RETROFITTING AND SUSTAINABLE DESIGN

Policy Overview

National

NPPF Chapter 2. Achieving sustainable development
NPPF Chapter 16. Conserving and enhancing the historic environment
Historic England – Energy Efficiency and Historic Buildings (2018)
Energy Efficiency and Traditional Homes
LETI Climate Emergency Retrofit Guide
SPAB Research into the Energy Efficiency of Old Buildings

Regional

London Plan Policy HC1 Heritage conservation and growth
London Plan Policy SI 5 Water Infrastructure

Local

City Plan Policy 38 Design principles
City Plan Policy 39 Westminster's heritage
Retrofitting Historic Buildings for Sustainability

Image credit: The Crown Estate

Introduction

This chapter includes sustainable design principles for both existing buildings and new build. While the main focus is retrofit of existing buildings, the overarching sustainable design principles in City Plan policy 38D seek to ensure all development, in both new build and existing buildings, is designed to be durable, adaptable and limit long-term resource use, including water and energy consumption, with features to mitigate and adapt to climate change integrated in development design from the outset. Guidance on designing for sustainability cuts across a number of topics and is included in a range of chapters in this SPD.

Refurbishment and retrofit projects provide an important opportunity to improve the energy and water efficiency of existing buildings and reduce emissions, which is key to achieving net zero carbon by 2040 and addressing water stress in the capital.

New build projects will need to meet key sustainability standards to be acceptable in planning terms, including energy and water efficiency, as detailed in the City Plan, London Plan and elsewhere in this SPD.

Retrofitting existing buildings

The upgrade and reuse of existing buildings is a sustainable approach and can help by avoiding the higher carbon footprint associated with constructing new buildings. Retrofit can also enable existing and historic buildings, including listed buildings, remain fit for purpose and in active use when sensitively adapted and upgraded. Retrofitting buildings which contribute to the special character of conservation areas as opposed to demolishing them also helps retain their distinctive character.

Water use efficiencies help mitigate water stress, contribute to carbon and energy savings and help manage the need for new major infrastructure. Water efficiency through retrofitting can increase the energy efficiency of buildings by reducing hot water consumption and reduce costs on water bills.

Many of the existing buildings in Westminster are constrained, for example by space or subject to a heritage designation, and so retrofitting may be more complex. A large proportion of the building stock in Westminster has a heritage designation, whether through statutory listing or being located in a Conservation Area, so finding sensitive and effective ways to improve energy efficiency of historic buildings is of vital importance.

Given the extent of heritage assets, Westminster is uniquely placed to lead in work on the area of sensitive retrofitting of historic buildings and this work area will be a priority in order to tackle the issue of climate change. The council will also ensure the value of Westminster's exceptional heritage remains and will continue to meet statutory duties to protect heritage assets. An approach to retrofitting measures that is iterative in nature and looks for lower-cost and minimally invasive interventions can often be most effective.

The most effective retrofit solutions will optimise energy and water efficiency and ensure a safe, healthy and comfortable environment for occupants while protecting and enhancing heritage significance. The availability of trained and skilled trades people who can carry out the necessary works will be essential to delivering retrofit solutions. The council will seek opportunities to support skills development for a green economy as part of our **Climate Emergency Action Plan.**

GUIDANCE FOR RESIDENTS

There are a growing number of resources to assist residents in making their homes more energy efficient and reducing their environmental impact. The key elements of retrofit include:

1. Reduce the heating demand and energy use;
2. Remove fossil fuel heat sources and replace with low carbon alternatives; and
3. Generate renewable energy on site if feasible.

The **council's website** provides useful resources and advice for residents on climate change, energy efficiency and wider sustainability opportunities.

The Planning Portal has information on **planning rules, permitted development limits and building regulations for common projects** for the home. Most energy and water efficiency initiatives for domestic properties, such as draught-proofing, insulation, renewable energy installations and butts for rainwater harvesting are permitted development, but residents in listed buildings or conservation areas should check Table 10: Retrofit Measures below for further guidance.

EcoFurb provides a low carbon homes service that helps homeowners plan and deliver energy efficiency improvements, gives impartial advice, and oversees the works. London residents can also use the free Plan Builder on their website to get ideas on how to retrofit your individual home.

LETI's **Climate Emergency Retrofit Guide** provides advice on how to develop a whole house Retrofit Plan. It also provides best practice targets for constrained (e.g. listed buildings) and unconstrained building types. The Passivhaus Trust also has guidance on their **EnerPHit Retrofit Plan.**

There are a number of useful resources for residents wishing to upgrade their historic homes including the council's webpages on **Retrofitting historic buildings** and **Design and heritage in planning,** as well Historic England's **guidance on modifying historic windows for energy efficiency.**

A **template Sustainable Design Statement** has been developed by the council to help residents demonstrate that sustainable design principles, particularly the principles in Policy 38, have been considered for householder applications and to meet the planning application Validation Requirements.

Approach to retrofitting existing buildings

We support sensitive retrofit and expect proportionate measures to be taken to improve the energy and water efficiency of existing buildings. Applicants should set out in their design and access or sustainable design statement details of the building's current performance and condition, including the identification of issues and locations where it is sub-optimal, options which have been assessed and how consideration has been given to this issue having regard to the impact upon the historic environment. Where the building affected is a listed building or within a conservation area the impact of any retrofit measures on the building or area should be assessed and harm to their significance avoided. Where harm does occur, this must be weighed against the public benefits of the proposals. Addressing, mitigating and adapting to climate change is considered a public benefit as are other environmental aims such as improving air quality and reducing flood risk.

