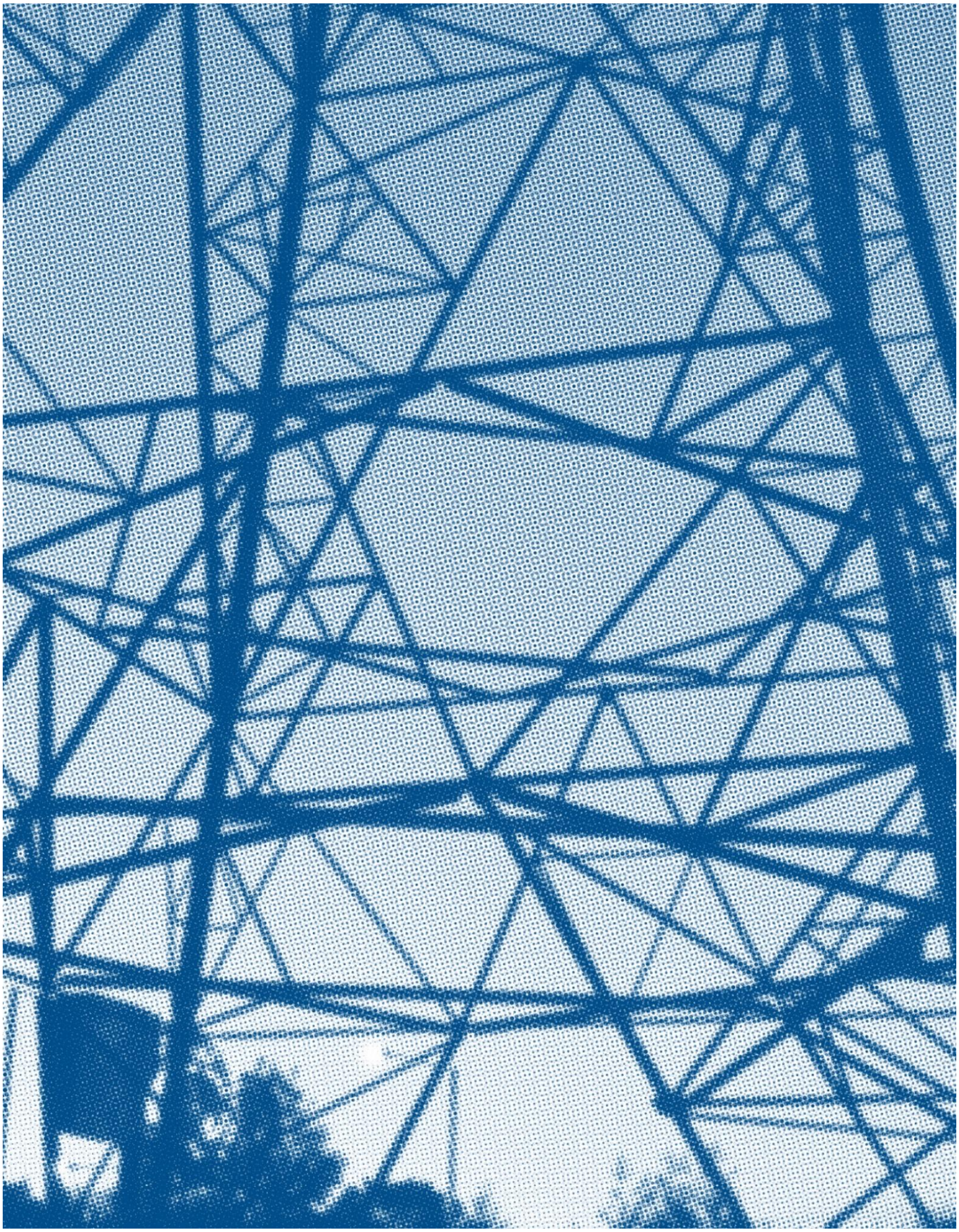

10. **CLIMATE CHANGE**

Strategic Policy CC8.10

Promoting Sustainable Design to Mitigate and Adapt to Climate Change

To make Merton a more environmentally sustainable place and net-zero carbon by 2050 [1], the council aims to reduce greenhouse gas emissions and increase local resilience to the impacts of a changing climate through sustainable design.

This will be achieved by requiring all development to:

a. Minimise greenhouse gas emissions and support the transition to a low carbon society by maximising energy efficiency, low carbon heat and local renewable energy generation;

b. Support the principles of the circular economy and promote more effective resource use, to ensure that resources are kept in use for as long as possible and minimise waste;

c. Recognise and adapt to Merton's changing climate and ensure that development mitigates the risk of overheating and flooding, and maximises comfort and wellbeing in a changing climate;

d. Maximise opportunities to enhance green infrastructure and tree planting to deliver multi-functional benefits such as minimising the urban heat effect, enhancing natural carbon sinks and improving air quality; and

e. Promote healthy and sustainable lifestyles in line with Merton's net-zero carbon target.

Justification

1.1.1. In accordance with Paragraph 149 of the NPPF, '*Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure*.'

A Climate Emergency and carbon reduction targets

1.1.2. In 2018, the Intergovernmental Panel on Climate Change (IPCC) published a Special Report [2] which concluded that global greenhouse gas (GHG) emissions need to reach net-zero by 2050 in order to keep global temperature rise below 1.5°C and minimise damaging climate impacts on human and natural systems. In May 2019, the Committee on Climate Change (CCC) recommended a new long-term emissions target for the UK: net-zero greenhouse gases by 2050 [3]. Following the adoption of the Climate Change Act 2008 (2050 Target Amendment) Order in 2019, the UK has a statutory requirement to reduce its GHG emissions by 100% by 2050 (based on 1990 levels) [4].

1.1.3. Furthermore, in his 1.5C Compatible Climate Action Plan 2018 [5] and Environment Strategy 2018 [6], the Mayor of London committed to London becoming a net-zero carbon city by 2050, with energy efficient buildings, clean transport and clean energy.

1.1.4. In July 2019, Merton Council declared a Climate Emergency and committed to working towards becoming a carbon neutral borough by 2050 and a carbon neutral Council by 2030 [7], in line with the national and regional targets mentioned above. Merton's Draft Climate Strategy & Action Plan [1][1] sets out the key actions required to achieve these carbon reduction targets across a range of sectors: economy, transport, buildings and energy, and green spaces.

1.1.5. By 2050, Merton will need to decarbonise activities across all sectors. This will require: a transition to a low carbon and circular economy which promotes the effective use of resources and minimises waste; all journeys using petrol and diesel vehicles will need to be replaced by low carbon alternatives such as cycling and walking, and low carbon vehicles; and emissions from all existing and new buildings will need to be net-zero carbon by minimising energy demand, and meeting all our energy needs using

[1] The Draft Climate Strategy & Action Plan was approved by Cabinet in July 2020 and is being considered by full Council on 18th November 2020.

renewable and low carbon energy [1] [8].

1.1.6. With some 81% of greenhouse gas emissions in Merton being generated from the energy used to heat and power our buildings, decarbonising our building stock will be a fundamental step in becoming a net-zero carbon borough [1]. The following policies aim to drive net-zero carbon development in Merton through sustainable design.

1.1.7. However, development should also encourage sustainable lifestyles more broadly. For example, development should reduce the need to travel, particularly by private car, and ensure that the largest possible share of journeys are made by active travel and public transport. Merton's transport policies are set out in Chapter 6.4 Transport. The council also encourages development to support community-led initiatives such as the promotion of decentralised renewable energy use or securing land for local food growing.

