GOSH CCC
Sustainability Statement for Planning

20/05/2022

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Rev: P03

NHS Great Ormond Street Hospital for Children NHS Foundation Trust

BDP.

Revision	Date	Comments	Author	Checked by
P01	21/01/2022	First draft for comment	NB	PG
P02	10/03/2022	Second draft for comment	NB/JM	PG
P03	13/05/2022	Issue for Planning	NB/JM	PG

Contents

Executive Summary

This Sustainability Statement outlines the environmental and sustainability principles that have been considered in the design proposals for the Great Ormond Street Children's Cancer Centre Hospital (GOSHCCC) development, in accordance with the relevant planning policy for the London Borough of Camden (LBC) and the Greater London Authority (GLA).

The proposals involve the replacement of the existing Great Ormond Street Hospital Frontage Building with a new build 18,288m^2 hospital building, as part of Phase 4 of the Great Ormond Street Masterplan. The new building will include a new Main Entrance to the Hospital and all of the essential elements and functions of the GOSHCCC .

The development will be assessed against the BREEAM New Construction 2018 methodology, with a target rating of 'Excellent'. A BREEAM pre-assessment has been completed, with the scheme achieving a score of 83.40%, translating to a high 'Excellent' rating.

The energy strategy for the development follows the be lean, clean, green, seen energy hierarchy. The proposals offer an optimised, high performing thermal envelope in line with the NHS Net Zero Brief guidance.The heat hierarchy is followed with connection to the existing site network prioritised to provide hot water, and high-efficiency electrically driven air source heat pumps are selected to provide 100% of the heating and cooling loads.

Low flow sanitary fittings are proposed throughout to reduce water consumption in cold and hot water systems, but also to reduce the energy used to heat the hot water service.

The design of the project gives consideration to environmental impact of materials. Prior to construction, the project team will target supply chains and manufacturers to minimise resource consumption and construction impacts. Attempts will be made to maximise the use of locally and responsibly sourced materials to maximise environmental, social and economic value.

A pre-demolition audit has been undertaken to identify opportunities to, where viable, reduce, re-use and recycle materials that are due to become waste with the demolition of the existing building. A Circular Economy Statement has been prepared that describes the circular economy principles included in the proposals to maximise material efficiency. A Demolition and Construction Management Plan (DCMP) including environmental impacts has also been produced by the appointed design and build contractor 'John Sisk & Son (Holdings) Ltd', which is included in the planning application submission.

The proposal provide internal, dedicated and appropriately labelled and segregated waste management facilities, to enable and encourage future occupants to recycle waste and manage flows effectively. Engagement with the GOSH NHS Trust has informed the design, aiming to overcome the existing challenges of managing goods in and out, including consumables, disposal holds, supplies, linen and uniforms.

The site is highly accessible, with a number of transport nodes in close proximity to the site. The proposed development is car free, and the site includes sufficient cycle parking facility.

A Preliminary Ecological Appraisal (PEA) has been undertaken and appropriate measures will be implemented for the avoidance, mitigation or compensation of the potential impacts of the proposed development on the identified ecological receptors. The site is of low ecological value, and proposals maximise enhancements to biodiversity. An Urban Greening Factor (UGF) of 0.334 is achieved for the building. Green space is prioritised and maximised through creation of a roof garden and balconies, aiding the health and well-being of the occupants.

The proposed development will mitigate against climate change by implementing the following measures:

- a fabric-first approach to the building envelope
- use of native and drought resistant planting
- a biodiverse (green) roof
- a drainage strategy accounting for future climate change
- provision of low water-use fittings

- use of durable and resilient materials.

A site-specific Flood Risk Assessment (FRA) has been prepared. Available data has been assessed to determine the potential risk of flooding at the site, and recommendations provided, where applicable. The FRA confirms the proposed development is located in Flood Zone 1, as defined in the NPPF as land having a less than 1 in 1,000 annual probability of river or sea flooding (less than 0.1% AEP). The drainage strategy aims to provide resilience for 1 in 100 year storm, with a 40% uplift for climate change, using attenuation tanks to reduce runoff to greenfield rates.

Dispersion modelling was used to evaluate impacts of the proposed development's operation, confirming the proposals will not adversely affect local air quality. The building does not propose any new combustion plant, and situates air exhausts at high level.

The proposed external lighting will be designed in line with best practice. It will be automatically controlled for prevention of operation during daylight hours and ensure that upward lighting will be minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.

Using measured survey data, limits for noise emissions from fixed plant installation associated with the development have been proposed. These are in accordance with the Technical Guidance for Noise compliance standards. Building services equipment will be appropriately attenuated to ensure that these limits are not exceeded.

Health and well-being forms a key consideration of the design proposals. This includes thermal comfort and daylight optimisation, as well as selection of low VOC emitting materials, an accessible roof garden and balconies supporting a welcoming interior design to provide a feeling of home for patients.

1 Introduction

This Sustainability Statement has been prepared on behalf of the Applicant, Great Ormond Street Hospital for Children NHS Foundation Trust (referred to hereafter as the 'Applicant') in collaboration with the appointed design and build contractor John Sisk & Son (Holdings) Ltd (referred to hereafter as Sisk) to support an application to the London Borough of Camden (LBC) for full planning permission for the redevelopment of the Great Ormond Street Hospital (GOSH) Frontage Building and Entrance on Great Ormond Street WC1N 3JH X (referred to hereafter as the 'site'), to provide a new Children's Cancer Centre (CCC).

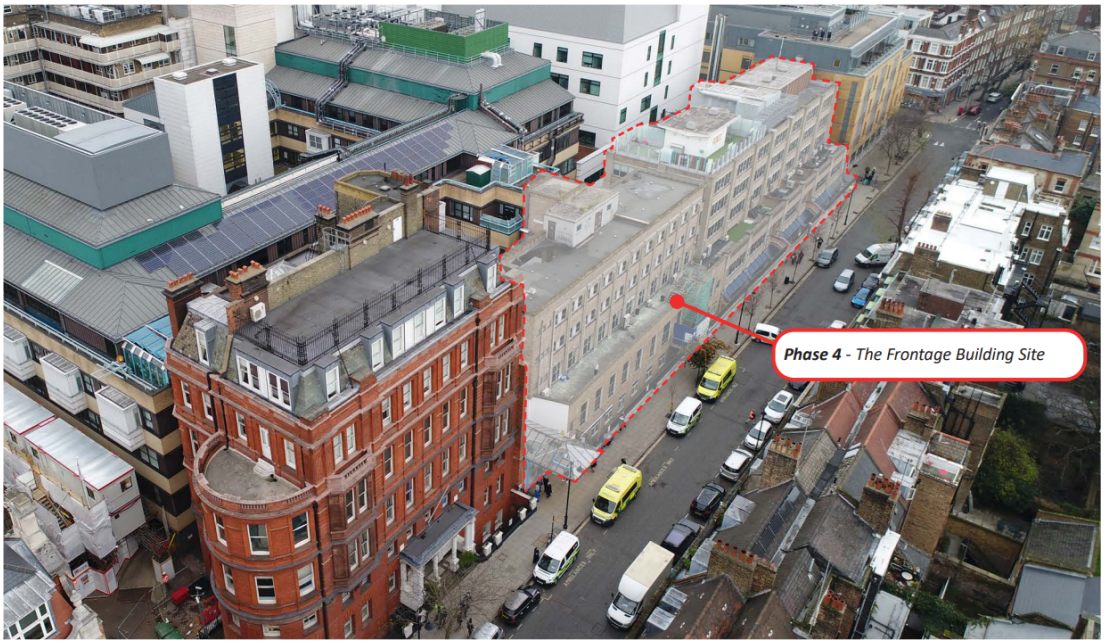


Figure 1. View of the existing site

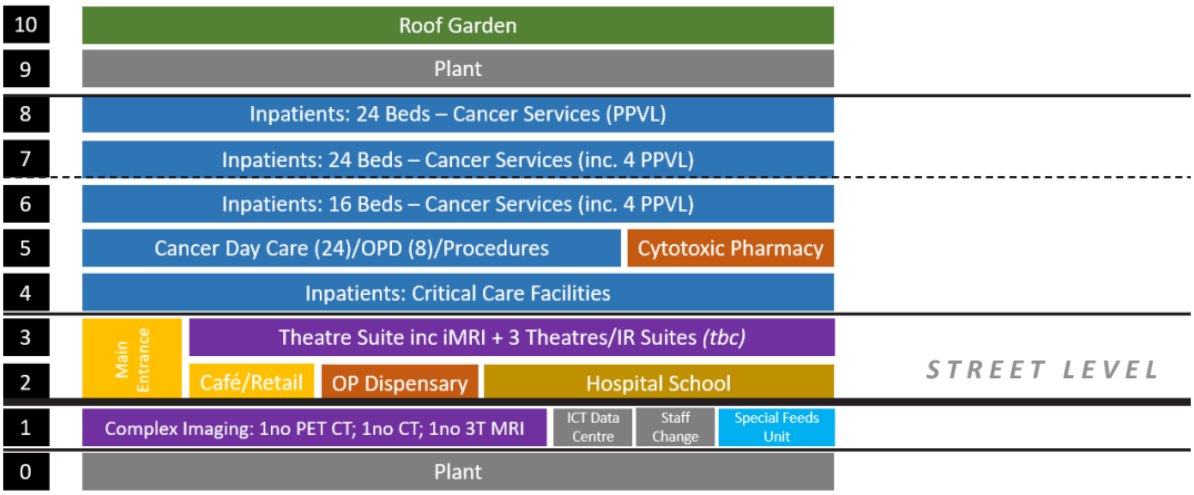


Figure 2. Clinical functions to be provided by the proposed development

The building's orientation and layout are constrained by the site's existing neighbouring buildings and Great Ormond Street. The majority of the site is currently occupied by the existing GOSH Frontage Building, a five storey building (inclusive of basement) dating from the 1950s that was constructed in two separate phases. The building is currently occupied by a number of GOSH departments including Audiology Department, Clinical Research Facility (CRF), Department of Child and Adolescent Mental Health and Paediatric Psychology Department. The western most part of the site is occupied by the main GOSH Entrance providing connections to the wider GOSH island site and by a small rear element (external staircase) of the Paul O'Gorman Building that will be demolished to facilitate the proposed development. The site is bounded by the Paul O'Gorman Building to the west, Octav Botnar Wing to the east, the Variety Club Building and Premier Inn Clinical Building to the north and Great Ormond Street to the south.

