

Oriel

Response to Technical Queries on Energy and Sustainability

March 2021



Oriel
Creating the centre for
advancing eye health



Moorfields
Eye Hospital
NHS Foundation Trust



Moorfields
Eye Charity



Oriel – Response to technical queries on Energy and Sustainability – 17th March 2021

1. Introduction

Moorfields Eye Hospital NHS Foundation Trust, on behalf of Oriel¹ (the ‘Applicant’), submitted a planning application on 16th October 2020 (Application Ref. 2020/4825/P) to the London Borough of Camden (LBC) for a new facility that would allow the existing Moorfields Eye Hospital at City Road (Moorfields at City Road) and University College London (UCL) Institute of Ophthalmology (IoO) services at Bath Street to relocate into a single building at the existing St. Pancras Hospital site (hereafter referred to as the ‘Proposed Development’).

The Proposed Development will be located at part of the existing St. Pancras Hospital site (hereafter referred to as the ‘Site’). The Proposed Development comprises a single building, between seven and ten storeys in height (including Ground Level and Lower Ground Level, as well as plant at Roof Level), as well as provision of public realm at ground level, blue badge parking, and a vehicular drop off point on St Pancras Way.

An Energy Strategy (Document Ref. ORL-INF-XX-XX-RP-PL-220_Energy Strategy) and a Sustainability Statement (Document Ref. ORL-INF-XX-XX-RP-PL-340_Sustainability Statement) were prepared for the Proposed Development and submitted with the planning application.

Both the LBC and the Greater London Authority (GLA) have reviewed the Energy Strategy and Sustainability Statement and have requested information and/or clarification on a number of matters. AECOM, as authors of these documents, have provided responses to the comments raised by LBC and GLA in Sections 2 and 3 of this technical note on behalf of the Applicant.

¹ Oriel is a joint venture between Moorfields Eye Hospital NHS Foundation Trust, University College London Institute of Ophthalmology and Moorfields Eye Charity.

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2. Queries raised by London Borough of Camden

Queries raised by LBC on the Energy Strategy and the Sustainability Statement submitted with the planning application were issued to the Applicant on 2nd December 2020 and are provided in Table 1 below. In summary the queries focussed on the Proposed Development's overall carbon reduction, as well as specific targets by stage, and whether these can be improved upon to comply with the policy expectations.

A meeting between the AECOM technical team and the LBC Case Officer and the LBC Senior Sustainability Officer was held on the 19th February 2021 to discuss the queries raised in further detail.

Table 1 provides the Applicant's responses to LBC's queries.

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Table 1 LBC queries on the Energy Strategy and Sustainability Statement and the Applicant's responses

Query No.	LBC Query	Applicant's Response
1	<p>It is understood that the requirements for healthcare areas can increase the power demand compared to other types of development. However, the proposals:</p> <ul style="list-style-type: none"> • Reduce carbon by 14.5% through on site renewable energy generation (Be Green) – which fails to meet the minimum requirement of 20% • Reduce carbon by 27.4% overall on site - which fails to meet the requirement of at least 35% <p>Further carbon saving options should be fully considered. This should be explored in advance upon the reliance of carbon offsetting</p>	<p>The Proposed Development will be a purpose-built eye care, medical research and educational centre for Moorfields Eye Hospital NHS Foundation Trust, the UCL Institute of Ophthalmology and Moorfields Eye Charity. It will comprise a mixture of clinical, research and education purposes, including an eye care accident and emergency department, outpatients, operating theatres, research areas, education space, cafe and retail areas, admin space and plant space. Due to the proposed use, the proposed building is required to meet the best practice engineering standards and satisfy policy requirements to enable management of this duty of care, as set out in the Health Technical Memoranda (HTMs). The HTMs provide comprehensive advice and guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare services. The Applicant is also targeting a BREEAM New Construction 2018 'Excellent' rating; the credits targeted help to demonstrate that energy efficiency has been considered throughout the development of the design. In line with guidance in Camden Planning Guidance (CPG) document "Energy efficiency and adaptation to climate change", Chapter 11, 60% of the available BREEAM credits in the energy section of the assessment are being targeted for the Proposed Development. A BREEAM Pre-assessment has been undertaken and a full BREEAM 2018 New Construction assessment will be undertaken during the post planning stage.</p> <p>The energy strategy for the Proposed Development has been developed in accordance with the guidance outlined in the new London Plan and Camden planning policy and aims to meet the targets set therein. An Energy Strategy for the Proposed Development has been prepared (Document Ref. ORL-INF-XX-XX-RP-PL-220-Energy Strategy), and was submitted with the planning application in October 2020, which summarises the options considered during design of the Proposed Development for reducing carbon emissions through energy efficiency measures, low carbon energy supply from decentralised sources and the integration of renewable energy technologies.</p>