The role of sustainable design in getting to net-zero carbon

1.1.8. All buildings in Merton will need to operate at net-zero carbon by 2050 in order to achieve our carbon reduction target. A building which operates at net-zero carbon does not burn fossil fuels, has ultra-high energy efficiency and is 100% powered by renewable energy [9].

1.1.9. Extensive retrofit will be required to decarbonise Merton's existing building stock given that low carbon heat solutions require reasonable levels of energy efficiency (Energy Performance Certificate (EPC) rating of C) [5], and more than three quarters of Merton's 88,000 homes have an EPC rating of D or below [1]. The costs of achieving higher standards via retrofit are three to five times higher than for new buildings and the carbon impact of delayed action is significant [10]. Merton's decarbonisation pathways modelling, estimated that retrofitting Merton's existing building stock would cost in excess of £2.7 billion [8].

1.1.10. In order to achieve our carbon reduction target as cost effectively as possible, all new development must therefore be fit for the future (i.e. be ultra-energy efficient and climate resilient, and maximise low carbon and renewable energy) [11]. Any new buildings which are not built to operate at net-zero carbon will require expensive retrofit in the next 30 years. Current housing projections for Merton indicate that around 29,000[2] new dwellings could be built in Merton between 2021 and 2050. Policy must therefore ensure that new development in Merton does not create a legacy of poor performance that will require remedial action in the future and add to Merton's retrofit burden. In their Climate Emergency Design Guide (2020), the London Energy Transformation Initiative (LETI) concluded that all new buildings will need to operate at net-zero carbon by 2030 in order to achieve a zero carbon built environment in the UK by 2050. This means that all new buildings must be designed to operate at net-zero carbon by 2025.

The policy gap and the need for higher local standards

NATIONAL STANDARDS – PART L OF BUILDING REGULATIONS

1.1.11. There is a significant gap between current building standards (Part L 2013) and the standards required to become net-zero carbon by 2050 [12]. In order to achieve a net-zero carbon balance across the UK housing stock, LETI found that all new development will need to be designed to achieve an Energy Use Intensity (EUI), i.e. energy use measured at the meter, of 35kWh/m2.yr [9]. However, the current Part L average EUI is 140 kWh/m2.yr.

1.1.12. It is widely accepted that there is a significant performance gap between predicted and actual performance using the Part L methodology [9] [11]. Reasons for this include, but are not limited to, the following:

- Part L does not address emissions associated with unregulated equipment such as fridges, washing machines, cooking equipment, computers, etc. which can represent up to 50% of a building's operational emissions [9]. This means that a building achieving a 100% improvement against Part L doesn't necessarily achieve net-zero carbon operational emissions.

- The relative improvement approach against a notional building used in Part L does not reward more efficient building forms which ultimately provide more energy and carbon savings [12].

[2] Based on sites identified to be delivered during the 15 year plan period and an assumed delivery of the Intend to Publish London Plan target for Merton of 918 new dwelling per year for the remaining 15 years to 2050. See Housing policies for further details.

- Delays in incorporating up to date carbon factors in Part L can lead to perverse modelling outcomes by overestimating the carbon savings from gas given that the carbon factors currently used in Building Regulations do not take into account the decarbonisation of the electricity grid achieved since 2012 [10]. Part L also overestimates the emissions associated with electricity use over a building's lifetime as it does not consider impacts of further projected reductions in carbon intensity of electricity in coming decades.

1.1.13. In addition, in recent years, policies supporting low-carbon homes, such as Zero Carbon Homes and Code for Sustainable Homes, have been weakened or withdrawn at a national level [11]. Policy proposals encouraging high energy efficiency such as the 'Interim' and 'Full' Fabric Energy Efficiency Standards defined by the Zero Carbon Hub in 2009 [13] have not been enforced through Building Regulations which has led to the development of buildings which are not future-proofed for 2050 [14]. Current proposals for the Future Homes Standard 2025 do not address the shortcomings set out above and are not ambitious enough to deliver the savings required to achieve our carbon reduction targets [15] [16] [17] [18].

REGIONAL STANDARDS – THE LONDON PLAN

1.1.14. In order to drive greenhouse gas and energy savings in London, the Mayor has implemented a zero carbon policy for all major residential developments since 2016, and this policy was extended to major non-residential developments in the Intend to Publish London Plan 2019. This policy aims to achieve net-zero carbon development in London, however, in practice, there are a number of shortcomings to the policy which must be addressed in order to genuinely achieve our net-zero carbon target:

- A development which achieves a 100% improvement against Part L on site in line with the Mayor's zero carbon policy, does not necessarily achieve net-zero carbon operational emissions given that the current Part L methodology does not account for unregulated emissions [12].

- The London Plan allows for up to 65% of a development's regulated emissions to be offset through cash-in-lieu contributions which shifts the responsibility for offsetting any residual emissions to the local authority [12]. However, in order to achieve our net-zero carbon target, emissions will need to reduce close to zero without offsetting, so carbon offsetting must not be heavily relied upon and should only be considered where further savings cannot be achieved on-site [9] [3].

- The cost of carbon used to offset a development's carbon shortfall included in the London Plan does not incentivise developers to achieve further carbon savings on site as it does not reflect the actual cost of implementing carbon saving measures [12]. This in turn also limits the carbon savings which can be achieved through carbon offset funds and prevents a zero carbon balance from being achieved.

- The Mayor's zero carbon policy only applies to major schemes which represent less than 10% of schemes in Merton given that over 90% of schemes in the borough are minor. However, all buildings, regardless of the scale of development, will need to be net-zero carbon by 2050 in order to achieve our carbon reduction target.

1.1.15. The council is committed to driving sustainable design and minimising greenhouse gas emissions through local policies in Merton. Policies CC8.11 to CC8.13 are intended to go beyond the London Plan requirements to drive building energy performance which is compatible with our 2050 net-zero carbon target, by maximising on-site savings through energy efficiency and low carbon and renewable energy generation. These policies set out Merton's requirements based on the current Building Regulations (2013) Part L methodology, but also embed recommendations from the Zero Carbon Hub, the CCC 's report on making UK housing fit for the future and LETI's Climate Emergency Design Guide where possible.

1.1.16. In addition, as operational emissions decrease with the roll out of low carbon heat and higher energy efficiency standards, embodied emissions will make up an increasing proportion of a development's whole-life cycle emissions. Policy CC8.14 sets out Merton's requirements to minimise embodied carbon and Policy CC8.15 sets out the sustainability standards required of development in Merton.

Climate adaptation in Merton

1.1.17. There is extensive evidence that human-induced global warming has already caused significant changes to the climate system including an increased frequency and intensity of extreme weather events such as heatwaves and heavy precipitation events [2] [3]. This trend is expected to continue as the magnitude of warming increases.

1.1.18. Impacts in London will likely include increased heat, flooding and drought, with a greater frequency of severe weather events [19]. In order to ensure climate resilience in our communities and minimise future climate-related human and financial costs, these risks will need to be embedded in how we design the buildings in which we live and work. Policy CC8.16 below sets out the requirements for all development in Merton in line with the London Plan. There are strong links between this policy and other policy areas in Merton's Local Plan including Flooding and Open Space.

1.1.19. Merton's climate change policies should be read alongside Chapter 8 Green Infrastructure and Natural Environment and Chapter 9 Sustainable Infrastructure of the Intend to Publish London Plan (2019).

Policy CC8.11

Minimising Greenhouse Gas Emissions

The council will require all proposed development within the borough to demonstrate that the fullest contribution to minimising greenhouse gas emissions has been made on site.

