

Information/Discussion Paper

Overview & Scrutiny Committee – 24 February 2025

Reconciling the challenges of heritage protection with sustainability measures

This note contains the information to keep Members informed of matters relating to the work of the Committee, but where no decisions from Members are needed.

1. Objectives

Identifying factors to develop a workable balance between protecting heritage and implementing environmental solutions (retrofit); Receiving feedback from the community retrofit project and other initiatives to meet our climate net zero targets.

2. Background

Cheltenham Borough Council (CBC) has set an ambitious target for the borough to become Net Zero by 2030. To achieve this, we need to consider sources of carbon emissions within Cheltenham and the unique set of challenges to decarbonise these sectors. Residential buildings account for approximately 40% of borough wide emissions¹, ensuring homes are as energy efficient as possible is a vital part of our journey to Net Zero.

This report firstly considers the distinct issues relating to heritage and historic homes when environmental solutions (retrofit) are considered. It also aims to provide information on, and understanding of, some of the terms and approaches used in retrofit, to develop understanding of the issues and the complexity of all retrofit, but especially in the heritage context.

3. Work in-progress

In 2024, approximately 66% of homes within the borough have an SAP (Standard Assessment Procedure) rating of band D, E, F and G². There has already been significant work achieved in this area, including:

- Future Fit Homes Project: a 6-month, peer-to-peer learning program with 60 households receiving support to improve the energy efficiency of their homes & install low/zero carbon energy systems.
- £15,000 in match funding grants to support upgrades to homes, which will improve the energy efficiency of the property and reduce fuel bills.

¹ [SCATTER](#)

² [Platform - CoreLogic | Parity Projects](#)

- Employment of Retrofit Engagement Officer (12-month fixed term): to engage householders, identifying barrier, helping individuals understand advice, guidance, and options available to take steps towards household decarbonisation.
- There is work on-going (supported by Government funding) to retrofit the Council's housing stock and to improve the SAP rating of all properties to at least band C.

Engagement work and support has addressed all householders, whether in heritage homes or not.

4. The role of historic buildings

Historic buildings have a significant role to play in the transition to Net Zero, they must continue to change and evolve if they are to both contribute to a greener future and be fit for purpose for the people who live in, experience and care for them. With careful consideration, these changes can achieve the two-fold benefit of protecting our heritage and adapting to a changing climate³.

There are 2602 listed buildings within Cheltenham, 5 of which are Grade I, 387 are Grade II* and 2210 are Grade II and a significant number of homes are within a conservation area. Although listed homes and homes within a conservation area is a relatively small number when compared to approximately 57,000 residential homes in the borough (included listed), they are a significant and iconic proportion of the existing building stock. Improving the energy efficiency of historic homes is essential for their long-term survival and can provide best practice case studies of successful retrofit in hard-to-treat properties, setting an example of what can be achieved in other complex properties. However, the retrofit of these buildings is often more challenging and costly, due to the material required and specific skills, along with permissions needed. Ensuring historic buildings are adapted appropriately, with the correct design and selecting the right measures upfront can help avoid unnecessary costs. The special considerations taken when assessing the impact on historic and architectural significance, provide opportunities to ensure the right design is developed⁴.

Historic buildings are, generally, inherently less energy efficient due to their age, construction materials, and architectural designs made without modern energy standards in mind. This can result in issues such as increased energy consumption, higher greenhouse gas emissions, and elevated costs for occupiers⁵. Traditional and modern buildings often differ in how they manage moisture, air, and heat. Industrially manufactured products and building techniques changed significantly in the mid-19th century, with concrete, steel, and cavity construction becoming more widespread. The material of most traditional buildings has the capacity to regulate fluctuations in humidity and temperature, and if well-maintained will remain in equilibrium with its environment. Most modern buildings use construction methods and materials, such as damp-proof courses and airtightness or vapour control membranes, which create

³ [HEAG321 Adapting Historic Buildings for Energy and Carbon Efficiency](#)

⁴ [Adapting historic homes for energy efficiency: a review of the barriers - GOV.UK](#)

⁵ [Energy Efficiency in Historic Buildings | EWI Store](#)

a sealed envelope to minimise exchange of moisture, air, and heat with the external environment.

