

Proposed conversion to veterinary practice
825 Manchester Road,
Bury

Carbon & Energy Statement

44622

First Issue



PREPARED BY:

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Rev	Date	By	Summary of Changes
-	15.07.26	JB	-
1	23.07.26	JB	

1 EXECUTIVE SUMMARY

An Energy & Sustainability Statement has been prepared for the proposed change of use of the former fish and chip restaurant at 825 Manchester Road. The structure and approach of this report have been developed in accordance with recognised best practice principles and follow the "Be Lean, Be Clean and Be Green" energy hierarchy. This hierarchy seeks to reduce energy demand through efficient design, maximise energy efficiency, and incorporate renewable and low-carbon technologies where appropriate.

Energy Efficient Measures (Be Lean – Use Less Energy)

The development will utilise the existing building structure and will primarily comprise an internal remodelling and change of use. As such, no new insulation materials will be introduced to the existing building fabric. To maximise the energy efficiency of the development and reduce energy demand, any new and/or refurbished elements will incorporate appropriate energy efficiency measures where applicable.

Energy Efficient Systems (Be Clean – Supply Energy Efficiently)

The existing heating and hot water system will be retained and reused as part of the development. Reusing the existing system will reduce the embodied carbon associated with the manufacture, transportation, and installation of new heating and hot water equipment.

Renewable Technologies (Be Green – Use Renewable Energy)

A Renewable and Low Carbon Technology Study has been undertaken as part of this report. In summary, the assessment concludes that the introduction of renewable and low carbon technologies would not be economically feasible for this development. Accordingly, the proposed scheme does not include the installation of such technologies, as they would not represent a viable option for use in the development.

The structure of this Energy & Carbon Statement follows the Greater Manchester Combined Authority's Net Zero Planning Guidance (Part 3 – Submission Guidance, 2024) and demonstrates compliance with PfE Policy JP-S 2 (Carbon and Energy).

With the proposed scheme falling under the Bury Unitary Development Plan (August 1997) and the Greater Manchester Combined Authority's Places for Everyone Plan (adopted 2024), the following policies are applicable:

Consideration to the emerging Bury Local Plan (adopted March 2025) is also given within this report.