This will be achieved by requiring:

All development:

a. To reduce energy demand and greenhouse gas emissions on site in accordance with the Mayor of London's Energy Hierarchy below, or in line with any future locally derived methodology:

- **i.** Be lean: use less energy and manage demand during operation
- **ii.** Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
- **iii.** Be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
- **iv.** Be seen: monitor, verify and report on energy performance

All development resulting in the creation of 1 or more dwellings or 500sqm or more non-residential GIA:

b. To provide an energy statement demonstrating how emissions savings have been maximised on site at each stage of the energy hierarchy in accordance with the relevant guidance.

c. To achieve the relevant minimum carbon reduction targets as set out in the table below:

Development Type	Minimum on-site total reduction in CO2[3]	Mayor's Net-Zero Carbon target applies[4]
Major residential development of 10 or more dwellings (including new build, change of use, conversions and major refurbishments)	60%	Yes
Minor new build residential development of 1 or more dwellings[5]	60%	Yes
Minor residential change of use and conversions resulting in the creation of 1 or more dwellings	35%	No
Non-residential development of 500sqm GIA or more (including new build, change of use and major refurbishments)	50%	Yes

Net-Zero Carbon

d. All major residential development, all minor new build residential development of 1 or more dwellings, and all non-residential development of 500sqm or more Gross Internal Area (GIA), to be net-zero carbon[6].

e. Where it is clearly demonstrated that the net-zero carbon target cannot be fully achieved on site beyond the minimum requirements, any carbon shortfall could be provided, either:

i. through a cash in lieu contribution to Merton's carbon offset fund, or

ii. off-site provided that an alternative proposal is identified, delivery is certain and subject to agreement with the council.

[3] This represents a minimum improvement beyond Part L of Building Regulations 2013. When Building Regulations are updated we will seek to apply an equivalent standard against the new Building Regulations.
[4] See policies (d) and (e).
[5] Throughout, this refers to gross residential development.

[6] As defined in the Intend to Publish London Plan (2019).

Justification

The Mayor's Energy Hierarchy

1.1.1. In line with the London Plan, all developments in Merton are required to maximise on-site carbon savings in accordance with the Mayor's energy hierarchy through energy efficiency, the use of clean energy, and on-site renewable energy generation, whether the minimum on-site saving has already been achieved or not.

1.1.2. All proposals resulting in the creation of 1 or more dwellings or 500sqm or more non-residential GIA will need to submit an energy statement which demonstrates that on-site carbon savings have been maximised at all stages of the Mayor's energy hierarchy.

1.1.3. Policies CC8.12 and CC8.13 below, set out Merton's requirements for the 'Be Lean' and 'Be Seen' stages of the energy hierarchy, and the 'Be Clean' and 'Be Green' stages respectively.

Net-zero carbon development

1.1.4. In order to achieve our net-zero carbon targets, all development, regardless of its size, will need to reduce greenhouse gas emissions to near zero on site, and become net-zero carbon or net-positive buildings [1].

1.1.5. Since 2016, the London Plan has implemented a zero carbon policy for all major residential developments to drive greenhouse gas and energy savings in London; this policy was extended to include major non-residential developments in 2020. To date, the Mayor's zero carbon policy has only been applied to major schemes in Merton.

1.1.6. However, over 90% of developments in Merton are built as minor schemes (i.e. 10 homes or less, or 1,000 sqm non-residential floor space or less). The vast majority of residential applications (around 7,000 in the last 5 years) are householder applications (i.e. proposals to alter or enlarge a single house, e.g. extensions). A large proportion of residential applications (over 1,000 in the last 5 years) are minor applications for the creation of new dwellings (including new build, conversions and change of use). A relatively small proportion of residential applications (around 100 in the last 5 years) are major applications. Around 90% of applications received for non-residential developments are smaller than 1000sqm GIA. Therefore, if Merton only requires major schemes to be net-zero carbon, there will be significant residual emissions from minor schemes in the borough which will prevent Merton from achieving its carbon reduction target without expensive retrofit in the next 30 years.

1.1.7. The council therefore requires all major residential development (including new builds, change of use, conversions and major refurbishments), all minor new build residential developments of 1 or more units, and all non-residential development of 500sqm[7] or more GIA (including new builds, change of use and major refurbishments), to be net-zero carbon as defined in the London Plan.

Minimum onsite carbon savings

1.1.8. The aim of the Mayor's zero carbon policy is to drive carbon savings on site and ensure that any carbon shortfall which cannot be addressed on site is offset elsewhere in the borough to achieve a net-zero carbon balance. However, in practice, the current London Plan approach (35% minimum target) allows up to 65% of carbon emissions from development to be offset via cash-in-lieu contributions, which shifts the responsibility to the local authority to make the scheme compliant. In order to achieve our carbon reduction targets, on-site emissions will need to reduce close to zero, so carbon offsetting must not be heavily relied upon and should only be considered where further savings cannot be achieved on site [9] [3].

1.1.9. In 2019/2020, a study commissioned by several London boroughs, to investigate the cost of carbon and its role in achieving greater carbon reductions on site, found that the London Plan on-site carbon reduction targets and cost of carbon are inadequate for delivering the savings required to achieve net-zero carbon [12]. The study demonstrated that, using more up to date carbon emissions factors than those used in Building Regulations 2013 (SAP 10 and SAP 10.1)[8], with an efficient low carbon heating system (e.g. a heat pump) and reasonable levels of fabric and ventilation performance, new build residential and non-residential developments can and should achieve at least a 60% and 50% improvement against Building Regulations 2013 respectively. The decarbonisation of the electricity grid means that, for the same specifications, a greater improvement over Part L is achieved with no extra effort/ cost.

[7] Since 2011, Merton has applied the London Plan targets to all non-residential schemes of 500sqm GIA or more given that a significant proportion of non-residential schemes in Merton are less than 1000sqm GIA.

[8] The use of outdated carbon emissions factors in Building Regulations means that SAP assessments currently don't reflect the actual carbon emissions associated with the expected operation of a development and significantly overestimate the expected lifetime carbon emissions from electricity use given that they do not reflect the decarbonisation of the electricity grid (Currie & Brown, 2019). This means that savings from the use of certain technologies, such as Combined Heat and Power (CHP) and solar photovoltaic (PV), are currently overestimated, whilst the savings achieved from the use of other technologies, such as heat pumps or mechanical heat ventilation recovery, are underestimated.

1.1.10. In order to drive on-site carbon reduction, the Council therefore requires all major residential development (including new builds, change of use, conversions and major refurbishments) and all minor new build residential development of 1 or more units to achieve at least a 60% improvement against Building Regulations 2013 on site. The Council requires all non-residential development of 500sqm or more GIA (including new builds, change of use and major refurbishments) to achieve at least a 50% improvement against Building Regulations 2013 on site. These minimum onsite targets will be reviewed over time unless there is a local or national change in methodology for assessing building energy performance. The council will seek to apply an equivalent standard when Building Regulations are updated. However, all development will need to demonstrate that on-site savings have been maximised at all stages of the energy hierarchy whether the minimum on-site target has already been met or not. Offsetting any carbon shortfall via cash-in-lieu contributions or via offsite renewable energy generation will only be considered where the Council is satisfied that on-site savings have been maximised.

Carbon offsetting and the cost of carbon

1.1.11. In order to genuinely deliver net-zero carbon development, carbon pricing must:

- Drive on-site savings by making it more cost effective for developers to deliver the savings on site than to opt to buy out of their obligation by paying carbon offset contributions; and

- Where offsetting is required, ensure that carbon offset contributions are sufficient for the local authority to pay for measures which achieve carbon savings equivalent to the carbon shortfall of the development. Otherwise developers are not achieving net-zero carbon development and the local authority cannot deliver a net-zero carbon policy [12].

