

Guide to Making Historic Buildings More Energy Efficient

Test Valley Borough Council



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“People who live in listed buildings and properties in conservation areas often think that they may not be able to make changes to their homes that improve energy efficiency or generate low or zero carbon energy. This is not the case. Whilst alterations to these types of properties need careful consideration, and not all options will be appropriate for every building, there are usually solutions that can be found. This guidance explains how to approach this to identify which changes would be appropriate for the building in question.”

Councillor Phil Bundy
Planning Portfolio Holder



Stockbridge

Test Valley Borough Council: Climate Change

In September 2019, Test Valley Borough Council declared a climate emergency and committed to identifying steps to achieve carbon neutrality as soon as possible. A Climate Emergency Action Plan (CEAP) was published as a response to this. The Action Plan will be regularly reviewed in line with changes to technology, government policy and other local trends. The Action Plan can be found on the council's website: [Climate Emergency Action Plan | Test Valley Borough Council](#).

The CEAP focuses on actions that direct the council and borough towards being carbon neutral by considering council assets, community buildings and households, and other projects seeking to reduce emissions and increase resilience to a changing climate. One of the actions outlined within the plan states a guidance resource on heritage assets for energy efficient and renewable energy proposals is produced. This recognises that historic buildings have a role to play in reducing carbon emissions, to reach a nature-positive net-zero future.

This guide is intended as a summary of measures that occupants of historic buildings can consider to make their buildings more energy efficient and reduce carbon emissions. This can also have the added benefit of providing energy savings to homeowners.



Romsey

1. Introduction

This guidance document will cover:

1. Information about the types of designations for the historic built environment, and what permissions may be needed to make alterations.
2. Historic buildings and their links to sustainability.
3. Guidance on how to take a 'whole house approach' on retrofit.
4. Advice and next steps for homeowners.

This document is provided to assist owners and occupiers of traditional buildings within the Test Valley. It will help to identify what appropriate opportunities there may be to enhance the energy efficiency of their buildings and contribute to renewable and low carbon energy generation.

Many occupants of these buildings already recognise the importance of reducing carbon emissions as well as the benefits of renewable energy generation.

However, historic buildings and places are typically more sensitive to change and as such a careful approach is required.

Due to the individual significance of each historic building and place, it is not possible to give a 'blanket' solution which will apply to everything. This guidance is intended to help owners and occupants to find bespoke solutions, which will help them to obtain the required permissions and/or consents to carry out work to their properties.



Broughton



Barton Stacey

2. Designation, Policy and Guidance



2.1 Types of designations in the historic environment and permissions needed

It is important for the owners and occupiers of historic buildings to understand designations that may apply to where they live and the subsequent legal and planning implications of these. Some changes in historic places will require consents or permissions, to help preserve their unique character.

Traditional buildings and places may be designated such as by being listed, or located within a conservation area, registered park and garden or scheduled monument.

Heritage assets, such as listed buildings and conservation areas, are defined in Planning Policy as '*A building, monument, site, place, area, or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest*' (National Planning Policy Framework, NPPF).

The information in this section is intended to provide a short overview of the types of heritage assets you may need to consider and where you can find further information about them.

Please note that the setting of heritage assets is also a consideration when planning change. Historic England have produced guidance around this topic: [The Setting of Heritage Assets](#).

There is an opportunity to seek the views of the council prior to making a formal application to undertake works to a historic property or property within a conservation area. This feedback on the proposed works can help inform decisions as to how to proceed including making a subsequent application for planning permission or listed building consent. Information about pre-application advice and how to contact the council can be found on Test Valley Borough Council's website: [Planning Permission and Pre Application Advice | Test Valley Borough Council](#).



Nether Wallop Conservation Area

2.1.1 Conservation Areas

If you are planning change, it is important to know whether you live in a conservation area (or in a location close to a conservation area where any change could affect the area's setting) to plan how your application will preserve or enhance its special interest.

There are 36 conservation areas in Test Valley Borough, ranging from town centres to rural villages. Further information on each one can be found on Test Valley Borough Council's website: [Conservation Areas | Test Valley Borough Council](#).

Conservation areas are designated by local planning authorities to help them manage 'areas of special architectural or historic interest'. Conservation area designation covers *all* features within the area, including buildings and spaces. The preservation or enhancement of a conservation area's character and appearance is taken into account when granting planning permission, so it is important for building owners to understand what makes them special before proposing any changes within them.

Andover Conservation Area



2.1.2 Listed Buildings

Within Test Valley there are over 2,200 listed buildings and structures. This designation marks and celebrates a building's architectural and historic interest. It also introduces statutory protection and additional planning controls, to protect what makes it special for future generations to enjoy. Listing is not a preservation order, preventing change. It simply means that listed building consent must be applied for in order to make any changes to that building which might affect its special interest. Further information about listed buildings can be found on Historic England's website: [What are Listed Buildings? How England's historic buildings are protected | Historic England.](#)

Further information on listed buildings within the borough can be found on Test Valley Borough Council's website: [Listed Buildings | Test Valley Borough Council.](#) For information about individual designations, and to find out if your property is listed, check the National Heritage List: [Search the List - Find listed buildings and more | Historic England.](#)

Not all heritage assets are listed or scheduled, and just because a building is not included on these lists does not mean it is of no heritage value. Buildings and other features may be of significance and worthy of consideration in the planning process.



The Old Market House, Broughton - Grade II Listed Building



16-19 Leckford Lane, Leckford – Grade II Listed Building

3. Historic buildings and sustainability

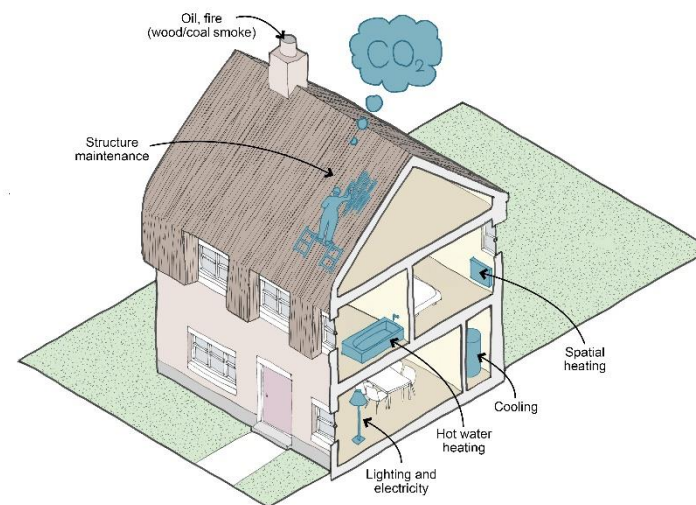
3.1 Understanding the potential of Test Valley's historic buildings

There are over six million historic buildings of traditional construction, which accounts for almost one quarter of the housing stock in the UK. There are a wealth of historic buildings in Test Valley which will have the potential to contribute towards tackling the challenges of climate change.

Traditional and modern buildings differ fundamentally in how they manage moisture, air, and heat; this can influence what energy efficiency measures will work with each building. Therefore, finding the right balance between energy efficiency and preserving the historical value of traditional buildings is a key challenge and can be a more delicate process than on newer homes.

There are three key considerations when working with historic buildings and considering their energy efficiency:

- 1. Know the type of heritage designation, e.g. whether the building is listed or in a conservation area.**
- 2. Understand the building/heritage asset, its heritage significance and how it performs from an energy perspective.**
- 3. Identify the objective of the works being considered and their impact upon the significance of the building.**



Top: Examples of energy used in a historic building

Bottom: Broughton High Street, showing the range of historic buildings and materials within Test Valley, including thatch, slate and clay tiles, brick, and render.

