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EFDC SUSTAINABILITY GUIDANCE & CHECKLIST / REFURBISHMENT & EXTENSIONS *(householders)*

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DECEMBER 2021

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Issue and Revision Record

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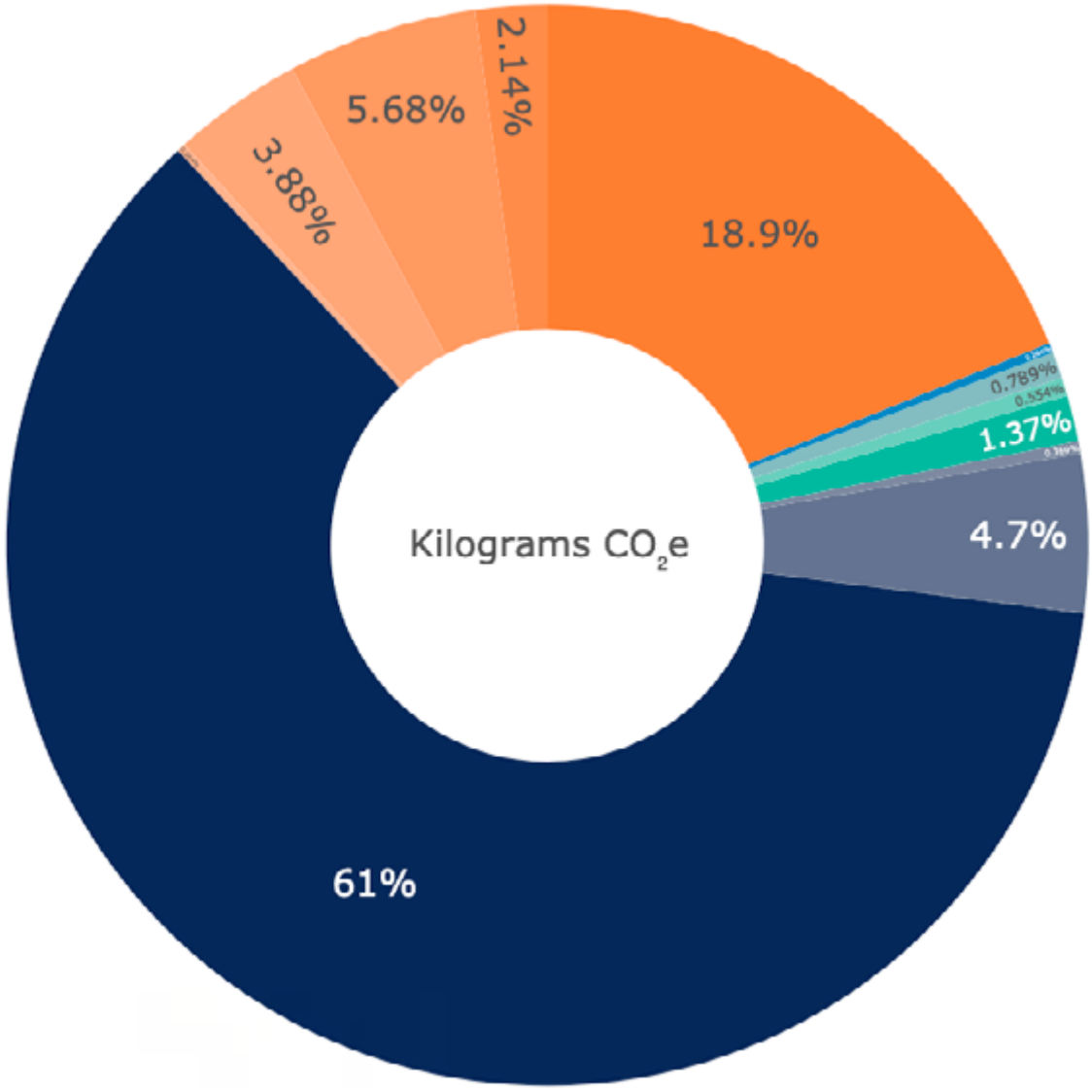
1

INTRODUCTION

This document supports the highest environmental commitment across the District - to become net zero carbon by 2030

Overview

Epping Forest District has an annual carbon emission contribution of 2,048 CO2 (kt) across all industries (2017 data). The graph below provides a break down of the District's emissions based on sector:



- *Residential buildings*
- *Commercial buildings & facilities*
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- *Industrial buildings & facilities*
- *Agriculture*
- *Livestock*
- *Industrial Process*
- *Wastewater*
- *Solid waste disposal*
- *Off-road*
- *Aviation*
- *On-road*

Source: scattercities.com

Overview

CLIMATE EMERGENCY

The UK Government and Epping Forest District Council have declared a Climate Emergency.

The global climate is changing, primarily as a result of greenhouse gas emissions from human activity. Communities, businesses and the natural environment are already feeling the impacts of the changing climate. Continuted change is now unavoidable and will disrupt everyday life, with higher average temperatures and more extreme weather events.

This Sustainability Guidance supports the highest commitment across the District, which is to produce net zero cabon emissions by 2030. It sets out practical solutions to set out a clear design and construction process for any new development, into a net zero future. EFDC believes that in order to meet our climate change targets, all new buildings must operate at net zero carbon by 2030.

Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs. High quality sustainable developments require adopting a holistic approach to environmental, social and economic sustainability.

EPPING FOREST FOREST DISTRICT COUNCIL

The Council's emerging Local Plan sets out the most significant level of development to be brought forward across the District in a generation. Within the period 2011-2033 the growth proposed in the emerging Local Plan will provide for a minimum of 11,400 new homes. Much of this will be delivered through larger strategic sites.

The emerging local plan also recognizes the importance of adapting existing homes within the District to ensure they are liveable and comfortable in a changing climate. Housing stock improvement should be an integral part of future climate impact mitigation..

PLANNING POLICY CONTEXT

There is a strong and committed national and local policy context for planning environmentally, socially and economically sustainable places and developments, and climate adaptation.

The National Planning Policy Framework (NPPF) (February 2019) sets out national policy for local planning authorities and decision makers. The NPPF states that there is a presumption in favour of sustainable development (paragraph 11), with sustainable development having economic, social and environmental objectives.