While this guidance sets out many typical retrofit measures and provides general guidance, the complex and sometimes unique nature of historic buildings means that generic guidance has its limitations. Due to the unique nature of heritage assets, the balance of addressing climate change, protecting heritage assets and viability will need to be considered on a case-by-case basis. Applicants are encouraged to contact the council for **pre-application advice.**

Applicants should take a coordinated or 'whole building' approach to planning and delivering all retrofitting projects as opposed to delivering piecemeal measures. Applicants are encouraged to develop a retrofit plan to help understand all of the individual pieces of work needed to improve the home, how these interact and any associated consequences. A retrofit plan can help maximise the energy, health and comfort improvements delivered by retrofit and avoid unnecessary, costly or abortive work.

A retrofit plan should include:

- Key building information, constraints, risks, and opportunities;
- Main works proposed along with related strategies and details;
- The sequence of work; and
- A plan for monitoring and reporting energy consumption.

Not all retrofit measures require planning permission (see Table 10). Small scale changes can deliver dramatic outcomes. These could include: thoughtful maintenance and repair; changing how the building is operated; repairing existing windows and doors and taking advantage of their special characteristics; installing secondary glazing, and upgrading lighting.

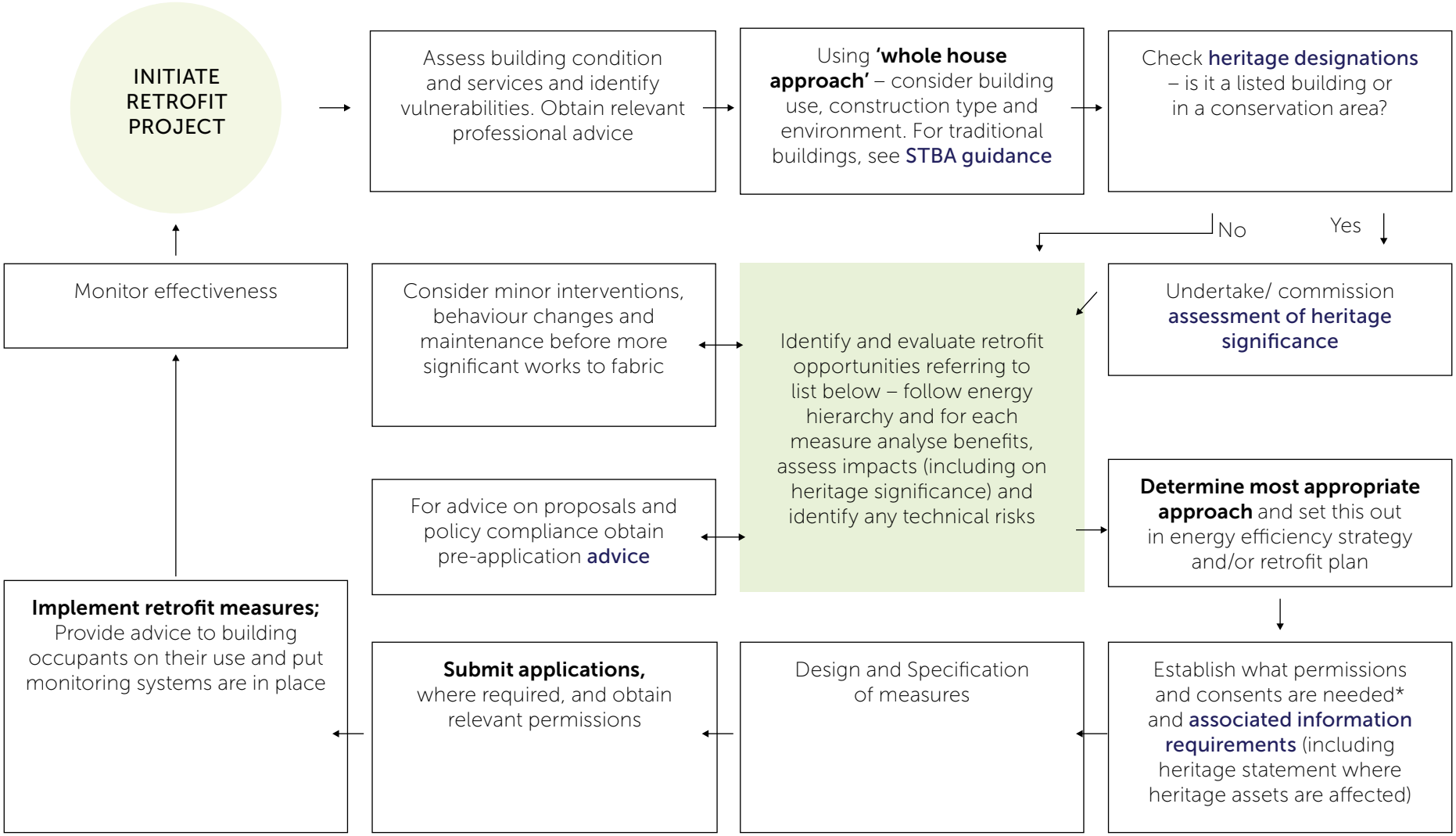
Historic buildings should be treated sensitively having regard to the differences between modern and traditional construction. Before beginning to think about measures to retrofit to a property, it is necessary to understand the building as it is already, to think about what simple changes can be made. A 'whole building approach' should be taken as advised by Historic England which considers:

- Context;
- Construction;
- Condition;
- Historic significance;
- An understanding of all the factors that affect energy use; and
- Producing an energy efficiency strategy.