3.2 Planning work to your historic building

3.2.1 Whole Building Approach

When planning work to your building, it is important to understand the sensitivity of your property and what interventions or development will realise the most benefits. It is appropriate to first consider the building holistically, and/or seek external expertise (see Section 3.2.2 and 6.1 for further guidance). This can avoid changes being made which might affect the traditional function of the building, preventing how it copes with the flow of moisture, air, and heat. The 'whole building approach' suggests the following:

- Understand the significance of any heritage assets that could be affected by the works.
- Understand your building and how it performs.
- Prioritise interventions or development that is effective and proportionate.
- Minimise harm to the historic environment and avoid adaption/development that will result in more harm than benefit (maladaptation).

Once the above steps have been considered, an optimum design approach can be developed. It is important to understand the balance between the significance of a heritage asset, the impact an intervention will cause, and its benefit. A developed plan may include a number of items and may be incrementally implemented. Appropriate permissions and consents should be sought before undertaking works.

3.2.2 Existing Guidance

There is a wealth of guidance documents available which consider climate change. Many of these are produced by Historic England and are referenced throughout this document, particularly their advice note on listed building consent: [Listed Building Consent | Historic England](#)

Historic England have produced an advice note which outlines how the significance of heritage assets can be considered and assessed: [Statements of Heritage Significance: Analysing Significance in Heritage Assets | Historic England](#).

They have also produced guidance for adapting historic buildings for energy and carbon efficiency: [Adapting Historic Buildings for Energy and Carbon Efficiency | Historic England](#).

Protected Species

Works to a listed building, particularly in the roof, may have an impact on protected species. Protected species should be considered early in forming proposals, as mitigation can add time and cost to a project. It may also mean certain activities are limited to being undertaken at certain times in the year.

Historic England provide further advice: [Building Works and Bats | Historic England](#).

4. Energy Efficiency and Retrofit Enhancements

The 'Whole House Approach'

This chapter outlines how to approach individual items which have the potential to either improve the energy efficiency of a property or contribute to sustainable energy generation.

For each item this guidance will outline:

- The recommended approach.
- Whether the intervention typically requires planning permission or listed building consent.

Once a 'whole building approach' has been undertaken, and the beginning of a proposal is established, it is important to consider the impact of the proposed changes. It is also worth considering the likelihood of obtaining the appropriate consents and permissions, either by seeking specialist input (see Section 6.1 for further information), or speaking to the council through the pre-application service, before investing in work to detail proposals. The level of detail provided by the council through the pre-application service will be commensurate to the level of detail submitted in the application.

Whilst a building should be considered holistically, it is useful to consider each intervention or upgrade and its impact. Each element of a proposal could be identified as either a low, medium, or high-risk intervention. Elements may also impact the risk that other changes will pose (this inter-relationship between different measures can be appreciated in the Sustainable Traditional Buildings Alliance

guidance wheel: [STBA Guidance Wheel - STBA](#)). Considerations for the different levels of heritage risk are noted in the following sections.

Low risk:

- Majority of or all historic fabric retained.
- No impact to the significance of the building.
- Considered to be compatible with the existing building fabric and heritage asset's significance.

Medium risk:

- Limited to small impact to the significance of the building.
- Could be compatible with the existing building fabric.

High risk:

- Interventions that are only acceptable if they are subject to careful design and detail.
- Little historic fabric retained/is at high risk of being lost in the future.
- High or detrimental impact to the significance of the building.
- Considered not to be compatible with the existing building fabric.

4.1 Maintenance and Repair

4.1.1 Recommended Approach

It is best practice to keep properties in good repair, as a building which is in good repair will perform more efficiently. Generally, maintenance as a preventative measure will also be more financially economical than reactive repairs.

Should a building require repair works, these should typically be completed before undertaking any energy efficiency measures. This is best for the building and homeowner because unresolved issues could result in risks to thermal performance and lead to subsequent costly repairs.

In addition to general maintenance, some works can help to establish an acceptable level of baseline performance. One example is dealing with damp. Damp within buildings can have significant impacts on the thermal efficiency of a building (possibly up to 40%) and also have impacts on an occupant's health. Examples of poor maintenance or items which can cause damp include:

- Poorly maintained and faulty rainwater goods.
- Inappropriate renders or mortars which affect the breathability of a building.
- Plumbing defects and faults resulting in leaks.
- Missing or slipped roof tiles.
- Higher external ground floor levels.
- Impermeable ground surfaces, such as concrete.
- Excessive internal moisture.

If a building has damp issues, these should be addressed before any retrofit measure is proposed, especially insulation. However, the historic buildings of Test Valley will require a more considered approach to damp than those of more recent construction; damp is an example of a maintenance issue where 'typical' modern

solutions may not work for buildings of traditional construction and could instead make a situation worse. Many of the methods for addressing damp will require listed building consent. Further reading on damp issues is noted in the Historic England guidance: [Investigation of moisture and its effects on traditional buildings](#).



Maintaining timber windows and removing moss from tile roofs can help to reduce the risk of damage.

4.1.2 Do maintenance works require full planning permission or listed building consent?

Maintenance can typically be undertaken without the need for consent or permission so long as it is completed on a like-for-like basis. A distinction should be drawn between maintenance and repair, as repair more often can affect the special interest of the building which would require consent for a listed building. For example, removing inappropriate cement renders from cob to address damp would require Listed Building Consent, as there would be a change of materials used.

It is important to consult appropriate experts for planned repairs and maintenance to a historic building. It may be beneficial to contact Test Valley Borough Council to query what permissions and consents maybe required when considering works.

4.2 'Quick wins'

There are several changes property owners can undertake that can enhance the way a building thermally performs and reduce the energy it uses.

It is important to remember the baseline that 'Buildings don't use energy, people do'. The way buildings are used changes the way they perform or are required to perform, and occupant behaviour can have an impact on the energy usage of any property. Ways to improve energy usage through changing behaviours, whilst maintaining comfort, should be an initial consideration.

Building Services and Controls

Improving the efficiency of building services, e.g. changing lighting to LED, upgrading boilers, refurbishing, or replacing radiators, can be a highly effective method of improving the energy performance of buildings. Some upgrades do not require consent and would have no impact on the building's fabric or significance. It has been estimated that replacing an outdated or ineffective boiler can make a 30 to 40% improvement in energy usage. Heating controls and smart meters can be valuable in understanding and controlling a building's energy usage. However, when upgrading appliances, there should be considerations of the life-time cost and if it is beneficial to upgrade before the existing appliances reaches the end of its life.

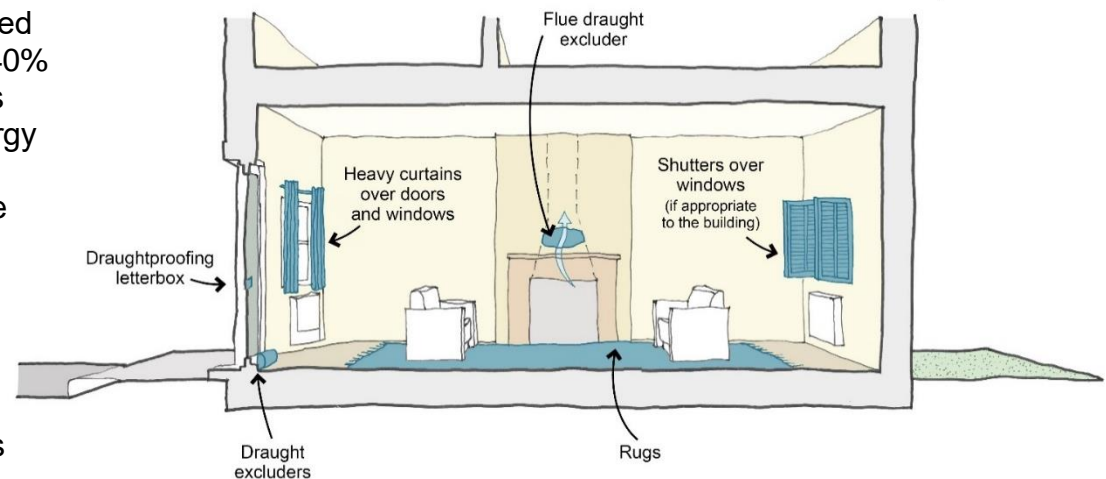
Draught proofing

Air leakage is a major source of heat loss in traditional buildings. Draught proofing is recognised as one of the most cost effective and quick solutions. This is particularly useful for historic buildings as it can enhance occupant comfort, reduce energy usage, and

importantly it does not typically change the appearance of a building.