The environmental objective is that development should protect and enhance the natural, built and historic environment as well as protecting biodiversity, minimising pollution and adapting to climate change and the demands of a low carbon economy.

In addition, in October 2021 the UK Government published their Net Zero Strategy which is a long-term plan for transitioning to a low carbon economy. The retrofit of existing homes plays an important part within this plan, especially with reference to providing low-carbon solutions for heating.

COVID-19 RECOVERY

The guidance has been developed during the COVID-19 pandemic, which has highlighted stark health inequalities relating closely to environmental, social and economic inequalities.

Now more than ever, high quality, sustainable and resilient design and development is needed to ensure that existing and new residents of Epping Forest District recover from the pandemic in a long term and locally-led manner.

Opportunities to foster community strength, support green and local economies and bolster residents health must be taken. All stakeholders are therefore expected to work collaboratively to contribute to this recovery, and ensure that Epping Forest District is a joyful and sustainable place to live, work and play.

How to use this guidance?

1 / PURPOSE OF THIS GUIDANCE

The purpose of this guidance is to help both homeowners and applicants meet EFDC's goals of becoming net zero carbon by 2030.

EFDC will set the agenda for Sustainable living, making it is easy for residents to adopt sustainable lifestyles. This means the choices offered across all aspects of living, work, and play are sustainable. This document provides practical and technical guidance on how relevant Sustainability indicators and policies (environmental, social, and economic) in the Epping Forest District Local Plan will be applied to residential extensions and refurbishments across the district.

2 / WHO USES THIS GUIDANCE?

Homeowners + Applicants:
The document is to be used by homeowners, design teams, consultants and contractors in shaping development proposals, This will guide design, and ensure coordinated and integrated consideration of sustainability principles and targets at an early stage.

Local Authority Officers and decision-makers:
This document will be endorsed to have material planning weight and the Checklist will help guide the assessment of planning applications for residential extensions within the District.

3 / WHEN TO USE THIS GUIDANCE?

Best Practice: The guidance can be used as best practice guidance by any homeowner or resident within Epping Forest District who may be doing refurbishment or extension work to their home, the work does not require planning permission.

Pre-Application; The Sustainability Checklist should accompany pre-application discussions to ensure all applications have considered and incorporated sustainability measures from the outset of their design.

Planning Application; A Sustainability Strategy incorporating the Checklist, with relevant certification, is to be submitted alongside planning applications.

Post-Planning; Relevant conditions will be discharged and planning obligations and monitoring will be coordinated to ensure that sustainable measures are in place through to delivery and beyond. Tools such as Post-Occupancy Evaluation for ongoing monitoring will be expected relating to key indicators.

4 / HOW TO USE THIS GUIDANCE?

The guidance is split in to the following sections:

1. EFDC & Refurbishment - provides an introduction to the importance of Sustainability for existing buildings in the District

2. Design Principles - this section presents practical and technical guidance on how to approach sustainable refurbishments projects during early design stages. The principles encourage a wholistic approach to sustainability, and their incorporation at an early stage of a project will make it easier to meet Sustainability principles set out in the remainder of the Guidance.

3. Checklist (to be completed and submitted) - for use in planning applications

4. Appendix: LETI Guide to Refurbishments and Extensions - practical and technical best practice guidance from industry specialists on Sustainability targets for refurbishment and extension projects

5 / SUBMISSION REQUIREMENTS

1. Checklist
2. Sustainability Statement

The Sustainability Statement should be accompanied with relevant certifications where applicable.

6 / APPLICATION OF GUIDANCE

The guidance is applicable to all projects involving the refurbishment and/or extension of existing building within Epping Forest District.

8 / RELATIONSHIP TO THE LOCAL PLAN

This guidance should be read in conjunction with the policies found in the Epping Forest District Council Local Plan. The Sustainability guidance will be endorsed to have material planning weight when determining applications.

This EFDC sustainability guidance will need to be considered as part of the wider policy context but is expected to compliment the policies by providing a practical tool for enhancing the sustainability of development in the District.

9 / REVIEW & MONITOR

Requirements in this guidance are based on current (2021) regulations and best practice, and may be superseded by future standards. It is intended that the guidance will be updated every 3 years.

This document provides practical and technical guidance on how relevant Sustainability policies in the Epping Forest District Local Plan will be applied to residential extensions and refurbishments across the district.

Sustainability policies that relate to refurbishments and extensions in the Local Plan are:

DM1 Habitat protection and improving biodiversity
DM2 Epping Forest SAC and the Lee Valley SPA
DM3 Landscape character, ancient landscapes and geodiversity
DM5 Green and blue infrastructure
DM9 High quality design
DM12 Subterranean, basement development and lightwells
DM15 Managing and reducing flood risk
DM16 Sustainable drainage systems
DM17 Protecting and enhancing water courses and flood defences
DM19 Sustainable water use
DM20 Low carbon and renewable energy
DM21 Local environmental impacts, pollution and land contamination
DM22 Air quality

EFDC Green Infrastructure Strategy
EFDC Open Space Strategy
EFDC Heatlh and Wellbeing Strategy
EFDC Air Pollution Mitigation Strategy
Essex SuDS Design Guide

EFDC & RETROFIT

This section looks at how adapting existing buildings will help Epping Forest District Council to become net zero carbon by 2030.

Why is refurbishment important?

Why is refurbishment important?

Housing stock contributes a significant amount to carbon emissions across the country. We know that in Epping Forest District, existing residential buildings make up just under 20% of our annual carbon emissions.

The majority of Epping Forest District's inhabitants live in existing homes. Of these homes, the overwhelming majority - if not all - were designed for climatic conditions prevalent at the time of build rather than the climate we can expect to experience now and over the coming decades. This means that much of our housing stock will not deliver levels of comfort, safety and resource efficiency required in the 21st century. It is predicted that 70% of housing stock in 2050 will consist of the buildings that exist today. As our climate changes our housing stock will become increasingly inappropriate.

Therefore, widespread adaptation of existing homes is crucial to ensuring that they are comfortable, marketable, resource efficient and fit for purpose in the present and future.