Special consideration is necessary when determining the correct retrofit approach to take with historic buildings, as some energy efficiency interventions can affect the heating and ventilation balance, potentially leading to moisture accumulation, overheating, or mould growth and subsequent damage to the historic fabric. The effects of climate change are also impacting buildings performance due to increasing and more frequent intense rainfall events, maximum summer temperatures, rising external humidity levels, and shorter but more concentrated wind-driven rain spells. Consequently, it is increasingly important to enhance the ability of traditional buildings to buffer the internal environment against temperature and humidity fluctuations⁶.

5. Understanding retrofit and associated terms

Retrofitting includes a variety of alterations to improve the energy efficiency of buildings. Historic England lists several different approaches and terminologies used to describe different retrofit interventions⁷. Key is the Energy Efficiency Hierarchy:

5.1 Energy Efficiency Hierarchy

The 'Energy Efficiency Hierarchy' recommended approach towards implementing retrofit measures is⁸:

- reduce energy consumption in real terms (sufficiency) – often including a fabric first approach along with energy saving i.e. lighting.
- minimise unavoidable energy use (efficiency).
- generate energy from 'renewables', also known as low and zero carbon technologies, where possible (generation).

This strategic approach to retrofitting ensures that the most effective and beneficial measures are implemented first, providing a clear roadmap for energy-efficient retrofitting.

5.2 Whole House Retrofit

Historic England advocates a whole building approach (which is also considered the best approach in all other buildings) when considering adapting historic buildings. This does not mean doing everything all at once, but instead taking a holistic approach in which the whole building (including context and significance, as well as performance) is considered before improvements measures are then assessed and when multiple interventions are planned these can, if required, be carried out in stages and each stage has considered the overall plan for the building, so one measure does not adversely affect another. This approach should be based on:

- An understanding of the significance of a historic building, including the contribution of its setting.

⁶ [Traditional Buildings and Energy Efficiency | Historic England](#)

⁷ [Introduction to Retrofitting | Heritage Counts | Historic England](#)

⁸ [Energy Efficiency and Retrofit in Historic Buildings | Historic England](#)

- An understanding of the building and how it performs.
- Prioritising interventions that are proportionate, effective, and sustainable.
- Avoiding and minimising harm and the risk of maladaptation.

Each home is unique, and both technical considerations and significance vary greatly from building to building - there is no one-size fits all approach. Therefore, decisions and actions taken at every stage have bearing on the success of the outcome. Stages include gathering data and surveys, assessing and plans, design and specify, procure and install, evaluate and maintain. When planning energy efficiency interventions, it is essential to understand the way the building functions⁹.

The “Whole House” approach has been formalised through PAS (Publicly Available Specification) 2035¹⁰. PAS 2035 is a new specification that provides a framework for the application of retrofit measures to existing domestic buildings in the UK and provides best practices approaches, including addressing the issues of heritage buildings. The use of, and compliance to, PAS 2035 is a required for Government funded retrofit projects.

5.3 *Fabric First*

As implied by its name, this refers to the strategy of first focussing on improvements (including necessary repairs) to the fabric of the buildings which encompasses the main structural elements of a property, such as the roof, walls, windows, doors, and floors.