The following considerations and questions may provide guidance when considering which of the sustainability upgrades set out in the following section will be most appropriate for a property.

- **How is the building used?** Can it be used more efficiently? Firstly, you should ensure that you are already undertaking measures that can be implemented at no cost, which involve changes to behaviour rather than the building fabric, and low cost minor alterations and additions to make the building more energy efficient.
- **What condition is the building in?** You should first undertake any necessary repairs, ensuring buildings are in good order and water-tight. A damp building will be less thermally efficient, and this should be addressed before additional measures are considered.
- Consider the type of heritage protection that applies. **Is your property a listed building or within a conservation area?**
- **What scope do you have to make changes?** Freeholders will have the most scope, while leaseholders and tenants will be constrained by the terms of their lease and will require permission/consent of the freeholder/landlord.
- **What is the budget?** Each building is unique and costs will vary depending on the requirements. Consider the cost effectiveness, and the likely payback period of measures that will have a medium to high cost.
- **What permissions/consents do you need to obtain?** Some measures will be 'permitted development' for which planning permission is not required, as long as the property is not subject to an Article 4 direction or planning condition amending the permitted development rights. For listed buildings it is likely that listed building consent will be required. Please refer to permissions table below for details.
- **Undertake work** Ensuring that any new systems work effectively, and that occupants (and future occupants) understand how to use them.
- **Monitor and undertake necessary maintenance, upgrading systems where new technology emerges.**

Figure 13 below shows the process for assessing retrofit opportunities



*See Permissions Required table page 116 onwards.

Westminster retrofit opportunities

Advice is set out below on the main opportunities for retrofit in Westminster. Please note that not all the measures below will be appropriate for all buildings. You should identify the most appropriate measures for your building based on analysis above and using the advice on technical risks associated with different measures and impacts on heritage significance set out in the table that follows. Lower risk measures should be considered first.

Building Insultation

LOFT AND ROOF INSULATION

Installing insulation in existing roof voids can have a significant positive impact on energy efficiency. Historic buildings with a timber roof structure lend themselves to insulation between joists and rafters without any visual impact or harm to the historic building. Natural insulation materials such as wool-based insulation which allow a building to breathe should be used, reducing the possibility of moisture and damp problems. When fitting, an air gap must be left around the margins of the building to allow air to circulate. Care should be taken around electrical cables (lay these over the insulation), and allow a gap around any lights that may heat up (e.g. downlighters installed for the rooms below). It is also advised to insulate loft hatches.

Whilst insulation of a loft (between joists) is straightforward (sometimes referred to as 'cold roof') and is likely to be acceptable, insulation at rafter level (where a loft space has already been converted to provide additional space, referred to as 'warm roof') is more complicated. There are various options including insulation between the rafters, on top of the rafters and below the rafters. Some options will result in the roof height changing. Additional considerations in heritage buildings may include whether there is a historically significant lining or ceiling fixed to the underside of the rafters. If this cannot be removed, and the only way to attach insulation is by removing the roof tiles and inserting from above, then this may not be economic, unless other works to the roof are being undertaken at the same time. It is important adequate ventilation is retained to avoid moisture build up and consequent damp problems.

For more information please see **Insulating Roofs in Historic Buildings**

FLOOR INSULATION (SUSPENDED TIMBER FLOORS)

Heat loss through the floor amounts to around 15% for the average house. Simple draught-proofing of gaps between floor and skirting and between floorboards with sealant can be undertaken relatively easily and at low cost. Suspended timber floors on the ground floor, typical for many older properties can be insulated to improve thermal comfort. This will be quite straightforward if there is a cellar or crawlspace below, but without this, floorboards can be lifted and insulation inserted underneath, supported by netting. This should be to the depth of the joist only and should not block air bricks. Care needs to be taken when lifting boards to minimise damage. Avoid blocking airbricks when draughtproofing or when insulating, and take care to maintain cross ventilation beneath suspended timber floors to avoid rotting floor timbers. Consider the potential loss of historic fabric (floorboards/skirting/door surrounds/doors) that may occur if insulation increases floor height.

For more information please see **Insulating Floors in Historic Buildings**

SOLID WALL INSULATION

Solid wall insulation can be a way of improving the thermal efficiency of a building, and could save energy and reduce heating bills. Most of the historic buildings in Westminster have solid masonry walls, either of brick or stone. The only way to insulate them is by adding a layer of insulation either internally or externally. Around 35% of heat loss from a typical home is through its walls.

External solid wall insulation systems consist of a layer of insulating material fixed to the wall and covered by a render or cladding, which provides a degree of protection from weather and impact damage. The major issue to consider is that external wall insulation will have an impact visually on the relationship between the building envelope and its openings, altering the detailing around windows and doors, and also eaves and roof verges. It is possible to extend roof eaves to deal with this.