The purpose of this Sustainability Statement is to demonstrate compliance with relevant LBC and GLA planning policy, providing a holistic overview of the scheme's sustainability credentials in terms of the progressive design, construction, infrastructure and operation. It summarises key elements and sets out how the proposed project will meet the principles of local sustainable development policy. Each aspect of this statement has been related to its relevant policy context and refers to supporting planning application documents where appropriate. This also aligns with the Trust's own sustainability ambition, which has been provided in Appendix C.

2 Policy Context

2.1 National Planning Policy Framework (NPPF) (2021)

The National Planning Policy Framework (2021) replaces the National Planning Policy Framework (2019). It provides a framework within which locally-prepared plans for housing and other development can be produced.

The NPPF sets out a presumption in favour of sustainable development and the need to support sustainable economic growth through the planning system. It identifies three overarching objectives as follows:

- An economic objective - to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure
- A social objective - to support strong, vibrant and healthy communities by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being
- An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy

Planning Practice Guidance for renewable and low carbon energy
The NPPF seeks to promote the delivery of renewable and low carbon energy in line with the UK's legal commitments to cut greenhouse gases and meet increased energy demand from renewable sources. New developments should consider the local potential for accommodating a range of renewable and low carbon energy generation technologies.

Pollution Control Framework
Development should not contribute to or be placed where there is risk of being adversely affected by unacceptable levels of soil, air, water or noise pollution.

Policy for meeting the challenge of climate change, flooding, and coastal change
Development should mitigate and adapt to climate change, taking full account of flood risk, gas emissions, water supply and demand considerations.

2.2 Delivering a Net Zero NHS

In October 2020, the NHS announced a commitment to become the world's first national health system to become 'net zero'. The commitment comes amid growing evidence of the health impacts of climate change and air pollution, with the aim of saving thousands of lives and hospitalisations across the country. Two clear targets have emerged from the NHS net zero commitment:

- For emissions within direct control (the NHS Carbon Footprint): net zero by 2040, with an ambition to reach an 80% reduction by 2028-2032
- For emissions within influence (the NHS Carbon Footprint plus); net zero by 2045, with an ambition to reach an 80% reduction by 2036-2039

Net zero guidance for the NHS is currently being developed and is due for release in Q3 2021.

2.3 The London Plan 2021

GG3 Creating a healthy city
To improve Londoners' health those involved in planning and development must:

- Use the Healthy Streets Approach to prioritise health in all planning decisions

- Assess the potential impacts of Development Plans on the mental and physical health and wellbeing of communities
- Plan for appropriate health and care infrastructure to address the needs of London's changing and growing population
- Seek to improve London's air quality, reduce public exposure to poor air quality and minimise inequalities in levels of exposure to air pollution
- Plan for improved access to and quality of green spaces, the provision of new green infrastructure, and spaces for play, recreation and sports
- Ensure that new buildings are well-insulated and sufficiently ventilated to avoid the health problems associated with damp, heat and cold

GG6 Increasing efficiency and resilience

To help London become a more efficient and resilient city, those involved in planning and development must:

- Seek to improve energy efficiency and support the move towards a low carbon circular economy, contributing towards London becoming a zero-carbon city by 2050
- Ensure buildings and infrastructure are designed to adapt to a changing climate, making efficient use of water, reducing impacts from natural hazards like flooding and heatwaves, while mitigating and avoiding contributing to the urban heat island effect

Policy D8 Public realm

Development Plans should incorporate green infrastructure to support rainwater management through sustainable drainage, reduce exposure to air pollution, moderate surface and air temperature and increase biodiversity.

Policy D14 Noise

Development proposals should manage noise by:

- Avoiding significant adverse noise impacts on health and quality of life
- Mitigating and minimising the existing and potential adverse impacts of noise from the new development
- Improving and enhancing the acoustic environment and promoting appropriate soundscapes
- Separating new noise-sensitive development from major noise sources through the use of distance, screening, layout, orientation, uses and materials – in preference to sole reliance on sound insulation
- Promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver

Policy S2 Health and social care facilities

Development proposals that support the provision of high-quality new and enhanced health and social care facilities to meet identified need and new models of care should be supported. New facilities should be easily accessible by public transport, cycling and walking.

Policy G1 Green infrastructure

Development Plans should use evidence, including green infrastructure strategies, to identify key green infrastructure assets, their function and their potential function and identify opportunities for addressing environmental and social challenges through strategic green infrastructure interventions.

Development proposals should incorporate appropriate elements of green infrastructure that are integrated into London's wider green infrastructure network.

Policy G5 Urban greening

Major development proposals should contribute to the greening of London by including urban greening as a fundamental element of site and building design, and by incorporating measures such as high-quality landscaping, green roofs, green walls and nature-based sustainable drainage.

Policy G6 Biodiversity and access to nature

Development proposals should manage impacts on biodiversity and aim to secure net biodiversity gain.

Policy G7 Trees and woodlands
Development proposals should ensure that, wherever possible, existing trees of value are retained. If planning permission is granted that necessitates the removal of trees there should be adequate replacement based on the existing value of the benefits of the trees removed.

Policy SI 1 Improving air quality
Development Plans, through relevant strategic, site-specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality

Development proposals should not:

- Lead to further deterioration of existing poor air quality
- Create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits
- Create unacceptable risk of high levels of exposure to poor air quality

Policy SI 2 Minimising greenhouse gas emissions
Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

- Be lean
- Be clean
- Be green
- Be seen

Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development.

Policy SI 3 Energy infrastructure
Development Plans should:

- Identify the need for, and suitable sites for, any necessary energy infrastructure requirements including energy centres, energy storage and upgrades to existing infrastructure
- Identify existing heating and cooling networks, identify proposed locations for future heating and cooling networks and identify opportunities for expanding and inter-connecting existing networks as well as establishing new networks

Policy SI 4 Managing heat risk
Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.

Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning.

Policy SI 5 Water infrastructure
Development Plans should promote improvements to water supply infrastructure to contribute to security of supply.
Development proposals should:

- Achieve at least the BREEAM excellent standard for the ‘Wat 01’ category
- Incorporate measures such as smart metering, water saving and recycling measures, including retrofitting, to help to achieve lower water consumption rates and to maximise future-proofing

Development proposals should:

- Seek to improve the water environment and ensure that adequate wastewater infrastructure capacity is provided
- Take action to minimise the potential for misconnections between foul and surface water networks

Policy SI 7 Reducing waste and supporting the circular economy
Development Plans that apply circular economy principles and set local lower thresholds for the application of Circular Economy Statements for development proposals are supported.

Policy SI 8 Waste capacity and net waste self-sufficiency
Development Plans should:

- Plan for identified waste needs
- Identify how waste will be reduced, in line with the principles of the circular economy and how remaining quantums of waste will be managed
- Allocate sufficient sites, identify suitable areas, and identify waste management facilities to provide the capacity to manage the apportioned tonnages of waste

Policy SI 12 Flood risk management
Development Plans should use the Mayor's Regional Flood Risk Appraisal and their Strategic Flood Risk Assessment as well as Local Flood Risk Management Strategies, where necessary, to identify areas where particular and cumulative flood risk issues exist and develop actions and policy approaches aimed at reducing these risks.

Developments Plans should contribute to the delivery of the measures set out in Thames Estuary 2100 Plan.

Policy SI 13 Sustainable drainage
Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible.

Development proposals for impermeable surfacing should normally be resisted unless they can be shown to be unavoidable.

Policy T1 Strategic approach to transport
Development Plans should support the delivery of the Mayor's strategic target of 80 per cent of all trips in London to be made by foot, cycle or public transport by 2041.
All development should make the most effective use of land, reflecting its connectivity and accessibility by existing and future public transport, walking and cycling routes.

Policy T2 Healthy Streets
Development Plans should deliver patterns of land use that facilitate residents making shorter, regular trips by walking or cycling.

Policy T4 Assessing and mitigating transport impacts
Development Plans should reflect and be integrated with current and planned transport access, capacity and connectivity.

Transport assessments/statements should be submitted with development proposals to ensure that impacts on the capacity of the transport network are fully assessed.

Development proposals should not increase road danger.

Policy T5 Cycling
Development proposals should demonstrate how cycle parking facilities will cater for larger cycles, including adapted cycles for disabled people.

Development Plans requiring more generous provision of cycle parking based on local evidence will be supported.

Policy T6 Car parking
Where sites are redeveloped, parking provision should not be re-provided at previous levels where this exceeds the standards set out in this policy.