The principles of fabric first are:

1. **Optimising Insulation:** Retrofitting with a fabric first approach starts with enhancing insulation in walls, roofs, and floors. High-quality insulation materials and techniques are used to prevent heat loss during winters and heat gain during summers.
2. **Reducing Thermal Bridging:** Thermal bridging occurs when heat escapes at junctions between fabric elements such as around windows and doors, or junctions between walls, between the wall and roof or between the wall and floor. The fabric first approach addresses these issues to ensure a continuous and effective thermal barrier.
3. **Airtightness:** Preventing unwanted air leakage is crucial for energy efficiency. By sealing gaps, cracks, and joints, the building's airtightness is improved, reducing the need for excessive heating or cooling.
4. **Passive Design Strategies:** The principles of passive design, such as optimal solar orientation, natural ventilation, and shading, are integral to a fabric first retrofit. These strategies harness natural elements to regulate temperature and lighting, minimising reliance on active systems.
5. **Balanced Ventilation:** While ensuring airtightness, a fabric first retrofit also incorporates balanced ventilation systems that maintain indoor air quality without compromising energy efficiency.

⁹ [Whole Building Approach for Historic Buildings | Historic England](#)

¹⁰ [PAS: About Publicly Available Specifications - Retrofit Academy | Training Courses](#)

Historic England suggest the ‘fabric first’ approach may not be practicable nor desirable in historic buildings and is often not the most technically sound, efficient, or effective approach. It may result in unintended consequences and therefore should be carefully considered.

5.4 Deep Retrofit

This is categorised by implementing multiple and/or large-scale energy efficiency measures. Taking the fabric first approach and making changes to many elements of the fabric of building, improving the airtightness, etc as well as upgrading space and water heating, lighting services, and the fabric and airtightness of the building. There are several standards relating to “deep retrofit” in the market that define the level of performance against key indicators, such as EnerPHit Quality-Approved Energy Retrofit with Passive House Components¹¹. This is the Passivhaus refurbishment standard from the Passivhaus Institute, representing a gold standard for retrofit. It is not easy to achieve, especially where there are additional factors to consider, i.e. within heritage buildings.

5.5 Shallow or Light Retrofit

Considers few and or/small scale measures to improve build energy use such as installation and draught excluders¹².

5.6 Single Measure Retrofit

Implementing a single energy-saving improvement in a building. This has been the historic approach, and the majority of retrofit has taken place in this form. There is concern that the current practice of single-measure retrofits may lead to poor performance and a greater risk of maladaptation as the approach does not consider the interdependencies and knock-on impacts on other energy efficiency measures as per the whole-building approach. Furthermore, there may be a greater risk of harm to the heritage value of a building with this approach¹³.

6. Barriers

In 2024, HM Government undertook a review to research and collect evidence on the practical planning barriers to installing energy efficient and low carbon heating measures focusing on listed homes and dwellings, and those in conservation areas¹⁴. Several themes were identified highlighting the breadth of issues requiring attention:

6.1 The Planning System

- Owners and occupiers of listed buildings and buildings in conservation areas found that most residents of listed buildings support the requirement to obtain listed building consent, agreeing it is important to protect the special architectural and historic character of the property.
- The length of time taken to obtain planning permission or listed consent can lead to homeowner frustrations and the potential of losing out on financial

¹¹ [Demonstration of Energy Efficiency Potential: Literature review](#)

¹² [Introduction to Retrofitting | Heritage Counts | Historic England](#)

¹³ [Demonstration of Energy Efficiency Potential: Literature review](#)

¹⁴ [Adapting historic homes for energy efficiency: a review of the barriers - GOV.UK](#)

support. Some people are put off from pursuing retrofit measures due to the perception that the planning process is too complex and uncertain to navigate.

- Stakeholders within the government review were positive about the potential impact of Local Listed Building Consent Orders (LLBCOs) for solar panels and other measures which provide a general grant of listed building consent for these works, removing the need to submit individual applications.
- Many listed building consent applications to local planning authorities across the country focus on minor works to Grade II listed buildings.
- During 2024, CBC received 6 planning applications for listed building consent relating to energy efficiency. It could be argued that this low figure supports addressing the barriers discussed in this section to enable more uptake.