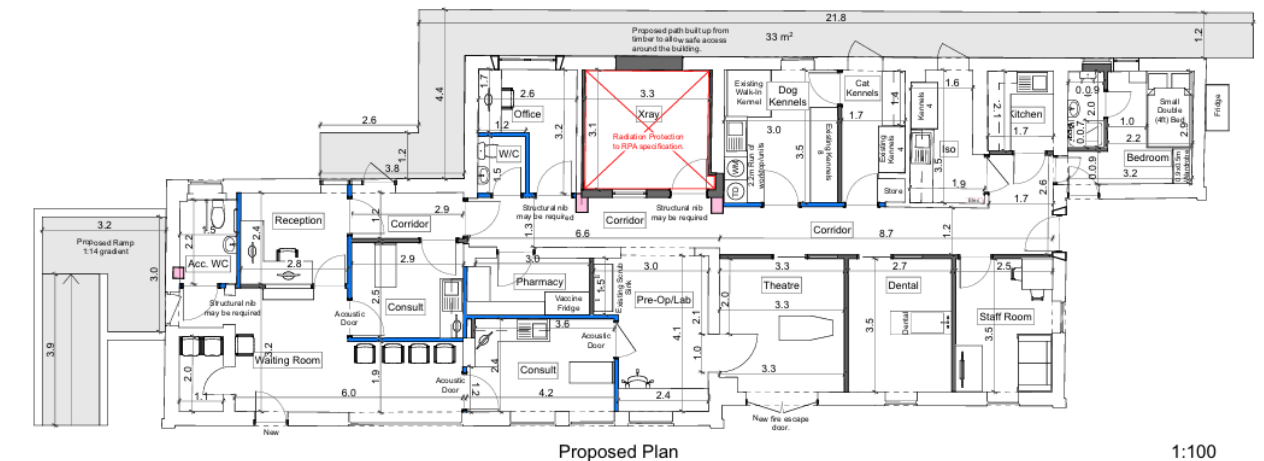


Figure 1: Floor plan of the proposed development

Document Source & Adoption Date	Policy Reference	Summary of Policy Requirements	Proposed design meets requirement?
Bury Unitary Development Plan (August 1997)	EN4/2 - Energy Efficiency	The Council will encourage energy efficiency in development proposals through: the promotion of energy efficient modes of transport such as walking, cycling and public transport; seeking the location of new development in areas easily accessible to public transport and local facilities; promoting the efficient use of energy in the design and layout of development.	✓
Sustainable Design & Construction SPD – Adopted 10 October 2016	Sections 3 & 4 – Climate Change & Renewable Energy / Mitigating Climate Change	Guidance on minimising energy demand, integrating renewables, achieving a 10 % on-site renewable contribution where viable, and ensuring climate resilience.	✓
	Policy Statement & Appendix A – Local Policy Summary	Expands Core Strategy to set out practical sustainability measures, including low/zero-carbon design, water efficiency, and sustainable materials.	✓
Places for Everyone Plan for Greater Manchester – Adopted March 2024	JP-S 1 – Sustainable Development	Establishes that development across Greater Manchester should contribute to sustainable growth and respond to the climate emergency, promoting energy-efficient, low-carbon, and resilient design.	✓
	JP-S 2 – Carbon and Energy	Requires all new development to minimise energy demand, maximise energy efficiency, use low-carbon and renewable energy, achieve substantial CO ₂ reductions beyond Building Regulations, and support the 2038 Net Zero target.	✓
	JP-S 3 – Infrastructure Provision and Transport	Promotes energy-efficient transport, sustainable travel, and infrastructure that supports carbon reduction (e.g., EV charging, heat networks).	✓
	JP-S 4 – Green Infrastructure	Requires integration of green and blue infrastructure to support carbon sequestration, microclimate control, and climate adaptation.	✓
	JP-S 5 – Climate Change and Resource Efficiency	Requires development to mitigate/adapt to climate change, maximise energy efficiency, and use renewable/low-carbon technologies, sustainable materials, and water efficiency.	✓
	JP-S 6 – Clean Air, Water and Environmental Quality	Promotes energy-efficient, low-pollution design and aims to reduce emissions while improving environmental quality.	✓
	JP-P 1 – Sustainable Places	Encourages design and layouts that support sustainable lifestyles, efficient resource use, and reduced carbon footprints.	✓
Emerging Bury Local Plan (adopted March 2025)	Policy LP-CC1: Climate change & Policy LP-W2: Sustainable Drainage	The Council will ensure development helps tackle climate change by reducing emissions, improving energy efficiency, supporting renewable energy, promoting sustainable travel, and expanding green infrastructure. New development must also be designed to adapt to climate change, minimise flood risk, conserve water, and use sustainable construction methods. All developments must include a sustainable drainage strategy that prioritises managing surface water on-site, reduces flood risk, and follows the drainage hierarchy. Major developments should incorporate multifunctional Sustainable Drainage Systems (SuDS), supported by long-term management and maintenance plans to ensure effective drainage and resilience.	✓
National Planning Policy Framework (NPPF) – Updated 2023	NPPF (Paras 164–169)	Requires planning to support the transition to a low-carbon future, shape resilient places, and ensure new development minimises greenhouse gas emissions.	✓

2 INTRODUCTION

2.1 PROJECT SCOPE

Complete Sustainability Solutions have been commissioned to prepare an Energy & Carbon Statement to assist with the planning submission for the proposed scheme.

The purpose of this energy statement is to model the proposed development, utilising SBEM software, identify the baseline carbon emissions; then utilise the energy hierarchy to minimise energy usage and carbon emissions, thus ensuring compliance with both national and local policy.

2.2 DEVELOPMENT DESCRIPTION

The proposed development comprises the change of use and internal adaptation of an existing commercial unit to create a single veterinary practice. The unit, No. 825 (159.6 sqm), is currently occupied as a fish and chip restaurant with an ancillary takeaway function. The premises is considered suitable for conversion to a veterinary practice, with the proposed change of use expected to benefit from permitted development rights, where applicable.

