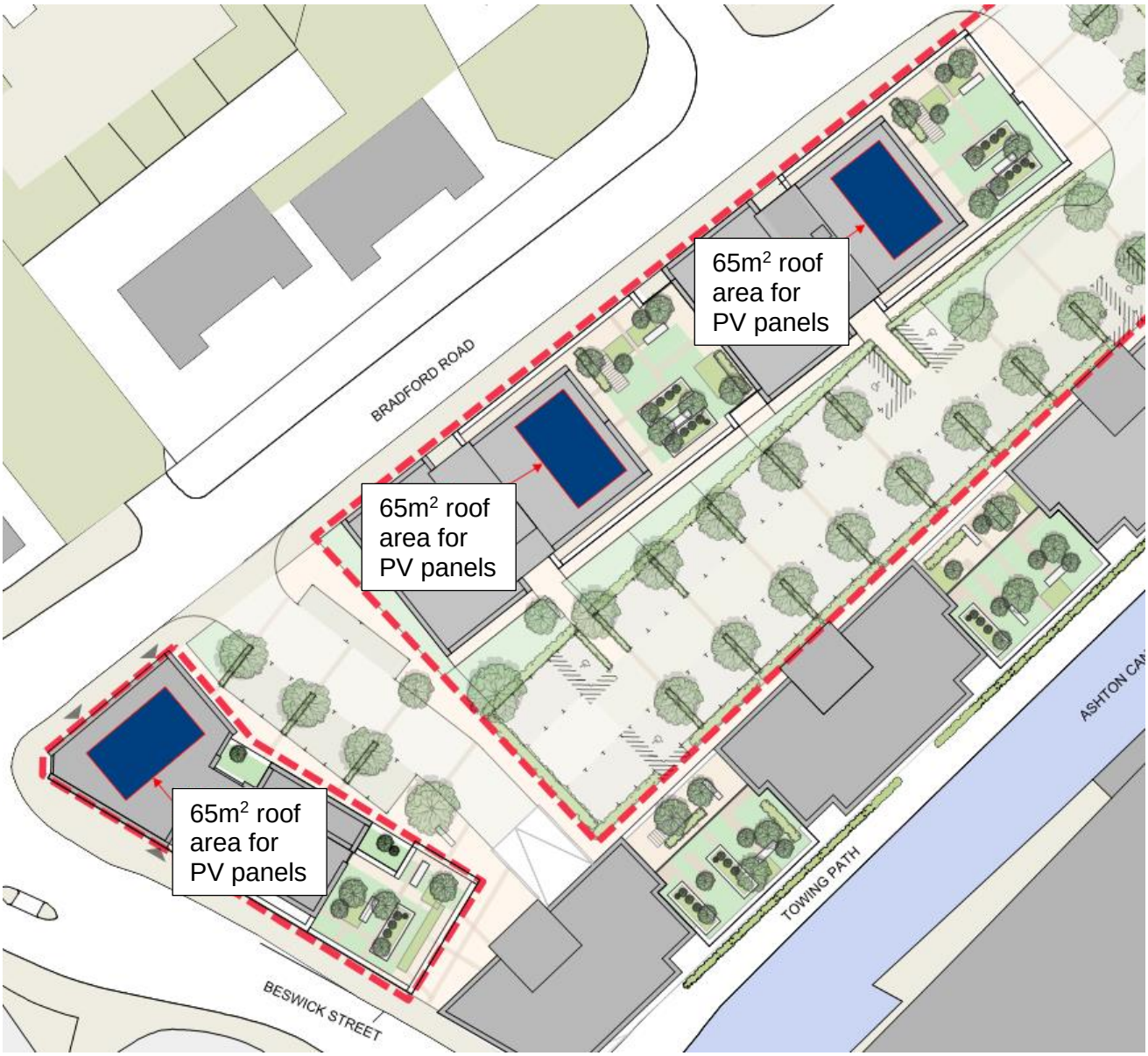
3.4. Be Green – Renewables

Incorporate **renewable and Low and Zero Carbon** energy sources where necessary and economically viable to **reduce carbon emissions** and meet energy targets.

An analysis of the available high efficiency, Low and Zero Carbon (LZC) technology and renewable energy solutions was reviewed for feasibility of us at this development. The findings of the review are included in the Regulation 25A assessment (Appendix A)

Renewable and LZC systems will be adopted across the Proposed Development as outlined in Table B above to reduce carbon emissions to achieve final compliance with Building Regulations and planning targets.

The concept design includes for the provision of the following plant located on the roof areas as indicated on the image below:



3.5. Part L Results

SAP block compliance assessment and Part L2A modelling were conducted for the performance criteria outlined in Table A and Table B above. The results of the modelling are outlined below in Table D and Table E below.