6.2 Local authority skills, training, and capacity

- In Historic England's 2023 Local Authority Staffing Survey, 59% of responding local authorities said that the volume of casework involving decisions, advice, or pre-application enquiries about retrofit had increased over the last year. When asked to rate staff confidence in making decisions on energy efficiency retrofit only 16% said they felt very confident¹⁵.
- There is limited specific training available which draws heritage, sustainability, and retrofit together. With the lack of central government action in this area it is down to local authorities to pursue additional training and education. This has challenges when the planning sector is facing capacity constraints.
- There is a HM Government £29 million Planning Skills Delivery Fund to support planning authorities with upskilling staff.

6.3 Guidance and Information for homeowner and occupiers

- Lack of effective, clear, non-technical guidance and information. This was highlighted as one of the first tools homeowners look for when considering energy efficiency measures for their historic homes.
- There appears to be a lack of awareness of the whole building approach. Experience of the Retrofit Engagement Officer indicates that people tend to go straight to wanting to introduce active energy technologies before considering eliminating unnecessary energy use. More guidance and information are required.
- Where free, credibly sourced guidance did exist, it was often thought to be overly technical and not designed for homeowners, or alternatively too generic and therefore not helpful for considering specific circumstances. Meanwhile, seeking independent, impartial, tailored advice was perceived to be expensive.
- Recommendations from Energy Performance Certificates (EPCs) are often used by homeowners to inform retrofit activities, however, as discussed above are not effectively designed to consider the more specific physical needs of traditionally constructed buildings, and therefore may not be fit for purpose. However, a Retrofit Assessor would collect full data which will reflect occupancy, condition and heritage, which a Retrofit Coordinator can then use to advise on suitable retrofit measures.

¹⁵ [Historic England Local Authority Staffing Survey 2023 Technical Report](#)

6.4 Construction industry skills, training, and capacity

- The loss of skills in the heritage construction industry is a key barrier to adapting historic homes, with a need to upskill mainstream construction workers to ensure the industry understands appropriate methods to adapt historic buildings.

6.5 Affordability and financial incentives

- All the challenges discussed above contribute to issues around affordability and cost of retrofitting historic homes. Whilst making an application carries no fee, there are associated costs including, pre-application advice charges, statements of significance from consultants, and architectural technicians' fees for drawing up the required detailed plans.

Case Study

LLBCO: Royal Borough of Kensington and Chelsea

In 2022, Kensington and Chelsea became the first Council to implement a Local Historic Building Consent Order regarding solar panels. They have many listed buildings (over 4000) in the borough, of which around 70 per cent are in a conservation area. These listed buildings required listed building consent before solar panels can be installed which meant that owners of listed buildings were required to gain individual listed buildings consent if they wanted to install solar equipment making it difficult and expensive for homeowners to install solar panels.

Their assessment and evidence gathering, conducted by officers internally over a period of weeks, suggested that the predominantly nineteenth century character of the borough meant that they could be confident that most listed buildings will be capable of accommodating solar panels without harm to their special interest.

Working alongside Historic England, officers successfully devised their own local listed building consent order, in 2022 implementing this over a three-month period, to enable listed buildings to be retrofitted with solar panels.

Applications for listed building consent are free, although processing them still requires officer time. For the Council this has meant that for a relatively small amount of effort up front they could free their specialist heritage officers for other, more complex, applications with no loss of income. Residents will be saved the time and expense of preparing a full application for listed building consent.

Residents are now, normally, able to get sign-off of the details using the information provided by their solar equipment installers.

The public consultation had revealed strong support from those residents who responded, and from other local groups. This suggested a strong public appetite for measures such as this.

Given the success of the scheme, RBKC swiftly introduced a second Local Listed Building Consent Order, covering window works, to enable secondary glazing in specific circumstances.

Case Study

Green Heritage Homes: Bath & Northeast Somerset Council

This is a project to improve understanding of energy efficiency works for listed buildings, and to showcase positive examples of retrofit.