2.4 London Borough of Camden Local Plan (2017)

Policy G1 Delivery and location of growth

The Council will deliver growth by securing high quality development and promoting the most efficient use of land and buildings by:

- Supporting development that makes best use of its site, taking into account quality of design, its surroundings, sustainability, amenity, heritage, transport accessibility and any other considerations relevant to the site
- Resisting development that makes inefficient use of land
- Supporting a mix of uses either on site or across multiple sites as part of an agreed coordinated development approach, where it can be demonstrated that this contributes towards achieving the strategic objectives and delivers the greatest benefit to the key priorities of the Plan

Policy C1 Health and wellbeing

The Council will require:

- Development to positively contribute to creating high quality, active, safe and accessible places
- Proposals for major development schemes to include a Health Impact Assessment (HIA)

The Council will:

- Support the provision of new or improved health facilities, in line with Camden's Clinical Commissioning Group and NHS England requirements
- Protect existing health facilities in line with Policy C2 Community facilities

Policy C2 Community facilities

The Council will:

- Seek planning obligations to secure new and improved community facilities and services to mitigate the impact of developments. The Council may also fund improvements to community facilities using recepts from the Community Infrastructure Levy where this is identified on the Council's CIL funding list
- Ensure that facilities provide access to a service on foot and by sustainable modes of travel.
- Support the investment plans of educational, health, scientific and research bodies to expand and enhance their operations, taking into account the social and economic benefits they generate for Camden, London and the UK

Policy C5 Safety and security

The Council will aim to make Camden a safer place. They will:

- Require developments to demonstrate that they have incorporated design principles which contribute to community safety and security, particularly in wards with relatively high levels of crime, such as Holborn and Covent Garden, and Bloomsbury
- Require appropriate security and community safety measures in buildings, spaces and the transport system
- Promote the development of pedestrian friendly spaces

Policy C6 Access for all

The Council will seek to promote fair access and remove the barriers that prevent everyone from accessing facilities and opportunities. They will:

- Expect all buildings and places to meet the highest practicable standards of accessible and inclusive design so they can be used safely, easily and with dignity by all
- Expect facilities to be located in the most accessible parts of the borough
- Expect spaces, routes and faciltities between buildings to be designed to be fully accessible
- Encourage accessible public transport
- Secure care parking for disabled people

Policy A3 Biodiversity

The Council will protect and enhance sites of nature conservation and biodiversity. They will:

- Seek the protection of other features with nature conservation value

- Assess developments against their ability to realise benefits for biodiversity through the layout, design and materials used in the built structure and landscaping elements of a proposed development, proportionate to the scale of development proposed
- Seek to improve opportunities to experience nature, in particular where such opportunities are lacking
- Require the demolition and construction phase of development, including the movement of works vehicles, to be planned to avoid disturbance to habitats and species and ecologically sensitive areas, and the spread of invasive species
- Resist the loss of trees and vegetation of significant amenity, historic, cultural or ecological value including proposals which may threaten the continued wellbeing of such trees and vegetation
- Require trees and vegetation which are to be retained to be satisfactorily protected during the demolition and construction phase of development in line with BS5837:2012 'Trees in relation to Design, Demolition and Construction' and positively integrated as part of the site layout
- Expect replacement trees or vegetation to be provided where the loss of significant trees or vegetation or harm to the wellbeing of these trees and vegetation has been justified in the context of the proposed development.
- Expect developments to incorporate additional trees and vegetation wherever possible

Policy A4 Noise and vibration

The Council will seek to ensure that noise and vibration is controlled and managed.

Where uses sensitive to noise and vibration are proposed close to an existing source of noise or when development is likely to generate noise is proposed, the Council will require an acoustic report to accompany the application. Further guidance on the application of these standards will be provided in supplementary planning document Camden Planning Guidance on amenity.

Policy A5 Basements

In determining proposals for basements and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability in the form of a Basement Impact Assessment, and where appropriate a Basement Construction Plan.

The Council will require applicants to demonstrate that proposals for basements:

a. do not harm neighbouring properties, including requiring the provision of a Basement Impact Assessment which shows that the scheme poses a risk of damage to neighbouring properties no higher than Burland Scale 1 'very slight'
b. avoid adversely affecting drainage and run-off or causing other damage to the water environment
c. avoid cumulative impacts
d. do not harm the amenity of neighbours
e. provide satisfactory landscaping, including adequate soil depth;do not harm the appearance or setting of the property or the established character of the surrounding area
f. protect important archaeological remains
g. do not prejudice the ability of the garden to support trees where they are part of the character of the area

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding.

Policy D1 Design

The Council will seek to secure high quality design in development. Requirements for the development:

- Is sustainable in design and construction, incorporating best practice in resource management and climate change mitigation and adaptation
- Is of sustainable and durable construction and adaptable to different activities and land uses
- Integrates well with the surrounding streets and open spaces, improving movement through the site and wider area with direct, accessible and easily recognisable routes and contributes positively to the street frontage
- Is inclusive and accessible for all

- Promotes health
- Is secure and designed to minimise crime and antisocial behaviour
- Responds to natural feature and preserves gardens and other open space
- Incorporates high quality landscape design (including public art, where appropriate) and maximises opportunities for greening for example through planting of trees and other soft landscaping
- Incorporates outdoor amenity space
- Preserves strategic and local views
- Carefully integrates building services equipment

Policy CC1 Climate change mitigation

The council will:

- Promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy
- Require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met
- Ensure that the location of development and mix of land uses minimise the need to travel by car and help to support energy networks
- Support and encourage sensitive energy efficiency improvements to existing buildings
- Require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building
- Expect all developments to optimise resource efficiency

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

Policy CC2 Adapting to climate change

All development should adopt appropriate climate change adaptation measures such as:

- The protection of existing green spaces and promoting new appropriate green infrastructure
- Not increasing, and wherever possible reducing, surface water run-off through increasing permeable surfaces and use of Sustainable Drainage Systems
- Incorprotaing bio-diverse roofs, combination green and blue roofs and green walls where appropriate
- Measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy

The Council will promote and measure sustainable design and construction by:

- Ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation
- Expecting non-domestic developments of 500 sqm of floorspace or above to achieve “excellent” in BREEAM assessments and encouraging zero carbon in new development from 2019

Policy CC3 Water and flooding

The Council will seek to ensure that development does not increase flood risk and reduces the risk of flooding where possible. They will require development to:

- Incorporate water efficiency measures
- Avoid harm to the water environment and improve water quality
- Consider the impact of development in areas at risk of flooding (including drainage)
- Incorporate flood resilient measures in areas prone to flooding
- Utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible.
- Not locate vulnerable development in flood-prone areas

Policy CC4 Air Quality

The Council will ensure that the impact of development on air quality is mitigated and exposure to poor air quality is reduced in the borough, considering both the exposure of occupants to air pollution and the effect of the development on air quality.

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan.

Policy CC5 Waste

The council will seek to make Camden a low waste borough by making sure that developments include facilities for the storage and collection of waste and recycling.

To ensure an integrated approach to waste management and the highest possible reuse and recycling rates, the Council will encourage the submission of a site waste management plan prior to construction.

Policy T1 Prioritising walking, cycling and public transport

The Council will promote sustainable transport by priortising walking, cycling and public transport in the borough.

Walking

The council will seek to ensure that developments:

- Are easy and safe to walk through ('permeable')
- Are adequately lit
- Provide high quality footpaths and pavements that are wide enough for the number of people expected to use them

Cycling

The Council will seek to ensure that development:

- Provides for accessible, secure cycle parking facilities exceeding minimum standards outlined within the London Plan and design requirements outlined within the supplementary planning document Camden Planning Guidance on transport. Higher levels of provision may also be required in areas well served by cycle route infrastructure, taking into account the size and location of the development
- Makes provision for high quality facilities that promote cycle usage including changing rooms, showers, dryers and lockers

Policy T2 Parking and car-free development

The Council will limit the availability of parking and require all new developments in the borough to be car-free. They will:

- Not issue on-street or on-site parking permits in connection with new developments and use legal agreements to ensure that future occupants are aware that they are not entitled to on-street parking permits.
- Limit on-stie parking to:
    - Spaces designated for disabled people where necessary, and/or
    - Essential operational or servicing needs
- Support the redevelopment of existing car parks for alternative uses
- Resist the development of boundary treatments and gardens to provde vehicle crossovers and on-site parking

Policy T3 Transport infrastructure

The Council will seek improvements to transport infrastructure in the borough. They will:

- Not grant planning permission for proposals which are contrary to the safeguarding of strategic infrastructure improvement projects
- Protect existing and proposed transport infrastructure, particularly routes and facilities for walking, cycling and public transport, from removal or severance

Policy T4 Sustainable movement of goods and materials

Developments of over 2,500 sqm likely to generate significant movement of goods or materials by road (both during construction and operation) will be expected to:

- Minimise the impact of freight movement via road by prioritising use of the Transport for London Road Network or other major roads
- Accommodate goods vehicles on site
- Provide Construction Management Plans, Delivery and Servicing Management Plans and Transport Assessments where appropriate

2.5 Camden Supplementary Guidance

2.5.1 Air Quality (January 2021)

Air Quality in Camden

- All of Camden is a designated Air Quality Management Area due to the high concentrations of nitrogen dioxide (NO2) and particulate matter (PM10)
- All developments are to protect future occupants from exposure to poor air quality
- All developments are to limit their impact on local air quality and be at least air quality neutral

Assessing air quality impacts

- Air quality neutral assessments are required for all major developments. An Air Quality Assessment (AQA) is an assessment of the impact of a development on the levels of certain pollutants in a local area

Minimising emissions into the air

- All proposals involving demolition and construction should adopt best practice measures to reduce and mitigate emissions
- On-site monitoring may be required dependant on the scale of demolition and construction
- Certain developments using Non Road Mobile Machinery (within the KW range) need to meet standards in the Mayor's Dust and emissions SPD
- The impact of outdoor air pollution on indoor air quality in new developments needs to be taken into account at the earliest stages of building design
- Development should take into consideration the location of amenity space and opportunities for appropriate planting 'greening'
- Development should reduce emissions by being energy efficient (reducing emissions associated with the operation of the building)
- Development should prioritise more sustainable modes of transport and where applicable improve the walking and cycling environment

2.5.2 Amenity (January 2021)

Overlooking, privacy and outlook

- Developments should be designed to protect the privacy of occupiers of both existing and proposed dwellings
- Mitigation measures should be included to reduce overlooking
- Public spaces benefit from overlooking as natural surveillance

Daylight and Sunlight

- Where appropriate a daylight and sunlight assessment should submitted which should be follow the guidance in the BRE's Site layout planning for daylight and sunlight: A guide to good practice
- The 45 degree and 25 degree tests cited in the BRE guidance should be used to assess ('screen') whether a sunlight and daylight report is required
- Levels of reported daylight and sunlight will be considered flexibly taking into account site-specific circumstances and context
- The Council may seek independent verification of sunlight and daylight reports if necessary

Artificial Light

- Artificial lighting should be considered at the design stage and not affect the amenity of neighbours or wildlife
- Planning permission is required for artificial lighting structures and equipment that substantially affect the external appearance of a building
- Developers are expected to employ a specialist lighting engineer accredited by the Institute of Lighting Engineers to design their lighting schemes

Construction Management Plans

- Construction Management Plans (CMPs) are expected for major developments and the Council will assess the need for a CMP for smaller developments on a case-by-case basis
- The Council expects CMPs to be submitted after planning permission is granted and to include significant input from the contractor(s) appointed to undertake the work
- CMPs must address transport/highways and environmental health impacts, as well as any cumulative construction impacts as a result of activity from multiple sites in close proximity to one another
- The Council's CMP Pro-forma template must be used when completing a CMP
- Developers are expected to consult on their CMP with affected parties before submitting it to the Council