For this reason external solid wall insulation will need to be very carefully designed, and where heritage assets are affected is likely to be contentious. In these cases it is likely to be allowed in certain circumstances such as on the rear elevations, and in enclosed locations, not for part-only of a unified terrace, although applications to apply to the whole of a terrace would be considered. Careful detailing is required around windows to minimise the impact of altered window reveals. This is generally considered a safer solution in terms of the risk of damp and moisture in a building than internal solid wall insulation and will not reduce floor space internally. However, there are also significant inherent risks in creating thermal bridges for moisture which can result in damp and rot problems in localised areas, so professional advice is necessary and on traditional buildings, very careful analysis of impacts on fabric would be needed and if acceptable, vapour permeable insulation should be used.

Internal wall insultation will take up internal floorspace and can alter the relationship of the door and window reveals, and will require skirting boards, cornicing and decorative plasterwork to be relocated. There are also inherent risks in creating thermal bridges for moisture which can result in damp and rot problems in localised areas, and in many circumstances it will not be appropriate on buildings of traditional construction. On such buildings, where internal insultation is demonstrated to be appropriate, materials with similar breathable qualities should be used.

For more information please see **Insulating Walls in Historic Buildings**

DRAUGHTPROOFING

Poorly fitting windows and doors, often the result of warping over time, and years of repainting can lead to significant heat loss and make rooms feel uncomfortable. A significant amount of heat is lost through windows, both the glass and the gaps in and around the frames. The heritage conservation value of a building will influence the options that are available, as alterations to windows and doors can have a significant impact on the historic value of the building.

There are a range of types of draught proofing systems available, from DIY foam strips which stick on to professionally fitted compression seals or carrier seals that fit within frames and suitable for different types of window. Generally, foam strips, although very low cost, are not recommended for sash windows, and will need to be replaced regularly. Casement windows will be suitable for compression seals that sit within the window frame, and sash windows will typically have brush seals installed, which seal the gaps between top and bottom sashes when closed.

Generally, there will be no problem with fitting these to existing windows in historic buildings. For particularly noteworthy windows in listed buildings it is advisable to check with design and conservation officers before proceeding.

For more information please see **Draught-proofing windows and doors**

Glazing

SECONDARY GLAZING

Secondary glazing is available in a variety of systems to suit different window styles. Heat losses from a window could be reduced by over 60% by using secondary glazing with a low emissivity (Low-E) hard coating facing the outside. This also has benefits in terms of noise reduction. There are a variety of systems – those that are openable – hinged or sliding, fixed, and lightweight removable. In all cases careful thought should be given to how to access original windows for cleaning and maintenance.

Secondary glazing will generally be possible for all types of historic property, subject to obtaining listed building consent (where relevant). For best results it should be combined with a refurbishment of existing single glazed windows. However, draught- proofing should not be applied to the original window to maintain ventilation and avoid condensation. Double glazed secondary glazing may be an option particularly where noise is a significant issue. When considering the historic fabric of a building, secondary glazing is a lower risk option than replacing existing historic glazing with thermal single or double glazing as secondary glazing is reversible.

For more information please see **Secondary glazing for windows**

THERMAL SINGLE, DOUBLE (OR TRIPLE) GLAZING

Use of energy efficient glazing and modern double-glazed windows can achieve improved thermal performance as well as security and acoustic benefits. There are slim profile options as well as those with low emissivity coatings which improve performance. These are appropriate in conservation areas, subject to detail and in some situations in listed buildings. Upgrading of existing historic windows to incorporate slim profile double glazing is also possible where this can be achieved without harm to significance. This will only be acceptable where windows are of types robust enough to accommodate the increased thickness and weight of double glazing without significant alteration. Thermal single glazing could also be acceptable where the existing window cannot be adapted to take double glazing. Where historic windows to a listed building contribute positively to special interest and these cannot be upgraded without harm to significance, they should be retained, repaired and consideration given to draught-proofing and secondary glazing or other benign and reversible methods of upgrading to improve thermal efficiency.

The PassivHaus standard, which aims to achieve very high levels of thermal insulation and air tightness is most appropriate for new build developments. Retrofit projects are unlikely to achieve the same levels of energy efficiency as the Passivhaus standard because many of the elements, like orientation and structure, are already decided. To meet the high levels of air tightness required a building would typically fit triple glazing which is not always appropriate for existing buildings. However, **EnerPHit** is the Passivhaus certificate for achieving highly energy-efficient home retrofits. The EnerPHit standard recognises this difficulty and sets the required performance at a lower level than Passivhaus to accommodate working with existing buildings.

For more information see **Modifying historic windows.**

Key considerations

Wildlife in the UK is protected under the Wildlife and Countryside Act (1981) (as amended). Before you start any works to a property you need to make sure wildlife and protected species would not be affected. Before undertaking works, check the roof space for bird / bat roosts and other urban wildlife dependent on buildings for shelter. Any works that would affect breeding birds and their nests, such as works of demolition, vegetation removal or site clearance, should be done outside the nesting season from 1 of March to 31 July inclusive. Also note that any scaffolding even for minor external works can prevent birds accessing their nest sites in buildings. Bats use existing holes and gaps in trees and buildings for nesting. They can fit in gaps as small as a human thumb, so be mindful of missing tiles or gaps within the roof soffits before you start any works.

Heating and Energy

Efficiencies in heating can be made by reducing sources of thermal discomfort and by choosing to heat the people rather than the air (especially when local sources use low-carbon energy). For space heating and cooling, adjusting the thermostat can deliver great benefits. When boilers need to be replaced, low carbon equipment should be chosen. In this way, significant energy and carbon savings can be made without adverse effects on the fabric of the historic building, its character, or its setting.