What are the potential future effects of climate change on existing homes?

Flooding, water stress and overheating are the key changes projected for the East of England.

01. Flooding - increased urbanization as well as changes in weather patterns can result in a reduced capacity for regions to absorb water, leading to more water surface runoff and increased flooding.

02. Water Sress - climate change projections suggest that in the period to 2050 and beyond, the UK will experience wetter winters and drier summers. Overall precipitation may decrease by up to 15%.

03. Overheating - there is low awareness of domestic overheating as an impact of climate change. This can result in thermal discomfort, especially in more urban areas.

Effective adaptation options are available for all three of these impacts. Early, widespread adoption of appropriate adaptation measures will enable existing homes to remain habitable in increasing summer temperatures, be reoccupied more quickly after floods and consume less water.

What are the challenges facing householders?

01. Uptake of climate change adaptation measures is low because of the lack of information and awareness about adaptation options and access to appropriate technical advice.

02. In contrast to new buildings, the adaptation of existing homes is the responsibility of a complex range of independent actors, including the individual homeowner. It may be difficult for individual homeowners to raise the initial capital costs associated with refurbishment work.

03. As there is variation in the construction, age and condition of existing housing stock in the District, a level of individual assessment is necessary to select the most appropriate adaptation measures.

The Sustainability Guidance aims to help homeowners overcome some of these challenges by providing guidance on how to undertake refurbishment or extension work as well as signposting to successful case studies and additional resources. The guidance does not take a 'one-size-fits-all' approach but rather offers best practice advice that can be adapted to specific cases by individual homeowners.

The 'Incentives' section (p.14) also provides information on financial incentives for individuals.

Incentives

1 / INCENTIVES FOR THE DISTRICT

Planning
National planning policy is setting increasingly higher sustainability standards for development. Both the Planning White Paper and Affordable Housing White Paper place special emphasis on quality design and sustainability. Compliance with sustainability standards will ensure compliance with wider regulatory framework.

Awards and Recognition
Exemplar schemes will be shared as case studies. Schemes with excellent sustainability credentials may be put forward for local and national awards, gaining the Council recognition.

Building Regulations
The minimum energy efficiency standards for domestic rental properties are changing - from April 2020, a rental property will require a minimum rating of EPC E and this is likely to increase to a rating of EPC C by 2030. This will be applicable to social housing and housing associations as well as private landlords.

Cost Benefits
The long-term operation costs of refurbished homes are vastly reduced due to their lower energy demand, helping to eliminate issues such as fuel poverty, and providing cost savings of 30%-40% over 30 years.

Health & Wellbeing
There are numerous health benefits associated with sustainable homes. The comfort and wellbeing of inhabitants will be improved due to environmental factors such as healthier air quality and temperatures, improved humidity and noise levels.

Sustainable and healthy living also provide mental health benefits through the reassurance provided to inhabitants when their home is futureproofed and built to last.

2 / INCENTIVES FOR INDIVIDUALS

Design and Planning
Compliance with sustainability standards may lead to a smoother planning process and faster assessment time.

Awards and Recognition
Exemplar schemes will be shared as case studies. The Council will work with applicants to put their schemes forward for local and national awards.

Building Regulations
The minimum energy efficiency standards for domestic rental properties are changing - from April 2020, a rental property will require a minimum rating of EPC E and this is likely to increase to a rating of EPC C by 2030.

Funding Opportunities
Funding schemes provide financial incentives for homeowners to refurbish their homes to higher energy standards. These schemes include;
- Green Homes Grant
- Eco Flex
- Domestic Renewable Heat Incentive

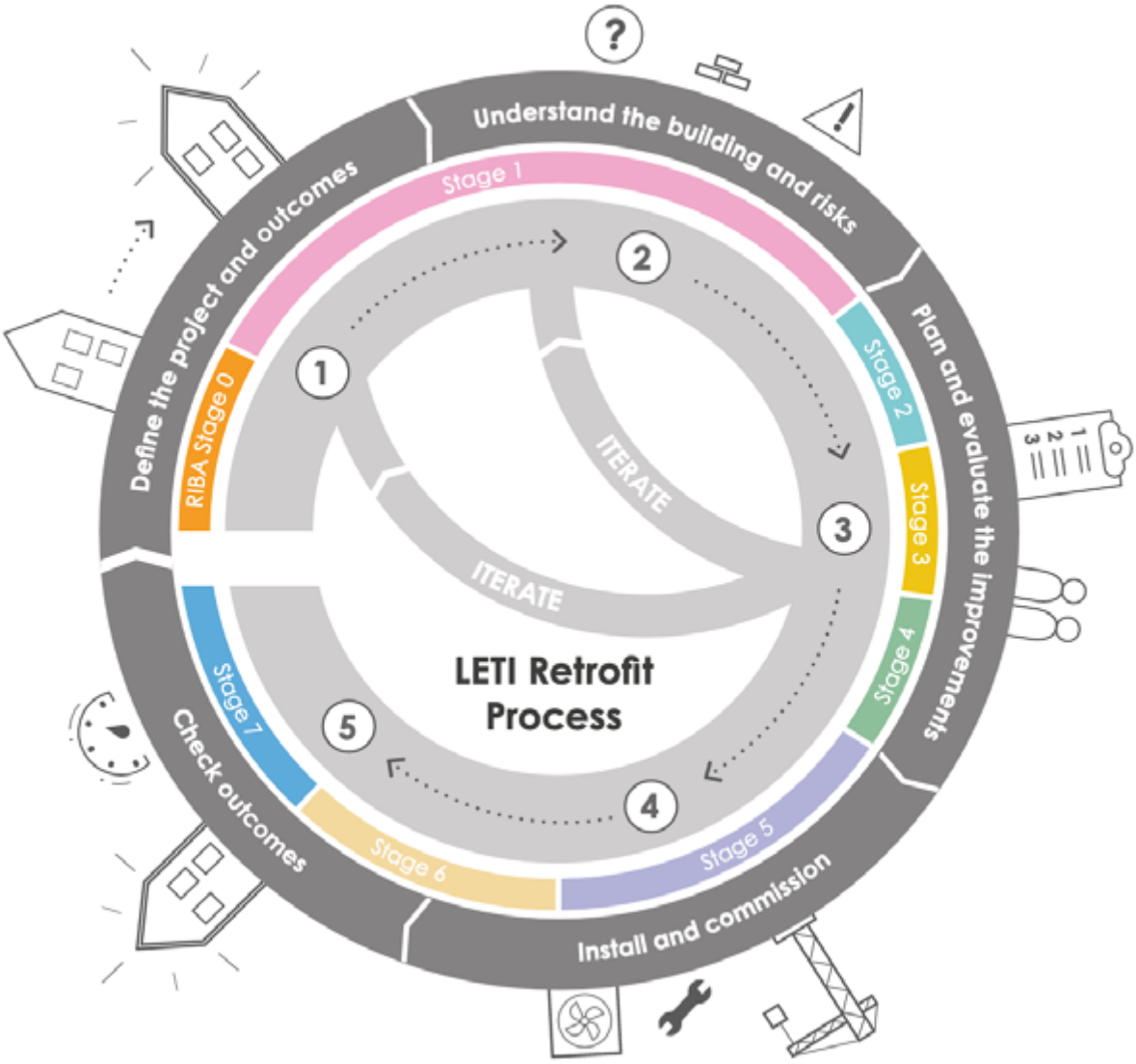
Businesses that are looking to refurbish their offices may be eligible for tax incentives.