Noise and vibration

- The Council will assess the impact of noise and vibration through the consideration of acoustic reports submitted by applicants
- Noise mitigation (where appropriate) is expected to be incorporated into developments at the design stage
- The Council will secure mitigation measures through planning condition or legal agreement where necessary
- The Council will adopt the 'agent of change' principle

Wind and micro-climate

- New developments should consider the local wind environment, local temperature, overshadowing and glare, both on and off the site
- Buildings taller than their surroundings may cause excessive wind in neighbouring streets and public areas
- Where poor wind conditions already exist reasonable attempts must be made to improve conditions

Contaminated Land

- Contaminated land can pose a serious risk to health and the environment
- Contaminated land assessments should be submitted for developments located on contaminated land or propose a use that has the potential to contaminate land
- Developers should contact the Council's Contaminated Land team for information regarding a site's contamination history and possible remedial measures

2.5.3 Biodiversity CPG (March 2018)

- A biologically diverse natural environment has an important role in economic prosperity, health and wellbeing of Camden residents, workers and visitors
- Proposals must demonstrate:
    - how biodiversity considerations have been incorporated into the development
    - how the five-point Mitigation Hierarchy has been addressed, and
    - what positive measures for enhancing biodiversity are planned
- Ecological impact assessment (EcIA) and/or ecological constraints and opportunities plan (ECOP) will be required unless the Council's Ecology Officer has agreed that it is not
- Developers will be required to assess the impact of proposals on designated sites and the areas adjacent to or surrounding protected sites
- Camden recognizes six strategic wildlife corridors, identified and described through the SINC selection process. Proposals should be assessed for impacts on and opportunities to enhance these corridors

2.5.4 Energy Efficiency and Adaption (January 2021)

Energy Hierarchy

- All development in Camden is expected to reduce carbon dioxide emissions by following the energy hierarchy in accordance with Local Plan policy CC1
- Energy strategies are to be designed following the steps set out in the energy hierarchy

Making buildings more energy efficient

- Natural 'passive' measures should be prioritised over active measures to reduce energy
- Major nonresidential development to achieve 15% reduction (beyond part L Building regulations), in accordance with the new London Plan, through on-site energy efficient measures (Be lean stage)

Decentralised energy

- All new major developments in Camden are expected to assess the feasibility of decentralised energy network growth (paragraph 8.25 Local Plan)

Renewable energy technologies

- There are a variety of renewable energy technologies that can be installed to supplement a development's energy needs
- Developments are to target a 20% reduction in carbon dioxide emissions from on-site renewable energy technologies

Energy statements

- Energy statements are required for all developments involving 5 or more dwellings and/or more than 500sqm of any (gross internal) floorspace
- Energy statements should demonstrate how a development has been designed following the steps in the energy hierarchy
- The energy reductions should accord with those set out in the Chapter below 'Energy reduction'

Energy Reduction

- All development in Camden is expected to reduce carbon dioxide emissions through the application of the energy hierarchy
- All new build major development to demonstrate compliance with London Plan targets for carbon dioxide emissions
- Deep refurbishments (i.e. refurbishments assessed under Building Regulations Part L1A/L2A) should also meet the London Plan carbon reduction targets for new buildings
- Developments of five or more dwellings and/or more than 500sqm of any gross internal floorspace to achieve 20% reduction in carbon dioxide emissions from on-site renewable energy generation

Energy efficiency in existing buildings

- All developments should demonstrate how sustainable design principles have been considered and incorporated
- Sensitive improvements can be made to historic buildings to reduce carbon dioxide emissions
- Warm homes and buildings are key to good health and wellbeing. As a guide, at least 10% of the project cost should be spent on environmental improvements
- The 20% carbon reduction target (using on-site renewable energy technologies) applies for developments of more than 500 sqm of any gross internal floorspace

Reuse and optimising resource efficiency

- All development should seek to optimise resource efficiency and use circular economy principles
- In assessing the opportunities for retention and refurbishment developers should assess the condition of the existing building and explore future potential of the site

Sustainable design and construction measures

- All developments involving 5 or more residential units or 500 sqm or more of any additional floorspace should address sustainable design and construction measures (proposed in design and implementation) in a Sustainability Statement (Local Plan policy CC2)
- Active cooling (air conditioning) will only be permitted where its need is demonstrated and the steps in the cooling hierarchy are followed (Local Plan policy CC2)
- Development is expected to reduce overheating risk through following the steps in the cooling hierarchy. All new development should submit a statement demonstrating how the cooling hierarchy has been followed (Local Plan policy CC2)
- All developments should seek opportunities to make a positive contribution to green space provision or greening

Sustainable Assessment tools

- BREEAM Excellent is required for all non-residential development of 500sqm or more floorspace
- Other assessment tools such as Home Quality Mark and Passivhaus are encouraged, they can serve to demonstrate the incorporation of sustainable design principles

2.5.5 Planning for health and well-being (January 2021)

- Measures that will help contribute to healthier communities and reduce health inequalities should be incorporated in developments
- The potential impacts of schemes on health and wellbeing should be identified early in the design of schemes
- Health Impact Assessments (HIA) and screening should be undertaken for all major applications and developments likely to give rise to significant health impacts. This will allow schemes to be refined to maximise positive effects on health and wellbeing

2.5.6 Transport (January 2021)

Assessing Transport Impact

- A Transport Assessment, Statement or Note is required for all applications that involve a change in the way that a site is accessed from the highway
- These documents must clearly demonstrate what measures will be required in order to mitigate the transport impact of the development

Travel Plans

- Travel Plans enable a development to proceed without adverse impact on the transport network through promoting a greater use of sustainable travel and thereby helping to tackle congestion and air pollution
- The requirements of a travel plan will be tailored to the specific characteristics of the site and nature of the development

Delivery and Servicing Plans

- The need for a Delivery and Servicing Plan (DSP) should be identified in the Transport Assessment
- A framework/draft DSP will form part of the Transport Assessment; the DSP itself will form part of the Travel Plan or be a standalone document, secured as a Section 106 planning obligation
- The use of the term ‘Delivery and Service Plan’ is interchangeable with the term ‘Delivery and Servicing Management Plan’

Parking and car-free development

- The Camden Local Plan 2017 extends car-free development to the whole of the Borough
- Legal agreements will be used to maintain car-free and car-capped development over the lifetime of a scheme

Car Parking Management and Reduction

- Developments with associated car parking will be required to submit a Car Parking Management and Reduction Plan

- Applicants must demonstrate how parking will be managed, monitored and enforced, and provide details as to how the car parking can be repurposed in the future

Vehicular Access and Crossovers

- Planning permission must be sought for works that create or alter an access onto a classified road
- Highway Authority consent is required for any works affecting the public highway
- The Council will not approve applications that would cause unacceptable parking pressure, add to existing parking problems or result in negative impacts on amenity

Cycling Facilities

- The Council will seek high quality cycle parking facilities for development, including redevelopments and in applications that change travel patterns and the travel profile or increase the numbers of people travelling to a site
- Applicants must provide, as a minimum, the quantity of cycle parking spaces as set out in the London Plan; and
- Applicants will provide cycling facilities that are fully inclusive and accessible by step free access

Pedestrian and Cycle Movement

- All developments must have due regard to the safety, ease of movement and the quality of pedestrian and cycle facilities for people moving to and within a site

2.5.7 Trees CPG (March 2019)

- With all proposals, the Council will expect:
    - A survey of existing trees (and woody vegetation) to be undertaken prior to the developer deciding on a design of a scheme
    - Retention and integration of existing significant trees in the design of a scheme
    - New trees to sustain or increase canopy coverage and visual amenity, applying a “right place, right tree” approach
    - Other planting to be provided to contribute to Camden’s green infrastructure, where appropriate

2.5.8 Water and Flooding CPG (March 2019)

Water efficiency

- All developments are to be water efficient
- Major developments and high or intense water use developments should include grey water recycling
- Refurbishments and other non-domestic development will be expected to meet BREEAM water efficiency credits

Flooding

- All developments must not increase the risk of flooding
- Developments are required to utilise Sustainable Drainage Systems (using the drainage hierarchy) to achieve greenfield run off rates, where feasible

3 Sustainable Design Assessment (BREEAM)

BREEAM is an internationally recognised and robust standard that helps to deliver and validate the sustainability value of a project cost effectively. Credits are awarded across 9 categories and ratings range from 'Pass' (≥30% score) to 'Outstanding' (≥85% score).

BREEAM workshops were held with the design team to identify target credits based on current design intent, and to ensure strategies are being developed with consideration to the sustainability targets.

The project is aiming to achieve a BREEAM New Construction 2018 (Healthcare) rating of 'Excellent', which requires a score of ≥70%. A BREEAM pre-assessment has been completed (Appendix A), predicting a score of 83.40%. As per Camden policy, a minimum of 60% of all available water and energy credits are targeted, as well as 40% of available materials credits, as shown in the table below:

	Credits available	**Predicted**	**% of Credits achieved**	**Overall % Percentage**
Management	21	21	100.00%	11.00%
Health & Wellbeing	19	13	68.42%	9.58%
Energy	23	19	76.00%	12.16%
Transport	12	10	83.33%	8.33%
Water	9	6	66.67%	4.67%
Materials	14	12	85.71%	12.86%
Waste	10	8	80.00%	4.80%
Land Use & Ecology	13	10	76.92%	10.00%
Pollution	12	9	75.00%	6.00%
Innovation	10	4	50.00%	5.00%
			Total	**83.40**

A maximum of four credits can be achieved for Ene 01-01, which precludes achieving BREEAM Outstanding (for which achieving six credits is a minimum standard). This is primarily due to the high energy demand of the building as a result of hospital functionality and connection into existing site network which uses CHP/gas.

4 Energy and Carbon

This section covers the predicted energy and carbon associated with the operation of the building, the embodied carbon and the Whole Life Carbon.