Aiming to:

- Enable sensitive retrofitting of listed buildings by growing knowledge and confidence among householders and professionals.
- Demystify the listed building consent process for energy improvement works.
- Offer guidance on effective retrofit solutions informed by conservation principles and technical understanding of traditional buildings and fabrics.

This project will focus on listed buildings and the unique challenge that comes with upgrading their energy performance, as well as their specific planning requirements. There is continued advice and support for homeowners of unlisted heritage buildings across the district, and further resources on practical retrofit guidance will be made available through the project.

Green Heritage Homes is a government funded Local Energy Advice Demonstrator project, run in partnership with Bath and West Community Energy (lead), B&NES Council, Bath Preservation Trust, The Centre for Sustainable Energy, People Powered Retrofit, and the Southwest Net Zero Hub. Receiving funding of approximately £344k.

Level 0 pre-application service for homeowners who are interested in improving the energy of their listed building but don't know where to start. You will have the chance to discuss retrofit options with a Conservation Officer and look at the heritage considerations of different energy efficiency measures.

Applicants for the Level 0 pre application receive:

- Conservation Officer to manage the pre-app.
- Site visit to investigate the listed building and any potential restrictions or opportunities for energy efficiency works.
- Pre-app report outlining suitability of retrofit measure and the next steps to progress energy efficiency works.

7. Other considerations

7.1 Case studies of other Planning Authorities Approaches¹⁶

Other Local Authorities (LAs) have started to address the issues relating to heritage and retrofit homes. CBC Officers have been reviewing the work and activities of other LAs in this area and below are two relevant case studies which provide important examples.

¹⁶ [Royal Borough of Kensington and Chelsea: Local Listed Building Consent Order | Local Government Association](#) & [Green Heritage Homes | Bath and North East Somerset Council](#)

7.2 Local and National Policy

There are a several relevant local and national policies, which indicate and support the need for retrofit.

National Planning Policy Framework (December 2024)¹⁷

- Chapter 14: Meeting the challenge of climate change, flooding, and coastal change.
- Chapter 16: Conserving and enhancing the historic environment.
Gloucester, Cheltenham and Tewkesbury Joint Core Strategy (2017)¹⁸
- Policy SD8: Historic Environment.
- INF5: Renewable Energy/Low Carbon Energy Development.
- Cheltenham Plan (2020)¹⁹
- Policy HE1: Buildings of local importance and non-designated heritage assets.

8. Scopes of work for CBC

The two case studies above relate to two potential areas of work. CBC's climate/planning team have been in discussion with both LAs, to gain additional insight into their activities. The two CBC teams are now working together to determine potential areas of works to address the title of this report.

8.1 LLBCO:

Local Listed Building Consent Orders allow a Local Planning Authority to grant listed building consent for an extended period for works of any description for the alteration or extension of groups of listed buildings in all or part of their area, or buildings of a particular description in their area. This is a pro-active and blanket grant of consent, which means that owners of those listed buildings will not have to make individual applications, but will be able to proceed with the works, subject to any conditions that may be attached to the Order²⁰.

Pros	Cons
<ul style="list-style-type: none">- Demonstrates strong support by CBC for environmental solutions (retrofit) in heritage properties. Important in terms of reducing barriers and public perception.	<ul style="list-style-type: none">- Only applicable to specific properties, working on an individual single measure such as Solar PV or window improvements. This has the potential to result in a single measure retrofit approach.
<ul style="list-style-type: none">- Potentially allow works which would otherwise require a series of applications for listed building consent to be dealt with by a single consent mechanism.	<ul style="list-style-type: none">- Time consuming to implement (including significant consultation with stakeholders such as Historic England).