Historic England guidance ([Traditional Windows: their care, repair and upgrading | Historic England](#)) suggests that draught proofing windows can reduce air leakage by up to 50% and this can substantially reduce the heating requirements for a building.

Historic England has also produced guidance ([Energy Efficiency and Historic Buildings: Open Fires, Chimneys and Flues](#)) which will be relevant to many residential buildings in Test Valley. Whilst guidance is a useful place to begin, it should be noted that technology is changing quickly, and new products come onto the market all the time. One example is the use of 'chimney balloons', noted in Historic England guidance, but there are now further options such as 'chimney umbrellas'.



4.2.1 Recommended Approach

These adaptations are all typically low risk items. There are a number of ways in which the draught proofing of a building can be enhanced, as outlined on the previous page. A benefit of these methods is that many of these enhancements are not physically fixed and can be removed in summer months. The diagram on page 14 shows some of the measures which can be undertaken.

It is important to note that controlling air leakage is different to ventilation. Ventilation is required in many traditional buildings and is vital to maintain for moisture control and occupant health. Therefore, items such as existing air bricks and extractor fans should not be blocked as part of draught proofing measures.

4.2.2 Do these works typically require a permission or consent? Listed Buildings

The reason many of these items are considered to be 'quick wins' is because they are relatively cheap compared to other interventions, and many require no permissions or consents. If the building is not listed, then Listed Building Consent will not be required for these interventions.

Items such as rugs, curtains, and draught excluders require no permission to install. Items which are fixed to a listed building, such as shutters, will typically require listed building consent.

Conservation Areas

No planning permission will typically be required for these upgrades within a conservation area.

4.3 Roofs

Roof materials within the Test Valley contribute to its historic character, with thatch, slate, and clay tiles found throughout the borough. In a building, 25% of heat loss is typically through the roof, and therefore installing roof insulation can often be an effective energy efficiency measure. However, as with any intervention, careful consideration will be required to respond to each building's unique material and construction, covering:

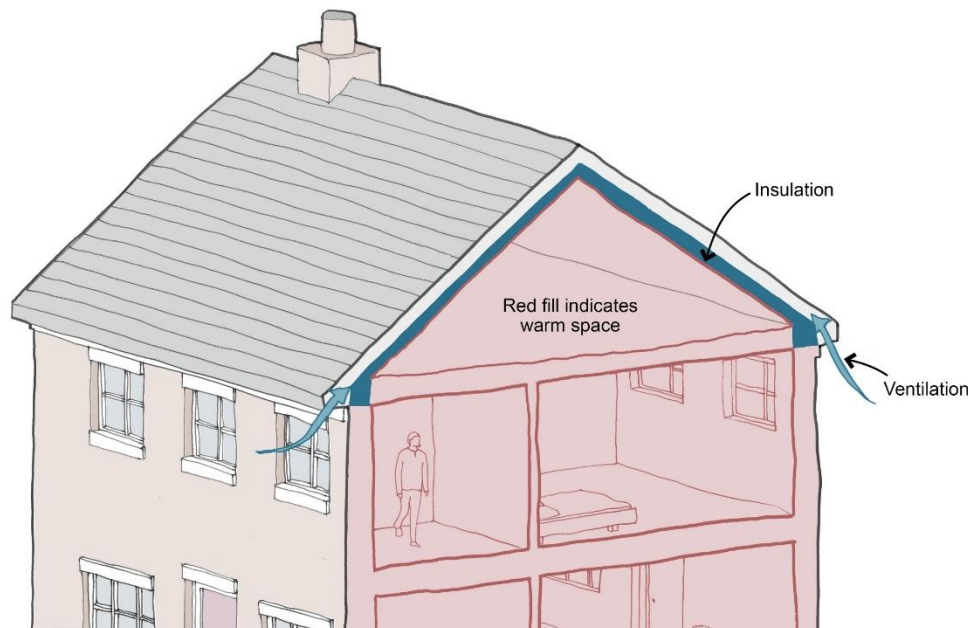
- The type of building
- The type of insulation
- The method of insulation

4.3.1 Recommended Approach

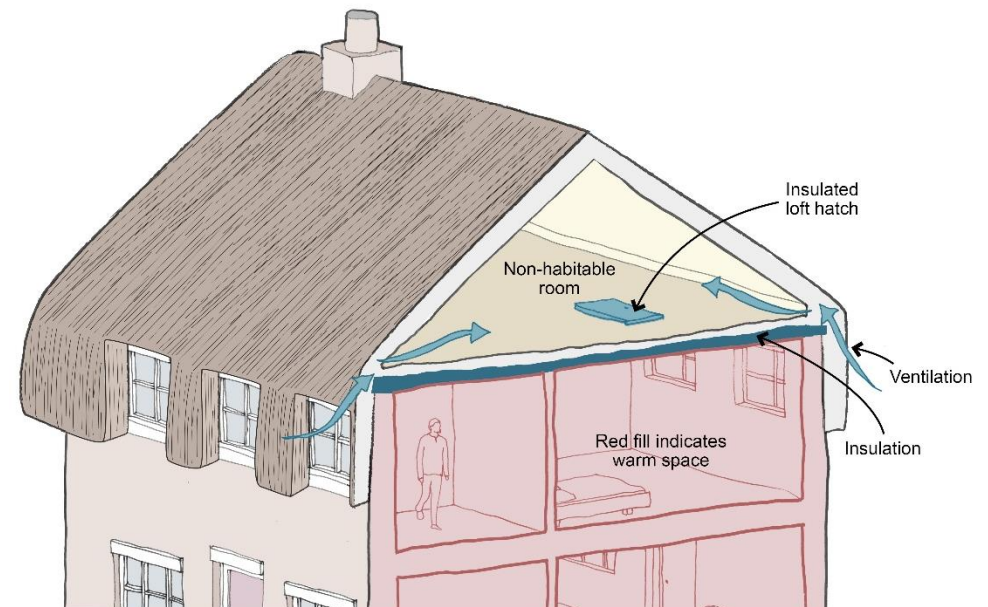
The building form and type of roof will determine what opportunities there may be for roof insulation. There are two types of principal approaches; these are 'warm roofs' and 'cold roofs' (see diagram on page 16). These approaches may not be available to some building forms in principle; for example, a warm roof would be inappropriate in a thatched building, because thatch itself has insulating qualities and the form of roof construction would not typically accommodate additional insulation.

It can be beneficial to engage a specialist for this type of intervention. This is because there are a number of ways roof installations could result in more harm than benefit, particularly if the building and its existing performance is not understood and the appropriate type of material is not selected and installed correctly. Maintaining ventilation is one of the key considerations in forming proposals.

Material selection is also fundamentally important. Using inappropriate materials can result in moisture build up and can lead to the deterioration of timber rafters. Natural materials, such as hemp, wood fibre board and sheep's wool, should always be considered as they have better vapour permeability qualities and also lessen the risk of condensation.



'Warm roofs' refer to the application of insulation between the rafters in the pitch, thereby keeping the roof as a useable space.