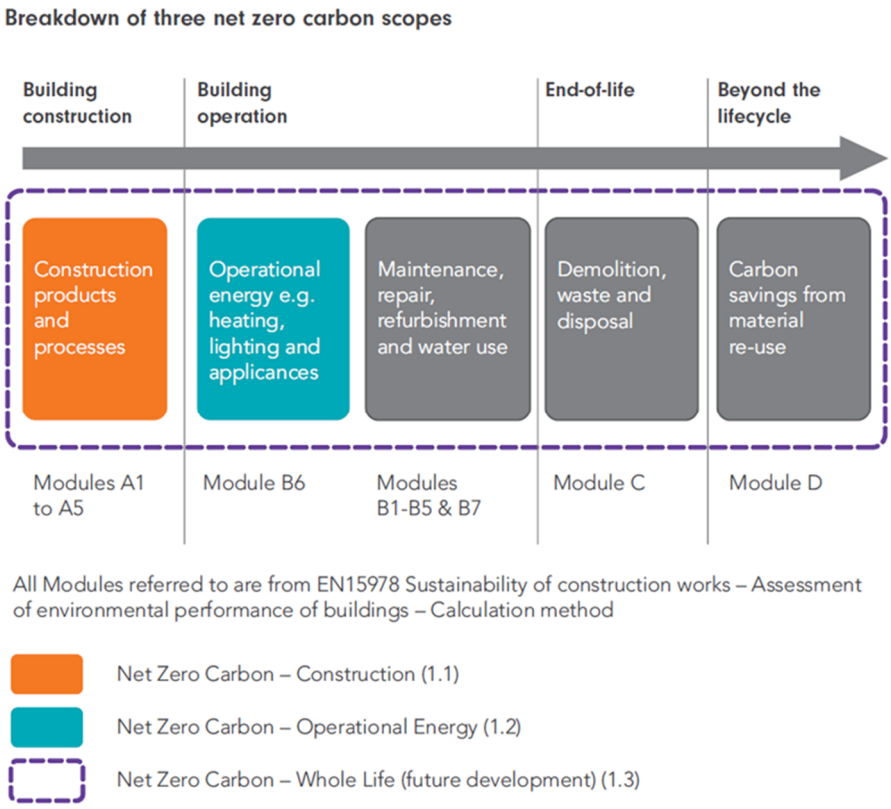


Figure 3. UKGBC Net Zero Carbon scope

4.1 Operational Energy and Carbon

An Energy Statement (GOSHCCC-BDP-ZZ-ZZ-RP-A-2000-0041) has been produced for the proposed development and is submitted with the planning application. The Energy Statement describes the proposed energy strategy as per the GLA Energy Hierarchy of 'Be Lean'; 'Be Clean'; 'Be Green'; and 'Be Seen', as set out in the London Plan.

The proposed development was modelled using the IES Virtual Environment 2021.3.0 software. The carbon dioxide emissions and savings were derived using the GLA carbon emissions reporting spreadsheet (version 1.2), and have been calculated using the SAP10 carbon factors as advised by the GLA Energy Assessment Guide.

The design adopted passive design measures to reduce energy demand. The proposed passive design and energy efficiency measures will reduce the emissions by approximatively 11% (SAP10) against an equivalent Building Regulations compliant building for Be Lean. This reduction is equivalent to 62.7 tonnes of CO2.

For Be Clean, the heat hierarchy was followed and connection to the existing GOSH CHP/boiler site system prioritised to provide hot water to the building. The efficiency of the system was further improved by lowering the distribution temperature from around 60ºC, which would be typical for a hospital, to 43ºC which drastically reduces the heat loss from the network and is currently only employed in two hospitals in the UK.

All available renewable energy technologies were also considered. Air source heat pumps were found to be the most feasible technology. The proposed heat pumps will be meeting 100% of the heating and cooling loads, and will provide a further 2%

reduction in carbon dioxide emissions, leading to a total carbon emissions reduction of 75.8 tonnes of CO2, which is equivalent to a 13% reduction in carbon dioxide across the whole development (SAP10).

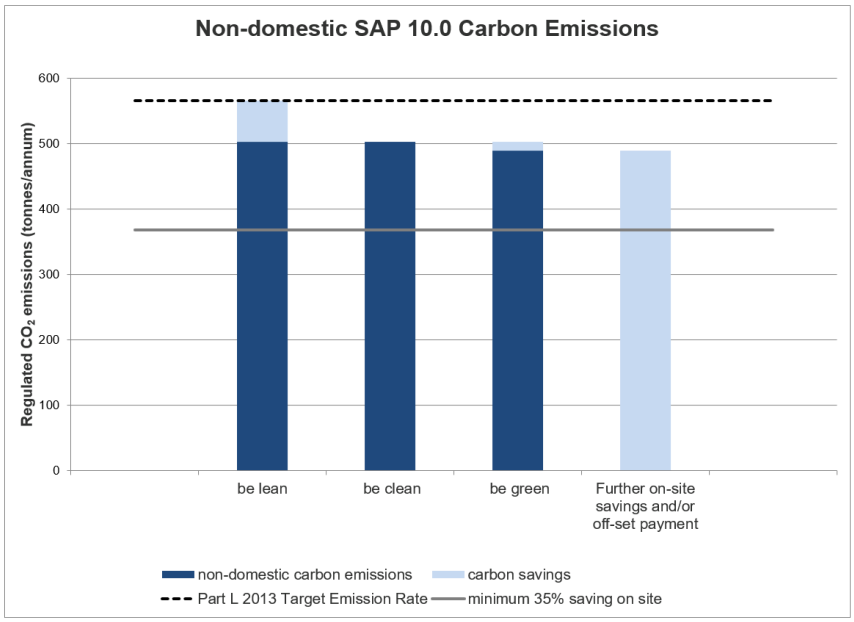


Figure 4.Carbon dioxide emissions reduction after Lean, Clean and Green measures (SAP10 carbon factors)

The proposed design (with hot water from the existing network) addresses London Plan Policy SI 3 but has shortfalls with regards to London Plan Policy SI 2, due to prioritising the Heat Hiearachy as recommended by the GLA.

Achieving 100% carbon emissions reduction is not possible on site due to the stringent requirements of a world-leading hospital located within a constrained urban site. High energy use hospital requirements includehigh auxiliary ventilation and hot water load. As a result it will be necessary to offset the residual regulated carbon emissions through a cash-in-lieu contribution to the LBC carbon offsetting fund.

The below sections detail the design response to each level of the Energy Hierarchy from Policy SI2 'Minimising carbon dioxide emissions' of the London Plan.

'Be Lean' – Passive Design and Energy Efficiency

Passive measures

A fabric first approach has been adopted for this building. The following measures were adopted to enhance the thermal envelope:

- Highly efficient fabric envelope with low, carefully selected U-values within the range recommended by the NHS net zero benchmark
    - South-East Façade U-value 0.13 W/m^{2}K (NHS net zero benchmark 0.12-0.15)
    - North Façade U-value 0.15 W/m^{2}K (NHS net zero benchmark 0.12-0.15)
    - Double glazing with a U-value of 1.2 W/m^{2}k (NHS net zero benchmark)
- Reduced solar gains through a low g-value of 0.34 (LETI guideline of 0.3-0.4)
- Optimised percentage glazing, with 35% glazing on the South East Façade and 25% glazing on the North Façade (NHS net zero guideline of 25-40%) (LETI guideline of 25-40%)
- Shading provided through architectural features: South-East Facade Self shaded in afternoon hours. Deep window reveals and external balconies provide external shading
- Bedrooms placed at south-east facade to benefit from views and natural light
- Fully sealed building strategy to address local air quality issues, infection control and safeguarding

- Controlled envelope air tightness **(Air Permeability of 2 $m^3/h.m^2$ @50 Pa**) leading to savings in the heating and cooling energy consumption throughout the year, and which maximises heat recovery effectiveness on air systems

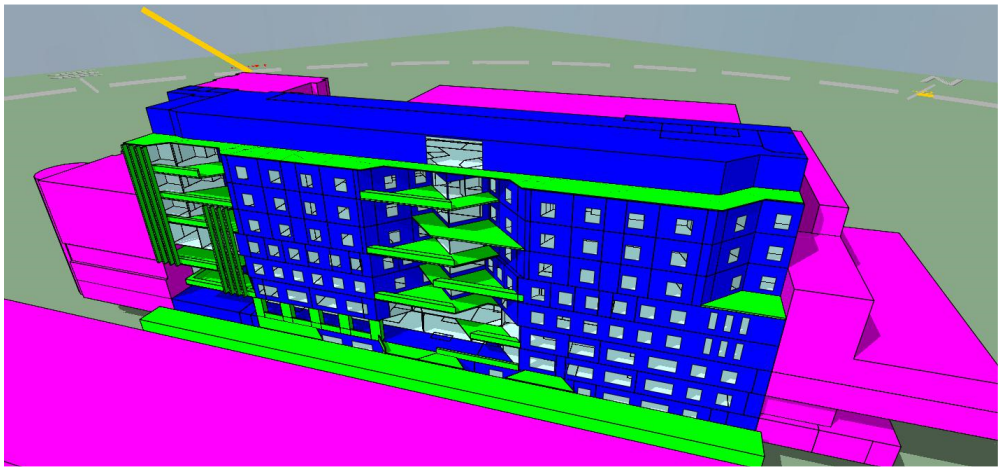


Figure 5. Model image showing the CCC, with external shading features shown in green

Active measures

- Full mechanical ventilation provided to meet specific clinical needs
- Air handling units (AHUs) are complete with plate heat exchangers to maximise heat recovery:
  - Specific Fan Power reduced to 2.0 W/l/s (+1.0 W/l/s where HEPA filters required)
  - Heat Recovery efficiency = 68%-75% depending on type of heat recovery for the specific application
- Highly efficient LED lighting (90 lm/W assumed throughout – Average value to balance out high efficient fittings in clinical areas with less efficient ones in front of house areas)
- Variable speed drives on pumps and fans where appropriate

'Be Clean' – District Heating

- In response to **London Plan Policy SI 3** and **Camden Local Plan Policy CC1(i)** which favours connection to existing site heat networks, the existing CHP/boiler site system is to be used to meet the hot water demand and provide backup for the space heating
- The current strategy for hot water generation on site utilises sizeable CHP plant which provides waste heat through the generation of electricity. This efficiency of the system is further improved by lowering the distribution temperature from around 60°C, which would be typical for a hospital, to 43°C which drastically reduces the heat loss from the network and is currently only employed in two hospitals in the UK. This is achievable by utilising copper-silver ionisation to mitigate legionella risk
- There is insufficient capacity to provide primary heating and cooling from the existing site network and its reliance on fossil fuel is penalised by the SAP10 carbon factors. A more efficient heating and cooling solution using Air Source Heat Pumps has been proposed to reduce carbon emissions
- The GOSHCCC building will be provided with connections to allow the building to be integrated with the site-wide system when the network decarbonises

'Be Green' – On-site Renewable Energy Generation

Following a feasibility assessment of low and zero carbon technology options for the building (Appendix B), highly efficient Air Source Heat Pumps are proposed to provide 100% of the heating and cooling loads. The proposals prioritise roof space to be used as a green space, rather than solar photovoltaics. The roof will be accessible to occupants, providing wellbeing benefits, and is intended to be a place of respite for neighbouring GOSH buildings as well. Consequently, maximising the accessible roof area for play and rest has been prioritised.