DWELLING SAP BLOCK COMPLIANCE ASSESSMENT	Corner Block	Mid Block
CARBON ASSESSMENT		
TER/m² ($kgCO_2$)	21.4	21.0
DER/m² ($kgCO_2$) (after PV panel contribution)	19.45	19.08
PASS (9% minimum required)	9.10%	9.10%
FABRIC ASSESSMENT		
TFEE/m² ($kgCO_2$)	27.5	25.7
DFEE/m² ($kgCO_2$)	25.1	22.7
PASS	8.80%	11.89%

Table D – Dwelling SAP Block Compliance Results

LANDLORD AREA PART L ASSESSMENT	Corner Block	Mid Block
TER ($kgCO_2$)	7942.2	18483
BER ($kgCO_2$) (after PV panel contribution)	7458	17356
PASS (6% minimum required)	6.10%	6.10%

Table E – Landlord, Amenity and Retail Part L Results

The results of the modelling indicate that the required carbon performance can be achieved against the Building Regulations Part L 2013 in line with the National, Regional and Local Manchester City Council planning policies by utilising the parameters outlined in tables A and B above.

During the design stage, the proposals will be subject to more refined modelling based on the final building form, construction details and building services systems to optimise the design provision.

It is proposed to fully review all inputs including the scale of the photovoltaic panel array and Air Source Heat Pump system to best suit the scheme.

4. Building Energy Loads

Preliminary building load estimates have been carried out for the Proposed Development based on the current GA plans. These estimated loads are outlined below in Table C.

CORNER BLOCK	
Anticipated Site Electrical Load (excluding commercial tenancy electrical supply)	140 kVA
Proposed Domestic & Sprinkler Storage (excluding commercial tenancy domestic water provision)	13,500 litres (4 hour fill)
Anticipated Mains Water Load (Peak) (incorporating fill rate to landlord and apartment domestic and sprinkler water tanks)	0.94 l/s
Natural Gas	N/A

MID BLOCK	
Anticipated Site Electrical Load (based on 20% electric vehicle charging provision)	568 kVA
Proposed Domestic & Sprinkler Storage	38,500 litres (4 hour fill)
Anticipated Mains Water Load (Peak) (incorporating fill rate to landlord and apartment domestic and sprinkler water tank)	2.67 l/s
Natural Gas	N/A

MILL CONVERSION	
Anticipated Site Electrical Load (excluding commercial tenancy electrical supply) (based on 20% electric vehicle charging provision)	808 kVA
Proposed Domestic Water Storage	15,750 litres (4 hour fill)
Proposed Sprinkler Water Storage	105,000 litres (24 hour fill)
Anticipated Mains Water Load (Peak) (incorporating fill rates to domestic and sprinkler water tanks)	2.3 l/s
Natural Gas	N/A

Table C – Preliminary Site Loads

The load assessment excludes the retail unit at ground floor which will be applied for and serviced independently via dedicated utility supplies.

Electrical loads have been based on the provision of electric vehicle charging points to 20% of proposed spaces.

Applications for incoming utilities will be made during the design / construction phase of the project.

5. Response to MCC Climate Emergency Declaration

5.1. Predicted future carbon emissions based on projected carbon emission factors.

The proposed development has been assessed against the requirements of the current Manchester City Council planning policy and has been found to comply with the following carbon emission targets:

- 15% improvement against Building Regulations Part L1 2010 (dwellings & non-dwellings)
- 9% improvement against Building Regulations Part L1 2013 (dwellings)
- 6% improvement against Building Regulations Part L1 2013 (non-dwellings)

However, the scheme does not address the emerging draft policy whereby a greater improvement in carbon performance of 19% against Building Regulations Part L1 2013 would be required.

The scheme proposes to utilise grid derived electricity as the primary fuel source and there have been significant steps in recent years towards decarbonising or 'greening' the national grid. Therefore, we believe that the new building will not present a retrofit challenge in the future, which is inline with the adopted policy, as it may have done if it had incorporated gas fuelled heating and hot water. The following information provides a narrative of how future carbon emissions have been projected up to 2035.

The building regulated energy has been used to compare the proposed electric scheme against the same building as if it had gas heating and hot water. It has been assumed that the gas heating and hot water would be at a seasonal efficiency of 90% and the split between gas and electricity has been based on Typical Domestic Consumption Values (TDCV) which is approximately 1/3 electricity to 2/3 gas.

Predicted grid emissions have been taken from the Department for Business, Energy & Industrial Strategy (BEIS) which were published in January 2018. There is less information for gas network carbon factors as currently there are ongoing investigations on how to decarbonise the gas network. One such investigation is being carried out at Keele looking at the use of Hydrogen in the gas network. Within the project details it estimates that if the UK's gas network had 10-20% hydrogen added that this would contribute to saving 15 – 29 TWh per annum based on a total usage of 414 TWh per annum. This equates to 3.6% to 7.2% carbon saving respectively. For the purposes of comparison for this study, it has been assumed that 5% Hydrogen is added in 2025, 10% Hydrogen is added by 2027; 15% by 2030 and 20% by 2032 although the future methods of decarbonising the gas network is unknown.