1.1.12. Etude et al. [12] found that the London Plan carbon offset price (£95/t in the Intend to Publish London Plan 2019) is too low to actually deliver equivalent carbon savings and therefore does not incentivise sufficient on-site savings. Indeed, the cost of installing additional PV to achieve further improvement on site is currently at around £190/t and this cost is expected to increase to £325/t using the SAP 10.1 carbon factors as a result of the further decarbonisation of grid electricity. This means that, using the cost of carbon recommended in the London Plan, it is cheaper and easier for developers to offset carbon emissions via cash-in-lieu contributions than it is to achieve the actual savings on site, resulting in developments with higher operational emissions.

1.1.13. Etude et al. also found that it would cost a local authority at least £300/t to save carbon in a sustainable way, taking into account administration and management costs [12]. Local authorities therefore have insufficient funds to deliver equivalent carbon savings off site through cash-in-lieu contributions using a cost of carbon of £95/t.

1.1.14. In order to incentivise developers to implement lower carbon strategies on site where possible, and to ensure that any remaining carbon shortfall can adequately be addressed off site, the carbon shortfall for the assumed life of a development (e.g. 30 years) will therefore be offset at a rate of £300/t.

1.1.15. Etude et al. [12] modelled a number of technical scenarios and demonstrated that several low carbon solutions (involving good practice or ultra-low energy fabric, and a range of low carbon heating systems) achieved the proposed minimum on-site targets across several typologies.

1.1.16. These scenarios were modelled using different approaches to carbon offsetting to determine their associated construction and carbon offset costs, which were tested as part of Merton's Local Plan Housing Viability Study [20].

1.1.17. Developers will be expected to adopt the highest possible standards of fabric and ventilation and heating plant to maximise carbon savings on site. Any development that fails to achieve the necessary on-site performance targets or to demonstrate that carbon savings have been maximised, must provide full evidence and justification as to why the scheme is unable to comply. Where the developer contends the policy requirements in relation to viability of a particular proposal, the onus would lie with the developer to demonstrate what can viably be achieved through the submission of a viability assessment. We may seek payments from applications for the cost of independent viability assessment(s).

Minor conversions and change of use resulting in the creation of one or more units

1.1.18. Proportionally, Merton receives a large number of minor development applications; of which a large proportion involves conversions and change of use to create new dwellings. While individually these developments do not represent a large source of carbon emissions, their cumulative impact will significantly affect Merton's ability to achieve national, London-wide and local carbon reduction targets. The energy used to heat and power Merton's existing building stock represents approximately 81% of Merton's emissions. Significant retrofit will therefore be required in order to achieve net-zero carbon emissions in Merton by 2050.

1.1.19. In order to make our housing fit for the future, existing homes must be made low-carbon, low-energy and resilient to a changing climate [11] through the uptake of measures including:

- Improved insulation in lofts and walls;
- Double or triple glazing windows;
- Low-carbon heating;
- Draught proofing;
- Highly energy efficient appliances;
- Highly water efficient devices;
- Passive cooling measures such as shading and ventilation;
- Green space to reduce the risks of flooding and overheating;
- Improved flood resilience and resistance.

1.1.20. BEIS' Clean Growth Strategy sets out that all fuel poor homes will need to be upgraded to EPC Band C by 2030, and that as many homes as possible must reach a similar standard by 2035 [21].

1.1.21. In order to drive carbon reductions in Merton's existing building stock, conversions and change of use of all sizes will be expected to seek new, innovative and more robust approaches to maximising carbon savings on site. All minor change of use and conversions of existing buildings resulting in the creation of 1 or more dwellings will need to achieve a minimum on-site improvement of 35% against Building Regulations 2013. An energy statement will need to be provided to demonstrate how carbon savings have been maximised at all stages of the energy hierarchy whether the minimum on-site target has already been achieved or not.

Policy CC8.12

Minimising Energy Use

The council will require all proposed development within the borough to demonstrate that they have made the fullest contribution to minimising energy use through energy efficiency on site.

This will be achieved by requiring:

All development resulting in the creation of 1 or more dwellings or 500sqm or more non-residential GIA

a. To demonstrate how energy demand has been minimised on site through passive measures and by maximising the efficiency of building form, fabric and systems.

b. To disclose the anticipated and actual energy demand at design and pre-occupation stage based on a CIBSE TM54 analysis or equivalent, as well as the Part L assessments.

c. To achieve the following minimum on-site carbon savings through energy efficiency alone, as part of achieving the overall savings set out in Policy CC8.11 (c), in order to reduce energy demand:

- **i.** All development resulting in the creation of 1 or more residential units (including new builds, change of use, conversions and major refurbishments) must achieve at least a 10 per cent improvement against Building Regulations 2013 through energy efficiency measures.

- **ii.** All non-residential development of 500sqm GIA or more (including new builds, change of use and major refurbishments) must achieve at least a 15 per cent improvement against Building Regulations 2013 through energy efficiency measures.

All new build development resulting in the creation of 1 or more residential unit or 500sqm or more non-residential GIA

d. To demonstrate compliance with the following relevant fabric efficiency targets:

Type of Development	Zero Carbon Hub Interim FEES until 31 December 2022[9]	Zero Carbon Hub Full FEES from 01 January 2023 to 31 December 2024	Space Heating Demand Target from 01 January 2025[10]
Blocks of flats and mid-terrace houses	<43 kWh/m2/yr	<39 kWh/m2/yr	<15 kWh/m2/yr
Semi-detached, end of terrace and detached houses	<52 kWh/m2/yr	<46 kWh/m2/yr	<20 kWh/m2/yr
Non-residential development	-	-	<15 kWh/m2/yr

e. From 2025, to meet the maximum Energy Use Intensity[11] targets as set out in the relevant guidance.

All major development

f. To monitor and report on energy use for 5 years post-occupancy[12].

[9] Based on the Fabric Energy Efficiency Standard for Zero Carbon Homes as defined by the Zero Carbon Hub (2009) [42].

[10] Based on recommendations from the Committee on Climate Change (2019) [11] and the London Energy Transformation Initiative (2020) [9].

[11] An annual measure of total energy consumed in a building which can be estimated at design stage and easily monitored in-use as energy bills are based on kWh of energy used by the building. It includes regulated (heating, hot water, cooling, ventilation and lighting) and unregulated (plug loads and equipment) energy.

[12] In line with the GLA's 'Be Seen' Energy Monitoring Guidance, or equivalent.

Justification

1.1.1. A building's operational carbon emissions are a direct result of its energy use. In order to reduce greenhouse gas emissions and ultimately achieve our carbon reduction targets, a development will therefore first and foremost need to minimise energy use through energy efficiency, as reflected in the first tier of the Mayor's Energy Hierarchy: 'Be Lean'.

1.1.2. In addition, the transition to low carbon heat, which is required to deliver long term carbon savings, is contingent on having high levels of energy efficiency [22].

1.1.3. Energy efficiency will depend on both building and equipment design. This policy focusses primarily on fabric efficiency, and Policy CC8.13 below addresses the importance of efficiency of plant in decarbonising heat.

The role of energy efficiency in delivering low carbon heat

1.1.4. In order to manage running costs and avoid external costs to the grid infrastructure, a transition to low carbon heat can only be achieved through significant improvements to energy efficiency [10]. Indeed, low carbon heating solutions (such as heat pumps and solar thermal) tend to operate most effectively at low temperatures, and are therefore much more sensitive to energy efficiency than conventional gas boiler systems [9]. Indeed, if a building's heat losses are much higher than anticipated, a low temperature heating system has to run at higher operating temperatures to compensate for this, which can result in significant increases in energy use and energy bills [10]. In addition, as we move from gas to electricity to heat our buildings, energy use needs to be minimised to reduce the demand for energy generation and peak loads on the national grid [9] [23].