In 'Cold roofs' the insulation is laid at ceiling level, typically between the ceiling joists. This effectively turns the roof cold as there will be minimal heat rising to the area. Generally, this is considered the option with less risk, as there is no interference with the timber rafters. However, this may not be an option if the roof is a useable space and/or is used for storage, depending on the items.

Generally, it is considered that at least 270mm of insulation is needed to be fully effective. However, this is subject to the construction and performance of the roof.

Wood fibre boards between rafters can be a good material to use due to its qualities. However, depending on the thickness and areas of application, a structural engineer (a Conservation Accredited Engineer is recommended, please see Section 6.1 for more information) may need to assess the building prior to any works taking place due to the additional loads from the boards.

In difficult to reach areas, spray foams are often considered, however, this has a detrimental effect to the building fabric and its qualities, and therefore is not compatible with traditional buildings.

Historic England provide further reading for:

Cold roofs: [Energy Efficiency and Historic Buildings: Insulating Pitched Roofs at Ceiling Level](#)

Warm roofs: [Energy Efficiency and Historic Buildings: Insulating Pitched Roofs at Rafter Level](#)

Insulating dormer windows: [Energy Efficiency and Historic Buildings: Insulating Dormer Windows](#)

Guidance for insulating thatched buildings: [Energy Efficiency and Historic Buildings: Insulating Thatched Buildings](#)

4.3.2 Do these works typically require a permission or consent?

Listed Buildings

Roof insulation is typically a medium-high risk intervention. There may be instances where installing insulation, such as laying insulation between ceiling joists with no fixing, will not require listed building consent if an appropriate material is used. In most cases, however, consent will be required to ensure the right material and design is used for the historic building.

Conservation Areas

There is typically no permission required for these types of work in a conservation area.



Thatched buildings need careful consideration, as they already provide insulation so interventions will need to complement this material.

4.4 Walls

Within Test Valley, common traditional building materials include cob, timber framing, render, lime mortars, and brick, which each require different bespoke solutions. These permeable traditional building materials and techniques allow for the movement of heat and water vapour through the building fabric. When determining if wall insulation is appropriate, the materials, orientation, and exposure of the walls can impact the type, location and material of insulation that can be considered.

Before considering wall insulation, it can be beneficial to address any existing damp issues in walls (see Section 4.1.1). Resolving damp issues will result in improvements to the efficiency of the walls. If there is still a significant amount of heat loss once these issues have been resolved, this can indicate that wall insulation may be appropriate.

The Institute of Historic Building Conservation (IHBC) have produced guidance: [Wall insulation and moisture risk - Designing Buildings](#)

Historic England have produced guidance for solid wall insulation: [Energy Efficiency and Historic Buildings: Insulating Solid Walls](#)

In Test Valley there are a high number of cob buildings and timber framed buildings. Historic England's guidance may be consulted for further details on timber frames: [Energy Efficiency and Historic Buildings: Insulating Timber Framed Walls](#)

4.4.1 Recommended Approach

External Wall Insulation

This intervention typically takes the form of insulation applied to external walls with protective cladding fixed over. In historic buildings, this can be challenging to work around windows and doors and introduces a risk of creating weak points in the building which will allow for heat loss.

Ultimately, because this type of insulation would result in significant change to the appearance of a building, this method is rarely considered acceptable for traditional buildings.

Internal Wall Insulation

In principle, internal wall insulation can be a more achievable option than external wall insulation. It does still, however, present some risk as it can result in more disruption to the building and its performance. There may also be a reduction in room space (a particular consideration for smaller properties). Adaptation of services and electrical cabling, and the relocation or reuse of skirting boards, architraves, and other joinery is an important consideration.

It is important to understand moisture movement in the existing walls and confirm that any new insulation will not have an adverse effect on performance or occupant health. Neighbouring buildings need to also be considered as any insulation on party walls can result in a build-up of moisture in an adjacent building.

Material selection will be important to address. Modern options such as closed cell foam and plastic-based insulations are often not appropriate as they lack vapour permeability, and materials such as hemp, wood fibre board, and sheep's wool would be more suitable.

4.4.2 Do these works typically require a permission or consent?

Listed Buildings

For listed buildings, almost all types of wall insulation intervention will require listed building consent. That is because these proposals are considered high risk, as they can be intrusive to the character of a building and have the potential to adversely affect its performance if they are not installed correctly or if they fail.

It may be challenging to accommodate wall insulation for many buildings of traditional construction due to the effect it can have on their special interest. Visually, historic walls give the building so much of its character.

A 'whole building approach' is fundamental to these proposals. How a proposal for insulation works with the wider building must be understood and demonstrated in any applications.

Conservation Areas

Internal insulation will not require planning permission. External wall insulation (for both listed and non-listed buildings in conservation areas) may require planning permission and Test Valley Borough Council should be consulted in this instance.



External cladding is a high-risk intervention for listed buildings, as it will affect the historic character by covering up distinctive materials and potentially impacting their performance.

4.5 Floors

Depending on floor construction and materials, having cold floors can be inefficient and floor insulation can reduce the amount of heat lost through flooring. Significant improvement to both solid floors and suspended timber floors can be achieved after installing insulation. However, the potential for application and improvements will depend on the age of the floor and its condition. Floor insulation can be disruptive to historic materials and fittings such as skirting boards, door frames, and architraves. Consideration must, therefore, be shown to the detail and materials to ensure there are no resultant performance issues.

There are also some 'quick win' options draughtproofing timber floors. The use of fabrics such as rugs and floor coverings can improve occupant comfort, particularly with cold solid floors, such as suspended timber floors that introduce cold air from below.



Timber floors require permeable solutions and careful consideration.

4.5.1 Recommended Approach

Suspended Timber Floors

Some residential buildings in the Test Valley will have suspended timber floors and improvements can be achieved by installing appropriate insulation between joists. To minimise disruption, floor insulation should be installed from below (where possible from cellars), where this is achievable.

Ventilation under the timbers is important to retain. If there are any air bricks or vents that are located underneath the flooring, these must not be covered as this would have a significant impact to the building's performance and would result in an accumulation of condensation and moisture.

Any non-permeable insulating materials and boards should not be used on top of a timber floor or between joists as these materials will affect the moisture movement and can trap water vapour; this can lead to deterioration and decay of historic timbers. Natural materials, such as wood fibre boards, would mitigate some of the risk, but even these will still require appropriate detailing and careful installation.

For further reading, Historic England have produced guidance for insulating suspended timber floors: [Energy Efficiency and Historic Buildings: Insulating Suspended Timber Floors](#)

Solid Floors

If an original historic flooring has been lost and it is now a concrete floor, rigid insulation can be laid on top. These materials are typically impervious to air and moisture. If a concrete floor needs to be removed, particularly if it is resulting in damp issues and affecting the performance of the building, installing an insulated lime concrete, sometimes with a foam glass base, could be possible. This can be installed with underfloor heating systems, which can have the added benefit of being more energy efficient.

Typically, no insulation should be installed on top of a historic solid floor, as these are a part of the historic character of a traditional building, and the insulation can have a detrimental impact to the floor and the overall aesthetic of the historic building.

For further reading, Historic England have produced guidance for insulating solid ground floors: [Energy Efficiency and Historic Buildings: Insulating Solid Ground Floors](#)

Materials

As with all insulation, materials are key to ensure there will be no deterioration of historic building fabric. A vapour permeable material will be required and natural materials such as hemp and wood fibre board are often most appropriate. This will ensure there is no accumulation of moisture. As with most insulation, synthetic options which are not vapour permeable can adversely affect performance.

In difficult to reach areas, spray foams are often considered as they can be achieved mechanically by a robot. However, this has a detrimental effect to a building fabric and its qualities, and therefore is not compatible with traditional buildings.