The heat pumps selected benefit from a high SCOP of 3.44 for heating, and a SEER of 4.61 for cooling. An all-electric heating and cooling solution will enable the building to benefit from the decarbonisation of the grid. The proposed development will be provided with connections to allow the building to be integrated with the site-wide system when the network decarbonises.

'Be Seen' – Monitoring, Verification and Reporting

The final step of the hierarchy ('Be Seen') requires comprehensive monitoring and reporting of energy demand and carbon emissions. Comprehensive monitoring and metering systems to measure actual energy and carbon performance will be installed as part of the works. These operational demands will be reported to the Mayor for at least five years via an online portal. An energy metering strategy will be developed to ensure that the Building Management System (BMS) has the capability to allow for this reporting requirements to meet the final step in the Energy Hierarchy, in line with the 'Be Seen' criteria in the London Plan. The GLA 'Be Seen' guidance will be followed post planning.

4.2 Embodied Carbon

The total embodied carbon has been reduced through the optimisation of structural elements while delivering maximum functionality. A flat slab concrete solution is proposed due to the vibration requirements for a hospital, in addition to being the simplest, most efficient solution and enabling future adaptability. An alternative option of a steel hybrid frame with slimfloor beams was analysed, but nearly doubled the embodied carbon. An alternative mass timber structural frame was also analysed, but was assessed to be of insufficient weight to meet the vibration requirements of the highly sensitive medical equipment that will be housed within the building.

The total embodied carbon for modules A-C was calculated to be 11,881 tCO_2e (SAP10 carbon factors). This was done using OneClick LCA, inputting figures from design drawings and cost consultant schedules.The building performs well against the LETI performance benchmark coming in at approximately 505.1 $kgCO_2e/m^2$ for modules A1-A5, against the 2020 LETI design target of 600 $kgCO_2e/m^2$.

4.3 Whole Life Carbon

The whole life carbon emissions for the project have been calculated based on current (SAP 10) and future emissions factor scenarios:

Table 1: Whole Life Carbon analysis undertaken on GOSHCCC (One Click LCA)

	SAP 10 emissions		**Future emissions scenario**	
	Absolute carbon emissions ($kgCO_2e$)	Carbon emission intensity ($kgCO_2e/m^2$)	Absolute carbon emissions ($kgCO_2e$)	Carbon emission intensity ($kgCO_2e/m^2$)
Operational Energy and Water (B6-B7)	101,536,311	5,604	72,211,710	3,985
Embodied Carbon (A1-A5)	9,103,899	505	9,092,306	505
Embodied Carbon (A-C)	11,880,958	655	11,869,365	655
Whole Life Carbon	113,417,269	6,260	84,081,075	4,640

The graph below (figure 6) shows the breakdown of the whole life carbon based on future emissions.

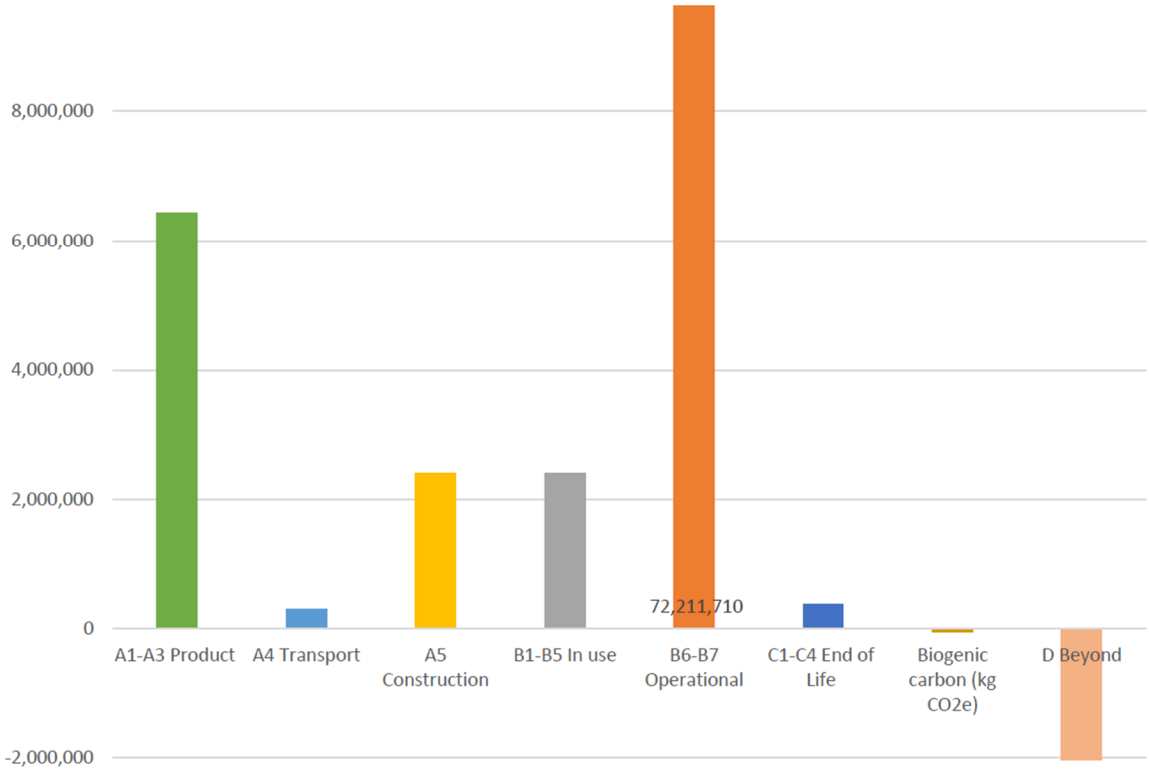


Figure 6. Whole life carbon for future emissions scenario.

5 Resource Management

5.1 Existing Site/Demolition

The proposed development will see the demolition of the existing Frontage Building on site, with replacement by a new build construction.

The existing Frontage Building currently provides 5,806 m^2 of principally outpatient clinic space. Proposals for the GOSHCCC seek to provide 18,288 m^2 of accommodation for the GOSHCCC including a new Main Entrance to the Hospital Estate. This represents an increase of 12,325 m^2 on the footprint, equivalent to a 67% uplift.

This uplift in healthcare area on the existing site responds to the Sustainable Design and Construction SPG Guide statement that *"Developers should optimise the scale and density of their development, considering the local context, to make efficient use of London's limited land."*

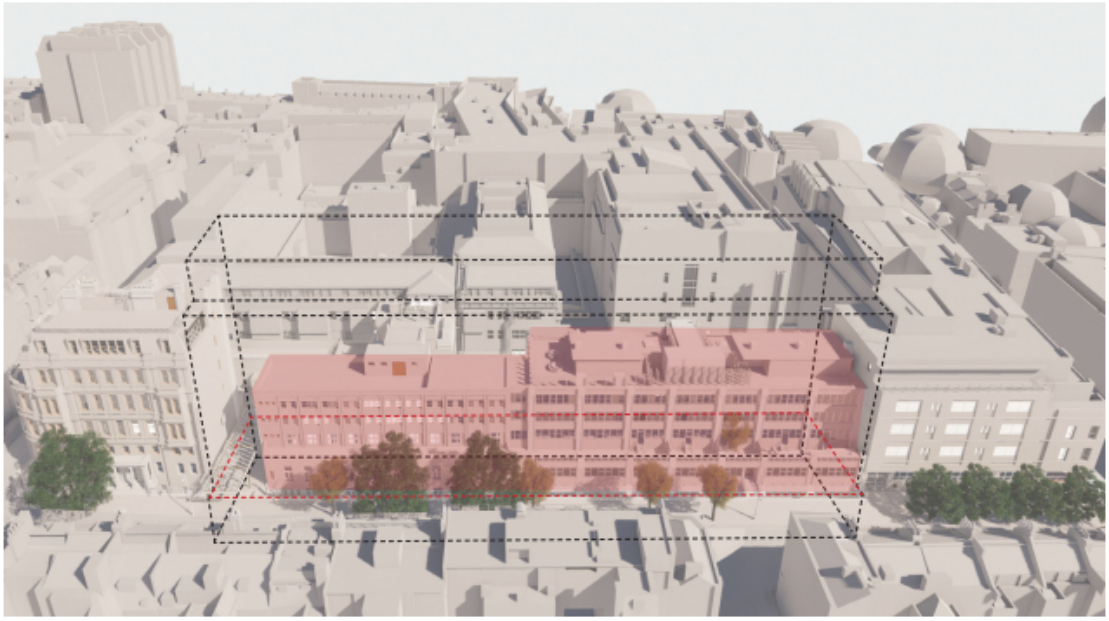


Figure 7. Existing frontage footprint compared against proposals.