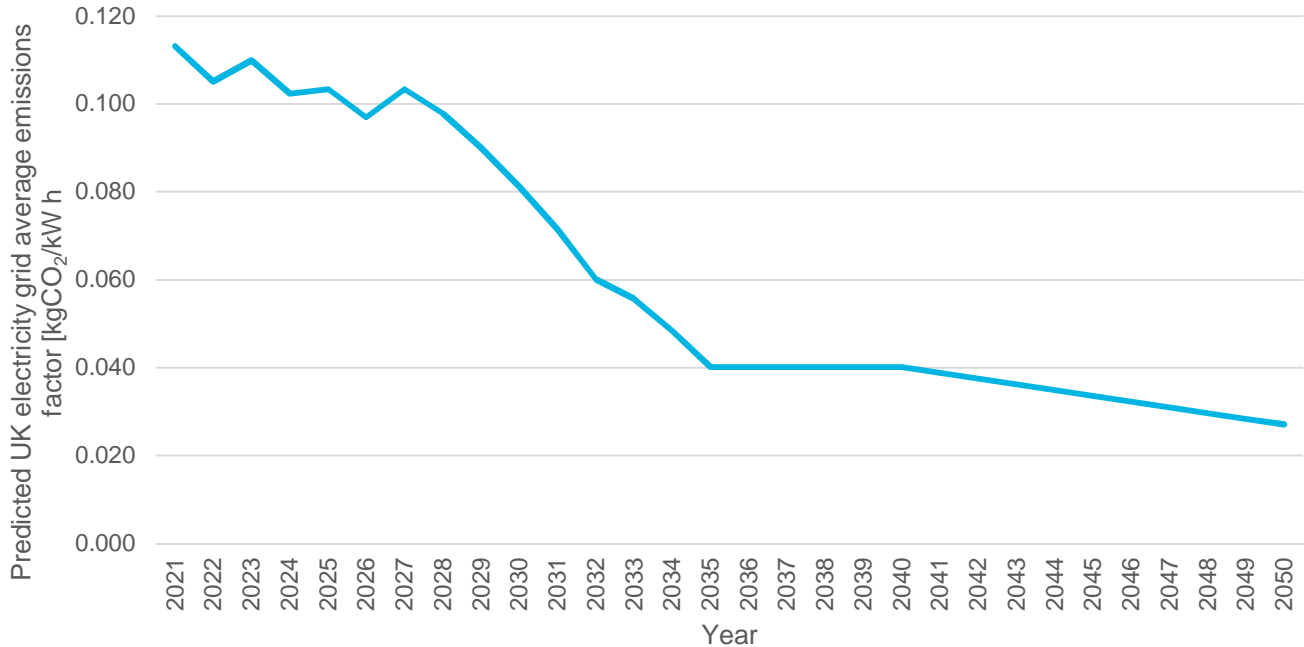
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Query No.	LBC Query	Applicant's Response
		<p>As described in the Energy Strategy, the energy hierarchy has been followed, resulting in significant carbon savings. However, the nature of the proposed use means that the targets set out in the new London Plan and Camden planning policy are very difficult to achieve for the Proposed Development. This is because the Part L modelling, the modelling standard defined by the Building Regulations in England upon which the planning targets are based, was designed around office buildings and does not take into account the specialised requirements of healthcare facilities. Healthcare buildings require significant amounts of air to be provided to a number of spaces (in accordance with HTM 03-01 Specialised ventilation for healthcare premises), in excess of what would be required in an office building for example. This means that the fans must be designed to meet these real-world air requirements.</p> <p>Reducing the fan powers in the building would require physically larger fans which would mean the height of the building would need to be increased to accommodate them, resulting in concerns around the aesthetics and massing of the building. As set out in the Design and Access Statement (Document Ref. ORL-INF-XX-XX-RP-PL-100_Design and Access Statement) submitted with the planning application, the massing of the proposed building has been carefully designed to respond to the surrounding townscape context where <i>'the new building will sit between a dense new neighbourhood of high rise development to the north and east, and the lower existing context of Victorian and early 20th Century buildings to the south and southwest. The building is therefore designed to mediate between these two contexts, rising from seven storeys (LG, G + 5) at the southwest to 10 storeys (LG, G + 8) to the north.'</i> Therefore, increasing the height of the building to accommodate larger fans is not feasible.</p> <p>As described in the Energy Strategy, measures to reduce carbon emissions have been taken where possible, including through demand reduction and through implementation of low and zero carbon technologies. Heat pumps are included to meet space heating and hot water demands, and these provide significant savings. To offset the necessarily high fan energy demand however, electricity generation technologies are required. The only electricity generation technology which has been identified as being suitable for the Site is PV panels. The</p>

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Query No.	LBC Query	Applicant's Response
		<p>PV provision on the roof has already been maximised. Due to the proposed use of the Proposed Development and its location within an urban, developed area, there are no suitable technologies to generate further electricity, see Sections 5 and 6 of the Energy Strategy for further details.</p> <p>As an electrical demand, the carbon emissions associated with the fans serving to the building will reduce over time as the electricity grid decarbonises. Furthermore, when auxiliary energy is excluded, the energy demand of the building is reduced by 41% when compared to the baseline building. The building is proposed to be an all-electric development, with no on-site combustion. This decision positions the building to take advantage of predicted future grid decarbonisation and reduce operational emissions over time. Figure 1 below shows the predicted UK electricity grid carbon intensity from 2021 to 2050, as published by the Department of Business, Energy and Industrial Strategy for the Treasury Green Book information (March 2019). On top of the design measures to reduce energy demand and associated emissions outlined in the Energy Strategy, the operational carbon emissions of the building as designed can be expected to follow the reduction in operational carbon emissions shown in Figure 1 below.</p>

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Query No.	LBC Query	Applicant's Response																																																														
		<div><p>UK future grid emissions factors</p><table><caption>Estimated data for Figure 1: UK electricity grid average emissions factors to 2050</caption><thead><tr><th>Year</th><th>Predicted UK electricity grid average emissions factor [kgCO₂/kWh]</th></tr></thead><tbody><tr><td>2021</td><td>0.115</td></tr><tr><td>2022</td><td>0.105</td></tr><tr><td>2023</td><td>0.110</td></tr><tr><td>2024</td><td>0.102</td></tr><tr><td>2025</td><td>0.103</td></tr><tr><td>2026</td><td>0.098</td></tr><tr><td>2027</td><td>0.103</td></tr><tr><td>2028</td><td>0.100</td></tr><tr><td>2029</td><td>0.092</td></tr><tr><td>2030</td><td>0.085</td></tr><tr><td>2031</td><td>0.078</td></tr><tr><td>2032</td><td>0.068</td></tr><tr><td>2033</td><td>0.060</td></tr><tr><td>2034</td><td>0.055</td></tr><tr><td>2035</td><td>0.040</td></tr><tr><td>2036</td><td>0.040</td></tr><tr><td>2037</td><td>0.040</td></tr><tr><td>2038</td><td>0.040</td></tr><tr><td>2039</td><td>0.040</td></tr><tr><td>2040</td><td>0.040</td></tr><tr><td>2041</td><td>0.038</td></tr><tr><td>2042</td><td>0.036</td></tr><tr><td>2043</td><td>0.034</td></tr><tr><td>2044</td><td>0.032</td></tr><tr><td>2045</td><td>0.030</td></tr><tr><td>2046</td><td>0.028</td></tr><tr><td>2047</td><td>0.026</td></tr><tr><td>2048</td><td>0.024</td></tr><tr><td>2049</td><td>0.022</td></tr><tr><td>2050</td><td>0.020</td></tr></tbody></table></div> <p>Figure 1 UK electricity grid average emissions factors to 2050</p> <p>In addition, use of the canal as a heat source continues to be investigated and calculations show this could result in additional savings subject to financial, legal and technical feasibility. See the response to item 6 below for further information.</p>	Year	Predicted UK electricity grid average emissions factor [kgCO ₂ /kWh]	2021	0.115	2022	0.105	2023	0.110	2024	0.102	2025	0.103	2026	0.098	2027	0.103	2028	0.100	2029	0.092	2030	0.085	2031	0.078	2032	0.068	2033	0.060	2034	0.055	2035	0.040	2036	0.040	2037	0.040	2038	0.040	2039	0.040	2040	0.040	2041	0.038	2042	0.036	2043	0.034	2044	0.032	2045	0.030	2046	0.028	2047	0.026	2048	0.024	2049	0.022	2050	0.020
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Query No.	LBC Query	Applicant's Response
2	<p>The proposals fail to meet the requirement of zero carbon.</p> <p>In line with query 1, this should be maximised before this is accepted. However, based on the current reporting, a Carbon offset contribution of £2,899,305 would be expected to be secured through s106 (note carbon offset comment at the end of this list)</p>	<p>Noted - the offset payment has been recalculated to include the 100% target and £95/tonne carbon price. The offset payment for the proposed development is now £2,899,335.</p> <p>If the canal is included as a heat source following a detailed feasibility assessment, the carbon offset would be revisited to incorporate the additional carbon savings.</p>
3	<p>Waste water heat recovery does not seem to have been considered as a potential option for this development. Whilst the Be Lean targets have been met as there is a significant shortfall against other targets and therefore consideration of other technologies such as waste water heat recovery should be fully considered.</p>	<p>As set out above, the Proposed Development will be a purpose-built eye care, medical research and educational centre, and will comprise a mixture of clinical, research and education uses. Due to the proposed use, the building is required to meet the best practice engineering standards and satisfy policy requirements, as set out in the HTMs.</p> <p>The use of waste water heat recovery has been considered, but has not been included as an option in the Proposed Development. Whilst waste water heat recovery is suitable for office buildings or hotel accommodation for example, the high risk of cross-contamination from waste water to potable water systems makes this technology unsuitable for a healthcare building. Further, HTM 04-01: Safe water in healthcare premises: Part A - Design, installation and commissioning <i>states "Heat recovery/systems for pre-heating water for domestic purposes should not be installed in healthcare premises unless there are adequate fail-safe measures in place to ensure that the hot water distribution system is not compromised."</i> For these reasons,</p>