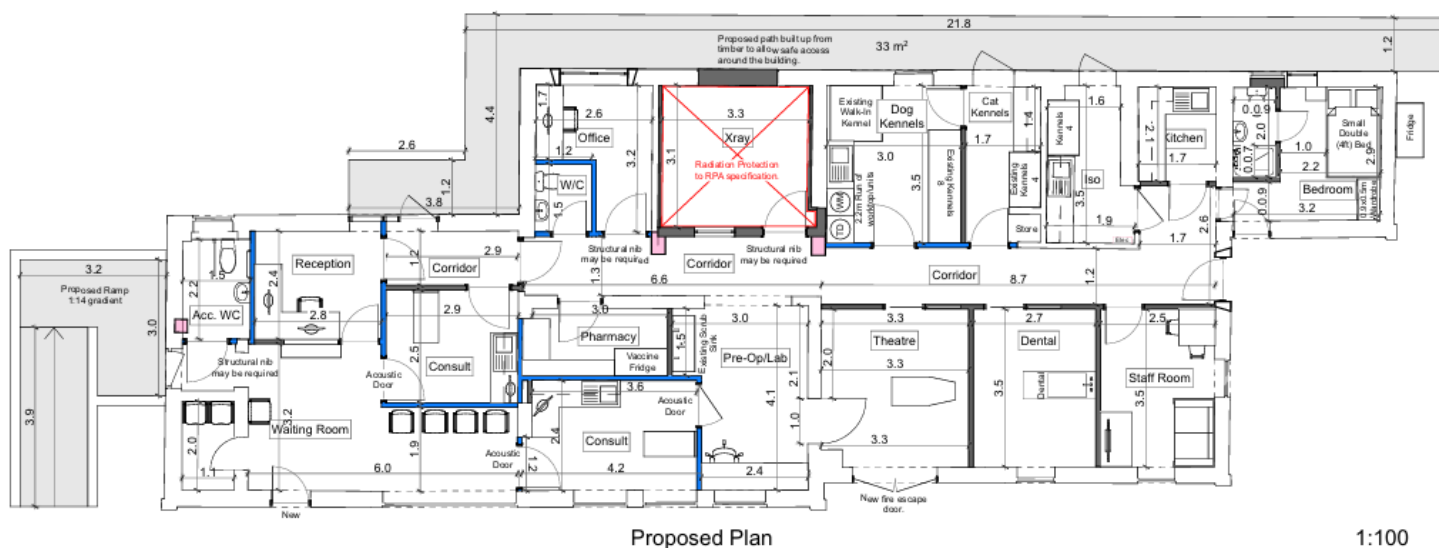


Figure 2: Proposed development floorplans/elevations

2.3 SITE LOCATION

Site location plan.



Figure 3: Location of proposed site

3 POLICY CONTEXT

Within this section of the report, we will review both local and national policy, establishing key principles that can be taken forward and applied across the development.

3.1 National Policy Context – National Planning Policy Framework December 2024

3.1.1 Section 2. Achieving Sustainable Development

(8) - Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

- a) an economic objective** – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
- b) a social objective** – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being.
- c) an environmental objective** – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

3.1.2 Section 14. Meeting the Challenge of Climate Change, Flooding and Coastal Change

(164) – New development should be planned for in ways that:

- a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through incorporating green infrastructure and sustainable drainage systems; and
- b) help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings in plans should reflect the Government's policy for national technical standards.

(165) – To help increase the use and supply of renewable and low carbon energy and heat, plans should:

- a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, and their future re-powering and life extension, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts);

b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and

c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for colocating potential heat customers and suppliers.

(166) – In determining planning applications, local planning authorities should expect new development to:

a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and

b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

(168) – When determining planning applications for all forms of renewable and low carbon energy developments and their associated infrastructure, local planning authorities should:

a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and give significant weight to the benefits associated with renewable and low carbon energy generation and the proposal's contribution to a net zero future;

b) recognise that small-scale and community-led projects provide a valuable contribution to cutting greenhouse gas emissions;

c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site.

(169) – Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.

3.2 Local Policy Context

The Development Plan for Bury Council comprises the following key documents:

- Bury Unitary Development Plan – August 1997
- Places for Everyone Plan for Greater Manchester (adopted March 2024)

Together, these documents form the statutory and strategic planning framework guiding sustainable design, energy efficiency, and carbon reduction within the borough.

Consideration to the emerging Bury Local Plan (adopted March 2025) is also referenced within this section.

Bury Unitary Development Plan – August 1997

The Bury Unitary Development Plan (UDP) acts as a guide for the future development or protection of land in the Borough and together with other adopted Development Plan Documents its policies and proposals form the basis for the Council's decisions on planning applications.

The current Bury UDP was adopted by the Council on 29th August 1997. The Council is now working to replace the adopted UDP with a new document called the Bury Local Plan. Until the new Local Plan is produced the UDP will continue be used to make planning decisions

EN4/2 - Energy Efficiency

The Council will encourage energy efficiency in development proposals through:

- the promotion of energy efficient modes of transport such as walking, cycling and public transport;
- seeking the location of new development in areas easily accessible to public transport and local facilities;
- promoting the efficient use of energy in the design and layout of development.

Justification:

Land use planning has an important role to play in encouraging energy efficiency by guiding and controlling the location and form of development that takes place.

A main aim of Government advice is to control the level of harmful gas emissions generated by motor vehicles. This policy therefore aims to guide new development to locations which reduce the need for car journeys, and the distances driven, whilst being accessible to public transport. This will involve ensuring that developments make full and effective use of land within the existing urban area, whilst avoiding town cramming, and are located close to the public transport network, including the Metrolink system and bus services. Other forms of transport, such as cycling, are also to be encouraged.

Planning policies can also encourage energy efficiency through the way in which development is designed and built, for example through the orientation of dwellings, the use of energy saving measures in the lighting, heating and insulation of buildings, and the use of environmentally friendly and non-pollutant materials. Whilst the Council is keen to encourage measures which increase energy efficiency, it will also be important to ensure that their design and appearance does not detract from the visual amenity of the surrounding area.

Places for Everyone Plan for Greater Manchester – Adopted March 2024

The Joint Places for Everyone (PfE) Development Plan Document was adopted by Bury Council with effect from 21 March 2024 and supersedes some of the UDP policies:

JP-S 1 – Sustainable Development - Establishes that development across Greater Manchester should contribute to sustainable growth and respond to the climate emergency, promoting energy-efficient, low-carbon, and resilient design.