The proposed changes to SAP for the SAP 10.1 carbon emissions factors have been revised to 136 CO_2 g/kWh for electricity and 210 CO_2 g/kWh for gas. The electricity value being the same as predicted by BEIS for 2020, which is highlighted in Figure 1.

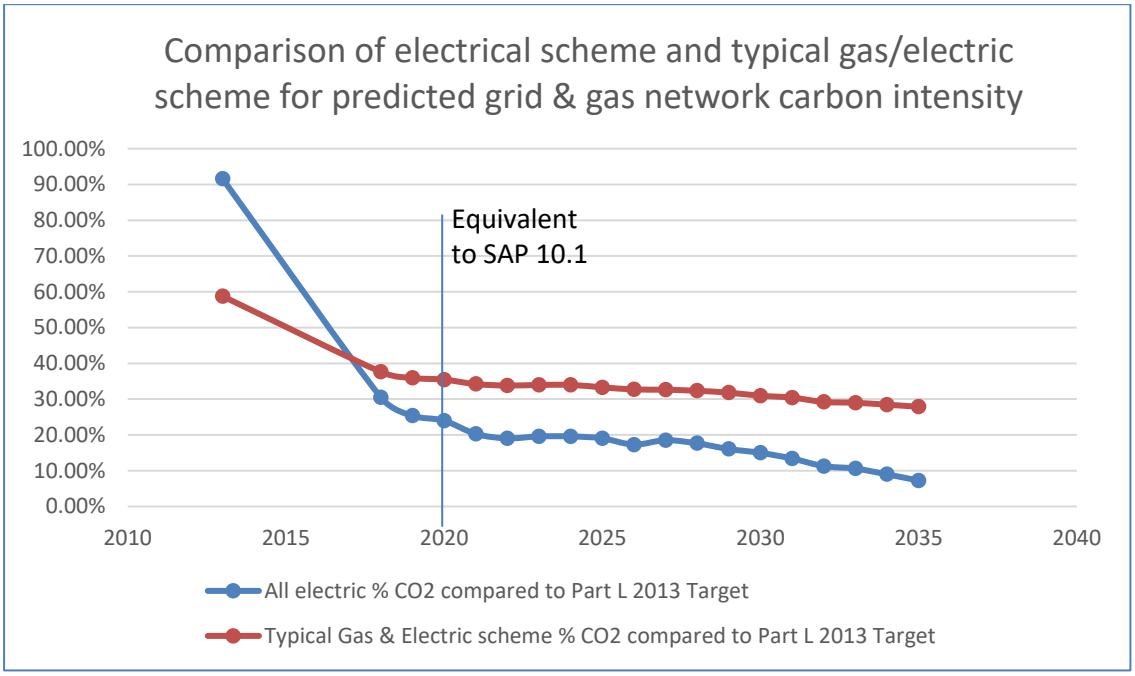


Figure 1: Comparison of electrical scheme and typical gas/electric scheme for predicted grid and gas network carbon intensity

The above graph shows that the building using gas and electricity produces much less carbon emissions when using the carbon factors contain within the building regulations 2013. However, when analysed with the proposed carbon factors of SAP 10.1 (at 2020) then the all-electric building becomes more carbon efficient with the all- electric building producing only 24.0% emissions of that of the Part L 2013 target.

Furthermore by 2035 the all-electric building only emits 7.24% carbon emissions compared to the 2013 Part L target. However, if the building were heated by gas and electricity the carbon emissions would be 27.9%.

5.2. Consideration of Climate Change

The building is being developed with climate resilience in mind. Part of this strategy is to design the building to perform well in summer against overheating. High temperatures at night can greatly affect sleep, a time when the body repairs itself and hence can be detrimental to health and wellbeing. The apartments will include opening door to increase natural ventilation. The opening door panels will incorporate a louvre or perforated panel which will enable them to be left open at night. The opening area will provide much more ventilation than restricted opening windows resulting in the potential of large bulk air flow through each property. The louvre or panel also attenuates wind which is a consideration of more extreme climates associated with climate change. This will enable natural ventilation to be utilised in more windy scenarios.

5.3. Consideration for Pollution

There will be no energy generation from gas, fossil fuels or solid fuel (i.e. Biomass) and therefore there are no additional local pollutants generated from equipment flues associated with the building services within these buildings. There is also no gas to the site and therefore all cooking will be via electricity. This will reduce pollution within kitchen areas during cooking as there will be no combustions products.

Ventilation provided to apartments is via Mechanical Ventilation with Heat Recovery (MVHR). This provides a 'best practice' ventilation strategy according to the Energy Saving Trust, which controls indoor pollutes more adequately from volatile organic compounds (VOC's), allergens (e.g. dust mites), odours from cooking and bodies, moisture etc.

The ventilation systems will incorporate inline attenuators to limit noise from outside and limit noise to outside from the fan.