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	Further information required to show that this has been explored.	<p>waste water heat recovery has not been proposed as part of the Energy Strategy for the Proposed Development.</p> <p>Measures already included in the building design have resulted in energy use for hot water as modelled being reduced by 64% below the baseline energy use, as shown in Table 22 of the Energy Strategy.</p> <p>In addition, the-Part L modelling for non-domestic buildings does not allow for the modelling of waste water heat recovery systems, therefore installation of such systems in non-domestic buildings would not increase the reported regulated carbon savings.</p>
4	Further to the proposal to enable future connection to a district heating network, and given the shortfall in achieving the targets and the requirement for a significant carbon offset contribution, consideration should be made to the potential of establishing a Decentralised Energy Network (DEN). If this is proposed we would be open to discussions regarding a reduction in the carbon offset payment to help towards the cost of	<p>It is acknowledged that there are a number of forthcoming developments in the area surrounding the Site which are at different stages in the planning process, as follows:</p> <ul style="list-style-type: none"> • 101, 102 and 103 Camley Street have all been granted planning permission for mixed use redevelopment. Construction at 103 Camley Street was completed (April 2015) and construction of 101 Camley Street is advanced at the time of preparing this document; • The Ugly Brown Building (Application Ref. 2017/5497/P) has been granted planning permission; and • The remainder of the St Pancras Hospital site, which is expected to be developed by Camden and Islington NHS Trust's preferred development partners King's Cross Central Limited Partnership (KCCLP). The scheme for the remainder of the St Pancras Hospital site is at an early stage of development and at the current time a design team has not been appointed. <p>The creation of a local Decentralised Energy Network (DEN) was not considered appropriate for the Proposed Development and its site for the following reasons:</p>

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	<p>establishing a network. It should be noted that if connection is not made by an agreed point the original carbon offset contribution would be payable.</p> <p>Further information required that explores the creation of a local DEN to include the St Pancras hospital, Camley Street as well as UBB developments. This could potentially generate a very significant level of carbon savings and lessen the needs for offsetting</p>	<ul style="list-style-type: none"> • The design of the proposed building has been maximised for its intended use within the Site. The inclusion of an energy centre to supply other buildings with heat would require space which is not available on the proposed site, and would likely mean reducing space in the proposed building that is required used to meet NHS clinical needs. • Based on the Energy Strategy for the Proposed Development, it is not immediately clear what heat would be available to export from the proposed building. The proposed ground source heat pump (GSHP) system is not expected to meet the entire energy needs of the building and air source heat pumps (ASHPs) have been sized to meet the remaining energy demands. • The developers of nearby buildings are likely to have little financial or legal incentives to connect to a DEN if one were provided. The neighbouring land, expected to be redeveloped by KCCLP, does not currently have an appointed design team nor has a level of design been reached that allows coordination for a potential DEN to be progressed at this stage. With the exception of the KCCLP scheme, the new or proposed major development buildings nearby are either already built or already have planning permission to develop their own energy systems. If these developments did connect to a DEN, it is likely that carbon savings would be no greater or even less than if local heat pumps were to be installed. Local installation of heat pumps would also avoid the added disruption and embodied carbon associated with the laying of heat network pipes. <p>BuroHappold, on behalf of LBC, prepared a study to review borough-wide heat demand and heat source mapping, published in 2015². This considered a number of heat network cluster areas for further assessment to help the borough in developing new, and expanding existing, decentralised energy networks. It included the identification of the Camley Street area as a potential heat cluster network, focusing on prospects for a large mixed use development to the</p>

² Borough Wide Heat Demand and Heat Source Mapping, London Borough of Camden, 15 May 2015.

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		<p>east of Camley Street (labelled Camley Street Corridor sites), illustrated on Figure 7-5 'Camley Street district energy network cluster' within the BuroHappold document. However, the report notes the Camley Street cluster is limited in expansion potential because of the physical constraints of the canal and rail tracks to the east and west of the site. The report states "site allocations earmarked for development exist on the southern bank of the canal but have been excluded from this cluster due to the lack of connectivity between sites. These sites may have potential for individual renewable or low carbon energy systems". These sites do not include the St Pancras Hospital site.</p> <p>The proposed building has been designed to incorporate the ability to connect to a district heating network if a low carbon option is developed in future, however, as explained above, there is not sufficient space to develop this on the Site. Space to allow for this potential future connection and incoming pipework connections are included in the design of the proposed building. Further, the NHS is not a heat provider and it is not desirable to burden the National Health Service with the responsibility of operating a wider heat network.</p>
5	<p>The proposed Solar PV arrays are welcomed.</p> <p>Condition recommended.</p>	An appropriately worded planning condition relating to the use of Solar PV arrays within the proposed development is acceptable.
6	<p>Further investigation of the canal for Water Source Heat Pumps is welcomed. A detailed feasibility study should be provided.</p> <p>Condition recommended.</p>	Further information has been received from the Canal and River Trust (CRT) including likely heating/cooling capacity and temperature profiles. Using this information, AECOM has undertaken initial calculations to calculate new average heat pump efficiencies for the proposed building. These have been inputted into the building energy model to produce an updated "be green" stage carbon calculation. These calculations show that there is the potential for the canal to provide an additional 53.4 tCO ₂ /year of carbon savings to the proposed building.