1.1.5. The council therefore requires compliance with minimum on-site carbon reduction targets through energy efficiency alone in line with the London Plan. Developers will need to demonstrate a 10% and 15% improvement for all residential development resulting in the creation of 1 or more units and non-residential development of 500sqm GIA respectively (including new builds, change of use, conversions and major refurbishments).

1.1.6. However, there are limitations to using Building Regulations as a tool for driving energy efficiency. Indeed, the Part L methodology enables low carbon energy to compensate for poor building fabric and doesn't reflect efforts to improve energy efficiency through form [14]. Part L assessments also underestimate carbon savings achieved through improvements to fabric and ventilation, given that they underestimate a development's space heating requirements [12].

The need for fabric energy efficiency standards

1.1.7. Improved fabric energy efficiency will ensure that buildings use low and zero carbon energy in the most efficient way [11]. As well as reducing greenhouse gas emissions, using ultra-high levels of fabric efficiency alongside heat pumps and Mechanical Ventilation and Heat Recovery (MVHR) systems can help reduce annual and peak electricity demand, provide comfort and health benefits to occupants, and deliver average bill savings of around £85 per year for a typical three bedroom semi-detached house [11]. This will also help 'future proof' developments and reduce the likelihood of buildings needing difficult and expensive refurbishment at a later date.

1.1.8. In 2019, the Committee on Climate Change recommended to the UK government that new homes should deliver ultra-high levels of energy efficiency achieving a space heating demand of 15kWh/m2/yr or less as soon as possible and by 2025 at the latest [11]. In 2020, the London Energy Transformation Initiative published their Climate Emergency Design Guide which concluded that in order to achieve our national carbon reduction targets, all new residential and non-residential buildings should be designed to achieve a space heating demand of 15kWh/m2/yr or less by 2025 [9].

1.1.9. In order to give industry the opportunity to adjust, Policy CC8.12 (d) sets out a gradual increase in fabric energy efficiency standards for residential developments. To do this, the Council will require all new build residential developments to comply with the minimum Fabric Energy Efficiency Standard (FEES) for Zero Carbon Homes defined by the Zero Carbon Hub in 2009.

1.1.10. The FEES, measured in kWh/m2/yr and available through the Government's Standard Assessment Procedure (SAP), covers space heating and space cooling energy demand. The FEES allows design flexibility, takes into account building form, promotes innovation and delivers a specific level of dwelling performance. The FEES is much better at recognising efforts made to improve energy efficiency through building form and fabric specifications than a percentage improvement against Building Regulations, as demonstrated by Etude in 2017 [14].

1.1.11. The Zero Carbon Hub recommended two different performance levels for (a) blocks of flats and mid terrace houses, and (b) semi-detached, end of terrace and detached houses. This is because certain dwelling types with less exposed fabric relative to floor areas, such as mid-floor apartments, can achieve a lower energy space heating and cooling demand with a less challenging construction specification than other dwelling types.

1.1.12. To encourage a gradual shift in fabric efficiency, the Zero Carbon Hub defined an 'Interim FEES' for implementation from 2013 and a 'Full FEES' for implementation from 2016. These standards were never introduced through Building Regulations as a result of the national Zero Carbon Homes policy being scrapped. However, in 2017, Etude demonstrated that both the interim and full FEES were technically feasible and viable with a range of combinations of form and fabric specification [14] and these standards are already being achieved by a number of schemes in Merton.

1.1.13. The council will therefore require all new residential development to achieve at least the 'interim' FEES until the end of 2022 and at least the 'full' FEES from the start of 2023. In line with the recommendations from LETI and the CCC, the Council will also require all new build residential and non-residential development to achieve a space heating demand of 15kWh/m2/yr or less by 2025.

Closing the gap between predicted and actual energy demand

1.1.14. It is widely accepted that there is a significant performance gap between the energy use and carbon emissions estimated at design stage and the actual in-use performance of buildings using the current Building Regulations Part L methodology, and that this needs to be addressed in order to genuinely make our buildings net-zero carbon [9] [11] [24]. The Part L methodology uses carbon emissions as the main performance metric which is dependent on the carbon factor of the electricity grid and does not necessarily reflect good operational performance. The UK Passivhaus Trust found that new build houses have an average performance gap of 40% between the actual overall energy use compared to the EPC modelling carried out at design stage [23] which means that buildings are emitting significantly more carbon than predicted using the SAP methodology.

1.1.15. Managing the performance gap and ensuring good design is particularly important with the roll-out of low carbon heating systems which are much more sensitive to building heat losses and system inefficiencies than traditional gas heating systems [10].

1.1.16. In addition, current Building Regulations (2013) do not address unregulated emissions associated with cooking, white goods and other equipment which can represent up to 50% of a building's operational emissions [9]. Operational performance of buildings therefore cannot be verified using the Part L methodology. The CCC has highlighted the importance of improving building performance monitoring and focussing on 'as built' performance in order to close this performance gap which could deliver £70-260 in annual bill savings per household [11].

1.1.17. In order to improve our understanding of energy demand and drive more energy efficient design of buildings, the council requires all developments resulting in the creation of 1 or more dwellings or 500sqm or more non-residential GIA to determine their anticipated and actual energy demand at planning and pre-occupation stage using the Chartered Institute of Building Service Engineers (CIBSE) TM54 methodology, or equivalent. This methodology enables more accurate determination of the anticipated energy demand and carbon emissions by considering factors which impact on a building's energy performance including expected occupancy and use, and calculates unregulated loads [25]. This methodology can also be used to verify the performance of the constructed building in operation, which is not possible with Building Regulation Part L percentage reductions.

1.1.18. In addition, all major developments are required to monitor and report actual operational energy performance for at least five years post-occupancy in line with policy SI 2 in the London Plan 2020 and the GLA's 'Be Seen' Energy Monitoring Guidance 2020.

A new metric for measuring performance: Energy Use Intensity

1.1.19. LETI's Climate Emergency Design Guide, which sets out a roadmap to net-zero carbon, recommends the use of Energy Use Intensity (EUI) targets in regulations, policy and design decisions to drive energy efficiency. EUI is an annual measure of total energy consumed in a building which can be estimated at design stage and easily monitored in-use as energy bills are based on kWh of energy used by the building. It includes regulated (heating, hot water, cooling, ventilation and lighting) and unregulated (plug loads and equipment) energy [9].

1.1.20. In 2019, Currie and Brown also recommended that absolute performance targets are used to reduce energy demand (peak demand in particular) in order to reward energy efficient designs and minimise running costs and pressures on the national grid [10].

1.1.21. LETI have identified energy consumption targets for four building typologies consistent with achieving national net-zero carbon targets; LETI concluded that all new build development should be designed to achieve these standards by 2025 [9]:

- **Small scale residential** – reducing EUI to 35 kWh/m2/yr in GIA excluding renewable energy contribution, and reducing space heating demand to 15 kWh/m2/yr.

- **Medium and large scale residential** – reducing EUI to 35 kWh/m2/yr in GIA excluding renewable energy contribution, and reducing space heating demand to 15 kWh/m2/yr.

- **Commercial offices** – reducing EUI to 55 kWh/m2/yr in GIA excluding renewable energy contribution, and reducing space heating demand to 15 kWh/m2/yr.

- **Schools** - reducing EUI to 65 kWh/m2/yr in GIA excluding renewable energy contribution, and reducing space heating demand to 15 kWh/m2/yr.