¹⁷ [National Planning Policy Framework](#)

¹⁸ [JCS+Plan+Adopted+Verison+\(PDF.+10MB\)+Formatted+\(1\).pdf](#)

¹⁹ [Cheltenham Plan | Local Plan core documents | Planning policy | Cheltenham Borough Council](#)

²⁰ [historicengland.org.uk/images-books/publications/drawing-up-local-listed-building-consent-order-advice-note-6/heag009-listed-building-consent-order-an6/](#)

8.2 Pre-application support:

This service is tailored to an applicant's needs, budget, and the identified characteristics of the listed building. The aim of the pre-app is to clearly identify the next steps of a retrofit project and submitting a listed building application with the best chance of success.

Pros	Cons
<ul style="list-style-type: none">- Offers individual advice, specific to the property.	<ul style="list-style-type: none">- Time intensive, reliant on the capacity of conservation officers to visit/discuss with homeowners.
<ul style="list-style-type: none">- Assists with homeowners making intelligent decisions, through advice at the pre application stage, before committing to potentially inappropriate measures (damaging to heritage). Educating and encouraging uptake of whole building approach to retrofit.	<ul style="list-style-type: none">- Current education gap, there is a need to allocate resource towards specific officer training needs covering retrofit in heritage homes.
<ul style="list-style-type: none">- Involving the Conservation officer at early stages of project development has the potential to reduce officer time spent later in the planning permission process.	<ul style="list-style-type: none">- Budget requirements for project development and stakeholder engagement.

9. Feedback on existing Retrofit Initiatives

9.1 Future Fit Homes

Future Fit Homes is a peer to peer learning project, showcasing the value of community networks and conversations in supporting homeowners to self-fund energy improvement work in their homes.

Through an online group, regular meet ups (Sept 24 to Feb 25) and events - including talks from experts, plus support and advice from Severn Wye Energy Agency; this project is helping us to understand what the barriers to action are, and to identify steps to overcome them. The project explores how to put power into the hands of communities when it comes to retrofitting our homes.

Fifty successful applicant homes had access to free home energy surveys (Severn Wye Energy Agency), energy saving goodies, and the opportunity to apply for a grant of up to £1,000 to support their projects.

Outside of the initial 50 sign ups the group has grown to over 60 residents who regularly discuss the best solutions for their homes.

Members have self-managed home visits to see other participant installations and have an active Facebook group where they share experience and advice.

Of the 60 in the group there are 3 listed properties and 10 within conservation areas. The breakdown of the age of properties involved in the project are as follows:

What is the age of your property?

60 responses

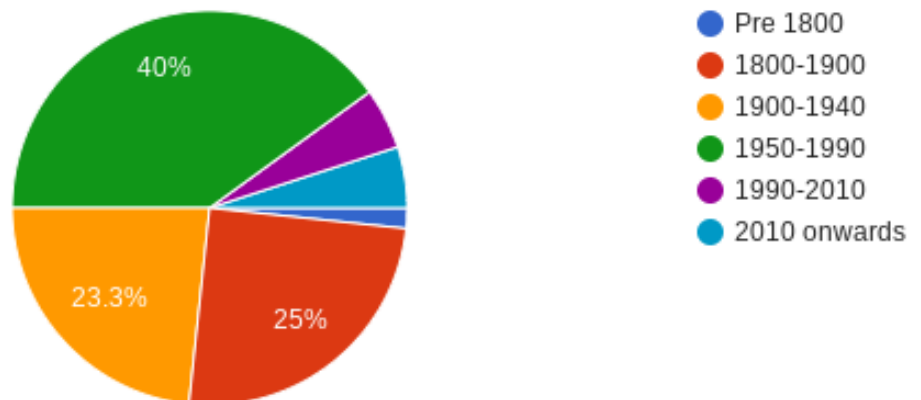


Figure 1. Pie chart showing age of homes involved in future fit home project.