Cost Benefits
Studies have demonstrated correlations between homes with better energy efficiencies, and higher house prices. Furthermore, the long-term operation costs of refurbished homes are vastly reduced due to their lower energy demand, and can provide cost savings of up to 30%-40% over 30 years. Futureproofing a home to rely more on energy from renewable sources protects it from rising energy costs.

Health & Wellbeing
There are numerous health benefits associated with sustainable homes. The comfort and wellbeing of inhabitants will be improved due to environmental factors such as healthier air quality and temperatures, improved humidity and noise levels. Sustainable and healthy living also provide mental health benefits through the reassurance provided to inhabitants when their home is futureproofed and built to last.

EXTENSION & REFURBISHMENT DESIGN PRINCIPLES

This section looks at how the principles of sustainability can be incorporated in to a project at the design stages.



LETI Retrofit Process summary diagram showing the key stages and how, where necessary, early design and evaluation gives a chance to revisit the project definition and building evaluation with new information. Source: LETI Retrofit Guide

0 / Preparing a Project Plan

A COORDINATED APPROACH

Preparing a project plan before embarking on a refurbishment or extension project will make it easier to achieve the energy savings and health and comfort improvements you are looking for in your home. Having a coordinated approach to your home - rather than carrying out work piecemeal - can deliver the most benefits.

This section provides a simple introduction as to how to prepare a project plan before starting any work.

(Please note - this approach is based on the LETI 'Retrofit Process' - for a more detailed overview, please refer to Chapter 5 of the LETI Retrofit Guide, provided in the Appendix).

THE PROJECT PLAN

The project plan should include the following steps -

01. Define the project and outcomes:

- The plan should start with identifying the scope of work you wish to carry out. Are you refurbishing a single home, or does it make sense to coordinate with neighbours to reduce the cost and have more impact?

- Set out the project outcomes - what is the primary aim of the refurbishment? Is it to gain more space, improve the health and comfort of your home, or to reduce your energy bills?

- Does it make sense to seek professional help? Having an Architect or contractor on board at an early stage might help you save on costs and time in the long term.

02. Understand the building:

- Set out key building information related to your home and its context. This should include information on any potential constraints, risks and opportunities (e.g. Is your home in a flood risk zone? Is there local air pollution? Are there external walls onto a street or public highway?)

- Survey your home - list the main construction for floors, walls and roofs. List the types of window and doors, material, glazing type, approximate age. Identity the current ventilation strategy and record any areas of damp in the home. You can also consider getting a professional building surveyor to carry this out for you.

03. Plan and evaluate the improvements

- Identify the parts of your home that require maintenance, as well as easy temporary wins that can reduce energy in the short term (e.g.simple draught proofing around door and window frames).

- List all the measures that will form the refurbishment or extension work and decide whether you will be phasing these works out over a period of time.

- Consider how the phases of work could best be procured and delivered. How much of the work can you do yourself, and which parts require help from a contractor?

04. Install and commission

- Engage a builder or contractor if you are going to use one, and share your project plan with them.

- Carry out the planned phase of works. Make sure there is enough slack left in the project plan for changes that may be required if you come across unexpected challenges.

- Commission ventilation, heating and any other systems you require.

05. Check outcomes

- Monitoring the work over a period of time will allow you to check whether the project outcomes have been met (for example meter readings, a meeting with the design team to review). Consider setting up monitoring devices (e.g. CO2 or humidity sensors).

1 / Landscape Led Design

OBJECTIVE

Landscape and natural environments contribute both to the quality of a place, and the quality of life of its occupants. Whenever we build, we must protect and plan for the plants and animals that already live on the site. We should also look for opportunities to enhance and create new habitats and support biodiversity.

The land on sites of extensions or refurbishment projects should be used efficiently with new planting supporting existing local species of flora and fauna. Opportunities for the enhancement of existing species can be incorporated in to the design of your extension; e.g. bird boxes, swift bricks or bat boxes.

Opportunities to connect and introduce multifunctional green infrastructure should be considered e.g. by adding green roofs. Find out more about the green infrastructure networks in your area (look at the EFDC Green Infrastructure Strategy) which include open spaces, parks and gardens, allotments, woodlands, fields, hedges, lakes, ponds, playing field, as well as footpaths, cycleways and waterways. Consider how your landscape can strengthen and connect to local green infrastructure.

CASE STUDY

The Black Curve (Bromley) by Ar'Chic

A rear house extension that includes the creation of a garden terrace. The green meadow roof installed as part of the extension will enhance the insulation of the home, reducing energy usage, and give opportunities to wildlife to take over.

THINGS TO CONSIDER

Are there opportunities to retain and/or enhance habitats and biodiversity?
Integrate green roofs with native wildflower and grass species, and plant small areas of green space around the extension. Retain protected trees and/or consider re-planting existing trees within the garden.