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		<p>Therefore, an appropriately worded planning condition to undertake a study to review the financial, legal and technical feasibility of the use of the canal as a heat source for the proposed building is acceptable.</p> <p>Tables 2 and 3 below provide an indicative estimate of carbon savings at each stage in the energy hierarchy if the canal were to be included as a heat source. Note that the figures in the table are subject to detailed technical feasibility and design.</p> <table> <tr> <th colspan="3">Carbon Dioxide Emissions for new buildings (tCO₂/year)</th></tr> <tr> <th></th><th>Regulated</th><th>Unregulated</th></tr> <tr> <td>Baseline: Part L 2013 of the Building Regulations Compliant Development</td><td>1,401.0</td><td>1,820.5</td></tr> <tr> <td>After energy demand reduction</td><td>1,190.4</td><td>1,820.5</td></tr> <tr> <td>After heat network/CHP</td><td>1,190.4</td><td>1,820.5</td></tr> <tr> <td>After renewable energy</td><td>963.9</td><td>1,820.5</td></tr> </table> <p>Table 2 Carbon emissions after each stage of the energy hierarchy including canal source heat pumps</p>	Carbon Dioxide Emissions for new buildings (tCO ₂ /year)				Regulated	Unregulated	Baseline: Part L 2013 of the Building Regulations Compliant Development	1,401.0	1,820.5	After energy demand reduction	1,190.4	1,820.5	After heat network/CHP	1,190.4	1,820.5	After renewable energy	963.9	1,820.5
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Query No.	LBC Query	Applicant's Response															
		<p style="text-align: center;">Regulated new-building carbon dioxide savings</p> <table> <tr> <th></th><th>(Tonnes CO₂ per annum)</th><th>(%)</th></tr> <tr> <td>Savings from energy demand reduction</td><td>210.7</td><td>15%</td></tr> <tr> <td>Savings from heat network/CHP</td><td>0.0</td><td>0%</td></tr> <tr> <td>Savings from renewable energy</td><td>226.5</td><td>16%</td></tr> <tr> <td>Total cumulative savings</td><td>437.1</td><td>31%</td></tr> </table> <p>Table 3 Regulated carbon dioxide savings from each stage of the energy hierarchy, including canal source heat pumps</p> <p>As shown in Tables 2 and 3 above, incorporation of the canal water source heat pump has increased the savings from the “be green” stage of the energy hierarchy from 12% to 16%, and overall savings from 27% to 31%.</p>		(Tonnes CO ₂ per annum)	(%)	Savings from energy demand reduction	210.7	15%	Savings from heat network/CHP	0.0	0%	Savings from renewable energy	226.5	16%	Total cumulative savings	437.1	31%
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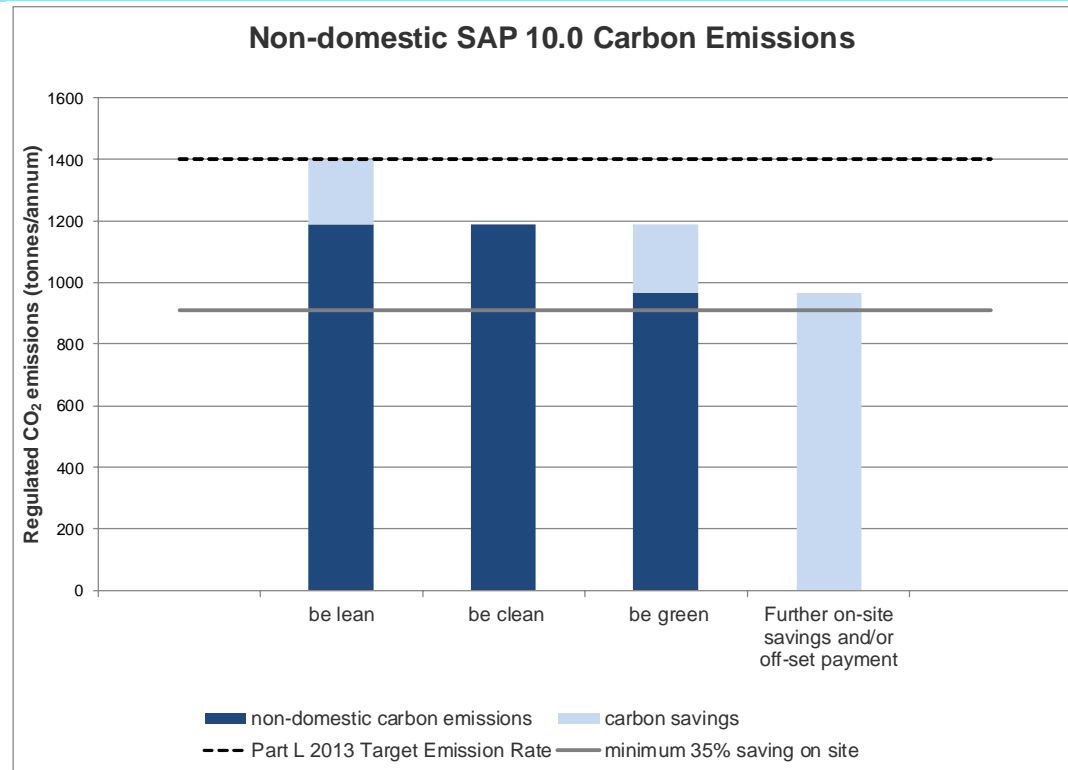


Figure 2 Oriel proposed energy strategy: Energy Hierarchy CO₂ baseline, emissions and savings

Further discussions are proposed to take place post-planning with the Canal and River Trust to continue exploration of this option as part of a feasibility study. Issues surrounding suitable access points, land ownership and Environment Agency licencing remain to be reconciled to allow the building to take advantage of these carbon savings.

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7	<p>The proposed ground source heat pump system is welcomed. Further details are required.</p> <p>Condition recommended.</p>	<p>An appropriately worded planning condition relating to the use of Ground Source Heat pump system within the proposed development is acceptable.</p>
8	<p>The proposed Air Source Heat Pump system is welcomed. A minimum SPF of 2.5 is required, in line with RHI requirements. Further details are required.</p> <p>Condition recommended.</p>	<p>An appropriately worded planning condition relating to the use of Air Source Heat pump system within the proposed development is acceptable.</p>
9	<p>Dynamic overheating modelling in line with the guidance and data sets in CIBSE TM52 and TM49 respectively should be undertaken.</p> <p>Further information required.</p>	<p>Section 4 of the Energy Strategy presents the 'Overheating risk analysis' which shows how the risk of overheating has been considered for the Proposed Development, in accordance with Greater London Authority (GLA) guidance.</p> <p>As set out above, the Proposed Development will be a purpose-built eye care, medical research and educational centre, and will comprise a mixture of clinical, research and education purposes, including an eye care accident and emergency department, outpatients, operating theatres, research areas, education space, cafe and retail areas, admin space and plant space. Due to the proposed use, the proposed building is expected to meet the thermal comfort levels set out in the HTM 03-01 Specialised ventilation for healthcare premises guidance for patient and clinical areas.</p>