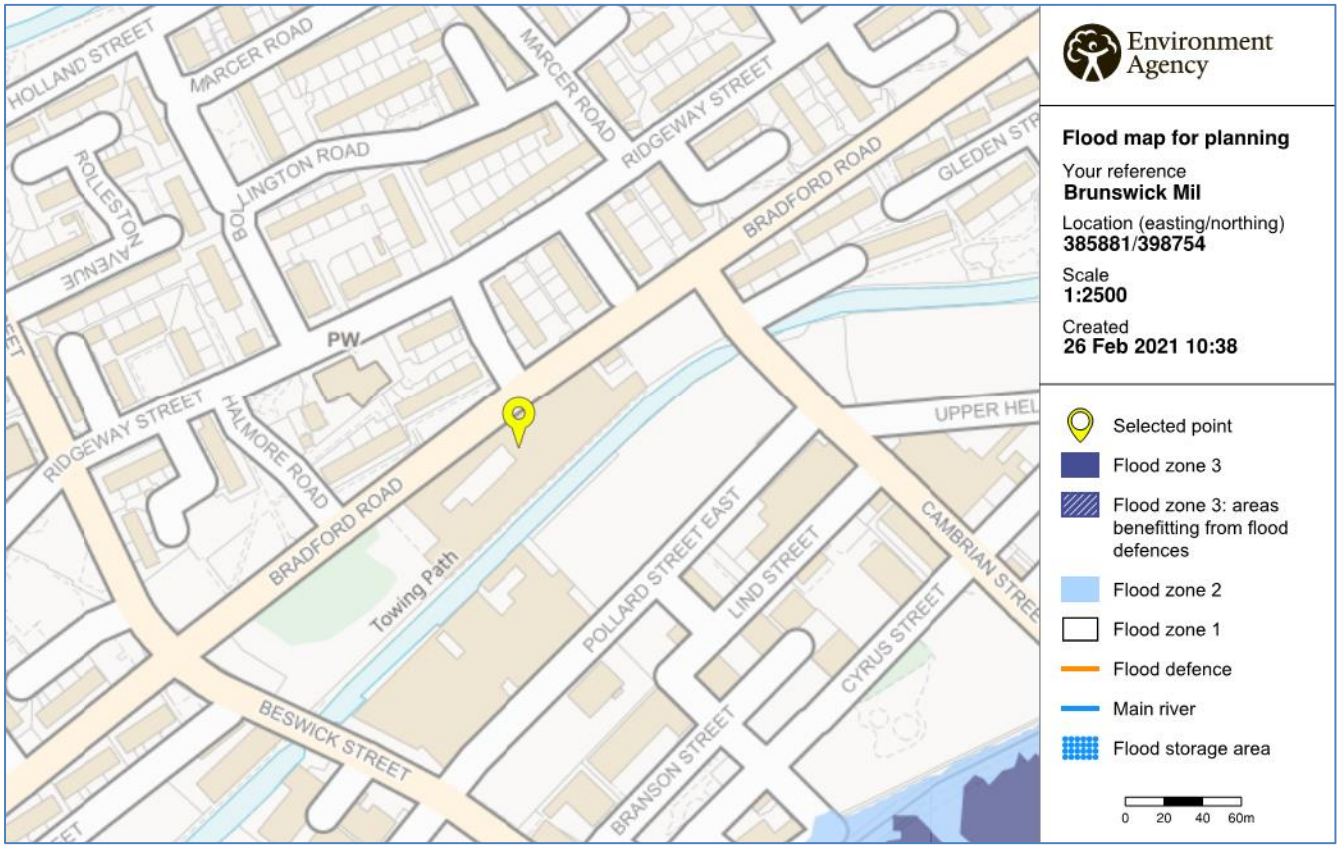
Potential commercial restaurant shall have a dedicated riser will be provided to accommodate a potential catering kitchen supply and extract ventilation system from ground floor to roof. Space on the roof will be allocated for ventilation equipment and acoustic attenuation equipment.

The development is located in an area which has good access to public transport in the area, but the building will also include cycle storage to encourage a healthier lifestyle that the policies are targeting.

5.4. Water Management

5.4.1. Flood Risk

A high level review of the Environment Agency flood map indicates that the proposed development site is located in flood zone 1, an area with a low probability of flooding. A reproduction of the flood map is indicated in the diagram below.