As outlined below, the existing Frontage Building is not fit for purpose and cannot be reused to deliver the functional requirements of the GOSHCCC:

- The current building provides significantly less space than required for the proposed Cancer Centre over only 6 floors. Additional and extended floor levels would be required to meet the briefed area requirements
- Columns would require significant strengthening to support additional floor levels
- The creation of new basement levels below the existing building represents complex engineering The building's current use (outpatient clinics/non acute care inpatients) means that the existing structure is incompatible with briefed functions that impose heavy loads or have strict vibration criteria (theatres/Imaging facility).
- A relatively tight existing structural grid provides layout and future flexibility constraint
- Spatial constraints limit the area efficiency of services distribution strategies
- The existing building envelope would require significant upgrade/replacement to meet sustainability targets
- New protected cores required to facilitate an acceptable fire strategy
- Misalignment of existing building levels requiring significant removal and reconfiguration to ensure accessibility from the street and links to adjacent hospital buildings

A Demolition Feasiblity is submitted with the planning application which assesses in greater detail the reasons why re-use, adaption and extension of the existing building is not possible.

5.2 Construction and demolition waste

Demolition Waste

A pre-demolition audit was undertaken to support a reduction in waste being generated during the strip-out and demolition phases of the project.

Limited opportunities to reuse building components were identified. The components identified for reuse and upcycling off-site are being explored in collaboration with Sisk's supply chain. Given the age of the building and unknown component qualities (e.g. fire capacity), there might be little appetite for re-use in the wider industry.

The pre-demolition audit also identifies the types of demolition waste that will be generated, allowing a plan to be put in place to reduce waste to landfill.

The demolition works will include a “soft demo” phase, to allow careful dismantling and strip-out, segregating items to enable the most suitable disposal route. Prior to any demolition works, all loose furniture and equipment deemed suitable for re-use will be removed and re-used elsewhere in GOSH. The Trust have recently appointed Sharpsmart as the new waste management contractor, who work in partnership with Veolia (sustainability & recycling specialists) to manage clinical and domestic waste services. The Trust generates approximately 48 tonnes of bulk waste p.a. This includes office furniture and equipment which is sustainably managed through different processes. In the first instance, the items are offered internally to staff and departments for reuse. The Trust are also signed up to Globechain, a sustainable online furniture & equipment exchange service; unwanted furniture and equipment are donated to charities, social enterprizes, small businesses and individuals who are in need, through a marketplace exchange service. The Trust has also worked with Crown workspace, who specialise in refurbishment and remodelling of office furniture and equipment, and has worked with the company on specific projects such as bulk refurbishment of staff rest room chairs and reception seating, remodelling of desks and equipment.

The lack of space on the existing site, in the middle of Bloomsbury, prohibits on-site waste management potential. Waste generated will be transferred off-site for sorting and handling in line with the waste hierarchy.

Construction Waste

The new structure is designed to be an independent building, with no reliance on support from adjacent buildings to minimise demolition and strengthening works (and associated material quantities). The efficient structural grid with cantilevers employed around the columns optimises the floorplan and make full use of the site, providing maximum clinical functionality in a constrained location.

The feasibility of modular construction to reduce waste has been carefully considered. Identified opportunities include off-site fabrication of the south façade, pre-fabricated serviced wall panels for bedrooms, pre-fabricated and pre-wired internal partitions, pre-plumbed modular sanitaryware, balustrades and doors. Further opportunities such as bathroom pods were explored, however the constraints of space (modular solutions would be larger than bespoke solutions adopted required to maximise clinical function) and the deliveries associated with tight local roads.

Further information is provided in the Circular Economy Statement provided as part of the planning application (GOSHCCC-BDP-ZZ-ZZ-RP-A-2000-0044).

Waste targets for the project are aligned with BREEAM, as below:

- Wst 01-02 Construction Resource Efficiency – two credits targeted
    - ≤ 6.5 tonnes of construction waste per 100m^2 gross internal floor area)
- Wst 01-03 – one credit and exemplary targeted
    - 95% of demolition waste by tonnage diverted from landfill
    - 95% of excavation waste by tonnage diverted from landfill
    - 90% of non-demilition waste by tonnage diverted from landfill

5.3 Operational Recycling & Waste

The proposal provide internal, dedicated and appropriately labelled and segregated waste management facilities, to enable and encourage future occupants to recycle waste and manage flows effectively. Engagement with the GOSH NHS Trust has informed the design, efficiently solving existing waste and logistics issues of dealing with consumables, disposal holds, supplies, linen and uniform management.

The Trust’s Waste Management Policy details how waste is segregated and managed, and follows guidance from HTM 0701: Safe Management of Healthcare waste. Services are managed by Trust appointed Waste Management contractor for clinical & non-clinical waste.

5.4 Adaptability

While the fundamental clinical hospital use of the GOSHCCC is not expected to change, the design proposals offer adapatabiltiy to enable the Applicant to respond to changing methods of healthcare delivery. The structural grid proposed allows for change of use/room layout and movement of partitions to create different spaces without resource intensive structural alterations. The floor loading accommodates partition loads across the entire floorplate allowing for easy reconfiguration of room layouts. Shear walls are positioned carefully so that they would not impede access to plant for replacement. The design allows for the replacement of building layers of shorter life-spans without requiring extensive works to layers of longer life-spans.

The concrete frame adopted has inherent durability and fire protection. Treatments and finishes are kept to a minimum. The concrete flat slab can easily accommodate floor openings in a range of locations, allowing for relocation of rooms (WC for e.g.) or plant runs and service distribution without significant structural intervention.

Risers are regularly spread across the floorplate, allowing localised modification. Additional openings/risers are potentially easy to form in the concrete flat slab system. A flat soffit allows for replacement or upgrade to ceiling services without significant coordination around structure.

6 Water Consumption

The design of the proposed development will aim to minimise internal potable water consumption within the building by 25% over the baseline building water consumption (as calculated by BRE's water calculator tool) in line with the BREEAM NC 2018 credit Wat 01. This will be achieved through the specification of water-efficient sanitary fittings such as low flush toilets, low flow showers and wash hand basins.

Reflecting the Mayor's 'Best Practice' measures as described in the GLA Sustainable Design and Construction SPG, water meters are proposed to help prevent water wastage. The water meters will be connected to the Building Management System (BMS) to provide visibility of the consumption in order to make changes to minimise usage.

Water leak detection will be provided in line with the BREEAM criteria. These will shut off the supply to the WCs when they are not in use and provide a monitoring system to alert if there is a major leak to further reduce water wastage. Features such as flow control devices will be specified as part of the fit-out design.

Rainwater harvesting is proposed to serve the irrigation system for the green roof. As required by LBC Local Plan Policy CC3, greywater and rainwater harvesting systems have been reviewed by the project team for use internally to assist with toilet flushing, however due to clinical and hygiene reasons they have not been proposed – the hospital accommodates immune-compromised patients. Rainwater and greywater harvesting – the use of rainwater from the roof, or waste water from showers and baths, that is collected and filtered and re-used in the building, for example for toilet flushing – is prohibited by the Healthcare Technical Memoranda 04-01 (HTMs) with which the building has to comply.

7 Biodiversity

7.1 Ecology survey

A Suitably Qualified Ecologist (SQE), as defined by BREEAM, has been appointed at early design stages to review the existing Site's ecology and to provide advice on enhancement opportunities as part of the proposed development. A Preliminary Ecological Appraisal (PEA) for the existing Site has been prepared and is submitted alongside the planning application.

A desk study showed nine statutory sites within 5km of the site, none of which will be negatively impacted by the proposed development. The survey identified that the site is of low ecological value, comprising habitats common to urban areas including bare ground (hardstanding), buildings, introduced shrub and scattered trees. The site holds low potential for roosting and foraging bats. The buildings and scattered trees had limited potential for nesting birds.

Due to the removal of habitat features for the development of the site, compensation and enhancement of ecological features is required to adhere to local and national planning policy. In accordance with local policy A3, section 6.68, and in line with Camden BAP Action Plan No.2.2 and Camden Development Policy 22, measures to promote green infrastructure are provided, enhancing the sites ecological potential and helping to achieve biodiversity net gain. Further enhancement and compensation measures recommended include the installation of five bird boxes, additional native planting and installation of four insect hotels. Measures recommended by the ecologist are listed in the table below.

Table 2: Measures recommended by the ecologist

Survey/Action	Rationale	When
Bat building(s) emergence/reentry survey	Once full access to the utilities vaults can be arranged and asbestos pipe lagging has been made safe, further internal inspection of the vaults should be carried out to ascertain whether roosting bats are using the feature. Further recommendations and actions may be proposed after the results from the recommended surveys are carried out.	Pre-development phase
Nesting birds	The buildings and any trees on site to be removed will require checking for nesting birds if demolition/clearance works are with construction phase on the bird nesting period (March – August inclusive).	48 hours prior to any construction phase on site
Green infrastructure	Installation of green roofs/walls and additional native planting will provide enhancement for the site to obtain local and national policy environmental targets.	Design phase
Bird box installation	Installation of five bird boxes is required to compensate for loss and enhance the site for nesting birds. At least five bird boxes should be installed on external walls of the new buildings. Bird boxes should be placed at least three metres from ground level. A combination of the 1HE Schwegler Brick Box, 1SP Schwegler Sparrow Terrace and Schwegler nestbox 1B should be used.	Construction phase
Insect hotel installation	Installation of four insect hotels on the new building to enhance the site for insects. Insect hotels should be installed at least two metres from ground level.	Construction phase

Dusk emergence / dawn re-entry bat surveys will be undertaken between May and August 2022.

7.2 Green Infrastructure

The existing site is of very low ecological value. The design proposals remedy this, introducing accessible amenity space in the form of a roof garden, specifically designed for children, including accessible play opportunities, sensory features, as well as impact attenuating surfaces to mitigate injuries from falls. Additionally, balcony gardens will form social spaces on levels 4 to 8. Bedrooms will look onto these balcony gardens, providing a direct connection to nature. The design team engaged with the Trust at RIBA Stage 3 to ensure the green roof and terraces are designed to suit the needs and wants of occupants.,

The immature trees at street level removed for construction will be replaced with new trees post construction. It is proposed that if possible these will be removed and planted off site elsewhere within the Borough. The current proposal's Urban Greening Factor was calculated to be 0.334, illustrated in Figure 8 below.