Some animals and plants are legally protected – are there any on your site?
To find out, a protected species survey may be required. For example, bats may roost in trees and buildings, and a pond may contain newts.

Where a new extension impacts on existing habitats, what mitigation measures will be put into place?
Phase construction works around local species' seasonal patterns of nesting, mating, foraging and hibernation.

USEFUL RESOURCES

The following are good sources of information on green infrastructure, and how to protect animals and plants on your construction site:

EFDC Green Infrastructure Strategy

Green Essex Strategy
Essex Biodiverstiy Action Plan
Stort Catchment Management Plan
Green Arc Strategy

Natural England
Wildthings Biodiversity Action Plan
National Design Guide

2 / Orientation

OBJECTIVE

Early adoption of passive design principles can allow your home to benefit from natural lighting whilst avoiding overheating.

When designing extensions, there is an opportunity to orient them to maximise natural daylight and sunlight into the building and take advantage of passive solar gain (absorbing the sun's heat energy to warm internal spaces).

Building axis' should be orientated in the east-west direction – to take advantage of maximum daylight and heat from the sun which significantly reduces the energy consumption of a building, and can reduce a homes' heating and cooling costs by up to 85%. External shading can help a home stay cool in the summer months and avoid overheating, including the use of landscape and plants. A Daylight / Sunlight Assessment can help provide more information on how much natural light your development will be exposed to.

Buildings in close proximity to each other can block out a neighbours natural light, so take care not to overshadow nearby homes.

CASE STUDY

Manor Farm (Oxfordshire) by Transition by Design

Extension to a listed Georgian country house that provides the home with new kitchen, dining room, garden room and utility spaces and follows sustainable design principles. The solar gains are optimised to the south allowing light and warmth to pour into the garden room yet protected in excess summer heat by the oversailing roof

THINGS TO CONSIDER

Is your glazing sized and oriented to reduce heat loss, while allowing light and heat from the sun to enter?
Rooms facing south should be designed with shaded glazing (to exclude high-angle summer sun) and good ventilation (to remove summer heat gains).

Are your windows shaded to avoid overheating in the summer?
Features such as awnings, shutters, blinds or planting can protect rooms from the sun while allowing light, window ventilation and views out.

Have you incorporated other passive design features to avoid overheating in your home?
Replacing fitted carpets with wooden floors or tiles can expose the ground's cooling effects. Installing secondary glazing behind existing glazing to create triple glazing, with external ventilation of outer cavity, can greatly reduce solar heat gain.

USEFUL RESOURCES

The following are good sources of information on passive design principles:

Energy Saving Trust

3 / Energy Efficiency

OBJECTIVE

There are two ways buildings use energy: embodied and operational. When trying to reduce the amount of energy your home is responsible for, consider both types and follow the 'energy hierarchy' approach: (1) reduce the need for energy at home, (2) install different types of energy efficiency measures and (3) install renewable enery measures. By reducing energy demand through the first two stages, you should have cut down on how much energy you need to produce (Renewable Technologies).

Embodied Energy
The total energy required to manufacture or construct a building. You can reduce your embodied energy by using environmentally friendly, locally sourced and low impact building materials (Materials and Finishes).

Operational Energy
The energy used on a daily basis for heating and electrical appliances. You can reduce your operational energy by designing your home to be more energy efficient (Fabric-First Approach). This includes using high performance building components and installing smart appliances to control and monitor your energy usage.

THINGS TO CONSIDER

Could you install smart meters in your home?
Smart meters monitor your energy use and make sure you are billed accurately. They are usually provided and fitted without charge by your energy supplier.

How will your new extension contribute to reducing energy demand for heating, lighting and cooling within your home?
Following sustainable design principles such as orientation to maximise natural daylight, avoiding overheating and natural ventilation will help you reduce energy demand.

Are your new appliances energy efficient?
The Energy Saving Trust register is an extensive database of energy efficient products - use this to ensure any new appliances you purchase are energy efficient, and can help you reduce your energy consumption.

CASE STUDY

80% House (London) by Prewett Bizley Architects

An extension to a townhouse that includes living, cooking and dining spaces A rooftop extension adds a third bedroom-cum-study. The house achieves an 80% reduction in CO2 emissions, primarily by incorporating high levels of insulation and air tightness. Fresh air is supplied by an MVHR system. A photovoltaic array on the roof with a provides a little over half the annual electricity requirement.

USEFUL RESOURCES

The following are good sources of information on how to make your home more energy efficient:

Centre for Sustainable Energy
LETI Embodied Carbon Primer
Energy Saving Trust
Smart Energy GB
Superhomes.org.uk

https://historicengland.org.uk/whats-new/statements/modifying-historic-windows-as-part-of-retrofitting-energy-saving-measures/

4 / Renewable Technologies

OBJECTIVE

Buildings can reduce their energy consumption by generating their own energy using renewable technologies. These technologies use little or no energy and are therefore cheap to operate.

Photovoltaics (PVs): Solar PV systems turn sunlight into electricity through the 'solar cells' they contain - this electricity can be used to power home appliances.

Solar Thermal Panels: Solar panels are used to absorb the heat of the sun and transfer it to heat the water you use in your home.

Ground Source Heat Pumps: This captures the heat trapped under the surface of the ground, and uses it to run central heating systems in homes.

Air Source Heat Pumps: An air source heat pump uses heat from the air outside (even when its freezing) to heat your home - via radiators, underfloor heating or to heat water in a storage tank for use in the kitchen or bathroom.

CASE STUDY

1860s Farm (Huntingdon), pump by Finn Geotherm

A ground source heat pump was installed in this 1860s farmhouse to replace an oil-fired boiler. The pump heats up radiators throughout the house, as well as provides hot water. The heat pump also runs entirely on renewable energy generated by the farm's own turbine, making the farm carbon positive.

THINGS TO CONSIDER

Could you create suitable space for solar thermal panels in your home?
Your roof should face south and have between 2-5 sq.m of available space free of shading. Some systems involve the installation of an additional hot water cylinder, so you may need space to fit this.