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Query No.	LBC Query	Applicant's Response
		<p>The Applicant is also targeting BREEAM 'Excellent'; the credits targeted help to demonstrate that energy efficiency has been considered throughout the development of the design. Credits targeted include those for thermal comfort (Hea 04) and also passive design analysis (Ene 04), aimed at reducing heating and cooling demand in the proposed building whilst maintaining a comfortable internal environment.</p> <p>The proposed use and relevant HTMs have influenced the design and energy strategy for the Proposed Development. Due to the proposed building uses, many areas of the Proposed Development, for example operating theatres, are unsuitable for natural ventilation. Mechanical cooling is therefore an integral part of the design of the building. However, in order to reduce the cooling loads where possible, the cooling hierarchy has been considered, as summarised below (further details are provided in Section 4 of the Energy Strategy):</p> <ol style="list-style-type: none"> 1. Minimising internal heat generation through energy efficient design: <ul style="list-style-type: none"> – Where possible the heat distribution infrastructure within the proposed building has been designed to minimise pipe lengths. – Efficient lighting has been specified which incorporates dimming in the office areas where there is sufficient daylight. 2. Reducing the amount of heat entering the building in summer: <ul style="list-style-type: none"> – High performance solar control glazing has been specified which will reduce heat gains through windows. – Shading from window reveals and other architectural elements has been incorporated into the design – Glazing ratios have been optimised to maximise daylight whilst limiting unwanted solar gains.

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		<p>3. Use of thermal mass and high ceilings to manage the heat within the building:</p> <ul style="list-style-type: none"> – Exposed columns and soffits where possible in non-hygiene-restricted areas will help to mitigate heat gains through the use of thermal mass. <p>4. Passive ventilation:</p> <ul style="list-style-type: none"> – The building location gives rise to issues of noise and air pollution which prevent openable windows being part of the building design, given its purpose. <p>5. Mechanical ventilation:</p> <ul style="list-style-type: none"> – The building is mechanically ventilated, however the purpose of the Proposed Development means that it is expected by users that mechanical cooling will be included. Efficient cooling plant is specified to reduce the energy used for mechanical cooling. <p>The above measures have been included to reduce cooling demand and avoid excess emissions from cooling. The cooling demand of the proposed building has been reduced to around two thirds that of the baseline building. This is reported in the Energy Strategy in line with GLA guidance.</p> <p>As mechanical cooling is included in the building, an overheating assessment is not proposed as the chillers will be sized and specified to maintain a comfortable internal temperature within the building. Because this cooling is included, to achieve the thermal comfort levels set out in the HTM 03-01, an overheating assessment would only show that thermal comfort levels are achieved, not that demand has been reduced. The measures described above show that the building design process has considered and included measures to reduce cooling demand throughout the cooling hierarchy. This is demonstrated through the reduction in the building cooling demand significantly below that of the baseline building.</p>

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Query No.	LBC Query	Applicant's Response
10	<p>Whilst planting is welcomed it is not clear if there are any green roof areas. Our preference is for blue / green roofs combined with solar PV. As raised in our pre-app meetings, green roofs can actually increase the performance of PV cells if properly designed. Appreciating that certain areas of the roof require void space below, more should be done to introduce green roofs wherever possible.</p> <p>Further information required.</p>	<p>Within the scheme design submitted with the planning application in October 2020 a brown roof with PV panels was proposed on the western elevator shaft; see Sections 9.1 and 10.3 of the Landscape Design Report (Document Ref. ORL-INF-XX-XX-RP-PL-270).</p> <p>The brown roof replicates biodiverse brownfield habitats that can support a diverse assemblage of invertebrates and bird species.</p> <p>We have reviewed other areas of the roof of the proposed building for potential locations of additional brown roofs and confirm that brown roof areas are also now proposed to the top of the central Oriel in the atrium, as shown on the revised drawing pack by Penoyre & Prasad, which will be submitted separately. This will be designed to facilitate maintenance access to the building plant in this area.</p>
11	<p>Further details of the rainwater harvesting are required. We require more information to understand what mitigation you would propose here to reduce water usage.</p>	<p>As set out above, the Proposed Development will be a purpose-built eye care, medical research and educational centre. It will comprise a mixture of clinical, research and education purposes. In accordance with HTM 04-01 (Safe water in healthcare premises, Part A) due to the nature of the Proposed Development it is not appropriate to include sustainable urban drainage systems (SuDS) at roof level that would feed water back into the building. However, a small rainwater harvesting unit (up to 3 m³) will be installed at the 6th floor roof level to capture runoff for irrigation purposes. This unit is not included in the drainage design calculations as its volume is small and the system cannot be guaranteed to be empty at the start of each rain event.</p>

Oriel
Response to technical queries on Energy and Sustainability

Query No.	LBC Query	Applicant's Response
	Condition recommended	In addition, the proposed roof space will be heavily constrained by the need for significant MEP plant and the roof design relies mostly on syphonic downpipes to drain. Changing to gravity downpipes will severely affect the coordination of services and will impact on the effective space available in the building through the introduction of additional downpipes, with resulting complications for acoustic and thermal insulation.
12	Further to the above, it is noted that the formula used to calculate the carbon offset payment is not in line with the most recent guidance.	<p>Noted - the offset payment has been recalculated to include the 100% target and £95/tonne carbon price. The offset payment for the proposed development is now £2,899,335.</p> <p>If the canal is included as a heat source following a detailed feasibility assessment, the carbon offset would be revisited to incorporate the additional carbon savings.</p>

3. Queries raised by Greater London Authority

The GLA issued a planning report (ref. 2020/6824/S1) on 25th January 2021, relating to the planning application. The report stated the following in relation to energy:

'Energy

52 The applicant has submitted an energy assessment in accordance with London Plan Policy 5.2 and Policy SI2 of the Publication London Plan. The development is estimated to achieve a reduction of 210.7 tonnes per annum (15%) in regulated CO2 emissions compared to a 2013 Building Regulations compliant development. This is in line with the London Plan target of a minimum 15% improvement (non-domestic) on 2013 Building Regulations from energy efficiency.

53 The carbon dioxide savings exceed the on-site target within the London Plan. The applicant should consider the scope for additional measures aimed at achieving further carbon reductions and clarify how it is proposed to incorporate the waste heat recovery system into the design and energy simulations.

54 Heat pumps are being proposed in the form of a (centralised) GSHP system. A COP of 3.4 is assumed for heating and 6 for cooling. This is welcomed. Further information on the heat pump system is required. The applicant should confirm whether they are proposing a site-wide heat network supplied by a centralised energy centre.