4.5.2 Do these works typically require a permission or consent?

Listed Buildings

This approach is considered low to medium risk and will typically require listed building consent. Floor insulation can be intrusive to the character of a building, affecting historic materials and visual character.

Conservation Areas

No planning permission is required for this type of proposal within a conservation area.

4.6 Windows and Doors

Windows and doors are a vital part of a historic building's character and appearance; however, it is estimated that heat loss through doors and windows can account for up to 25% of overall loss in a building. Upgrades to windows and doors are therefore some of the most common applications proposed for historic buildings. There is a careful balance to consider in approaching these types of intervention. It is fundamentally important to understand the significance of any historic fixtures and their performance with the 'whole house'.

Historic England have produced guidance pertaining to windows: Traditional Windows - Their Care, Repair and Upgrading

4.6.1 Recommended Approach

Low Risk Options

In the first instance, low risk options should be considered, many of which will not require listed building consent or planning permission. Repairing, refurbishing, and draught-proofing historic windows and doors can preserve the special interest of a building. From a sustainability perspective, this also retains embodied carbon.

The repair and refurbishment of windows can improve the thermal performance of historic windows. Where draughts are causing an issue, draught-proofing the windows and doors can have considerable improvements.

The use of shutters and heavy curtains for windows can make a significant improvement in reducing heat loss in windows. Historic England's research found that heavy curtains can reduce heat loss



Using heavy curtains can have considerable improvements to draught-proofing windows.

in sash windows by 39% and well-fitting shutters reduced heat loss by 64%. Other benefits to shutters are achieved during warmer months as they can help with ventilation and avoiding over-heating. Shutters may not be appropriate or possible for all listed buildings but can be worth considering, it is likely they would need listed building consent.

Historic England have produced guidance for draught proofing windows and doors: Energy Efficiency and Historic Buildings: Draught-proofing Windows and Doors.

Secondary Glazing

Installing an additional layer of glazing can be a good energy efficiency measure and improve building performance, whilst having little impact to a building's fabric. This should particularly be considered if other options are limited due to a building's significance.

It would be beneficial to have detailed designs which consider appropriate materials, position, and fixings into the window reveals, and how the design will respond to the existing window. There are a number of secondary glazing systems available which vary from high-end, bespoke made, permanent installations to more economical magnetic fixings. The latter have the added benefit of being easily removed in summer months.

Dependant on the form of the windows, and their surround, secondary glazing may not always be possible.

Historic England have produced guidance for secondary glazing: [Energy Efficiency and Historic Buildings: Secondary glazing for windows | Historic England](#)

Double-glazing and Window Replacement

The approach to window replacement and repair will be bespoke to each building. In all cases it is important that a thorough understanding of the significance of existing historic windows is undertaken to inform the design approach, covering both the window frame and glazing.

Generally double-glazing should only be considered where the existing windows (if of heritage significance) are beyond repair.

The building's fenestration should work as a whole; for example, a double-glazed window replacement should not be installed on an elevation where all other fenestration is historic single glazing. In this circumstance, the addition of double glazing would adversely impact the historic character of the building.

If windows are not historic, then there may be the opportunity for an appropriate double-glazed replacement to be considered, so long as they are compatible with the building's overall historic significance. However, another important consideration is that the replacement of repairable windows would be unsustainable, as it results in the loss of embodied carbon. It should also be noted that double-glazed units have a limited lifespan; generally, warranties vary from 10-20 years. For example, the units will require replacing again when the seal fails as this will impact the vacuum between the glazing panels. Installing secondary glazing, if well maintained, may have a longer lifespan, particularly as there is no reliance on the vacuum between panels.

Where the installation of double-glazing is acceptable, any replacement should not be uPVC windows. They tend not to be compatible with the building fabric and can result in an increase of moisture issues and are often inappropriate in their design and detailing. Historic England's [Guidance Traditional Windows: Their Care, Repair and Upgrading](#) (and many appeal decisions) succinctly outline the issues with uPVC windows in the historic environment.

Products are constantly evolving, and double-glazing options are becoming increasingly thinner, especially vacuum glazing. There may be opportunity for (non-significant) glazing in modern frames to be upgraded, dependent on the form of the existing frame and its ability to accommodate thicker glazing.

Doors

Consideration of doors is primarily down to the historic significance of the existing fixture. Historic doors which contribute to architectural interest should be retained and where possible enhanced for thermal performance. If a door is not of significance a replacement may be considered of appropriate design and material.

4.6.2 Do these works typically require a permission or consent?

Listed Buildings

Replacements and alterations to windows in listed buildings will almost always require listed building consent. This can be a low-high risk option, depending on the information provided within an application. For example, an application should demonstrate whether windows are of historic significance or not, and how their significance has informed the resulting proposal. If a historic windows and/or glazing makes a contribution to the historic and architectural character of a building, which it likely will, then they are less likely to be replaceable.

It is important that the significance of the existing fixtures such as windows and doors are understood, and the proposals for new interventions contain an adequate level of detail.

Conservation Areas

Planning permission may be required for replacement of windows in a conservation area. Like-for-like replacement (or windows of similar appearance) generally does not require planning permission, however this should be like-for-like in both design and material. For example, a timber window replaced with a uPVC 'timber effect' window may not be considered like-for-like, as the material is different.



Historic doors and doorcases can be a vital part of creating a historic character.

5. Renewable Energy and Low Carbon

Options for Historic Buildings

There are a range of different renewables and low carbon options, such as solar panels and heat pumps, that may be used in historic buildings.

It is best practice that the installation of renewables or low carbon options is considered after ensuring the building is performing efficiently. As output from renewables can fluctuate, there is often still a requirement for electricity input. If the building is under performing, an increased amount of energy will be required, whereas if less energy is needed, there will be less demand on the renewables and the need for low carbon options to be reduced.

Historic England set out several considerations when assessing options for low and zero carbon energy sources:

- Does it suit the building and use?
- What are the carbon reduction benefits?
- Will the potential savings exceed the whole-life energy costs?
- Can the system be fitted safely with no significant adverse impact on the building and its historic fabric?
- What will be the visual impact on the building/heritage asset and its setting?
- Are there any planning controls that affect your choice and positioning of the installation?

5.1 Solar

Solar energy is a renewable source converted through panels. Photovoltaic (PV) Solar Panels convert sunlight energy into electricity, whereas Solar Thermals use solar energy to heat water.

When considering solar technology, the following should be taken into account:

- The impact of their installation on historic fabric, located in the least sensitive parts of a buildings (i.e. later rear extensions or roof valleys).
- The location and orientation of the panels with regards to visual impact and effect on designated areas (i.e. panels should not face onto the street particularly within a conservation area).
- Location and orientation of the panels for solar gains.
 - The visual impact needs to be considered if panels are installed on a heritage asset, or in its setting. Whilst visual impacts can be minimised, this needs to be considered in the context of solar gains. For example, if the orientation is north facing to minimise the visual impact, there will be minimal gains.
- The locations of required servicing and infrastructure.
- The size and area of solar modules for required energy output for the household.
- The approach to planning the installation, ongoing maintenance, and removal of PV panels at the end of their useful life.

Photovoltaic (PV) Solar Panels

The main components of these systems are the PV panels, inverter, isolator, electrical distribution system, and often battery storage.

PV panels can be ground mounted or mounted onto buildings. Ground mounted solar panels are a good solution where space and facilities allow, as they will have limited interference with the historic building fabric. For properties that do not have sufficient space, installing PVs on the building may be the only option (if they can be installed in a way that does not harm the character and significance of the building).

For panels installed on roof slopes, there are two different types of panels: fixed over the roof covering and integrated into the roof.