Is your home suitable for a ground or air source heat pump?
These technologies work best in well-insulated homes, as they are most effective in homes which warm up quickly, and keep the heat in. Improving the general energy efficiency of your home will help make it suitable for these pumps.

Have you checked what financial incentives are availble for you?
You can earn an income from the Renewable Heat Incentive (RHI) is you install any of the above technologies.

USEFUL RESOURCES

The following are good sources of information on renewable energy technologies, and funding incentives:

Domestic Renewable Heat Incentive (RHI)
Renewable Energy Consumer Code
Microgeneration Certification Scheme

Heat Pump Association
Ground Source Heat Pump Association
Superhomes.org.uk
https://mcscertified.com/wp-content/uploads/2020/07/Heat-Pump-Guide.pdf

5 / Adaptable & Future Proof Design

OBJECTIVE

We can ensure that homes designed today can be used by future generations by designing them to be flexible and adaptable to changing needs.

Internal walls can be lightweight and demountable construction, allowing layout arrangements to be reconfigured if required. The foundations of extensions can be future-proofed to accommodate for a potential additional future floor. Garage spaces could be incorporated in to the design, that have the potential to be converted in to living rooms in the future.

Doorways, floor levels and circulation space within the home and garden areas should be designed for easy access by all abilities and avoid creating trip hazards. Not just internal layouts, but any landscape features should also be designed with potential future needs in mind.

Future-proofing your home when doing extension or refurbishment work to it may help you save on additional costs in the future.

CASE STUDY

The Linney (Devon) by Casswell Banks Architects

An old 45 sq.m stone barn is refurbished to provide a home for a family of 6. The existing stone walls are left intact and a secondary skin is built behind it, allowing for a more flexible configuration of the interior, built with sustainable materials, without compromising the original walls. A series of lightweight insertions and sliding doors create an open plan ground floor that can be used in many different ways by the family.

THINGS TO CONSIDER

Is the layout of your home flexible enough to allow for adaptation, conversion or extension?
Extensions should be designed to be adaptable - demountable internal walls, foundations able to support an additional floor, and easily accessible circulation will cater to potential future needs.

Is there space to work from home if you need to?
In a post Covid-19 society, more people will be working from home and this trend is likely to continue as our digital infrastructure continues to develop. Extensions to a home should look to accommodate future working space, if your home does not currently have it.

USEFUL RESOURCES

The following are good sources of information on designing your home to be adaptable and future-proof:

National Design Guide

6 / Fabric-First Approach

OBJECTIVE

A fabric first approach prioritises design and construction that minimises the need for heating and cooling. It is worth following the 'energy hierarchy' (introduced under Energy Efficiency) to conceptualise this: (1) reduce the need for energy at home, (2) install different types of energy efficiency measures and (3) install renewable enery measures.

This translates to optimising building orientation or elemental aspects (i.e. windows) for passive solar gain; lots of insulation; high-performance windows and doors; and good overall air-tightness, so that no drafts can get in and no warm air can escape. A well-insulated, airtight house relies not just on the efficiency of its components but on the quality of the workmanship behind it.

When building an extension to your home, take care to reduce thermal bridging (where heat escapes from the interior via structural elements that cut across the tightly-sealed fabric). This can occur at weak spots such as junctions between walls, floors and roofs, and around windows and doors.

CASE STUDY

Almshouses (Cambridgeshire) by ECD Architects

Refurbishment of a mid-terrace, 1-bed almshouse property in Cambridge. The approach to energy saving and CO2 reduction is to follow a lean-clean-green hierarchy: minimising heat losses from the property thermal fabric and ventilation method; supplying heating using replicable, low carbon technology; minimising lighting and appliance energy loads; and micro-generation using proven, renewable energy systems

THINGS TO CONSIDER

Can walls, floor, and roofs be insulated?
This is beneficial to reduce heat loos from your home, reducing your annual energy bills. You could consider insulating the inside face of your external walls, or, the outside face of your external walls where Planning permits.

Can windows, doors, and rooflight elements be replaced with more energy efficient elements?
You should aim for these elements to have low 'u-values' (ideally aim for a u-value below 1.00W/m2.K).

Could you look to measure the existing energy used in your home, with a view to analyse the energy savings you are likely to make once a refurbishment has been completed?
Monitoring the before-and-after energy use of your home will allow you to quantify the energy and financial savings afforded by the refurbishment.

USEFUL RESOURCES

The following are good sources of information on adopting a fabric-first approach for your home:

British Fenestration Rating Company
Green Building Store
BRE Green Guide to Specification
LETI Design Guide
Superhomes.org.uk

7 / Materials & Finishes

OBJECTIVE

Construction materials frequently cause environmental damage during their production. For example, quarrying damages landscapes; wood can come from unsustainable sources; metals use significant amounts of energy in their production and PVC production results in atmospheric pollution, and even brick needs to be fired at high temperatures using fossil-fuels.

The ambition here is to reduce the use of embodied carbon caused through the use of new materials. Reclaimed materials, products made from recycled material, and adopting offsite construction principles cause less environmental damage than new products and can also reduce waste and land fill. Therefore, wherever possible, it is ideal to first reuse and refurbish your home, before looking to build new ('retro-first'). Where you do have new elements, you should look to reuse existing elements such as bricks, timber rafters, and conservatories, in an innovative way. Where you have the opportunity to, aim for embodied carbon target of below 300 kgCO2e/m2.

CASE STUDY

Cork House, Matthew Barnett Howland with Dido Milne and Oliver Wilton

The Cork House is a residential extention project which explores the use of low carbon materials. Solid structural cork is used for the walls and roof of this building, resulting in the building having exceptionally low whole life carbon.

THINGS TO CONSIDER

Can any demolished elements (walls, roofs, staircases, etc), be reused in your new extension or home?
Speak to an architect to explore innovative ideas for reuse.

Are you prioritising low carbon healthy materials (i.e. low VOC emitting materials) and products made of natural materials (e.g. hemp, timber or wool)?
For example, when choosing insulation, using a wood fibre insulation might bring embodied carbon benefits over PIR (Polyisocyanurate) insulation options.