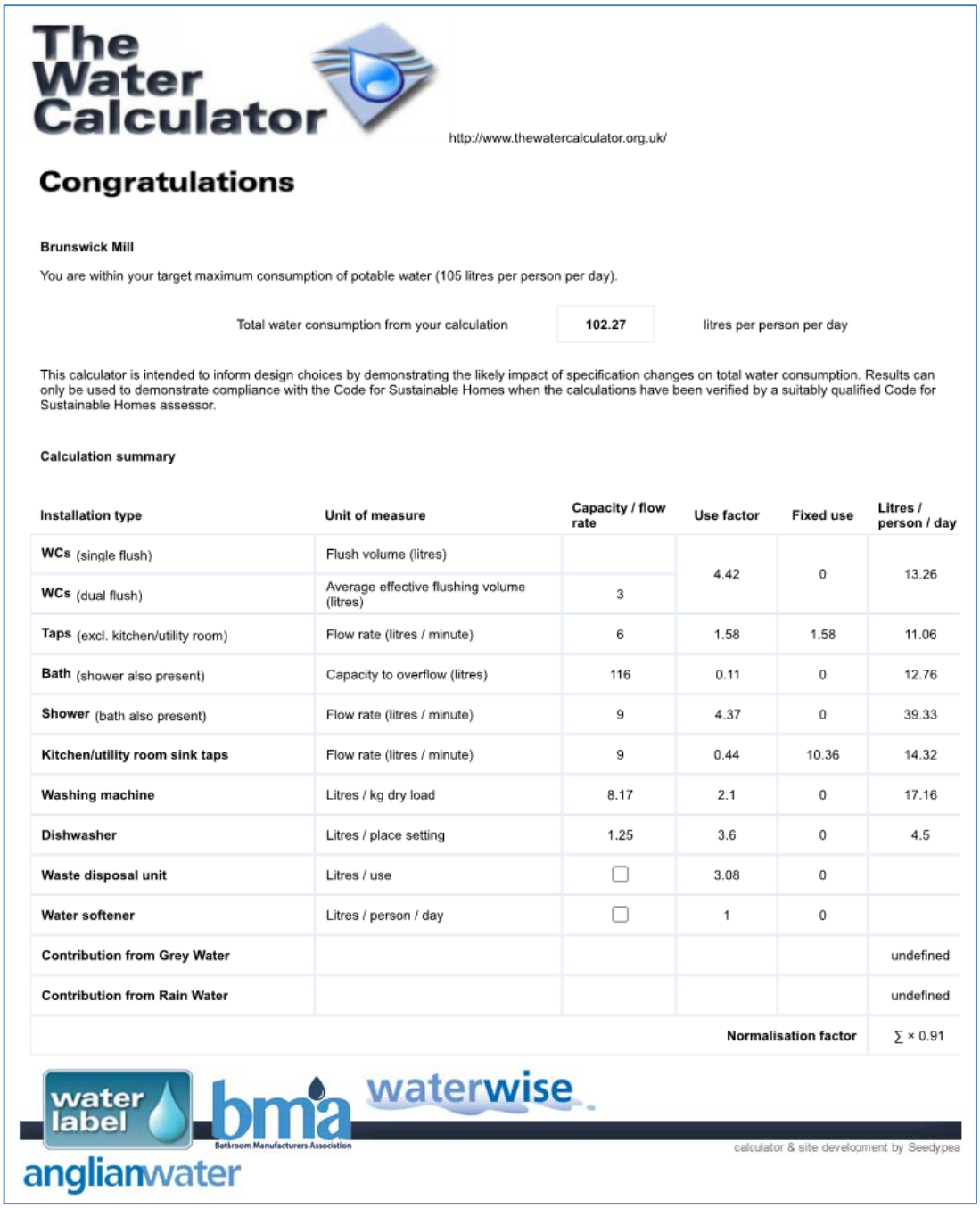
Brunswick Mill Environment Agency Flood Risk Map

For further details of the flood risk assessment, drainage strategy and Sustainable Urban Drainage Systems approach please refer to the overall project Flood Risk Assessment and Drainage Strategy document.

5.4.2. Water Usage

The aim of the MEP strategy is to reduce the consumption of potable water through the use of water efficient components and the adoption of water efficient measures as follows:

- Use of water efficient components / equipment (i.e. low flow sanitary fittings / flow restrictors) throughout the residential and landlord areas
- A water usage calculator has been used to assess the feasibility of achieving a daily potable water usage of less than 105 litres per person per day in line with best practice. It can be seen from the indicative water usage calculator below that achieving this level of water usage is feasible for a typical 2-bedroom 2 bathroom apartment of the type provided within this scheme. Final daily water usage levels will be reviewed during the detail design stage as the sanitary fitting specification and apartment layouts are developed further.



The Water Calculator

http://www.thewatercalculator.org.uk/

Congratulations

Brunswick Mill

You are within your target maximum consumption of potable water (105 litres per person per day).

Total water consumption from your calculation **102.27** litres per person per day

This calculator is intended to inform design choices by demonstrating the likely impact of specification changes on total water consumption. Results can only be used to demonstrate compliance with the Code for Sustainable Homes when the calculations have been verified by a suitably qualified Code for Sustainable Homes assessor.