Fixed Panels

Panels that are fixed onto the roof have the potential for greater solar gains, due to their size and positioning. There is also less fabric intervention than an integrated panel, and their installation is reversible. Generally, to mount the panels onto the roof, roof tiles are removed in specific areas for the batons to be fixed into the timber rafters. Cabling is installed and the tiles are then replaced. The inverter, isolator, electrical distribution system, and battery storage (if applicable) is stored internally. The majority of the built fabric has no intervention. There is, however, an aesthetic impact. Some roof structures in historic buildings are also of historic value and therefore cannot be altered due to their significance. They may also not have the structural integrity to accommodate the weight of a PV.

Integrated solar panels, also referred to as in-roof solar panels, will have less of a visual impact to a historic building. However, they are

only compatible with certain roof tiles and require the existing roof tiles/slates to be removed. Therefore, they can have a significant amount of fabric intervention and are not a reversible solution. Over time, there may be weathering to the roof tiles, that result in the PV panels being more prominent. Generally, they should only be considered if the whole roof is in need of replacement, due to the disruption and loss of fabric.

Solar roof slates are small solar panels which absorb sunlight and generate electricity in exactly the same way. The key difference is that they perform just like normal roof tiles or slates and can have less of a visual impact. However, as solar slates are engineered, they lack the authentic matt finish provided by natural slate; in this sense they carry the same risks as artificial slates in the historic built environment and may not be appropriate in some instances.

Historic England provide advice for installation of solar panels:
[Installing Solar Panels | Historic England](#)

Solar Thermals

The main components of solar thermals are solar panels/tubes (which are typically roof mounted), a pump managed by a controller unit and a hot water cylinder with heating coils.

Whilst the size of thermals varies, there is little alteration in design, and these can appear more prominent. Therefore, particular care needs to be given to their orientation and location. The size of the solar thermals should be determined by the size of the household and the hot water usage. For heating water, solar thermals can be more efficient than PVs.

Choosing a location for a proposed solar array

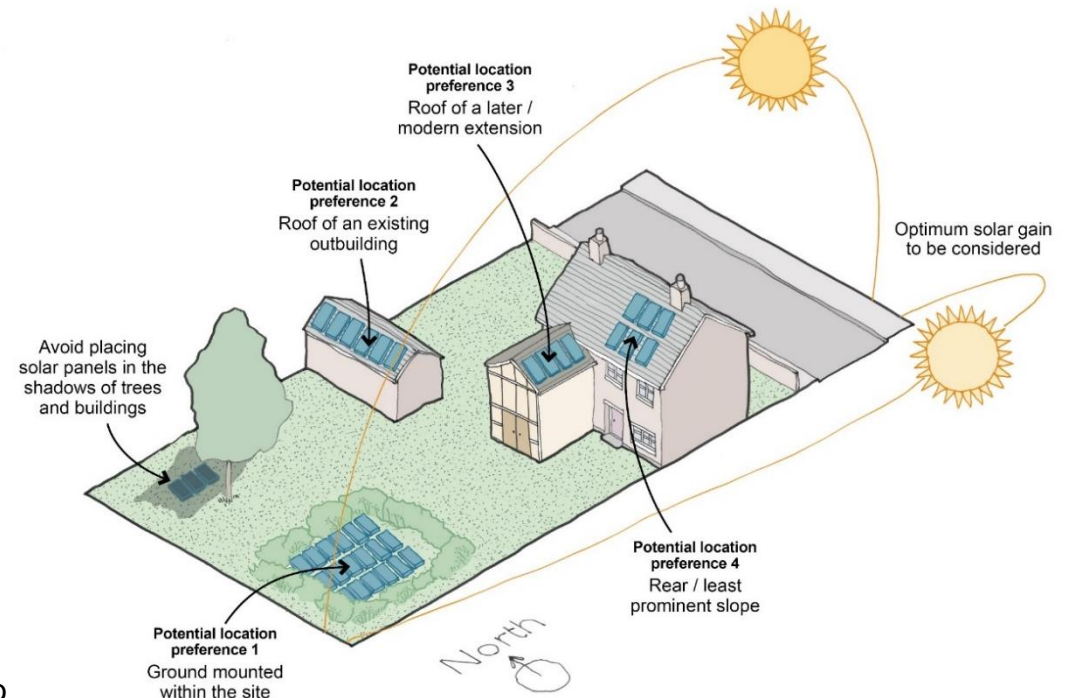
For historic buildings a balance must be achieved between generating their own energy and avoiding damage both to the significance of the building and its fabric, as well as minimising the visual impact of a renewable installation on the character and appearance of the historic building or conservation area.

When choosing a location for a proposed solar array it is considered best practice to appraise each option sequentially in the following order of preference:

1. **Ground-mounted**
2. **To the roof of any outbuilding (such as a garage or shed)**
3. **To the roof of a later / modern extension**
4. **To the rear roof slope of the host building**

If a proposed location is found to be harmful, it would be beneficial to be able to demonstrate that the previous preferred option(s) are not viable.

It should be noted that by demonstrating that a preferred alternative location is not viable, this does not mitigate any potential harm caused by solar panels to roofs, and some heritage assets may not have the capacity for this change in principle.



Placement of solar panels must be carefully considered, to ensure they do not face onto the street.

5.1.1 Do these works typically require a permission or consent?

This guidance does not consider building regulations, which should be checked for any proposed interventions to a property.

Listed Building

If fixed to a listed building, solar works will always require listed building consent. Installation to a curtilage listed building will also require consent. These proposals can be mid-high risk and will be bespoke to the significance of individual buildings. It is important that any proposal presents both the installation method as well and the associated infrastructure and service routes through the listed building.

There will be buildings in the Test Valley where solar panels are not appropriate, such as thatched buildings, due to the traditional building materials. It will also be generally challenging for others, such as timber framed buildings, due to the significance of roof structures. Historic timber roofs can be more challenging to alter to accommodate PVs.

Ground mounted solar panels in the grounds of listed building, and the installation of solar panels on a modern outbuilding do not require listed building consent but will require planning permission.

Conservation Areas

Installation of solar panels in a conservation area may require planning permission and advice from the council may be needed for clarification. Installation of some solar panels do come under permitted development; however, this is on the condition they are sited, so far as practicable, to minimise

their effect on the external appearance of the building and on the amenity of an area. The sequential approach outlined above can be followed to demonstrate that solar panels have been sited to minimise their visual impact.