When building an extension, could you reduce the 'dead loads' where possible?
Building with lighter materials reduces the structural load and therefore material use of the building.

USEFUL RESOURCES

The following are good sources of information on selecting and sourcing sustainable materials and finishes:

LETI Embodied Carbon Primer
BRE Green Guide to Specification

8 / Indoor Air Quality

OBJECTIVE

Ensuring good indoor air quality is important for both your health and safety (as air pollution causes more harm than smoking), and for the maintenance of your home. There are ways to improve ventilation within the home; either by promoting natural and 'passive' cross-ventilation (e.g. allowing air move through rooms and corridors via windows on all sides) or 'active' ventilation through installation of mechanical ventilation systems including MVHR (Mechanical Ventilation with Heat Recovery), which filters and warms outside polluted air before distributing this within the home. This is particularly useful with nearby activities which might affect outside air quality such as industrial parks or busy roads.

Additionally, planting trees of particular species have a role to play in helping reduce air pollution; through 'cleaning' the air by absorbing harmful airborne particles and gaseous pollutants. For example, the silver birch tree is more effective than the white willow tree is in capturing particles. It is also known that that trees with large leaf areas can remove many times more particulate pollution than small ones.

CASE STUDY

Lark Rise (Buckinghamshire), bere Architects

Lark Rise is an all-electric, two-bedroom guest house designed to Passivhaus standards, producing at least twice as much energy in a year as it requires, while maintaining a very high level of comfort all year round. Ventilation is provided through MVHR units.

THINGS TO CONSIDER

Where you live near an air polluted area, could you look to install an MVHR system?
Whilst natural ventilation is best to reduce energy consumption, MVHR units will ensure better air quality within your home.

Could you look to site the spaces you spend the most time in away from busy roads?
For example; when designing the layout of your new extension - think about locating your living room to the rear of a home, as this is one of the most occupied rooms of a house.

In your front or rear garden, could you look to plant tree species that help reduce poor air quality?
You can refer to the list of tree species listed by the Woodland Trust's Urban Air Quality guidance, to find out which species are best for improving air quality.

USEFUL RESOURCES

The following are good sources of information on ensuring high indoor air quality in your home:

EFDC Air Pollution Mitigation Strategy
Woodland Trust Urban Air Quality
Superhomes.org.uk

9 / Water Management

OBJECTIVE

There are many simple measures to take at home to use less water. When designing new bathrooms, we can choose to use low flush WCs, have flow restrictors on taps and have low flow shower heads.

We can also reduce our reliance on mains water through the use of greywater recycling (the use of waste water from baths, showers and hand basins for toilet flushing, irrigation etc.) and rainwater harvesting (the collection of rainwater from roofs to use of toilet flushing, irrigation, the use of water butts etc.).

Consider also how you can manage surface water runoff due to rain sustainably. Covering driveways, gardens and patios with hard surfacing is increasingly popular, yet it prevents rainwater seeping into the ground, forcing the water to run off quickly into drains, or to pool on hard surfaces.

CASE STUDY

Example of domestic water management; water butts

A water butt is essentially a large container used to capture and store rainwater. When attached to a downpipe, the water butt collects the rainwater that lands on the roof of a building so it can be used later. It is this time of year, when rainfall has been scarce, that water butts become really useful.

THINGS TO CONSIDER

Have you considered water saving measures? The installation of relatively affordable and simple water saving appliances in your bathrooms can contribute significantly to more efficient water use in your home. These measures can include low flush WCs and flow restrictors on taps.

Could you use planting and permeable materials in your landscape to naturally drain rainwater?
For example, the use of water butts in gardens can help collect rainwater for use in the house.

USEFUL RESOURCES

The following are good sources of information on sustainable water management for your home:

Superhomes.org.uk
waterwise.org.uk

10 / Waste Management

OBJECTIVE

Constructing buildings creates huge amounts of waste – over a third of all waste created in the UK. We can make a big difference by designing our buildings to use materials more effectively, using less material, making sure to recycle construction waste where possible and using recycled or renewable materials in the construction of our homes. We should also take care to recycle and compost as much of our household waste as possible.

It is therefore important to think of waste not only in terms of what material is used now, but also in designing for demolition. For example when using brickwork, lime mortars allows the bricks to be easily demolished in the future, so it can be reused in other parts of your house or sold to others.

You can also look to capture and harness waste heat from all sources around your home. Capturing heat that has been realised as a by-product of an existing activity can contribute to meeting energy demands. On a small scale, Exhaust Air Heat Pumps (EAHP) can be explored here; otherwise, exhaust air can be made available to other buildings via heat sharing networks.

CASE STUDY

Bill Powell's SuperHome (Cambridgeshire)

This was a householder refurbishment project of an existing 1950's house. The owner implemented a series of energy saving measures, including the installation of an Exhaust Air Heat Pump, which led to an overall reduction by 68% of the home's carbon use.

THINGS TO CONSIDER

Could you take measures to reduce the waste that will be created as a result of your extension / refurbishment project?
It may be possible to recycle your construction waste. Alternatively, look to see if it is possible to use prefabricated building components during construction - which are manufactured off-site and are more efficient in terms of material waste.

Could you design your home so that the building elements are reusable in the future?
Speak to your Architect about making sure that this is a consideration in the early stages of the design.

Could you explore EAHP to contribute to your annual home heating needs?
As a series of ducts are required through the building to allow the flow of air to and from the EAHP, installation should happen during construction.

USEFUL RESOURCES

The following are good sources of information on sustainable waste management for your home:

Superhomes.org.uk

4

SUBMISSION

This section includes the list of submission requirements, and the sustainability statement.

Checklist

01 / Do you have an architect / contractor that you will be working with, **who have experience in making sustainable buildings**?

☐ Yes ☐ No →

For information on finding the right design team, refer to:

https://www.greenregister.org.uk/
https://www.aecb.net/
https://www.climatechangeandyourhome.org.uk/

02 / Are you working with a **historic building, listed building or within a conservation area**?

☐ No ☐ Yes →

For additional information on work on existing historic buildings, refer to:

Energy Efficiency and Historic Buildings
EFDC Built Heritage

03 / Are you looking at **grant and/or incentive options** that may be available to you?