JP-S 2 – Carbon and Energy - Requires all new development to minimise energy demand, maximise energy efficiency, use low-carbon and renewable energy, achieve substantial CO₂ reductions beyond Building Regulations, and support the 2038 Net Zero target.

JP-S 3 – Infrastructure Provision and Transport - Promotes energy-efficient transport, sustainable travel, and infrastructure that supports carbon reduction (e.g., EV charging, heat networks).

JP-S 4 – Green Infrastructure - Requires integration of green and blue infrastructure to support carbon sequestration, microclimate control, and climate adaptation.

JP-S 5 – Climate Change and Resource Efficiency - Requires development to mitigate/adapt to climate change, maximise energy efficiency, and use renewable/low-carbon technologies, sustainable materials, and water efficiency.

JP-S 6 – Clean Air, Water and Environmental Quality - Promotes energy-efficient, low-pollution design and aims to reduce emissions while improving environmental quality.

JP-P 1 – Sustainable Places - Encourages design and layouts that support sustainable lifestyles, efficient resource use, and reduced carbon footprints.

Bury Local Plan – adopted March 2025

The Council is now working to replace the adopted UDP with a new document called the Bury Local Plan. Extracts of key relevant policies are found below:

Policy LP-CC1: Climate change

The Council will take a proactive approach in ensuring that the Borough is resilient and adaptive to the cause and effects of climate change. In particular, the Council will seek to:

- a. Ensure that new and existing development minimises emissions and maximises the use of renewable energy and resources;
- b. Maximise opportunities to encourage modal shift in transportation from private car use to accessible active travel and sustainable transport such as walking, wheeling, cycling and public transport;
- c. Achieve a step change in new housing development design to deprioritise the car and to prioritise space for pedestrians, safe play and cycling;
- d. Maintain a comprehensive network of green and blue infrastructure and secure the provision of new green infrastructure in association with new development;
- e. Achieve high standards of sustainable design and construction in order to mitigate the effects of climate change;
- f. Reduce energy consumption in new buildings through the promotion of sustainable design and layout;
- g. Recognise the importance of the use of recycled and low embodied carbon materials;
- h. Support opportunities for appropriate renewable and low carbon energy generation;
- i. Ensure that new development is not subject to unacceptable levels of flood risk, does not result in increased flood risk elsewhere and, where possible, achieves reductions in flood risk overall;
- j. Encourage the incorporation of climate change adaptation measures within the design and layout of new development; and
- k. Promote water efficiency

Policy LP-W2: Sustainable Drainage

The Flood and Water Management Act 2010 introduced new responsibilities for the Council relating to the approval of proposed drainage systems in new development redevelopments, subject to certain thresholds and exemptions, having regard to minimum national standards. The following policy should be read in conjunction with these statutory requirements.

All applications must be supported by a strategy for surface and foul water management. Surface water must be discharged in the following order of priority, recognising that a combination of measures within the hierarchy may be required to satisfactorily deal with all surface water:

- a. An adequate soakaway or some other form of infiltration system;
- b. An attenuated discharge to a surface water body;
- c. An attenuated discharge to public surface water sewer, highway drain or another drainage system; and
- d. An attenuated discharge to public combined sewer.

Proposals must be designed to maximise the retention of surface water on-site and minimise the volume, and rate of, surface water discharge offsite. On greenfield sites, any rate of discharge shall be restricted to a greenfield run-off rate. On previously developed land, applicants must also follow the hierarchy

for surface water management and target a reduction to a greenfield rate of run-off. Proposals on previously developed land must achieve a minimum reduction in the rate of surface water discharge of 40% rising to a minimum of 55% in any critical drainage area identified by the SFRA. This rate may increase to 70% in areas of higher flood risk. Relaxation of this standard will be at the discretion of the Lead Local Flood Authority

To demonstrate any reduction, applicants must submit clear evidence of existing operational connections from the site with associated calculations on rates of discharge. Where clear evidence of existing connections is not provided, applicants will be required to discharge at a greenfield rate of run-off. All drainage design submissions must include a full set of design calculations and, where appropriate, a plan indicating exceedance flow paths to demonstrate the potential impacts of more extreme storm events on the development.

The design of proposals must assess and respond to the existing hydrological characteristics of a site to ensure a flood resilient design is achieved and water / flooding is not deflected or constricted. Design proposals should comply with “Greater Manchester’s Sustainable Drainage Design Guide for Streets. Streets for All Supplementary Technical Guidance”.

Applications for major development will be required to incorporate sustainable drainage, which is multi-functional, in accordance with the four pillars of sustainable drainage, in preference to underground piped and tanked storage systems, unless there is clear evidence why such techniques are not possible. The sustainable drainage should be integrated with the landscaped environment and the strategy for biodiversity net gain.