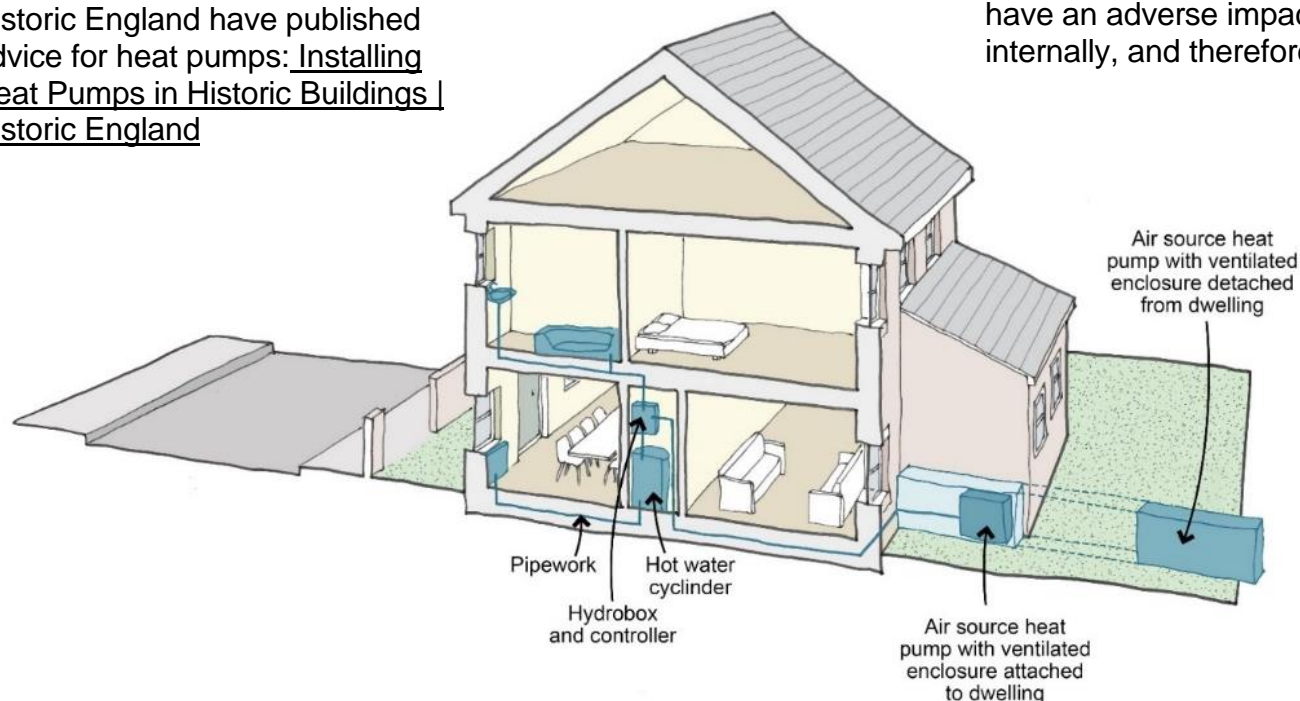
Principal and prominent pitches should be kept free from Solar Panels, to minimise visual impact, or placed on extensions or buildings of less significance

5.2 Heating Systems and Energy Generation

Heat pumps extract heat/energy from the 'source' location, which is converted and upgraded for central heating. The source can be ground, air, or water, though ground and air are more common as they can be accessible to most. Water source heat pumps require a water source that does not freeze during the winter months.

The benefit of installing heat pumps will be bespoke to each building. Homeowners are encouraged to consider whether heat pumps are appropriate at the outset, and a specialist could be consulted (see Section 6.1).

Historic England have published advice for heat pumps: [Installing Heat Pumps in Historic Buildings | Historic England](#)



5.2.1 Recommended Approach

Air Source Heat Pumps

Air source heat pumps extract heat through a fan and can be installed outside of a building, with services connected through the wall. This introduces some risk, as their installation can have an adverse visual impact to a building, which may need to be a consideration with designated heritage assets.

Mitigation can take the form of careful fixture placement and an appropriately designed enclosure. The heat pumps can also be installed internally with the fan for the air source connected through the wall. Whilst this has less of a visual impact externally, they can have an adverse impact on historic fabric and take up more space internally, and therefore may not be an option for smaller buildings.

The routing of services should also be sympathetic. Condenser units should be ground mounted and not typically placed on walls of historic buildings.

Ground Source Heat Pumps

Ground source heat pumps use electricity to exchange heat within the ground into a building to regulate its temperature. This system is typically energy efficient, as the earth's temperature remains relatively constant year-round, reducing the need for additional energy to heat or cool the building. Although typically more efficient than air-source pumps, ground source pumps are often more expensive and can require large areas of land to operate.

Installing a ground source heat pump in a listed building requires careful planning. Ground source heat pumps extract heat via pipes inserted into the ground and connected to a building. Burial of the pipes is either through a closed loop system, that requires trenches, or open loop systems, requiring boreholes. Large drilling machinery is required for the installation, and this can be disruptive. The best option depends on the size of the property, available land, and any restrictions related to the building or grounds.

To avoid altering the visible exterior of the building, it is beneficial to choose a system that minimises visual impact. For example, ground loops can be buried underground, but the heat pump unit itself should ideally be placed discreetly in a non-visible area (like a basement, garage, or utility room) to preserve the building's character.

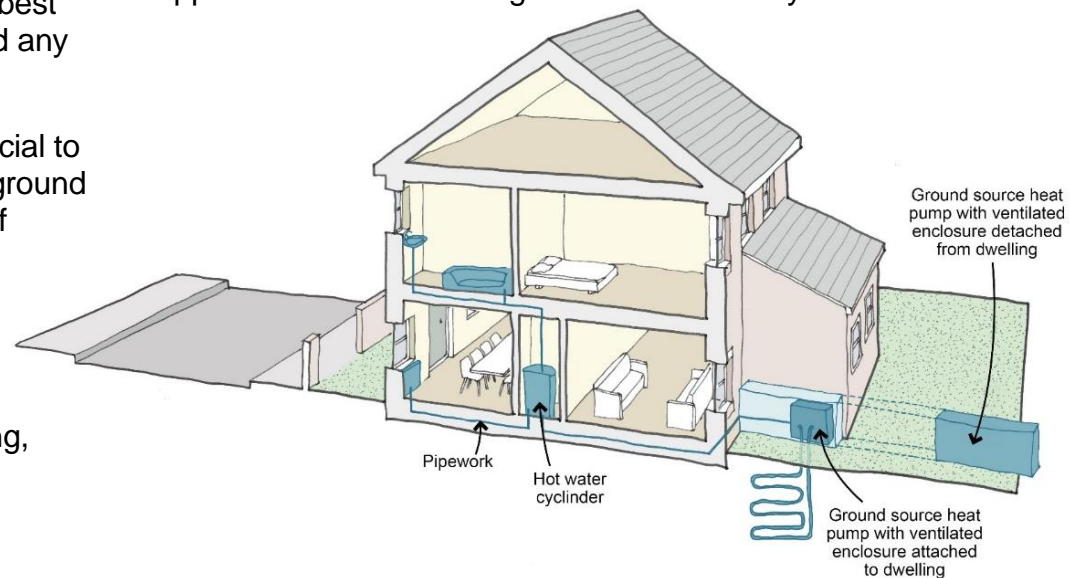
Depending on the chosen ground loop type, excavation work may be required. In conservation areas or near a listed building, this work must be done carefully to avoid damaging the surrounding environment, landscaping, or historical features. Archaeological sensitivity may also need to be considered in some areas.

5.2.2 Do these works typically require a permission or consent? Listed Buildings

Listed building consent will be required if an enclosure unit or fan unit is fixed to a listed building, or a curtilage listed building. If the ground source unit is detached (see diagram), listed building consent may still be required for routing new services through the listed building, and planning permission may be required for its installation within the grounds of a listed building.

Conservation Areas

Planning permission is not typically required unless the unit is sited on a wall fronting a public highway. However, this is on the condition it is sited, so far as practicable, to minimise its effect on the external appearance of the building and on the amenity of an area.



5.3 Electric Charging Points

5.3.1 Recommended Approach

Electric vehicles (EVs) are becoming increasingly used for lower carbon travel. Electric charging points will often be required at home to support EV use. However, consideration needs to be given to the location, positioning, and scale of charging points. This is particularly the case if they are located within a conservation area or the host building is listed, as there can be a visual impact. The designs of charging points are currently limited, making it harder to source one that is visually sympathetic to the historic environment. Sympathetic locations for charging points may include to the rear of a building, hidden from view in an external niche or hidden in a small enclosure or boundary treatment.

Installing charging points generally requires off-street parking. If the property does not have off-street parking, there may be difficulties with creating parking space. The loss of front gardens and garden boundaries is a challenge in conservation areas and therefore, any proposals including this are unlikely to be supported.

Acceptability is generally determined by the location of the charger and the form of the external fixture. The following considerations should form part of the approach:

- Can the charger be placed in a garage?
- Can the charger be placed to the rear of a property or in a discrete location?
- Can the charger be hidden, for example in a wall or gate post?

In addition to charger placement, consideration will need to be given to mains connection and any routing of services. This will need to be detailed for any listed building consent.