55 The GLA expects all major development proposals to maximise on-site renewable energy generation, where feasible. The applicant is proposing to install 159.3 kWp of Photovoltaic (PV) panels equating to circa 864 m² of net PV area and 137,570 kWh of electricity generation. A detailed roof layout has been provided. The on-site savings from renewable energy technologies should be maximised generally but particularly given the shortfall in on-site carbon emissions savings. In addition to additional proposed roof areas, the applicant should investigate more innovative strategies.

56 Further information in relation to carbon reporting, estimated energy cost, overheating, capacity for future connection to a DHN, the proposed GSHP systems, and carbon offsetting. The applicant should confirm the carbon shortfall in tonnes CO2 and the associated carbon offset payment that will be made to the borough. Detailed comments in relation to the required additional information have been provided separately to the Council.'

In addition, the GLA requested that Whole Life-Cycle Carbon Assessment is completed, which should 'calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.'

Detailed comments on the submitted Energy Strategy were received from the GLA on 28th January 2021 and the responses to these are provided in the remainder of this section. In accordance with GLA's requirements, the Applicant has responded to the comments within the GLA tracker, included below.

Comment No.	GLA Stage I Date: 18/12/2020	Applicant's Stage I response Date: 15/03/2021	GLA Post Stage I response Date:
General compliance comments			
1	The energy strategy is generally compliant with the London Plan policies however, the applicant is required to submit the additional information, which has been requested below.	Responses have been provided below as required.	
2	For the purposes of this assessment, the applicant will be estimating the CO2 emission performance against London Plan policies using the SAP 10 emissions factors. This is supported.	Noted.	
3	The applicant has submitted the GLA's Carbon Emission Reporting spreadsheet, which has been developed to allow the use of the updated SAP 10 emission factors alongside the SAP 2012 emission factors. This has been reviewed.	Noted.	
Be Lean			
4	<p>Based on the information provided, the non-domestic element of the proposed development is estimated to achieve a reduction of 210.7 tonnes per annum (15%) in regulated CO2 emissions compared to a 2013 Building Regulations compliant development. This is in line with the London Plan target of a minimum 15% improvement on 2013 Building Regulations from energy efficiency.</p> <p>The applicant has noted that the modelled auxiliary energy use of the proposed building was significantly higher than the notional building's auxiliary energy use. The applicant is advised to consider implementing additional measures which could improve the efficiency of fans/pumps proposed for the development.</p> <p>It is understood that the applicant has incorporated various energy efficiency measures into their design (such as high efficiency fabric, solar control glazing, and solid panels/shading in the facade). The applicant should clarify their lighting efficiency measures, as the modelled lighting energy use is very significant.</p>	<p>The Proposed Development will be a purpose-built eye care, medical research and educational centre for Moorfields Eye Hospital NHS Foundation Trust, the UCL Institute of Ophthalmology and Moorfields Eye Charity. It will comprise a mixture of clinical, research and education purposes, including an eye care accident and emergency department, outpatients, operating theatres, research areas, education space, cafe and retail areas, admin space and plant space. Due to the proposed use, the building is required to meet the best practice engineering standards and satisfy policy requirements to enable management of this duty of care, as set out in the Health Technical Memoranda (HTMs). The HTMs provide comprehensive advice and guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare services. Healthcare buildings require significant amounts of air to be provided to a number of spaces (in accordance with HTM 03-01 Specialised ventilation for healthcare premises).</p> <p>Fan and pump energy has been considered in depth as part of the design development for the Proposed Development. Fan powers have been reduced as far as practical and those proposed already represent a very high performance to meet the requirements of HTM 03-01. To further reduce these fan powers would require physically larger fans, which would require taller floor to ceiling heights and would consequently increase the overall height of the building. As set out in the Design and Access Statement (Document Ref. ORL-INF-XX-XX-RP-PL-100_Design and Access Statement) submitted with the planning application, the massing of the proposed building has been carefully designed to respond to the surrounding townscape context where 'the new building will sit between a dense new neighbourhood of high rise development to the north and east, and the lower existing context of Victorian and early 20th Century buildings to the south and southwest. The building is therefore designed to mediate between these two contexts, rising from seven storeys (LG, G + 5) at the southwest to 10 storeys (LG, G + 8) to the north.' For this reason increasing the height of the building to accommodate larger fans is not proposed.</p> <p>Lighting efficiencies for all the modelled areas of the proposed building are included in Appendix C of the submitted Energy Strategy (Document Ref. ORL-INF-XX-XX-RP-PL-220-Energy Strategy). As highlighted in Section 8 - Conclusions (Table 22) and Executive Summary (Summary Table 4) of the Energy Strategy, modelled lighting energy consumption for the proposed building is 38% lower than that of the notional building.</p>	
Overheating			
5	<p>The applicant has noted that noise and air quality concerns prevent openable windows or natural ventilation from being included in the design. The applicant has proposed a mechanical cooling as part of the design of the building. The applicant has implemented the cooling hierarchy in order to reduce the cooling loads.</p> <p>The area weighted average (MJ/m2) and total (MJ/year) cooling demand for the actual and notional building has been provided and the applicant has demonstrated that the actual building's cooling demand is lower than the notional.</p>	Noted.	
Be Clean			
6	<p>The applicant has carried out an investigation and found that there were two planned developments (King's Cross Heat Network and the Somers Town Network) in the vicinity of the proposed development. The applicant has contacted the relevant parties and gathered information on two different schemes. It was concluded that connection to these networks would not be feasible: It was noted that the operators of the Kings Cross network confirmed that cooling capacity was not available for connection. It was noted that their discussions with LBC confirmed that there would be the potential to connect to the Somers Town Network. However, it was considered that the pipe diameter at the nearest connection point to the Proposed Development may be too narrow to allow connection as it is furthest from the energy centre. The applicant has provided evidence of their communications with the borough officers. The applicant should provide additional information on the technical viability of connecting to the Somers Town Network (i.e. determining whether the network would be able to serve the development or not) and whether/how any technical constraints set out could be overcome. Decarbonisation opportunities should be explored.</p> <p>The applicant has also investigated the potential waste heat sources in the area. Their</p>	<p>It has been confirmed that the Somers Town network runs on gas-fired CHP, using an engine which has only recently been replaced.</p> <p>Through discussions between the AECOM team and the network operator, it was confirmed that there are therefore no plans in the short- to medium- term to decarbonise the system. Appendix F of the Energy Strategy (Document Ref. ORL-INF-XX-XX-RP-PL-220-Energy Strategy) includes records of the discussions where this was confirmed. Further, the buildings connected to this network are older, relatively inefficient buildings which require high temperature heat distribution systems. This limits the available options for decarbonisation and would make it less likely that extension to serve the proposed development would provide a lower carbon solution than the proposed on-site low-temperature, low carbon heating system. As noted in Table 22 of the submitted Energy Strategy, heating and hot water make up a relatively low proportion of the total energy demand of the proposed development. Therefore, connection to the Somers Town network, even if decarbonisation was possible or likely, is likely to result in only very small or even no savings compared to the baseline building, whilst increasing embodied carbon and disruption in laying the extra infrastructure that would be required to achieve connection.</p>	
7	<p>The applicant has provided a commitment that the development is designed to allow future connection to a district heating network. Drawings demonstrating how the site is to be future-proofed for a connection to a district heating network has been provided. This included a single point of connection to the district heating network. However, it has also been stated that there is issue in terms of piping sizing for connection to the existing Somers Town network. Further clarity is required on this point.</p>	<p>As outlined above, connection to the Somers Town network is not proposed as carbon emissions from the Somers Town network are likely to be high and to remain high for some time. In addition, the closest point of the Somers Town network to the proposed building is the furthest point from the Somers Town energy centre, and the operator has confirmed that the pipe diameter at this point would likely be too small to allow connection. Appendix F of the Energy Strategy (Document Ref. ORL-INF-XX-XX-RP-PL-220-Energy Strategy) includes records of the discussions where this was confirmed.</p> <p>The proposed building is however designed to facilitate a connection to a heat network if a suitable low-carbon network were to be developed in the future. This connection is to allow for connection to any potential future network, rather than the Somers Town network in particular.</p>	
8	<p>The applicant is proposing a site-wide/communal heat network supplied by a centralised energy centre. It has been confirmed that building uses will be connected to the heat network. A drawing showing the route of the heat network linking all buildings/uses on the site should be provided alongside a drawing indicating the floor area, internal layout and location of the energy centre.</p>	<p>This is incorrect. This application (planning ref. 2020/4825/P) is for a single building, between seven and ten storeys in height (including Ground Level and Lower Ground Level), as well as plant at Roof Level. The development proposals also include the provision of public realm at ground level, blue badge parking, and vehicular drop off points along St Pancras Way. Heat will be supplied via a building level heat network.</p>	
Be Green			