☐ Yes ☐ No →

For information on funding and grants available to individuals, refer to:

Green Homes Grant
Eco Flex
Domestic Renewable Heat Incentive

04 / Have you incorporated **sustainable design principles** in your extension / refurbishment project?

☐ No ☐ Yes →

Please tick the principles (following page) you have incorporated, and use the Sustainability Statement to give an example from the project that illustrates each relevant principle.

04 / (cont.)

- ☐ Landscape-Led Design
- ☐ Orientation & Form
- ☐ Energy Efficiency
- ☐ Renewable Technologies
- ☐ Adaptable & Future-Proof Design
- ☐ Fabric-First Approach
- ☐ Materials & Finishes
- ☐ Indoor Air Quality
- ☐ Water Management
- ☐ Waste Management

05 / Pick the following **building elements** that apply to your extension / refurbishment project, and provide specification details for each.

☐	Draught-proofing	
☐	Upgrading windows	
☐	New boiler	
☐	New lighting	
☐	Rainwater harvesting	
☐	Green / brown roof	
☐	Renewable energy technologies	
☐	Insulation	
☐	Other - please specify	

Sustainability Statement

Include any additional relevant information below.

NB. All submitted assessments / reports will be conditioned to the LPA at post completion / pre-occupation stage to ensure that all new developments are being completed to the specified design standards in order to close the performance gap and create truly sustainable communities.

APPENDIX

Appendix 1: Climate Emergency Declaration

EPPING FOREST DISTRICT COUNCIL

Declaration: Climate Emergency
Date of Declaration: 19th September 2019

Cllrs: S.Nevile + J.Phillip

Adopted Motion / Commitment:
1. Declare a 'Climate Emergency';

2. Pledge to do everything within the Council's power to make Epping Forest District Council area Carbon Neutral by 2030;

3. Call on Westminster to provide the powers and resources to make the 2030 target possible;

4. Work with other governments (both within the UK and internationally) to determine and implement best practice methods to limit Global Warming to less than 1.5°C;

5. Continue to work with partners across the district and region to deliver this new goal through all relevant strategies and plans;

6. In the special circumstances of this district, resolves to protect the Special Area of Conservation through the Local Plan and every other means;

7. Implement an Air Quality Strategy and bring forward Sustainability Guidance on planning; and

8. Engage with young people when considering the issue of climate change and appoint a 'Youth Ambassador' from the Epping Forest Youth Council."

Appendix 2: Glossary

Airtightness
Building airtightness is defined as the resistance to air leakage through unintentional points or areas in the building envelope. Heat can be lost through these gaps in the walls, floors and roofs of buildings creating draughts and so it is extremely important to make sure these are eliminated. This down to good detailing and good site workmanship.

Biodiversity
The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable.

Carbon Footprint
The amount of carbon dioxide released into the atmosphere as a result of the particular individual, organisation or community. The carbon footprint of a development is counted over its lifetime i.e. the materials used and their sources, construction, lifetime use and demolition.

Circular Economy
The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended.

Cold Bridge
Occurs when there is a thermal break in the insulating materials between the inside and outside of a building e.g. a gap in the wall or roof insulation, allowing heat to escape.

Development
'Development' includes building operations (e.g. structural alterations, construction, rebuilding, most demolition); material changes of use of land and buildings; engineering operations (e.g. groundworks); mining operations; other operations normally carried out by a person operating a business as a builder; subdivision of a building (or any part of it) used as a dwelling house for the use as two or more separate dwelling houses. As defined by section 55 of the Town and Country Planning Act 1990.

Embodied Energy
The sum of the energy requirements associated, directly or indirectly, with the delivery of a good or service. This includes: the energy required to initially produce the building (the processing and the manufacture of the materials of the building as well as their transportation and assembly on site), the energy needed to refurbish and maintain the building over its lifetime, and the energy necessary to demolish and dispose of the building at the end of its life.

Fossil Fuel
Fossil fuel is a general term for buried combustible geologic deposits of organic materials, formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the earth's crust over hundreds of millions of years. The burning of fossil fuels by humans is the largest source of emissions of carbon dioxide, which is one of the greenhouse gases that allows radiative forcing and contributes to global warming.

Green Infrastructure
Green infrastructure is a network of high quality and multifunctional green spaces , both urban and rural, including environmental features such as parks, public open spaces, playing fields, sports pitches, woodlands, and allotments, which are capable of delivering a wide range of environmental and quality of life benefits for local communities. The provision of green infrastructure can provide social, economic and environmental benefits close to where people live and work.

Local Plan
The plan for the future development of the local area, drawn up by the local planning authority in consultation with the community and stakeholders. Once adopted the Local Plan will legally form part of the Development Plan for the District, superseding the Replacement Local Plan (2006).

Appendix 2: Glossary (cont.)

National Planning Policy Framework
National Planning Policy Framework (NPPF) sets out the Government's planning policies for England, and provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflects the needs and priorities of their communities.

Operational Energy
Operational energy is the energy required during the entire service life of a structure such as lighting, heating, cooling, and ventilating systems; and operating building appliances.

Quality Review Panel
An independent panel of planning, architecture, urban design and construction experts set up by the Council to provide impartial expert advice to both applicants and local authorities on design issues in relation to important new development schemes and proposals for important public spaces including significant minor applications, major planning applications, pre-application development proposals, strategic masterplans and concept frameworks. The Quality Review Panel's feedback is a material consideration for local authorities and the planning inspectorate when determining planning applications. The purpose of the Quality Review Panel is to ensure that new development is of a high quality and contributes to place making.

Renewable Energy
Renewable energy is energy that is collected from renewable resources, which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat.

Sustainable Drainage Systems
These are drainage systems designed to manage surface water and groundwater to sustainably reduce the potential impact of new and existing developments on flood risk. They can form part of a wider integrated water management approach.

Zero Carbon
Causing or resulting in no net loss of carbon dioxide into the atmosphere. A zero carbon building is one with zero net energy consumption or zero net carbon emissions on an annual basis.

Appendix 3: LETI Retrofit Guidance