Calculation summary

Installation type	Unit of measure	Capacity / flow rate	Use factor	Fixed use	Litres / person / day
WCs (single flush)	Flush volume (litres)		4.42	0	13.26
WCs (dual flush)	Average effective flushing volume (litres)	3			
Taps (excl. kitchen/utility room)	Flow rate (litres / minute)	6	1.58	1.58	11.06
Bath (shower also present)	Capacity to overflow (litres)	116	0.11	0	12.76
Shower (bath also present)	Flow rate (litres / minute)	9	4.37	0	39.33
Kitchen/utility room sink taps	Flow rate (litres / minute)	9	0.44	10.36	14.32
Washing machine	Litres / kg dry load	8.17	2.1	0	17.16
Dishwasher	Litres / place setting	1.25	3.6	0	4.5
Waste disposal unit	Litres / use	☐	3.08	0	
Water softener	Litres / person / day	☐	1	0	
Contribution from Grey Water					undefined
Contribution from Rain Water					undefined
				Normalisation factor	∑ × 0.91

water label bma Bathroom Manufacturers Association waterwise

anglianwater

calculator & site development by Seedypea

Indicative Water Calculator Assessment

- Landscaping irrigation provided by natural precipitation (i.e. not from mains fed irrigation systems).
- A rated appliances will be utilised where possible.
- Water utility metering will be provided to all tenancies. Large water uses within the landlord areas will be sub-metered as required.
- Landlord meters and sub-meters will be monitored by a central Building Management System.
- A leak detection system will be put in place to monitor the incoming main flow rate to identify below ground leakage.

- The use of flow control / shutoff devices will be considered in any publicly accessible toilet areas.

5.5. Waste Management

5.5.1. Construction Waste

The proposed development seeks to reduce construction waste by encouraging reuse, recovery and best practice waste management practices to minimise the amount of waste sent to landfill.

- The scheme will seek to maximise the amount of deconstruction and construction material which is recycled

- The scheme will seek to maximise the amount of recycled material used in construction.

For further details on the overall construction waste management strategy refer to the overall project Waste Management Strategy document.

5.5.2. Operational Waste

The proposed development seeks to encourage the recycling of operational waste through the provision of dedicated recycling bin storage facilities.

Details of the overall bin storage provision across the scheme can be found within the architectural layout drawings and reports.

For further details on the overall operational waste management strategy including servicing arrangements and compliance with Manchester City Council's Waste Management Guidelines refer to the overall project Waste Management Strategy document.

5.6. Building Life Statement

As the existing structure has been partially retained on site the scheme is able to maximise the site building material efficiency and to reduce transporting building waste and spoil off site. This has been done to also maximise and promote the site character and balance it against the new build element of the site adjacent.

The new scheme elements (old and new) occupy most of the site. The scheme includes external works package which will contribute to landscaping and biodiversity.

The building design has, where practical, considered the potential to mitigate solar gain through building orientation and façade design where this can be achieved without compromising good urban design or creating overheating issues.

Where new materials are used, they shall be selected so their waste impact is considered. Also, where possible be of low embedded energy, we will work with the Main Contractor to support this where practical. Also, we will further consider the sustainability measures of this project further as we progress through the more detailed design stages.

6. Conclusion

The information obtained from the current design activity and Part L modelling (SAP and SBEM) demonstrates that the Proposed Development can be constructed in compliance with Building Regulations Approved Document Part L 2013 as well as the principles set out in the Manchester City Council planning policy documents by utilising the fabric performance criteria set out in Table A and the system performance parameters outlined in Table B above.

It has been demonstrated that the planning policy compliance improvement targets as set out in Policy EN6 above Building Regulations Part L can be met via the provision of roof mounted photovoltaic panels

The performance criteria and photovoltaic panel provision will be reviewed in more detail during the onward design stages to optimise the performance of the Proposed Development against the requirements of Building Regulations Approved Document Part L and the Manchester City Council planning policy requirements.

The analysis shows that the proposed all electric building takes advantage of the de-carbonisation of the grid, reducing the carbon emissions significantly closer to net zero than a building which uses gas for heating.

This reinforces the Manchester Climate Change Framework for 2020-2025 findings that recognises that the UK gas supply will take a long time for decarbonisation with biogas and / or hydrogen and that to stop using gas will promote decarbonisation because of the opportunity available for reducing carbon emissions associated with grid electricity.

We believe that the new building will not present a retrofit challenge in the future as it may have done if it had incorporated gas heating and hot water and supports the policy of keeping fossil fuels in the ground.

The buildings are being developed with climate resilience in mind and aims to provide good summertime performance to promote sleep within the accommodation areas.

The buildings exclude the use of combustion equipment for providing space heating and hot water and therefore there will be no additional local pollution sources associated with the building services.

The Mechanical Ventilation with Heat Recovery (MVHR) ‘best practice’ ventilation strategy will provide the best internal environment for occupants.

The proposed cycle storage will promote healthy lifestyle for occupants which in turn will help to minimise transport pollution.

Overall, we believe that the detailed design of the building directly supports Manchester City Council in addressing its declaration of climate emergency and incorporates an energy strategy that will enable the building's operational carbon to continually reduce overtime in line with the 2038 net zero carbon target.