9	<p>The applicant is proposing to install 159.3 kWp of Photovoltaic (PV) panels equating to circa 864 m2 of net PV area and 137,570 kWh of electricity generation. A detailed roof layout has been provided. The on-site savings from renewable energy technologies should be maximised generally but particularly given the shortfall in on-site carbon emissions savings. In addition to additional proposed roof areas, the applicant should investigate more innovative strategies like the viability of Building Integrated PV panels.</p>	<p>The PV area on the roof level has been maximised whilst also providing amenity space and allowing air flow above building plant where required. Building integrated PV panels have been considered but are not proposed. Inclusion of PV panels on external walls causes problems surrounding fire risk in the Building Regulations (Amendments to the Approved documents, Approved Document B: Fire safety, Volume 2 – Buildings other than dwellingshouses, 2006 edition incorporating 2007, 2010 and 2013 amendments, November 2018). As such, integration of PV panels on buildings over 18 m in height must meet strict Building Regulations fire safety criteria and it is not considered that these can be achieved for the proposed building.</p>
	<p>The applicant is proposing a centralised hybrid ASHP/GSHP system. The applicant has been investigating the potential use of the canal water to increase the efficiency of the proposed heating and cooling system. The applicant should investigate this option in more detail and share their findings, when they receive additional information from the CRT and Environment Agency.</p>	
10	<p>In addition to the proposed heat pump systems, a heat recovery chiller has been proposed for the building. It has been noted that this chiller will take waste heat from high cooling demand areas, such as Uninterruptible Power Supply (UPS) equipment, IT server rooms and Magnetic Resonance Imaging (MRI) areas and use it to meet some of the hot water baseload for the building. The applicant is advised to provide the details of the proposed heat recovery system (and how they incorporate the estimated savings into the Be Green model) and establish the carbon savings that could incur from such a system.</p> <p>The applicant has provided further information on the heat pumps including:</p> <p>a. An estimate of the heating and/or cooling energy (MWh/annum) the heat pumps would provide to the development and the percentage of contribution to the site's heat loads.</p> <p>b. Details of how the Seasonal Coefficient of Performance (SCOP) and Seasonal Energy Efficiency ratio (SEER) has been provided. The applicant should confirm whether this was based on a dynamic calculation of the system boundaries over the course of a year i.e. incorporating variations in source temperatures and the design sink temperatures (for space heat and hot water).</p> <p>c. The applicant has clarified that ASHP will be used to top us or during peak loads - gas boilers will not be used.</p> <p>The applicant should confirm the expected heat source temperature and the heat distribution system temperature with an explanation of how the difference will be minimised to ensure the system runs efficiently. The distribution loss factor should be calculated based on the above information and used for calculation purposes. The efficiency and savings from the proposed system should be maximised and optimised particularly given the shortfall in carbon performance.</p>	<p>Further information has been received from the Canal and River Trust (CRT) including likely heating/cooling capacity and temperature profiles. Using this information, AECOM has undertaken initial calculations to calculate new average heat pump efficiencies for the proposed building. These have been inputted into the building energy model to produce an updated "be green" stage carbon calculation. These calculations show that there is the potential for the canal to provide an additional 53.4 tCO2/year of carbon savings to the proposed building. Therefore, a condition as proposed by the London Borough of Camden to undertake a further study to review the financial, legal and technical feasibility of the potential use of the canal as part of the energy strategy is accepted. Further discussions are proposed to take place post-planning with the Canal and River Trust to continue exploration of this option as part of this feasibility study. Issues surrounding suitable access points, land ownership and Environment Agency licencing remain to be reconciled to allow the development to take advantage of these potential carbon savings.</p> <p>The benefits of the heat recovery chiller system are not fully seen within the compliance modelling (Part L loads) undertaken as part of the Energy Strategy, which uses standard room templates and assumptions to compare the hourly and annual energy and carbon performance of the proposed scheme with a notional Part L-compliant building; it therefore doesn't simulate the real-life loads of these specialised rooms and all of the opportunities for heat recovery – unlike the Be Seen modelling and later operational energy predictions. Therefore, within the Part L modelling undertaken as part of the planning and GLA energy & carbon emissions reporting, the benefit of the HRC forms part of the overall heating and cooling system efficiency, i.e. it is assumed to help deliver the seasonal efficiencies of the overall systems, comprising ASHP, GSHP and HRC.</p> <p>Further, we confirm that the Part L modelling is a dynamic thermal simulation, undertaken on an hourly basis and summed to give the annual figures. This is based on assumptions about the performance of the boreholes and GSHP system, which are also included in Appendix D of the Energy Strategy. During the next design stage, the contractor would employ a specialist heat pump sub-contractor and/or hydrogeologist to firm up the predicted output from the network; this analysis will inform the detailed design of the heating and cooling system.</p> <p>The building heating temperatures are 45°C flow, 35°C return and the chilled water temperatures are 11°C flow, 17°C return, which have been selected to work efficiently with the ground and air source heat pump system, as well as to minimise distribution losses. An appropriate distribution loss factor – based on the operating temperatures and the anticipated network - is incorporated within the delivery efficiency factor (0.9) that has been applied to the heating and cooling seasonal efficiency figures for the plant mix to arrive at the overall heating SCoP and Cooling SSEER figures used in the modelling. AECOM feels this approach provides a suitably-accurate representation of the system, both in this compliance modelling and to give confidence that the actual system will run efficiently.</p>
Carbon performance and offsetting		