9.2 Future Fit Homes Event

Saturday 8th of February 2025, the Future Fit Homes event had 510 attendees, with talks and stalls from local experts, trusted installers, and energy professionals to showcase a range of retrofitting solutions. The event attracted 23 stallholders, ranging from national organisations through to local installers and service providers, plus charities and community groups. All 12 talks were well attended, with discussion continuing afterwards. The Home Surgery advice hub was busy throughout, with homeowners able to access one to one support from experts.

The theme of retrofitting heritage properties was addressed at this event, with CBC's Head of Planning delivering a talk to residents and the Conservation team hosting 7 heritage advice drop-in sessions.

Out of the 52 attendees who answered the exit survey, 16 of these were occupiers of a historic (before 1919), listed or conservation area residential. This demonstrates a keen interest within the borough and a desire for heritage homeowners to learn more or uptake retrofit measure within their property.

9.3 Retrofit Engagement Officer (REO)

This 12-month, match funded project (Southwest Net Zero Hub / UKSPF funding in CBC), boosts existing activity to encourage householders to undertake, and where possible self-fund, retrofit measures. REO officers based in Cheltenham, Cotswolds and the Forest of Dean engage householders on home improvement options available towards household decarbonisation. The project supports both one to one

resident engagement, local community events and the promotion of the county wide retrofit platform (discussed below).

Across the three districts the project aims to engage 2,500 households EPC D and below: with a minimum of 85 progressing installations in the first 12 months.

This project has already identified the value of one-to-one trusted advice, to support homeowners in progressing with work and there is a necessity to provide assistance for homeowners in older building in general, not only those classified as heritage.

The REO is considering planning further events centred around heritage and retrofit.

9.4 Business West & People Power Retrofit

CBC has contracted Business West and People Powered Retrofit (PPR) to work in partnership to better understand the existing retrofit sector and supply chain capacity in the Cheltenham area, creating a database of providers and contractors, and offering training and Continued Professional Development opportunities. The project:

- Provides relevant business development and networking opportunities for the supply chain and Cheltenham's businesses, driving engagement and market stimulation.
- Informs training provision, provided by People Powered Retrofit, to service the demand for retrofit from Cheltenham based businesses.
- Evaluate and provide a longer-term view of skills needs for the sector and region, to provide baseline information for new retrofit and skills focused roles being appointed for Cheltenham and Gloucestershire.

9.5 Furbnow Project

Through Climate Leadership Gloucestershire, CBC is part of a district wide initiative to offer a one stop shop platform to homeowners looking to retrofit their properties. This service launched January 2025, and all 6 districts have committed to funding for 3 years.

Furbnow offer the self-funded market the ability to purchase home energy surveys and, if they choose whole home project management with independent, expert advice and trusted installers. The platform is linked to the Fairer Warmth app, which supports residents in creating their own home action plan, identifying local and national support options (including the SWEA Warm and Well service), grants, energy saving tips and home energy improvements. Furbnow's service (Home Energy Plan) will include a specialist service for heritage buildings, providing essential support to address some of the barriers discussed above.

10. Conclusion

As discussed, there are many challenges to reconciling heritage protection with sustainability measures. Improving the energy efficiency of historic homes is essential for their long-term survival and to achieving CBC's net zero ambitions. Ensuring historic buildings are adapted appropriately, through a whole building approach and by taking special considerations when assessing the impact on

historic and architectural significance, are key to success. Although practical barriers to uptake have been identified, CBC is already progressing on works to address these issues through:

- Future Fit Homes project.
- Employment of Retrofit engagement officer.
- Furbnow Project.
- CBC Climate and Planning teams currently working together to determine and progress areas of works to specifically support heritage building retrofit issues.

When considering impact within the borough, 2602 listed buildings within Cheltenham and a significant number of homes are within a conservation area, is relatively small compared to approximately 57,000 residential homes (included listed), accounting for approximately 40% of borough wide emissions. However, it's vital to assess barriers to low carbon transitions, when progressing towards CBC's net zero ambitions.