1.1.22. The council expects all new development to make reasonable endeavours to achieve these EUI and space heating demand targets to future-proof their development and lead the way in decarbonising Merton until EUI targets are required through national regulations or a locally derived methodology. The council will enforce EUI targets from 2025; these targets will be confirmed in relevant guidance closer to the time in order to consider the latest evidence and technologies.

1.1.23. Developments are also encouraged to adopt recognised and successful fabric first approaches such as Passivhaus which is seen as the most stringent low ‘energy in use’ standard and is consistent with LETI’s Climate Emergency Design Guide. This standard also relies on a more accurate energy demand assessment methodology using the Passive House Planning Package (PHPP).

Policy CC8.13

Low Carbon Energy

All proposed developments within the borough must demonstrate that they have made the fullest contribution to supplying energy efficiently and cleanly, and maximising renewable and low carbon energy generation, storage and use, through the deployment of appropriately selected, sized and sited technologies.

This will be achieved by requiring:

a. All new development to use low carbon heat. No gas boilers can be installed in new development in Merton from January 2023.

b. All development proposals to demonstrate in the energy statement:

- **i.** How the proposal has made the best potential use of roof space to maximise local renewable and low carbon electricity and/or heat generation – 100% of energy demand should be met by renewable energy generation on site wherever possible;
- **ii.** How appropriate roof spaces have been utilised to maximise the delivery of multi-functional benefits (e.g. co-location of renewable energy and green, brown or blue infrastructure);
- **iii.** How demand-side response has been incorporated, specifically through the installation of smart meters, minimising peak energy demand and promoting short term energy storage;
- **iv.** How the proposal has ensured efficient generation of low carbon energy on site; any developments proposing to use heat pumps to demonstrate that these are good quality and achieve a minimum standard of efficiency; and
- **v.** How all major development proposals located within identified heat network opportunity areas have utilised decentralised energy, or are enabled for connection to current or future district heat networks, unless it is demonstrated that it is not technically feasible to do so.

Justification

1.1.1. In order to have net-zero carbon emissions, once energy demand has been minimised, the remaining energy we use to power and heat our buildings will need to be generated from clean, low carbon and renewable sources [9].

The decarbonisation of heat

1.1.2. Low carbon heat is an essential component of our roadmap to net-zero carbon given that heat accounts for a third of the UK's greenhouse gas emissions [11] [22]. BEIS' Clean Growth Strategy emphasized that a fundamental shift away from fossil fuels for heating is required, alongside reductions in energy demand through energy efficiency [21]. In 2015, the Energy Technologies Institute estimated that 20,000 households per week would need to be switched from gas to low carbon heating between 2020 and 2050 in order to bring emissions from the UK's existing housing stock to near zero carbon [26].

1.1.3. 98% of homes in Merton use gas as their primary source of heating. All buildings in Merton must be gas free by 2050 in order to achieve our carbon reduction target, unless the Government plan to supply a low carbon gas through the gas grid [1]. There is increasing interest in the use of hydrogen as a low carbon alternative to gas [21], but insufficient evidence is currently available to demonstrate that this is a credible option for wide-scale decarbonisation of heat in the short term [27] [28] [12] [29].

1.1.4. Low carbon heating generally requires different space heating design standards to gas heating as the former tends to operate most effectively using a low temperature system whereas the latter operates at high temperatures [10]. A building typically has a lifespan longer than 30 years, so any new building which is designed and built to use a high temperature heating system will require retrofit to move to a low carbon system before 2050.

1.1.5. In their 2019 study [10] on the costs and benefits of tighter energy efficiency standards, Currie & Brown demonstrated that delayed action in decarbonising heat would have a significant carbon impact: each year of delay in adopting lower-carbon heat technologies could result in several million tonnes of avoidable carbon emissions. They found that a home built to use gas heating in 2020 which is retrofitted to use a heat pump in 2030 can be expected to emit over three times more carbon over 60 years than if the heat pump was installed from the start, as the house would have originally been built to different space heating design standards.

1.1.6. The costs of installing low carbon heat as a retrofit are also between three and ten times higher than delivering them in a new building [10]. The Clean Growth Strategy highlighted the importance of ensuring that all new homes can accommodate low carbon heating in order to avoid the need for expensive retrofit further down the line. In their 'UK Housing: Fit for the Future?' report (2019), the CCC concluded that no new homes should be connected to the gas grid from 2025 at the latest, with ultra-low energy homes using low carbon heat instead [11].

1.1.7. In order to drive the decarbonisation of heat in Merton and minimise the retrofit burden, the council requires all new development to use low carbon heat efficiently. Any development that proposes to use gas-powered systems will need to provide robust justification to satisfy the council that low or zero carbon systems cannot be used, to set out how the development has been future-proofed to achieve net-zero carbon by 2050, and to demonstrate that the gas-powered system is credibly being used as a stepping stone towards this objective. No gas boilers can be installed in new development from January 2023.

The electrification of heat

1.1.8. The electrification of heat will likely play a major role in decarbonising heat. As well as becoming a lower carbon energy source with the decarbonisation of the national grid, electricity also provides air quality benefits which is particularly important in a London-borough [12].

1.1.9. There are a range of technologies that can convert electricity into heat including heat pumps and direct electric heating systems. Proposals using direct electric heat will only be deemed acceptable if they are combined with ultra-high fabric efficiency in order to minimise energy use and limit running costs [12].

1.1.10. Heat pumps[13] are likely to play a growing role in the delivery of low carbon heat in London, as part of both low carbon heat networks and individual building heating systems [27].

1.1.11. Well designed, installed and maintained heat pumps can be very energy efficient and a way of harnessing waste heat. Heat pumps typically achieve efficiencies between 260 and 320% [27], whereas direct electric systems and gas boilers typically operate between 80 and 100% efficiency [22]. In addition, heat pumps use low flow temperature and large emitters to spread heating throughout the day, resulting in reduced peak heating demand compared to gas boilers and direct electric systems which operate when heat is desired

[13] A heat pump uses electricity to increase the temperature of a low temperature heat source (e.g. air, water or ground).

[22]. Heat pumps also have the benefit of being smart grid ready which could enable demand-side response.

1.1.12. Heat pumps are already a lower carbon system than gas boilers, and the carbon factor for grid electricity is expected to decrease further as more renewable energy is produced, while the carbon content of gas is likely to remain the same unless low carbon gasses are introduced to the gas grid [12]. Heat pumps also provide air quality benefits given that they do not produce any direct emissions on site.

1.1.13. Low-carbon heat using a heat pump is cost effective when built into new homes from 2021 and should not increase running costs if the system is well designed, installed and operated, particularly in well-insulated buildings [10]. Heat pump deployment in new build properties will also play an important role in helping develop the heat pump markets and supply chains required to electrify heat in our existing building stock [28].

1.1.14. However, inappropriate design, installation or operation of heat pumps can result in high energy costs and increased peak electricity demand. In order to mitigate impacts on the electricity grid and operating costs, electrical heating systems must be highly efficient and paired with high fabric efficiency [9] [27]. All new development should be designed to harness heat at low temperatures given that heat pumps tend to operate significantly more efficiently at lower temperatures and waste heat sources are also typically at lower temperatures [9].

1.1.15. Where heat pumps are proposed, developments will need to demonstrate that efficiencies have been maximised through the proposed technology and heating system. A high specification of energy efficiency (coefficient of performance) will be expected to ensure the system works efficiently and reduces running costs and peak electricity demand. UKPN has indicated that they will actively plan for additional demand due to heat pumps, provided they have early visibility of any deployment plans, and are notified of installations on their networks [27].