11	<p>The applicant has provided the relevant modellings output sheets (i.e. BRUKL) for the lean and green stages of the energy hierarchy and these have been reviewed.</p>	<p>Noted.</p> <p>The Proposed Development will be a purpose-built eye care, medical research and educational. It will comprise a mixture of clinical, research and education purposes. Due to the proposed use, the proposed building is required to meet the best practice engineering standards and satisfy policy requirements to enable management of this duty of care, as set out in the Health Technical Memoranda (HTMs). The HTMs provide comprehensive advice and guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare services.</p> <p>The energy strategy for the Proposed Development has been developed in accordance with the guidance outlined in the new London Plan and Camden planning policy and aims to meet the targets set therein. An Energy Strategy for the Proposed Development has been prepared (Document Ref. ORL-INF-XX-XX-RP-PL-220-Energy Strategy), and was submitted with the planning application in October 2020, which summarises the options considered during design of the Proposed Development for reducing carbon emissions through energy efficiency measures, low carbon energy supply from decentralised sources and the integration of renewable energy technologies.</p> <p>As described in the Energy Strategy, the energy hierarchy has been followed, resulting in significant carbon savings. However, the nature of the proposed use means that the targets set out in the new London Plan are very difficult to achieve. This is because the Part L modelling was designed around office buildings and does not take in to account the specialised requirements of healthcare facilities. Healthcare buildings require significant amounts of air to be provided to a number of spaces (in accordance with HTM 03-01 Specialised ventilation for healthcare premises), in excess of what would be required in an office building for example. This means that the fans must be designed to meet these real-world air requirements.</p> <p>Reducing the fan powers in the building would require physically larger fans which would mean the height of the building would need to be increased to accommodate them, providing resulting in concerns issues around the aesthetics and massing of the building. As set out in the Design and Access Statement (Document Ref. ORL-INF-XX-XX-RP-PL-100_Design and Access Statement) submitted with the planning application, the massing of the proposed building has been carefully designed to respond to the surrounding townscape context where 'the new building will sit between a dense new neighbourhood of high rise development to the north and east, and the lower existing context of Victorian and early 20th Century buildings to the south and southwest. The building is therefore designed to mediate between these two contexts, rising from seven storeys (LG, G + 5) at the southwest to 10 storeys (LG, G + 8) to the north.' Therefore, increasing the height of the building to accommodate larger fans is not proposed.</p> <p>As described in the Energy Strategy, measures to reduce carbon emissions have been taken where possible, including through demand reduction and through implementation of low and zero carbon technologies. Heat pumps are included to meet space heating and hot water demands, and provide significant savings. To offset the necessarily high fan energy however, electricity generation technologies are required. The only electricity generation technology suitable for the site is PV panels. As outlined above, the PV provision on the roof has already been maximised. Due to the proposed use of the Proposed Development and its location within an urban, developed area, there are no suitable technologies to generate further electricity, see Sections 5 and 6 of the Energy Strategy for further details.</p> <p>As an electrical demand, the carbon emissions associated with the fans serving to the building will reduce over time as the electricity grid decarbonises. Furthermore, when auxiliary energy is excluded, the energy demand of the building is reduced by 41% when compared to the baseline building. The building is proposed to be an all-electric development, with no on-site combustion. This Decision positions the building to take advantage of predicted future grid decarbonisation and reduce operational emissions over time. Figure 1 below shows the predicted UK electricity grid carbon intensity from 2021 to 2050, as published by the Department of Business, Energy and Industrial Strategy for the Treasury Green Book information. On top of the design measures outlined in the energy strategy to reduce energy demand and associated emissions, the operational carbon emissions of the building as designed can be expected to follow the reduction in operational carbon emissions shown.</p> <p>Figure 1 (included on the following tab) UK electricity grid average emissions factors to 2050</p> <p>In addition, use of the canal as a heat source continues to be investigated. Early calculations show a significant carbon saving could be achieved and this is now proposed subject to technical, financial and legal feasibility (see above).</p> <p>As noted in item 10 above, the heat recovery system is incorporated into the model through an improved overall heating and cooling system efficiencies.</p>
13	<p>The applicant has confirmed that £191,936 will be paid into the borough's offset fund, equivalent to 106.6 tonnes of CO2 per annum for the entire scheme. The GLA's expectation is that all new applications comply with new London Plan policies. The carbon offsetting agreement should be amended to reflect a £95/tonne carbon price and a net zero carbon requirement for the scheme.</p>	<p>Noted - the offset payment has been recalculated to include the 100% target and £95/tonne carbon price. The offset payment for the proposed development is now £2,899,335. If the canal is included as a heat source following a detailed feasibility assessment, the carbon offset would be revisited to incorporate the additional carbon savings.</p>
Whole Life-Cycle Carbon Assessment		
14	<p>The applicant should submit a WLC assessment which will be reviewed separately; comments will be provided. The WLC assessment should follow the GLA WLC guidance and reporting template (https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/planning-guidance/whole-life-cycle-carbon-assessments-guidance-pre-consultation-draft). Applicants will also be conditioned to submit a post-construction assessment to report on the development's actual WLC emissions.</p>	<p>A WLC assessment has been prepared by AECOM and the results are presented in a separate report. This was issued to Camden on 11th March.</p>
Be Seen' Energy Monitoring		
15	<p>The applicant has indicated that they are aware of the 'Be seen' energy monitoring guidance (https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/planning-guidance/be-seen-energy-monitoring-guidance-pre-consultation-draft) to ensure that they are fully aware of the relevant requirements to comply with the 'be seen' policy. A commitment should be provided that the development will be designed to enable post construction monitoring and that the information set out in the 'be seen' guidance is submitted to the GLA's portal at the appropriate reporting stages. This will be secured through suitable legal wording. The first submission of the planning stage data should be provided to the GLA through the be seen reporting spreadsheet within four weeks of planning approval.</p>	<p>Noted. The "be seen" report will be undertaken and submitted within 4 weeks of planning approval, in line with GLA guidance.</p>
Other points		
16	<p>Flexibility measures have been considered to minimise the site's demand and this is welcomed. Noted.</p>	
Move resolved comments under this section		