For any development proposal which is part of a wider development / allocation, foul and surface water strategies must be part of a holistic sitewide strategy. Pumped drainage systems must be minimised and a proliferation of pumping stations on a phased development will not be acceptable.

Applications must be accompanied by a drainage management and maintenance plan including a plan for any watercourse within the application site or an adjacent watercourse where the application site is afforded riparian rights. Proposals shall be submitted for approval by the Lead Local Flood Authority. It is not acceptable to burden individual property owners with riparian responsibilities. This should be reflected in the management plan for watercourses.

4 DESIGN CRITERIA

The proposed development at 825 Manchester Road represents a sustainable approach to development through the retention and re-use of the existing building fabric. As the proposal comprises solely a change of use from a fish and chip restaurant to a veterinary practice, with the existing external envelope and principal building elements retained, the scheme inherently delivers a robust carbon reduction strategy by minimising upfront embodied carbon emissions.

The retention of the existing building avoids the significant environmental impacts associated with demolition, the manufacture of new construction materials, transportation and installation. By preserving the existing structure and fabric, the proposal substantially reduces the embodied carbon that would typically arise during the product and construction stages (Modules A1–A5) of a development's life cycle. The limited scope of new construction works means that the quantity of new materials required is minimal, resulting in very low emissions associated with manufacturing, transport and installation.

Whilst no thermal fabric upgrades are proposed as part of the change of use, this reflects the nature of the development and should not be interpreted as a missed opportunity. The primary environmental benefit of the proposal lies in the conservation and continued use of the existing building, thereby extending its service life and avoiding the considerably higher carbon impacts that would arise from major refurbishment or redevelopment. The retention of existing building elements represents the most effective means of reducing embodied carbon and aligns with the principles of the circular economy, prioritising re-use over replacement.

In addition, the proposal seeks to retain and continue using the existing gas-fired heating system where practicable. Reusing the existing plant avoids the need for replacement heating equipment together with associated distribution systems, ductwork and pipework installations. This further reduces the demand for new manufactured products and associated installation works, all of which contribute significantly to upfront embodied carbon emissions. Extending the operational life of existing building services is considered an important component of the overall sustainability strategy for the scheme.

Scenario	Indicative upfront embodied carbon (kgCO ₂ e/m ² GIA)	Savings demonstrated in embodied carbon (kgCO ₂ e/m ² GIA)
Decoration only / minor repairs	15 (kgCO ₂ e/m ² GIA)	/
Fabric-only thermal upgrade (insulation + windows)	125 (kgCO ₂ e/m ² GIA)	Circa - 110 (kgCO ₂ e/m ² GIA)
Complete Rebuild	550 (kgCO ₂ e/m ² GIA)	Circa - 535 (kgCO ₂ e/m ² GIA)

Note – this figures above represent desktop research based on data available when comparing light refurbishment / fabric improvements and total new build. No WLCA assessment has been completed at this time.

The embodied carbon exercise demonstrates that the proposed development represents the most favourable option from a whole-life carbon perspective. By retaining the existing building and limiting the extent of new construction, the scheme achieves substantially lower upfront embodied carbon emissions than either a comprehensive programme of thermal fabric upgrades or the complete demolition and redevelopment of the site.

The assessment indicates that the proposed scheme delivers significant embodied carbon savings through the retention and reuse of the existing structure, thereby avoiding the considerable carbon emissions associated with replacement materials, demolition and new construction. Whilst further thermal improvements would also retain the building, the proposed development achieves a more balanced outcome by delivering the required development objectives with a lower overall embodied carbon impact than more extensive retrofit interventions.

Accordingly, the proposed development demonstrates that the principles of the waste hierarchy and the reuse of existing building fabric have been prioritised, resulting in a resource-efficient design solution. From an embodied carbon perspective, the proposal supports the transition towards a low-carbon built environment and aligns with the objectives of the RICS Whole Life Carbon Assessment (2nd Edition) methodology.

On this basis, the proposed development is considered to accord with the climate change and sustainable development objectives of the adopted Places for Everyone Joint Development Plan and the relevant policies of the Bury Development Plan, which seek to minimise whole-life carbon emissions, promote the efficient use and reuse of existing buildings and materials, and support development that contributes to Greater Manchester's transition towards net zero carbon