Decentralised energy

1.1.16. The use of decentralised energy and local secondary heat sources is expected to play a significant part in reducing emissions from buildings in London and meeting the Mayor’s zero carbon target [30]. All major development proposals will be expected to comply with London Plan policies on decentralised energy networks and decentralised energy.

1.1.17. The council will require all proposed major development and regeneration schemes within any identified heat network opportunity areas to fully explore and utilise decentralised energy, subject to technical and financial viability. Heat-mapping and feasibility studies undertaken by AECOM in 2017 [31]/2018 [32] identified two district heat network opportunity areas in Merton linked to two major regeneration schemes: Morden town centre and South Wimbledon (High Path estate).

1.1.18. Given that the carbon savings from gas engine combined heat and power (CHP) systems are declining due to the decarbonisation of the national electricity grid, and increasing evidence of adverse air quality impacts, developers will be required to consider low and zero carbon heat sources and existing heat networks will need to be decarbonised [30].

Renewable energy generation

1.1.19. The use of renewable and low-carbon micro-generation technologies (e.g. solar photovoltaic panels, solar thermal and air source heat pumps) is now a viable, cost-effective and practical approach to ensuring developments can achieve their on-site carbon emissions requirements alongside low carbon heat and high energy efficiency, and will play a crucial role in achieving our net-zero carbon target [21] [12] [9].

1.1.20. In order to genuinely operate at net-zero operational carbon, all buildings must be 100% powered by renewables [9]. As renewable energy generation increases in the UK, grid electricity will continue to decarbonise [8]. However, electricity demand is expected to increase across London as a result of population growth, the electrification of heat and increased uptake of electric vehicles [30]. In order to limit pressure on the national electricity grid, contribute to the decarbonisation of grid electricity (if development feeds back to the grid), and ultimately build a more resilient local energy supply, the council requires all development to demonstrate that on-site renewable energy generation has been maximised and that 100% of energy demand is met through on-site renewable energy generation wherever possible.

1.1.21. Developments in conservation areas or involving heritage assets need to provide careful consideration of how sustainable energy measures may be incorporated without adversely impacting on the character, function and preservation of a specific area or asset, in accordance with the policies on design in this Local Plan. In such circumstances, development proposals should not presume that a viable sustainable solution cannot be provided. Where necessary, Merton will determine whether the provision of sustainability measures causes any adverse impact with the asset or area, and will prioritise safeguarding of the asset, as appropriate.

Demand-side response and energy storage

1.1.22. Demand-side response involves changing how and when electricity is used to minimise peak energy demand. Demand-side response will play an important role in embedding flexibility in our energy systems, improving the utilisation of intermittent low carbon energy generation, and ensuring that energy supply always meets demand whilst reducing pressure on the national grid [33].

1.1.23. Energy storage (heat and battery storage) and flexibility will need to be maximised to reduce energy use and pressure on the national grid at peak times, and ensure that variable renewable energy supply can match electricity demand at all times [11] [34] [9]. Advancements in energy storage technology have meant that energy storage is now feasible at individual domestic level, and costs are predicted to continue to fall [10].

1.1.24. The council therefore requires all development to demonstrate that demand-side response has been considered and maximised alongside renewable energy generation.

Policy CC8.14

Minimising Waste & Promoting a Circular Economy

The council will require all development proposals to adopt a circular economy approach to building design and construction to reduce waste, to keep materials and products in use for as long as possible, and to minimise embodied carbon.

This will be achieved by requiring:

All development:

a. To prioritise the reuse and retrofit of existing buildings wherever possible before considering the design of new buildings.

b. To be designed for durability and flexibility as well as easy disassembly and reuse to minimise waste during the ‘in-use’ and ‘end of life’ phases of the development. Building shape and form should be designed to minimise embodied carbon and limit the need for repair and replacement.

c. To ensure resource efficiency and reduce embodied carbon emissions by sourcing and prioritising materials that can easily be maintained, repaired and renewed across the development lifetime.

d. To minimise the environmental impact of materials by specifying sustainably-sourced, low impact and re-used or recycled materials; this should include identifying opportunities for the retention and reuse of existing materials on site (e.g. re-using demolition material on site). Materials should be locally-sourced wherever possible to minimise transport emissions.

All major development and all development proposing to demolish and rebuild:

e. To undertake a Whole Life-Cycle Carbon assessment in line with the GLA’s Whole Life-Cycle Carbon Assessments Guidance, or equivalent, and demonstrate that whole life-cycle carbon savings have been maximised.

Justification

Embodied carbon and a circular economy

1.1.1. The construction of a development uses energy and resources which represent its embodied carbon emissions. Of the annual carbon emissions associated with the UK building stock (existing and new build) 20% is related to the embodied emissions associated with new construction [9]. Climate change policies relating to sustainable design have traditionally focused on reducing operational carbon emissions. However, as buildings become more energy efficient and energy generation is decarbonised, the proportion of operational emissions will significantly reduce and embodied carbon will represent a higher proportion of whole life carbon emissions. Embodied carbon can represent 40-70% of whole life carbon emissions in a new low carbon building [9].

1.1.2. A circular economy is one that seeks to promote waste minimisation by moving from a more traditional linear model of resource use, consumption and disposal, to one that promotes long-term sustained use, reuse and recycling. Merton is supportive of the move towards a more circular economy. As such, circular economy principles should be embedded across all facets of the development lifecycle - from concept and design to build-out and occupation/ use, in order to increase resource efficiency, minimise operational and embodied carbon emissions, and minimise residual waste.

1.1.3. Circular economy opportunities might include using materials with a lower embodied carbon (e.g. timber rather than concrete frame – using timber also provides an opportunity to sequester carbon), using more recycled content in the materials and finding other ways to enhance recovery and recyclability (e.g. reinforcement free concrete). Mechanical and electrical services will typically need to be replaced every 20 years and should therefore be designed to allow easy recovery, reconditioning and reuse whilst also optimising for performance and carbon emissions. Encouraging a ‘fabric first’ approach to building design can also minimise mechanical plant and services in favour of natural ventilation.

1.1.4. LETI identified the following embodied carbon targets consistent with achieving our national net-zero carbon target and concluded that all new build development should be designed to achieve these standards by 2025 [9]:

- Residential: <600kgCO2/sqm
- Non-residential: <500kgCO2/sqm

1.1.5. All new build development will be expected to endeavour to achieve these targets.

Whole life-cycle carbon emissions

1.1.6. A whole life-cycle carbon approach which captures a building's operational (regulated and unregulated) and embodied emissions as well as emissions associated with the maintenance and disassembly and disposal of the development is required to fully understand the impact of a development. Careful and considered use of natural and renewable resources, promoting sustainable construction and minimising energy use are key considerations in securing a sustainable, low carbon future for Merton.

1.1.7. Historically, Merton has received a large number of applications for the substantial or total demolition of a single dwelling house and rebuild as a single dwelling. Such proposals are typically driven by design, intensification or lifestyle rather than on the grounds of structural instability.

1.1.8. All such proposals outside of structural instability are considered a highly inefficient use of resources and materials and contrary to the principles of sustainable development and the circular economy. Even where proposals are deemed to result in an improvement of 'in use' energy consumption, the embodied carbon footprint of whole scale demolition and rebuild means that any environmental benefits are unlikely to be realised in the long term.

1.1.9. The council therefore requires all major schemes and all proposals to demolish and rebuild to submit a Whole Life-cycle carbon assessment in line with the GLA's Whole Life-Cycle Carbon Assessment Guidance 2020, or equivalent. Developers will be required to demonstrate that the development has been designed and delivered in accordance with the principles of a circular economy to minimise embodied carbon through a whole-life cycle carbon assessment.