5.3.2 Do these works typically require a permission or consent?

This guidance does not consider highways permissions, which should be checked with Hampshire County Council, as highway authority, for any proposed interventions on a highway.

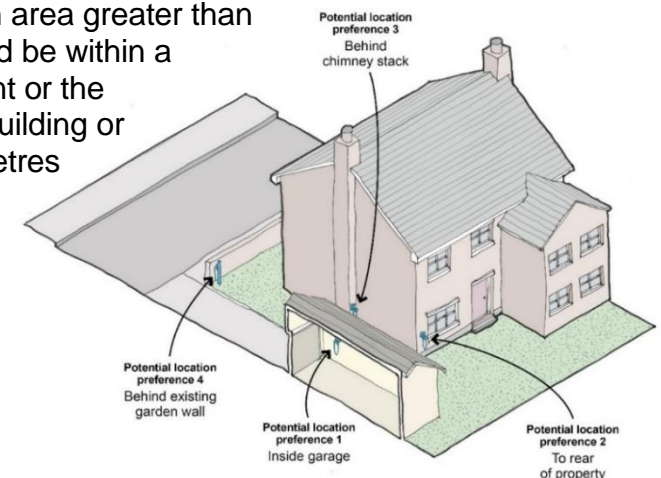
Listed Buildings

If an EV charger is attached to a listed building, or any curtilage listed structure, a listed building consent application will be required. Consent will also be required for routing of any services through a listed structure. Planning permission will be required for the installation of an EV charger within the grounds of a listed building.

Conservation Areas

Planning permission is not typically required, unless the charging point would cover an area greater than 0.2 sq. metres, would be within a scheduled monument or the grounds of a listed building or would be within 2 metres of a highway.

If access requires dropping the kerb, permission may be needed.



Communal EV Chargers

Some conservation areas in Test Valley present challenges where there are rows of residential terrace buildings without driveways, such as in Stockbridge or Broughton. In these situations, it is not possible for properties to place individual chargers, and it may not be possible to ensure there is parking provision outside a property for charging. In these instances, it may be appropriate to consider installation of a communal charger for electric vehicles. A proposal will likely need to be led by a parish or town council.

Installation of communal electric vehicle charging points within conservation areas will need a thoughtful approach to ensure that the installation preserves a conservation area's character and appearance.

5.3.3 Recommended Approach

To minimise visual impact, the design of the EV charging point should be discreet, take account of its context and be in-keeping. Utilising existing community spaces and car parks, such as at village halls and community facilities, may be beneficial. Charging points should be mounted in discrete locations, if possible, for example to the rear of buildings or within appropriate enclosures. Preserving existing landscaping such as trees, planting, historical paving may also ensure the visual impact of the unit is kept to a minimum. Using materials and finishes that match or complement the surrounding environment will also help to minimise their impact.



5.3.4 Do these works typically require a permission or consent?

This guidance does not consider highways permissions, which should be checked with Hampshire County Council for any proposed interventions on a highway.

Listed Buildings

Listed building consent is not required for detached freestanding charging points. Planning permission may be required within the grounds of a listed building.

Conservation Areas

Planning permission is not required, unless more than one charging point is proposed, the charging point would be more than 1.6m above ground level, would be within a scheduled monument, the grounds of a listed building or would be within 2 metres of a highway.

If access requires dropping the kerb, permission may be needed.



This charging point located at the Village Hall demonstrates how a communal location can be appropriate. Design should be considered to ensure that it does not detract from the existing historic character.

6. Conclusions and Advice

Next Steps to Homeowners

Should you wish to consider thermal enhancements to your property or installation of renewable energy sources it is recommended you take the following steps. The approach below is typically good practice but it may not be appropriate in all cases. Approaches can be altered by individual aspirations and the available budget.

Step 1: Whole Building Approach

Consider your property holistically. You will realise the best outcomes using the 'whole building approach' and avoiding relying on a single product or a solution. Your approach should be established through both an understanding of the significance of the historic building and/or place you are affecting and the existing performance of the building.

Step 2: Consult Appropriate Expertise

Historic buildings and climate change interventions have a common factor in that they can both be technically complex, and face challenges that modern buildings do not. As such it is important that you consult the appropriate specialists (see Section 6.1) to help establish a 'whole building approach' and resolve what is appropriate to your property. This will be a bespoke consideration in each individual circumstance.

Step 3: Existing Issues and Quick Wins

Any issues, such as maintenance or repairs to your property should be addressed before considering installation of new items. 'Quick wins' should also be evaluated before bigger scale interventions. These considerations will typically save time and money.

Step 4: When to consult Test Valley Borough Council

You will need to establish what permissions or consents may be required for your proposal. The council have further information available on their website [The Test Valley Borough Council | Planning Permission](#). Appointed specialists should be able to inform you, and pre-application advice can be sought from the council.

If planning permission or listed building consent is required, producing a technical application can be costly and as such it may be beneficial to gain an early opinion from the local planning authority to understand the acceptability of your proposal. Information on pre-application advice can be found on the council's website: [The Test Valley Borough Council | Pre-Application Advice](#).

Step 5: Make an Application

Should planning permission or listed building consent be required, an application should be sufficiently detailed and likely with input from a specialist.

The proposal must be supported with a Heritage Statement, which describes the significance of any heritage assets affected. The level of detail should be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of the proposal on their significance. This may include understanding the impact on historic fabric and may need to be supported with

additional reports such as a condition survey and a structural survey. It is good practice to undertake a Heritage Statement at the outset of the project, given the understanding of significance is fundamental to forming appropriate schemes.

To understand the significance of a building, the assessment must be in line with Historic England's: Statements of Heritage Significance: Analysing Significance in Heritage Assets.

If the proposal impacts the setting of a heritage assets, it should take account of Historic England guidance: The Setting of Heritage Assets.

Planning permission and listed building consent only apply to certain buildings and works; however, Building Regulations apply to any type of building, and is subject to the type of work being carried out. This should be considered by the applicant and applied for where relevant.

Step 6: Undertake the Works

It is important to obtain any required permissions and consents before undertaking works to your property. Works should also be undertaken in line with the permission/consent and any conditions attached to them.

Specialists will typically be required, and it is recommended using contractors with the appropriate knowledge and experience, especially for listed buildings and buildings of traditional construction.

Step 7: Post Monitoring & Maintenance

If energy efficiency measures have been made, particularly if there have been multiple fabric interventions, monitoring the works and continuing a programme of general maintenance of a building is vital to maintain efficiency.

There needs to be an understanding of whether the objectives of the project have been achieved and if the comfort levels of the occupants have been improved, or if further works need to be undertaken.

Monitoring will help assess whether the energy efficiency measures are failing. For instance, if there are any visible signs of damp, this must be addressed as soon as possible as there will be the build-up of moisture that may be impacting indoor air quality, which can affect the occupant's health, as well as resulting in adverse impacts to the built fabric.

Historic England guidance can be consulted: Maintaining and Repairing Traditional Buildings | Historic England.





6.1 Finding the Right Specialist

When considering works to a historic building it is sometimes appropriate to appoint a specialist to help better understand the sensitivities and opportunities of your property. They will likely have knowledge of the materials that are appropriate to the individual historic building for its conservation, character, and performance.

The specialists required will likely be bespoke to the proposal. Test Valley Borough Council does not recommend or promote any individual or company. However, there are national lists of recognised practitioners that property owners and occupants may find useful to consult:

Architects Accredited in Building Conservation: [Home Page | AABC: The Register of Architects Accredited in Building Conservation](#)

Conservation Accreditation Register for Engineers: [Supported Organisations | Conservation Accreditation Register for Engineers](#)

RICS Certified Historic Building Professionals (Surveyors): [RICS | Building Conservation Accredited Surveyors](#)

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