7. APPENDIX A: Regulation 25A Assessment

BRUNSWICK PLACE, MANCHESTER

REGULATION 25A CONSIDERATION OF HIGH EFFICIENCY ALTERNATIVE SYSTEMS

Project No: **7/6079**
Date: May 2021
Revision: CS4

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Report Origin

Revision	Date	Revision Description	Prepared	Checked	Approved
Concept Stage 1	07/12/17	First Issue	G Hirst	A Turl	S Howe
Concept Stage 2	26/02/21	Scheme Update	A Turl	S Howe	S Howe
Concept Stage 3	07/04/21	Comments Incorporated	A Turl	S Howe	S Howe
Concept Stage 4	07/05/21	Comments Incorporated	A Turl	S Howe	S Howe

CONTENTS

2 INTRODUCTION

2.1 Purpose of Study

This report considers the technical, environmental and economic feasibility of using high-efficient alternative systems in the construction.

The Building Regulations are technology neutral and do not require that high- efficiency alternative systems or other low and zero carbon systems are installed. However, where a technology is feasible but not included in the design, then consideration of making the building easily adaptable by facilitating the integration of any feasible technology will be included if appropriate.

This assessment has been carried out at RIBA Stage 2 (Concept Design)

2.2 Description of Project

The project comprises a variety of 1, 2 and 3-bed apartments across three separate blocks as follows.

The conversion of Brunswick Mill to form a residential scheme of apartments and a ground floor with commercial units.

The deconstruction of the white painted brick building to the corner of Beswick street and Bradford Road to allow for the erection of a for a residential scheme comprising of apartments set over a ground floor with commercial units.

Construction of two buildings to Bradford Road comprising of commercial units, residential apartments, refuse stores, cycle store and plant space.

We have considered the most suited technology for implementation within the scheme as outlined within this report.

The proposed solution will be in line with the City Councils planning policy documents.

A BREEAM compliance rating has not been requested as part of the environmental assessment of this scheme by Manchester City Council guidelines. However, we shall follow good environmental engineering practice and will consider BREEAM recommendations wherever practical and feasible during our decision making processes for the proposed development.

2.3 Limitation

This report considers high efficient systems at a high level and considers its feasibility on physical limitations of the site and known issues associated with each technology. It is recognised that the development of any energy strategy is an iterative process that takes into account development needs, end users requirements, site restrictions and changes to legislation and incentive programmes. Any considered system will need further detailed analysis prior to specification and installation.

2.4 Summary of the inclusion of High Efficiency Alternatives

The summary below outlines the systems proposed for this development. Full details of the systems and the rationale for inclusion or exclusion from the design are provided in section 3.

Renewable Sources
☒ Wind – Micro Scale
☒ Wind – Medium Scale
☒ Wind – Large Scale
☑ Solar Photovoltaic
☒ Solar Thermal
☒ Solar Air Heating
☒ Aero Thermal / Air Source Heat Pump
☒ Ground Source Heat Pump
☒ Hydrothermal / Surface Water Source Heat Pump
☒ Hydropower
☒ Biomass
☒ Biogas
Cogeneration / CHP
☒ Cogeneration / Combined Heat & Power
District Heating
☒ On site District Heating
☒ Off Site District Heating

3 High Efficient Alternative Systems

3.1 Energy from Renewable Sources

3.1.1 Wind – Micro scale

Technology Description
Wind turbines harness energy from wind and convert it into electricity. Wind passing over the blades causes them to rotate and the blade rotor axle passes through an electricity generator. The electrical output is passed through a control system and then an inverter which is connected to the buildings mains electrical system. The inverter ensures that the alternating current electricity produced by the turbine is synchronous and in phase with the mains electrical supply.

Not Technically Feasible - Urban Location with disrupted wind patterns which would not be appropriate for this development

3.1.2 Wind – Large and Medium scale

Technology Description
Medium (30m – 80m overall height to blade tip) and large turbine (80m+) can be used for a large building or groups of buildings. A 'private wire' system can deliver electricity to each building with any surplus being exported to the grid. Other factors to consider include risk of collision with low flying aircraft and interference with radar as well as visual impacts, shadow flicker and noise.

Not Technically Feasible - Urban Location with disrupted wind patterns which would not be appropriate for this development

3.1.3 Solar Photovoltaic Panels

Technology Description
Photovoltaic (PV) systems convert energy from the sun into electricity through semiconductor cells. When sunlight reaches the semiconductor material, direct current is generated. In most systems, this is then converted into alternating current by means of an inverter, which is fed into the dwelling's mains electrical system.

Feasible - It is currently proposed to include PV's within the design

3.1.4 Solar Thermal

Technology Description

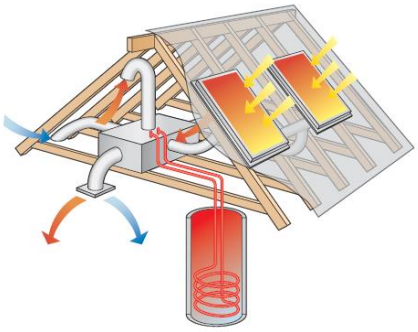
Solar thermal systems harness energy from the sun to heat water. Various systems are available, but generally a solar thermal collector, installed at roof level, absorbs the sun's energy and transfers it into a liquid (normally a water/antifreeze solution).This liquid is circulated through a heat exchange coil where its heat is transferred. Generally solar thermal systems are used to heat domestic hot water or swimming pool water.