5 SUSTAINABLE DRAINING / FLOOD RISK

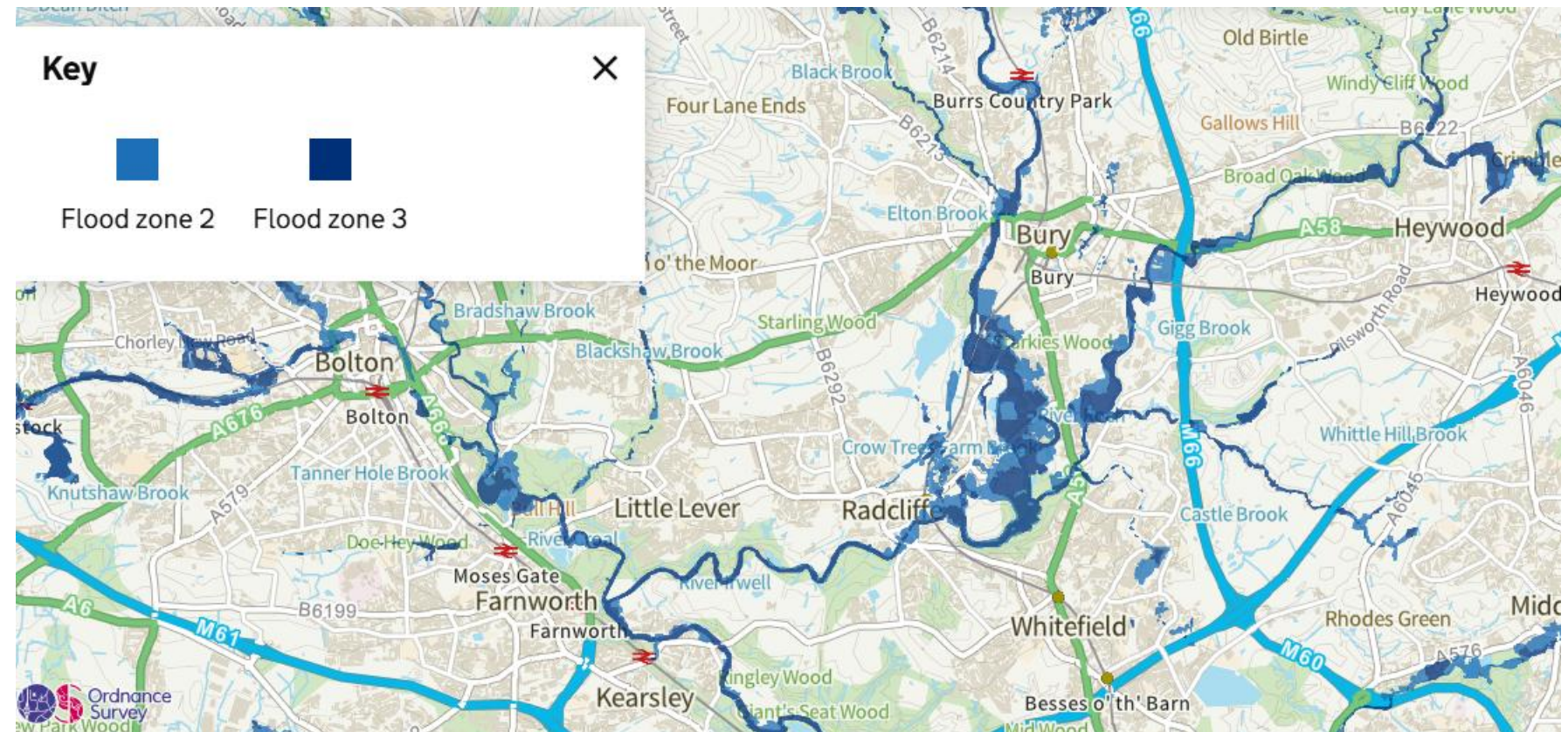
The proposed development comprises the change of use and internal remodelling of an existing building. The scheme does not include any extensions, new build elements, alterations to the building footprint, or other external works that would increase the impermeable area or otherwise affect the existing drainage regime.

As the development is wholly contained within the existing building envelope, there will be no changes to the existing surface water drainage arrangements, foul drainage network, ground levels, or site layout. The building will continue to occupy the same footprint as the existing structure, and the proposed works will not result in any increase in surface water runoff or alter the rate or volume of discharge from the site.

Given the nature of the proposals, there is no requirement for new Sustainable Drainage Systems (SuDS) to be incorporated, as no additional hardstanding or impermeable surfaces are being created. The existing drainage infrastructure serving the building will remain in place and continue to operate as existing, with no adverse impact on the capacity or performance of the local drainage network.

Similarly, the proposals do not alter the site's flood risk characteristics. The development will not increase flood risk on-site or elsewhere, nor will it affect overland flow paths, flood storage capacity, or existing drainage infrastructure. As such, the proposal is considered to have a neutral impact in terms of flood risk and drainage.

In light of the above, it is considered that a site-specific Flood Risk Assessment and a Sustainable Drainage Strategy are not required for this application. The proposals represent the reuse of an existing building with no material changes to the site's drainage characteristics or flood risk profile. Consequently, the development is consistent with national planning guidance and local planning policy objectives relating to flood risk and sustainable drainage, as it neither increases flood risk nor necessitates new drainage infrastructure.