BOILER UPGRADE

Without proper programmable heating controls, the benefits of a more efficient condensing boiler will not be realised. Therefore, thermostats should be programmable 'Chrono-proportional' thermostats on a timer, enabling a number of different programmable room temperature levels each day. These should be combined with TRV (Thermostatic Radiator Valves) in each room (except the room where the thermostat is located, and the bathroom) which switch off the heating in a room when it reaches the required temperature. Such systems can be wireless, which mean that no wiring or making good following works is required.

The government has indicated that there will be a ban on gas and oil boilers in new homes from 2025 and that replacement gas and oil boilers will be phased out by the mid-2030s.[12]

GROUND AND AIR-SOURCE HEAT PUMPS

Air source heat pumps take warmth from the air and use an evaporator coil to supply heating or hot water to a building. A system consists of an external unit, usually near a wall, though it can be located away from the building (requiring a clear amount of space either side for air circulation), and an internal unit with a hot water cylinder.

12 **Energy white paper; powering our net zero future** (December 2020)

Ground source heat pumps consist of pipes underneath the ground which extract warmth to supply heating or hot water to a building. It consists of a loop of pipes filled with water and antifreeze, laid horizontally, in a trench or vertically (up to 100m deep). The fluid in the pipes warms up and passes through a heat exchanger in the heat pump converting it to high grade heat. To install ground source heat pumps requires a certain amount of space externally.

Heat pumps require electricity to run, so are not strictly speaking renewable, but are a low carbon source of energy.

The installation of heat pumps on domestic premises are permitted development in some circumstances, meaning they don't need planning permission, providing they meet certain conditions as set out in Figure 10 and on the **Planning Portal website**[13] and residents are encouraged to contact the council to confirm whether planning permission is required before starting works.

Heat pumps are best suited to buildings with good insulation levels. If homes do not already have good levels of insulation, this will need to be added internally or externally depending on local circumstances. Heat pumps work better with underfloor heating but radiators can be upgraded to accommodate the lower output from heat pumps. Heat pumps need to be accessible for maintenance and so retrofitting into high-rise blocks will require a suitable balcony, roof or communal area nearby or an internal 'exhaust' unit. Electric heat retention storage heaters could be considered as an alternative for properties that cannot have a heat pump installed.

For more information please see **Heat pumps**

SOLAR PHOTOVOLTAIC

Solar PV panels convert energy from the sun into electricity. The installation of PV panels can significantly reduce CO_2 emissions and help to reduce energy bills. The orientation of the roof is the critical factor in determining maximum operational efficiency of solar PV panels. They should be as close to south facing as possible, and work best at an angle of 30° to the horizontal. They should not be shaded by trees or neighbouring buildings.

An alternative to conventional solar PV panels are solar roof tiles, which are designed to look similar to normal slate roofing tiles. These may be appropriate where the roof is not original – as they would replace modern roof fabric. Where historic fabric is retained solar panels would involve less loss of original roof tiles. For more information please see **Photovoltaics (PV).**

SOLAR THERMAL PANELS

Solar thermal panels use the radiant heat of the sun to warm water in solar collectors which is pumped to a thermal store. It is most likely to be used to top-up or supplement a main system, rather than meet all of a building's water heating demand. It is well suited to domestic buildings which have a low demand for hot water. The minimum amount of space needed to be effective is around 2 – 4m², ideally between south east and south west facing, at an angle of 30° and should not be shaded by trees or neighbouring buildings. In addition to the collector panels, space is typically needed to house a large hot-water cylinder with a storage capacity of at least 120 litres, and up to 200 – 300 litres for larger buildings. Additional pipework will also be necessary.

13 **planningportal.co.uk/info/200130/common_projects/27/heat_pumps/2**

There are different types of system, direct and indirect. Direct systems heat potable water in the collector panel, and pump it to a tank for use. Indirect systems are filled with fluid (often antifreeze) which passes through the collector panel and a heat exchanger transfers heat to potable water which is separate from the fluid circulating in the panels. This slightly more complex system provides freeze and overheating protection.

Greening

GREEN ROOFS

Technologies have evolved to enable planted roofs, ensuring they have an appropriate medium to grow in and the necessary support system. A well-designed green roof will make a significant contribution to conserve and enhance biodiversity, creating green corridors. They also are beneficial in managing flood risk, as they attenuate rainwater, reducing the likelihood of flooding from surface water runoff. There is also some evidence that they act to reduce overheating (and reduce the urban heat island effect), reduce CO_2 emissions, absorb noise and trap air pollutants.

A heavier intensive roof, requiring a greater load bearing capacity, may be less achievable on historic buildings. See the Green Infrastructure chapter for more information on green roofs.

Key Considerations (retrofit projects)

All developments involving retrofit of existing buildings are encouraged to meet the targets set out in LETI Climate Emergency Retrofit Guide. These represent best practice and go beyond the fabric performance of BREEAM domestic refurbishment. The council will consider using the LETI targets as a benchmark in the next iteration of the City Plan.

Information Required (retrofit projects)

Applicants should set out how they have complied with the above guidance in their Sustainable Design Statement or Design and Access Statement and are encouraged to include a retrofit plan, as set out above. Where heritage assets are affected, the heritage statement should set out how the proposed changes may impact on a building's heritage significance and address the balance between heritage harm and public benefit in line with paragraphs 201 and 202 of the NPPF and City Plan Policy 39.

Required Standards (retrofit projects)

A whole building approach is expected for retrofit development.