Not Technically Feasible - Large separation distance between roof and plant room increases pumping and losses. Therefore roof area is more appropriate for PV

3.1.5 Solar Air Heating

Technology Description

Solar air heating systems collect solar energy to heat air. The air can be used to pre-heat ventilation air, heat air inside a building or to heat water. A basic system comprises a solar collector and a hot air distribution system. Solar air systems can also incorporate thermal storage using either the thermal mass of the building or dedicated thermal stores, such as a rock store. The solar collectors can be purpose-built panels or a glazed cavity over an existing façade.



Not technically Feasible - No centralised mechanical ventilation to take advantage of solar air system

3.1.6 Aero-Thermal / Air Source Heat Pump

Technology Description

Air source heat pumps extract heat from the outside air or warm exhaust air. The heat can then be used for heating and domestic hot water. The heat pump efficiency is related to the difference between the source temperature and supply temperature, therefore in winter, when heat is most needed the efficiency and output reduces. Noise from the external unit also has to be considered.

Not Economically Feasible - Increasing emitter size to suit lower temperatures required by a heat pump is prohibitive due to cost and space issues

3.1.7 Ground Source Heat pumps

Technology Description

Ground source heat pumps extract heat from the ground by either horizontal coils or vertical bore holes. The heat can then be used for heating and domestic hot water. A ground source heat pump system absorbs heat from the ground and releases it at a higher temperature for use within a building. The ground has a more stable temperature than ambient air which often results in higher overall efficiencies than an air source heat pump.

Not Economically Feasible - Mucher higher cost solution than airsource for only a marginal improvment in efficiencies

3.1.8 Hydrothermal / Surface Water Source Heat Pumps

Technology Description

Surface water (rivers, lakes, sea canal) can be used in an open –loop or via submerged heat exchanger to extract heat to be used for heating and domestic hot water. The choice of system will depend on environmental consideration, quality of the water and risk of bio-fouling of the pipework and heat exchanger (for open source systems)

Not Technically Feasible - Canals have limited flexibility on temperature fluctuations imposed on them, limiting the heat extraction available.

3.1.9 Hydropower

Technology Description

The energy from flowing water is used to generate electricity using a turbine. Depending on the water flow and head of the water course, different types of turbines are used. An abstraction licence is required for all turbines, as the part of the water course between extraction and insertion can be affected by the reduced flow (this is known as the depleted or deprived reach). This can impact on ecology, amenity and navigation needs.

Not Technically Feasible - No suitable water course within the boundaries of the development.

3.1.10 Biomass

Technology Description

Biomass is any plant-derived organic material that renews itself over a short period. Biomass energy systems are based on either the direct or indirect combustion of fuels derived from those plant sources. The amount of carbon released from burning the biomass is equal to the carbon absorbed when growing. The only carbon associated with biomass is related to processing and transportation.

Not Financially Feasible: Additional plant costs and fuel costs makes biomass uneconomical for this project

3.1.11 Biogas

Technology Description

Biogas can be obtained from the breakdown of various organic materials, by natural digestion. The gas generated can be used for burning or may be used in internal combustion engines as part of CHP systems. Farm, food and market waste products are particularly good as source materials. Generally plant is of an industrial nature and is more ideal co-located with light industrial or agricultural buildings.

Not Technically Feasible - Inappropriate location for industrial type plant

3.2 Cogeneration (Also Known as Combined Heat and Power [CHP])

Technology Description

Combined heat and power is the generation of thermal and electrical energy in a single process where both energy streams can be utilised within buildings. Although the production of electricity by CHP is less efficient than that achieved from national power stations, the use of the heat that would otherwise be rejected leads to net saving in primary energy.

Possibly Feasible but not proposed: CHP maybe feasible if central hot water storage is utilised but PV is currently favoured for the project as there is less maintenance than a CHP scheme

3.3 District or Block Heating

3.3.1 Onsite District Heating or Block Heating

A community heating scheme provides heat from a central source to more than one building or dwelling via a network of heating mains. Heat can be supplied from conventional boilers or from renewable energy sources or waste heat from power generation (Combined Heat and Power). Community heating is most appropriate were heating demand is required over a small area. This is known as the heat usage density and is measured in kWh/m^2 per annum.

Possibly Feasible but not proposed: Central plant requires the landlord to act as an energy supplier. It is proposed to have direct utility metering to each property if possible to negate the need for this additional adminstration requirments.

3.3.2 Offsite District Heating

Large scale or city centre district heating schemes have greater efficiency where there is a greater energy density and diversity of load served. Where buildings are in the locality of such systems consideration should be given to using the thermal energy provided.

Not Technically Feasible - No offsite district heating system available