6 CONCLUSION

This Energy & Carbon Statement has been prepared in support of the proposed development to demonstrate how the scheme responds to the relevant national, regional and local planning policies relating to sustainable design, energy efficiency, climate change mitigation and carbon reduction. The statement considers the environmental performance of the proposals and sets out how the development has been designed to minimise its carbon impact while making effective use of the existing built environment.

A key principle of the proposed development is the retention and adaptive reuse of the existing building. Rather than wholesale demolition and reconstruction, the scheme seeks to maximise the value of the existing structure and, where practicable, retain existing building fabric and mechanical and electrical services. This approach significantly reduces embodied carbon by limiting the demand for new construction materials, avoiding the carbon emissions associated with demolition and waste disposal, and extending the operational life of the existing asset. The reuse of existing elements also supports the efficient use of natural resources and aligns with the principles of the circular economy, which are increasingly embedded within national and local planning policy.

The proposals do not materially alter the site's drainage characteristics or flood risk profile and therefore do not require a site-specific Flood Risk Assessment or Sustainable Drainage Strategy. As the development neither increases flood risk nor necessitates new drainage infrastructure, it remains consistent with relevant national planning guidance and local planning policy objectives.

The Statement has been structured in accordance with the Greater Manchester Combined Authority (GMCA) Net Zero Planning Guidance (Part 3 – Submission Guidance, 2024) and demonstrates full compliance with the following policy framework:

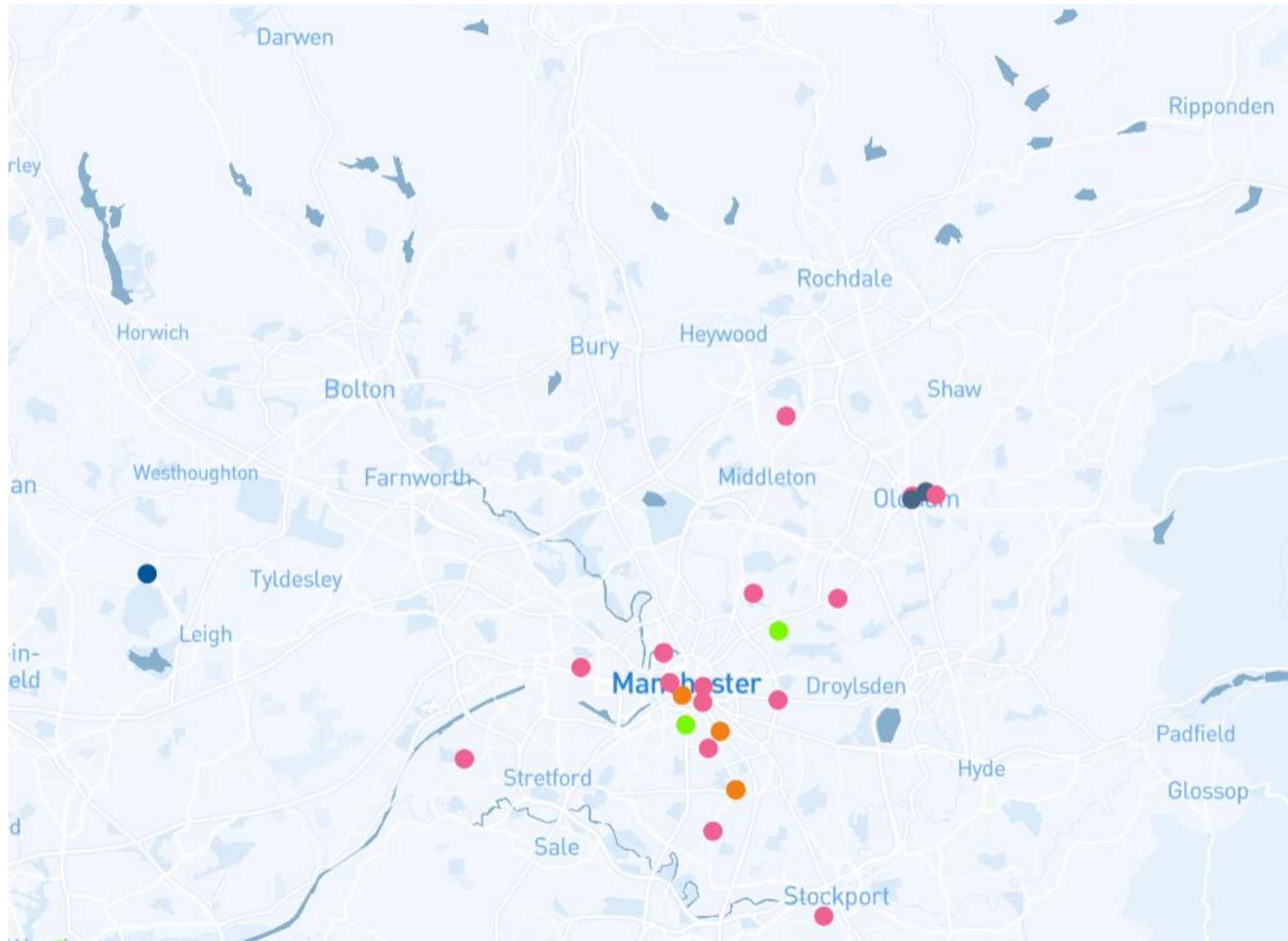
- **National Planning Policy Framework (NPPF, 2024)** – Section 14 on meeting the challenge of climate change and supporting renewable energy;
- **Places for Everyone Plan (adopted March 2024)** – Policies JP-S 1 (Carbon and Energy), JP-S 2 (Carbon and Energy), JP-S 3 (Heat and Energy Networks) and **JP-P 1 (Planning Obligations)**;
- **Bury Unitary Development Plan (August 1997)**