Where heritage assets are affected, applicants should set out the options which have been considered, and how any technical risks and impacts on heritage significance have been addressed, where relevant. The design and access/ heritage statements should demonstrate that harm has been avoided in the first instance and, where harm is caused, demonstrate that the least harmful option is being pursued, and justify that the proposed solution improves building performance.

Applicants are encouraged to use their Sustainable Design Statement and/or Design & Access Statement to explain how any proposed changes are delivering a public benefit in delivering exemplar schemes to mitigate and adapt to climate change and achieving standards beyond policy compliance.

Developers should seek opportunities to minimise the use of mains water and incorporate measures such as smart metering, water saving and recycling measures to help to achieve lower water consumption rates.

Table 10: Retrofit Measures – risks and issues and heritage considerations

		Permissions required		
Upgrade	Risks, Issues and considerations	Unlisted within a conservation area	Listed building	Unlisted outside a conservation area
Loft and roof insulation	Low risks if installing between existing joists, but ensure an air gap around edges of loft to avoid damp and allow air to circulate. Cold roof insultation is most likely to be appropriate. Installation of insulation at rafter level has more risks associated. Breathable insulation materials should be used.	Acceptable and permission not required as long as it doesn't alter external appearance of roof.	Acceptable and permission/ consent not normally required as long as it doesn't alter external appearance of roof or involve modification of roof structure.	Acceptable and permission not required as long as it doesn't alter external appearance of roof.
Floor insulation (suspended timber floors)	Low risk, but care needed when lifting floorboards. Ensure air bricks are not covered by insulation as circulating air is needed to prevent damp and rot. Breathable insulation should be used.	Acceptable, internal alterations of an unlisted property in a conservation area don't require planning permission.	Likely to be acceptable subject to detail.	Acceptable/ Permission not required.

		Permissions required		
Upgrade	Risks, Issues and considerations	Unlisted within a conservation area	Listed building	Unlisted outside a conservation area
Boiler upgrade	Low risk	Will generally be acceptable ideally should be located on the rear of a property and next to existing downpipes. If an existing flue is lawful and proposed new one is of the same dimensions it probably won't require planning permission to replace. A flue is permitted development on a dwellinghouse (not including flats) subject to the height of it not exceeding the roof by more than 1m, and in a conservation area not fronting a highway or being on principal or side elevation.	Likely to be acceptable where the flue is positioned in a visually discreet location on the rear elevation, ideally next to existing downpipes. If an existing flue is lawful and its replacement is proposed with a new one of the same dimensions, it is unlikely to require planning permission. Listed building consent would be required for the flue and for any internal alterations.	A flue is not permitted development for flats. Planning permission would be required for any flue that would materially affect the external appearance of the building. Would be permitted development for a dwellinghouse subject to it not exceeding the highest part of the roof by 1m or more. If an existing flue is lawful and proposed new one is of the same dimensions it probably won't require planning permission to replace.
Heating controls	Low risk	Internal alterations do not require planning permission.	Does not require planning permission or listed building consent.	Internal alterations do not require planning permission.
Micro Combined Heat and Power (CHP)	Low risk	In a conservation area, a flue for CHP on a dwellinghouse (here including flats) would be permitted development except where it is more than 1m above highest part of roof or a wall or roof slope which fronts a highway.	Acceptable where any flue should be positioned in a visually discreet location on the rear elevation. Listed building consent would be required for the flue and for any internal alterations.	Planning permission for a flue for CHP on a dwellinghouse (here including flats) not normally required, and the flue will be permitted development up to a maximum of 1m above highest part of the roof.

		Permissions required		
Upgrade	Risks, Issues and considerations	Unlisted within a conservation area	Listed building	Unlisted outside a conservation area
Ground source heat pumps	Low risk (requires well-insulated buildings)	Permitted development for dwellinghouses (including buildings wholly consisting of flats).	Listed building consent would be required.	Permitted development for dwellinghouses (including buildings wholly consisting of flats).
Air source heat pumps	Low risk (requires well-insulated buildings)	Permitted development for dwellinghouses or a block of flats, subject to certain restrictions. Air Source Heat Pumps which are not permitted development must conform to City Plan policy. Those which are permitted development should minimise effect on amenity of the area. One way of doing this is by complying with the noise standards. Seek advice from acoustics team in Environmental Health for larger/noisier systems.	Acceptable where the external unit is positioned in a visually discreet location. Noise may be an issue where planning permission is required. Air Source Heat Pumps which are not permitted development must conform with City Plan policy. Those which are permitted development should minimise effect on amenity of the area. One way of doing this is by complying with the noise standards. Seek advice from acoustics team in Environmental Health for larger/noisier systems. Listed building consent would be required.	Permitted development for dwellinghouses or a block of flats subject to certain restrictions including their use only for heating. Air Source Heat Pumps which are not permitted development must conform to City Plan policy. Those which are permitted development should minimise effect on amenity of the area. One way of doing this is by complying with the noise standards. Seek advice from acoustics team in Environmental Health for lager/noisier systems.