1.1.10. This policy will also apply in cases where a substantial amount, but not all, of the original building is demolished and rebuilt (for example, where the original façade is required to be retained).

Policy CC8.15

Sustainable Design Standards

The Council will seek high standards of sustainable design and construction from new development, change of use, conversions and refurbishments to ensure that all development makes effective use of resources and materials, minimises water use, and assists in meeting local and national carbon reduction targets.

This will be achieved by:

a. Requiring all development to demonstrate that the use of mains water has been minimised by incorporating measures such as smart metering, water saving and recycling measures, and retrofitting water efficiency measures where appropriate.

b. Requiring all major development and high water use developments[14] to include water saving measures such as rainwater harvesting and greywater recycling to reduce mains water consumption.

Residential development:

c. Requiring all residential development to meet a minimum internal water efficiency standard of 105 litres per person per day, as set out in Building Regulations Part G or equivalent.

d. Requiring all conversions and changes to the use of existing buildings resulting in the creation of one or more new dwelling(s) to achieve a minimum BREEAM Domestic Refurbishment rating of ‘Excellent’ or equivalent, and to meet carbon reduction targets in line with Policy CC8.11.

Non-residential development:

e. Requiring all new build non-residential development of 500sqm GIA and above, to achieve a minimum of BREEAM ‘Excellent’ standard or equivalent, and to meet carbon emission reduction targets in line with Policy CC8.11.

f. Requiring all conversions and changes of use to non-residential uses with an internal floor area of 500sqm and above to achieve a minimum of BREEAM Non-domestic Refurbishment and Fit-out ‘Excellent’ standard or equivalent, and to meet carbon emissions reduction targets in line with Policy CC8.11.

[14] High water use developments include hotels, hostels and student housing.

Justification

1.1.1. The principles of sustainable design and construction are designed to be holistic and are more wide ranging than energy performance alone. National sustainable design and construction standards such as BREEAM ensure that a development's full impact on the environment, including water use, transport and land use and ecology, as well as energy use and waste are considered and addressed. Using these standards or any subsequently adopted set of national sustainable construction standards, will assist in the delivery of a number of the policies covered in the Local Plan including the Transport, Open Space and Climate Change policies.

1.1.2. The highest standards of sustainable design and construction should be applied to improve the environmental performance of new development. Development proposals must demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure that they are considered at the beginning of the design process.

1.1.3. Proportionally, Merton receives a large number of minor development applications which involve the conversion and change of use of existing buildings to create new dwellings. The BREEAM Domestic Refurbishment standard provides a recognised scheme and methodology by which conversions and change of use can demonstrate their adherence to sustainable design and construction methodologies. In particular, this scheme will help drive energy efficiency improvements across Merton's existing building stock through its post-refurbishment Energy Efficiency Rating requirements.

Minimising water use

1.1.4. According to Waterwise, the UK has less available water per person than most other European countries [35]. London is drier than Istanbul, and the south-east of England has less water available per person than the Sudan and Syria. London has lower rainfall than the national average while having an extremely high population density [36].

1.1.5. This combination of limited water resources and high demand has resulted in London being declared an area of serious water stress [37]. This trend is very likely to be exacerbated by future changes in climate [38].

1.1.6. The council therefore requires all development to demonstrate that the use of mains water has been minimised by incorporating measures such as smart metering, water saving and recycling measures, and retrofitting water efficiency measures where appropriate, to help achieve lower water consumption rates and to maximise future-proofing.

1.1.7. All non-residential schemes will be required to achieve at least a 12.5% improvement against a baseline building water consumption rate through the BREEAM New Construction and Non-domestic Refurbishment and Fit-out schemes. All residential schemes will be required to demonstrate that internal water usage rates of less than 105 litres per person per day have been achieved.

1.1.8. All major developments and high water use developments, such as hotels, hostels and student housing, will be expected to include water saving measures such as rainwater harvesting and greywater recycling to achieve lower water consumption rates.

1.1.9. New development, conversions and change of use of all sizes should seek new, innovative and more robust approaches to achieving a high standard of sustainable design and construction.

Policy CC8.16

Adapting to a Changing Climate

The council will require all development proposals to demonstrate that they are well designed, fully adaptable and resilient to the impacts of a changing climate, and will not exacerbate any climate change impacts elsewhere.

This will be achieved by requiring:

All development:

a. To mitigate the risk of overheating and adverse impacts on the urban heat island, through design, orientation, layout, materials and the use of green and blue infrastructure.

b. To demonstrate how the risk of overheating and demand for active cooling will be reduced in accordance with the following cooling hierarchy:

- **i.** Reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
- **ii.** Minimise internal heat generation through energy efficient design
- **iii.** Manage the heat within buildings through exposed internal thermal mass and high ceilings
- **iv.** Provide passive ventilation
- **v.** Provide mechanical ventilation
- **vi.** Provide active cooling systems

c. To prioritise dual aspect dwellings and avoid single aspect dwellings[15].

d. To mitigate the risk of flooding (from all sources), both to and from the development for its lifetime and incorporate Sustainable Drainage Systems (SuDS) to reduce offsite runoff to greenfield rates and incorporate water efficiency measures.

[15] A single aspect dwelling will only be considered where it can be demonstrated that it will have adequate passive ventilation, daylight and privacy, and avoid overheating.

Justification

1.1.1. The impacts of climate change mean that London is likely to experience more frequent and severe extreme weather events; including higher average temperatures, more prolonged spells of intensely hot weather and higher seasonal and extreme rainfall [19].

Overheating

1.1.2. 20% of homes in England currently overheat even in cool summers and annual UK heat-related mortality is projected to increase from a current baseline of 2,000 heat-related deaths per year to 5,000 per year by 2050 [11]. Within London, the challenges of overheating are intensified by the urban heat island effect – caused by the absorption and retention of heat in built-up urban areas [19]. Issues of overheating can also be exacerbated by modern sustainable design, including improved air tightness [39].

1.1.3. The council therefore requires all development to demonstrate that the risk of overheating has been mitigated in line with the relevant guidance.

1.1.4. Development must prioritise passive design measures to promote cooling (e.g. design, layout and orientation) ahead of active forms of ventilation (e.g. air conditioning) so as to limit intensive energy use and waste heat production. However, passive ventilation strategies cannot be considered in isolation of potentially negative external environmental factors such as air quality or noise. Energy strategies that rely on passive ventilation must clearly demonstrate that occupants will not be adversely affected by air and noise pollution during periods of warmer weather.

1.1.5. Single aspect dwellings are more difficult to ventilate naturally and are more likely to overheat [40]. All domestic development must be dual aspect unless it can be demonstrated that a single aspect unit will have adequate passive ventilation, daylight and privacy, and avoid overheating without reliance on energy intensive mechanical cooling systems.

Flooding

1.1.6. Thames Water has modelled the impact of London’s projected population growth and climate change on its drains and sewers to understand their ability to cope with these future challenges [41]. The modelling shows that for a relatively common rainfall event in 2050 (one that would be expected on average once every other year), some areas of London, would not have sufficient drainage or sewerage capacity to manage the expected flows, leading to an increasing risk of surface water and sewer flooding.

1.1.7. The council will seek to direct development away from areas at the highest risk of flooding, or, where development is required in areas at risk of flooding, the council will ensure it is safe for the lifetime of development, without increasing flood risk elsewhere. Development proposals should ensure that they have taken full account of flood risk and sought to utilise sustainable drainage measures, where appropriate, in accordance with the policies in this plan on managing flood risk and sustainable drainage.

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