Overall, the proposed development provides a balanced and proportionate response to the energy and carbon objectives established by Bury Council, the Greater Manchester Combined Authority and national planning policy. Through the retention and enhancement of the existing building, the minimisation of embodied carbon, and the avoidance of unnecessary demolition and new construction, the scheme demonstrates a clear commitment to sustainable development. The proposals deliver environmental benefits while remaining appropriate to the scale and nature of the project.

APPENDIX A – RENEWABLE TECHNOLOGIES MATRIX

Technology	Description	Pros	Cons	Project Suitability	Included in Proposed Scheme?
Solar Thermal	Solar thermal hot water collectors are panels or evacuated tubes which are typically located on the roof of the buildings. The collectors harness the sun's energy to warm domestic hot water	- Reduced fuel bills and carbon footprint - Low maintenance - Proven technology	- Only compatible with boilers that have hot water storage - Need south facing roofs to optimise efficiency - Carbon saved is low comparative to the savings offered by PV	Solar thermal HW is not deemed suitable for this development due to the nature of the scheme in particular the level of hot water demand thus making the suitability of a system unfeasible.	✗
Solar PV	Solar Photovoltaic (PV) panels work by converting energy from the sun into electricity. This can then be used with the development to offset the electrical usage.	- Reduced bills and carbon footprint - Benefit from the feed in tariff - Proven technology - Relatively maintenance free	PV panels lose efficiency over their lifetime	PV would not be suited to this development as the existing roof structure is to be retained and as such the increased weight of the Solar PV could potentially impact the integrity of the structure.	✗
Combined Heat & Power (CHP)	CHP is a technology which develops heat and power from the same energy source, typically mains gas. The CHP engine is fed by mains gas which then drives an alternator to provide electricity. CHP is highly energy efficient as the heat and electricity are produced on site, therefore reducing transmission losses. Typical efficiencies are 50% for the heat and 35% for the electric.	- Reduced fuel bills and carbon footprints - Eligible for the feed in tariff. - Proven technology which is in use in many schemes in the UK - Suited to large developments	- Not a true renewable technology - Heating and electricity demand must remain fairly stable to ensure CHP is running at optimum efficiency - Requires a centralised/district heating network - Noise. / Capital intensive	The total size and nature of the development does not lend itself to CHP. It would add to the capital costs of the development making the development not financially viable. For these reasons, CHP has been discounted	✗
Air Source Heat Pump	Air source heat pumps extract heat from the external air which can be used to heat radiators/underfloor heating and hot water. ASHP can still extract heat from air as cold as -15 degrees centigrade. ASHP are particularly useful on sites where gas is not available. There are two forms of ASHP – air to air and air to water.	- Can offer lower heating bills and reduce carbon footprints (when compared to electric systems) - Relatively maintenance free - Offers high efficiencies - Can offer heating and cooling depending on system chosen (air to air)	- Requires space to locate the external condenser unit. The unit requires lots of space around it to ensure adequate air flow. - Requires the use of underfloor heating or large radiators due to low grade heat. - Noise issues	Air source heat pumps have not been included on this development.	✗
Ground Source Heat Pump	Ground source heat pumps (GSHP) work in a similar way to air source heat pumps, however they extract heat from the ground. A ground loop is buried within the garden and a mixture of water and refrigerant is circulated along the loop. The heat from the ground is then absorbed within the fluid and then passes through a heat exchanger within the GSHP. Ground loops can be laid horizontally at depths of 1-2m or vertically at depths of up to 100m.	- Can offer lower heating bills and reduce carbon footprints (when compared to electric systems). - Relatively maintenance free - Offers high efficiencies	- High capital costs - Requires space for boreholes or trenches to locate ground loops - Requires the use of under floor heating or large radiators due to low grade heat	Ground source heat pumps have been discounted on this development predominantly due to the nature of the development and the lower emissions associated with an air source heat pump.	✗

APPENDIX B – EXISTING AND PROPOSED LOCAL HEAT NETWORKS



No viable heat network exists within vicinity; design remains connection-ready for future integration.