		Permissions required		
Upgrade	Risks, Issues and considerations	Unlisted within a conservation area	Listed building	Unlisted outside a conservation area
Water efficiencies	Low risk – In all locations we recommend water butts are discreetly located where possible, for example to the rear of the property.	Internal measures such as water-saving showerheads and taps and external rainwater harvesting such as water butts do not require planning permission.	Internal measures such as water-saving showerheads and taps do not require planning permission. Listed building consent for external rainwater harvesting such as water butts is unlikely to be required unless directly fixed to historic/ original fabric	Internal measures such as water-saving showerheads and taps do not require planning permission. External rainwater harvesting such as water butts do not usually require planning permission, but in areas where there is an **Article 4 Direction** you may require permission if located on principal elevations/ fronting the highway.
Draughtproofing	Medium – Advice may be needed on ventilation and condensation.	Internal alterations of an unlisted property in a conservation area don't require planning permission.	Likely to be acceptable in most cases without listed building consent, although where the windows are especially important advice should be sought from design and conservation officers before proceeding.	Internal alterations of an unlisted property do not require planning permission.
Secondary glazing	Medium – Advice may be needed on ventilation and condensation. Take care not to damage existing windows and shutters (if present).	Acceptable Internal alterations of an unlisted property in a conservation area don't require planning permission.	Will generally be acceptable, subject to detailed design. Listed Building consent will be required.	Acceptable. Internal alterations of an unlisted property do not require planning permission.

		Permissions required		
Upgrade	Risks, Issues and considerations	Unlisted within a conservation area	Listed building	Unlisted outside a conservation area
Thermal single or Double glazing	Medium–Advice may be needed on ventilation and condensation	Acceptable but windows should be well-designed and detailed to reflect the character of the existing building. Planning permission will be required for flats where new windows materially affect the external appearance of the building, e.g. where the frame size changes; opening mechanisms change or materials for the window change. For a dwellinghouse (not flats) this is permitted development but is subject to certain conditions.	Thermal single glazing or slim profile double glazing will be acceptable where this can be installed without harm to significance. Listed Building consent will be required, and this is most likely to be appropriate where historic windows have been replaced with ones whose design are of poor quality installed to a modern extension or later part of the buildings.	Acceptable subject to detailing. Planning permission will be required for flats where new windows materially affect the external appearance of the building, e.g. where the frame size changes; opening mechanisms change or materials for the window changes. For a dwellinghouse (not flats) this is permitted development subject to certain conditions.

		Permissions required		
Upgrade	Risks, Issues and considerations	Unlisted within a conservation area	Listed building	Unlisted outside a conservation area
Solar photovoltaic system (PV electric panels)	Medium – Specialist installation advice needed and possibly a feasibility study or structural survey to ensure the roof structure will bear the weight of the panels. Have a supply of replacement roof tiles in case these are broken during installation.	This is permitted development, even on the roofs of principal elevations of dwellinghouses and flats in conservation areas, subject to it being 'sited so as to minimise its effect on the external appearance of the building and the amenity of the area', i.e. where there are alternative options for installation, the location which minimises the visual and amenity impacts must be selected. Would not be permitted development: – If it protrudes more than 20cm from the roof slope; – If it is higher than the highest part of the roof (excluding chimney); and – In a conservation area, on a wall which fronts a highway.	Will generally be acceptable in a discreet location, where not visible from surrounding properties (e.g. internal valley roof or flat wall behind a parapet). Listed building consent will be required.	This will not generally require planning permission as it is permitted development on any roof or wall slope of dwellinghouses and flats, subject to it being 'sited so as to minimise its effect on the external appearance of the building and the amenity of the area', i.e. where there are alternative options for installation, the location which minimises the visual and amenity impacts must be selected. Not permitted development if it protrudes more than 20cm from roof slope or is higher than the highest part of the roof (excluding chimney).

		Permissions required		
Upgrade	Risks, Issues and considerations	Unlisted within a conservation area	Listed building	Unlisted outside a conservation area
Solar thermal panels	Medium – Specialist installation advice needed and possibly a feasibility study or structural survey to ensure the roof structure will bear the weight of the panels. Have a supply of replacement roof tiles in case these are broken during installation.	This is permitted development, even on the roofs of principal elevations of dwellinghouses and flats in conservation areas, subject to it being 'sited so as to minimise its effect on the external appearance of the building and the amenity of the area', i.e. where there are alternative options for installation, the location which minimises the visual and amenity impacts must be selected. Would not be permitted development: – If it protrudes more than 20cm from the roof slope; – If it is higher than the highest part of the roof (excluding chimney); and – In a conservation area, on a wall which fronts a highway.	Will generally be acceptable in a discreet location, where not visible from surrounding properties (e.g. internal valley roof or flat wall behind a parapet). Listed building consent will be required.	This will not generally require planning permission as it is permitted development. Not permitted development if it protrudes more than 20cm from roof slope or is higher than the highest part of the roof (excluding chimney), on any roof or wall slope of dwellinghouses and flats, subject to it being 'sited so as to minimise its effect on the external appearance of the building and the amenity of the area', i.e. where there are alternative options for installation, the location which minimises the visual and amenity impacts must be selected.

		Permissions required		
Upgrade	Risks, Issues and considerations	Unlisted within a conservation area	Listed building	Unlisted outside a conservation area
Green roof	Medium – Specialist installation advice needed and possibly a feasibility study or structural survey to ensure the roof structure will bear the weight of the substrate; permeability of roof membrane by plant roots, and that any height of balustrade is sufficient, and structure has sufficient capacity to bear the load, where it is used as amenity space, although this would be less likely to be viewed favourably.	Planning permission required where depth of build-up is greater than 150mm, which is fairly likely with a well designed living roof. However for dwellinghouses where the build-up is less than 150mm and doesn't exceed highest part of the existing roof this is likely to be permitted development, but this would be for flat roofs in a discreet location (not pitched roofs) but note proposals for 'intensive' living roofs which can be used as an amenity space would be less likely to receive permission. For flats planning permissions would be required.	Acceptability will depend on impact upon significance. May be acceptable on an existing flat roof in a discreet location such as behind a parapet wall. Listed Building Consent and Planning Permission will be required.	Planning permission required where depth of build-up is greater than 150mm, which is fairly likely with a well-designed living roof. However for dwellinghouses where the build up is less than 150mm and doesn't exceed highest part of the existing roof this is likely to be permitted development, but this would be for flat roofs in a discreet location, (not pitched roofs) but note proposals for 'intensive' living roofs which can be used as an amenity space would be less likely to receive permission. For flats planning permissions would be required.

		Permissions required		
Upgrade	Risks, Issues and considerations	Unlisted within a conservation area	Listed building	Unlisted outside a conservation area
Internal solid wall insulation	Very high – Specialist advice and installation required due to possible moisture and ventilation problems. Breathable insulation should be used.	Internal alterations of an unlisted property in a conservation area don't require planning permission. However, you are advised to speak specialist advice if this is proposed to a building of traditional construction.	Acceptability will depend on impact on significance and fabric. Would require listed building consent for changes affecting the building's character as one of special architectural or historic interest, such as materials, details and finishes. This may be granted in spaces of lesser significance where original finishes have already been lost but impact on fabric needs consideration.	Internal alterations of an unlisted property don't require planning permission. However, you are advised to speak specialist advice if this is proposed to a building of traditional construction.
External solid wall insulation	High – Specialist advice and installation required due to possible moisture and ventilation problems. Breathable insulation should be used.	In certain circumstances external wall insulation may be possible, such as on the rear elevation, in an enclosed situation (not part of a unified terrace) where the materials used are of a similar appearance to the existing building or extension. Planning permission will be needed in all cases for external wall insulation comprising or including the following: stone, artificial stone, pebble dash, render, timber, plastic or tiles.	This is generally not considered appropriate for listed buildings but this will depend on the impact on significance, as well as potential impacts on fabric. Planning permission and listed building consent would be needed.	Central Government guidance suggests this is permitted development on the principal elevation (or other elevations) of a dwelling house (not flats) subject to the material being of a similar appearance to the existing building or extension.

New Buildings and BREEAM

For the council to assess the impact of a proposed new building it is necessary to evaluate the environmental performance of the building in the round. BREEAM (Built Research Establishment Environmental Assessment Methodology) is the most established environment assessment methodology that rates and certifies the performance of buildings by assessing a broad range of sustainability issues and categories. The standard is set out in City Plan policy 38 E. This assessment methodology can be applied to a range of buildings from residential to offices. There are environmental assessment methodologies on the market including LEED (Leadership in Energy and Environmental Design), WELL Building Standard and PassivHaus. If consideration is being given to a non-BREEAM methodology a pre-application discussion should be undertaken for the council to understand how BREEAM equivalent standards will be achieved.

Development Requirements

Required Standards

All developments must integrate and positively address the sustainable design principles in policy 38 and are encouraged to aim to achieve the highest possible BREEAM standards. The City Plan also sets requirements in policy 38E for minimum BREEAM standards for development of certain types and sizes:

Development Type	Size of Development	Standard Required
Non-Domestic	500sqm (GIA) or greater	At least BREEAM Excellent or equivalent
Residential conversions and extensions	Conversions or extensions which create 500sqm (GIA) or greater of residential floorspace or five or more residential units	BREEAM Excellent (BREEAM domestic refurbishment) or equivalent

Non-Domestic as referred to above includes some communal living accommodation such as hotels.

Developers should seek opportunities to minimise the use of mains water and incorporate measures such as smart metering, water saving and recycling measures to help to achieve lower water consumption rates in line with London Plan policy SI 5 Water Infrastructure. New residential developments must show that they are capable of achieving maximum internal mains water consumption of 105 litres per person/day excluding an allowance of five litres per person/day for external water use. Commercial development should achieve at least the BREEAM excellent standard for the 'Wat 01' water category or equivalent

Information Required

Evidence is expected to be submitted to demonstrate the BREEAM standards are met or exceeded.

This information is provided in two stages:

1. Planning application stage – using a BREEAM pre-assessment estimator submitted as part of the energy or sustainability strategy. This pre-assessment sets out the targeted credits and proposed measures in the scheme in accordance with different BREEAM methodology themes. It provides a narrative on the design and an indication of the likely score (and associated overall BREEAM rating to be achieved) which can be checked by officers at application stage.
2. Pre-occupation – usually secured by a condition attached to the application to be discharged prior to occupation. This is evidenced by the final or post-construction certification of the scheme by BREEAM confirming the level achieved. If BREEAM certification has not been provided prior to occupation, the council will consider an extension to this timeframe to avoid buildings lying empty.

Where an alternative methodology is being used requirements should be agreed in advance through pre-application discussions.

Applicants should show that sustainable design requirements within City Plan policy 38 have been met through a Design and Access Statement or Sustainable Design Statement where applicable.

MONITORING

City Plan Key Performance Indicator 17: Number of developments of thresholds set out in policy achieving BREEAM excellent (or equivalent) Standard

City Plan Key Performance Indicator 31: Number of designated heritage assets completely demolished/lost