Urban Greening Factor Calculator				
Surface Cover Type	**Factor**	**Area (m²)**	**Contribution**	**Notes**
Semi-natural vegetation (e.g. trees, woodland, species-rich grassland) maintained or established on site.	1	0	0	
Wetland or open water (semi-natural; not chlorinated) maintained or established on site.	1	0	0	
Intensive green roof or vegetation over structure. Substrate minimum settled depth of 150mm.	0.8	795	636	Ornamental planting in raised planters over structures on various levels, amenity lawn (activity lawn) on level 10.
Standard trees planted in connected tree pits with a minimum soil volume equivalent to at least two thirds of the projected canopy area of the mature tree.	0.8	0	0	
Extensive green roof with substrate of minimum settled depth of 80mm (or 60mm beneath vegetation blanket) – meets the requirements of GRO Code 2014.	0.7	0	0	
Flower-rich perennial planting.	0.7	0	0	
Rain gardens and other vegetated sustainable drainage elements.	0.7	0	0	
Hedges (line of mature shrubs one or two shrubs wide).	0.6	0	0	
Standard trees planted in pits with soil volumes less than two thirds of the projected canopy area of the mature tree.	0.6	920	552	Tree canopy sizes based on information provided by plantpartner.co.uk and growing condition over structure.
Green wall –modular system or climbers rooted in soil.	0.6	0	0	
Groundcover planting.	0.5	0	0	
Amenity grassland (species-poor, regularly mown lawn).	0.4	0	0	
Extensive green roof of sedum mat or other lightweight systems that do not meet GRO Code 2014.	0.3	0	0	
Water features (chlorinated) or unplanted detention basins.	0.2	0	0	
Permeable paving.	0.1	18.81	1.881	unsealed surface around trees on main pavement.
Sealed surfaces (e.g. concrete, asphalt, waterproofing, stone).	0	3541.19	0	Total area within redline boundary is considered a sealed surface, as no penetrable ground in relation to planting areas, with exception to street trees on main pavement.
Total contribution			**1189.881**	
Total site area (m²)			3560	
Urban Greening Factor			**0.334236236**	

Figure 8. Greening provided on site, contributing to a UGF of 0.334

Bird and bat boxes and insect hotels are not currently included in the design due to infection control concerns, with immuno-compromised patients accessing the roof. The GOSH NHS Trust is currently developing guidance for this, which will inform feasibility of interventions.

8 Climate Resilience

The design of the proposed development incorporates the below mitigation measures to help create a development which has the capacity to adapt for the projected effects of climate change:

Tackling Increased Temperatures

- Designing a fabric first approach with a high-performance façade and glazing to ensure that the building envelope U-values exceed those required by the Part L of the Building Regulations;
- The heating and cooling systems ensure compliance againnst BREEAM NC 2018 credit Hea-04, using software in accordance with CIBSE AM11 Building Energy and Performance Modelling. Additionally, thermal analysis shall account for future thermal comfort, modelling climate change forecasts specific to the proposed projects geographical location including:
  – Time period:2020s
  – Emissions scenario: High (A1F1)
  – 50th percentile DSY2 and DSY3
- Air Source Heat Pumps are selected to operate in ambient condition extremes of -12°C and +40°C

Flood Risk and Surface Water Run-off Management

A site-specific Flood Risk Assessment (FRA) has been prepared and is provided as part of this planning application.The FRA confirms the proposed development is located in Flood Zone 1, as defined in the NPPF as land having a less than 1 in 1,000 annual probability of river or sea flooding (less than 0.1% AEP).

The proposals do not increase impermeable area, and surface water generated from the site will be managed and discharged to the existing sewer system at a rate not exceeding the existing rates. Drainage of the site will be assessed as part of the drainage assessment for the site.

The drainage strategy aims to provide resilience for a 1 in 100 year storm, with a 40% uplift for climate change. A 225m^3 attenuation tank within the basement and greening at roofs and balconies are proposed to reduce run-off rates.

9 Transport

9.1 Public Transport

The site is ideally located for access to sustainable modes of travel facilitating travel on foot, by cycle and by public transport across London while benefiting from connections by train across the UK. Given the long distances that many patients travel, it is served well by three main line rail stations with the Underground network providing convenient connections to all major stations across central London. The site's public transport accessibility level (PTAL) rating of 6b demonstrates the site's ability for staff and patients to reach the site by non-car modes

Bus

The nearest bust stops are located on Southampton Row, approximately 300m to the southwest of the hospital, which equates to a 4-minute walk. Frequent bus services including the 59, 68, 91, 168 and 188 serve these stops, providing connections to various destinations.

Additional bus services including routes 19, 38, 55 and 243 can be accessed from the bus stops on Theobalds Road (A401), located approximately 350m to the south of the Site.

London Underground

The nearest main London Underground stations to the hospital are:

- Russel Square (500m to the north - approximate 6-minute walk);

- Holborn (600m to the south - approximate 7-minute walk)
- Euston (1.3km to the north - approximate 16-minute walk); and
- King's Cross St. Pancras (1.3km to the north - approximate 16-minute walk).

Piccadilly Line services are available from Russell Square with services between Heathrow and Cockfosters running at a frequency of one train every 2-5 minutes in either direction during the AM and PM peak periods. Piccadilly Line services are also available from Holborn, whilst Central Line services run between West Ruislip/Ealing Broadway and Woodford/Epping at a frequency of one train every 2-5 minutes in either direction at peak times. Further services including the Northern and Victoria lines can be accessed at Euston, with additional services including the Circle, Hammersmith and City and Metropolitan lines serving King's Cross St. Pancras.

National Rail Network

The hospital is accessible for national rail services from the following stations:

- Euston (1.3 km);
- St Pancras Internation (1.3 km); and
- King’s Cross (1.3 km).

All rail stations are located within 16 minutes walking distance of the site. A number of train operating companies including East Midlands Trains, Southeastern, First Hull Trains, Grand Central, Great Northern, Virgin Trains and Thameslink provide services from these stations.

9.2 Walking

Pedestrian routes within the vicinity of the hospital are well maintained. Zebra crossings are provided at various locations to assist with pedestrian movements across roads including Great Ormond Street and Guilford Street, and to serve key pedestrian desire lines between the hospital and local transport nodes.

Adjacent to the hospital, footways are generally wide on Great Ormond Street which can accommodate the pedestrian flows associated with the hospital during peak demand. To the west, Queen Square and Cosmo Place offers a pedestrian route between the Site and Southampton Row where bus stops and key facilities and services are provided.

9.3 Cycling

There are several cycle routes within the vicinity of the Site providing connections with the local rail and underground stations including Russell Square, Euston, Kings Cross, St. Pancras and Farringdon. Advisory cycle routes to the north of the Site along Bernard Street, Grenville Street and Guilford Street provide links to Russell Square Station. There are also advisory cycle routes to the east of the hospital on Lamb's Conduit Street.

GOSH also provides a large number of cycle parking stands for staff and visitors across the hospital site. Proposals for the GOSHCCC will result in requiring relocation of 93 spaces, however this still leaves 206 long-stay spaces, broadly comparable to the requirement of 198 spaces under local parking standards. This provision would likely accommodate the existing demand for staff cycle parking as observed through surveys undertaken. Cycle parking in the nearby Morgan Stanley Clinical Building will be improved and increased to compensate. The total number of spaces provided at GOSH will accommodate the existing demand for cycle parking and continues to provide in excess of the required cycle parking for staff, allowing for growth during construction of the GOSHCCC. Furthermore, The Trust is continuing to develop and extend cycle parking to meet the needs of the staff and whilst not part of this application, investigations are being made for a scheme to accommodate future growth in cycling, following the completion of the GOSHCCC.

The Trust’s travel plan and support for cyclists will be updated to factor in the GOSHCCC development – please refer to the Travel Plan and Transport Assessment included as part of the planning application.

9.4 Car Travel

Parking

The proposed development is car free. No car parking is provided. Local streets are characterised by controlled on-street parking, generally restricted for use by resident permit holders Monday to Friday between 08:30 and 18:30, and Saturday between 08:30 and 13:30.

There are also a number of pay by phone and pay and display parking bays on Great Ormond Street and Queen Square which are restricted during the same time periods. A number of ambulance only bays are located directly adjacent to the main hospital entrance.

GOSH do not provide off-street parking for staff and patients/visitors. Public car parks within the vicinity of the site include the Imperial Hotel, RCP Parking at Russel Square, NCP car park at the Brunswick Centre and the 'Secure Parking' underground car park at Bloomsbury Square. The majority of patients and visitors tend to arrive at site via public transport. Of those limited number that do arrive by car, they can use the pay by phone and pay and display on-street car parking bays in the vicinity of the Site.

The Applicant manages a dispensation scheme for on-street parking via the main reception. Parking permits can be provided which allow parents to park on a single yellow line on Guilford Street for a few hours during the day of their child's appointment, admission or discharge. Parents of children in intensive care are eligible for a parking permit for up to three days in succession. The use of this dispensation is strictly controlled by the Applicant.

A collaboration between the GOSH arts and sustainability teams, alongside LBC, has tackled the problem of pollution from car exhausts outside the Site. Great Ormond Street has become a 'no idling zone', with signage to restrict the number of idling cars on the road.

Servicing and Deliveries

All servicing of the GOSHCCC will take place via the 'Central Stores and Goods Inwards' servicing yard on the southern side of Guilford Street. A separate entrance and exit is provided which ensures that vehicles can enter and leave in forward gear.

The Applicant has been recognised in a TfL best practise guide 'Transport Planning for Healthier Lifestyles' for its commitment towards improving the efficiency of freight deliveries to achieve cost and environmental benefits.

10 Pollution

10.1 Air pollution

Indoor Air Quality

The design proposes a fully sealed building to address local air quality issues, clinical requirements and safeguarding of young people. Mechanical ventilation (with HEPA filters where required) for will ensure indoor air quality. Detailed specifications at RIBA Stage 4 will aim to meet the BREEAM NC 2018 VOC requirements.

Outdoor Air Quality

An Air Quality Assessment for the proposed development has been undertaken and submitted alongside the planning application.

Construction phase impacts may have the potential to occur, due to emissions from vehicles and plant associated with construction related activities, and the generation of dust and PM emissions during the period of construction. The risk of dust impacts was assessed in accordance with the IAQM 2014 guidance and was predicted to be a maximum of ‘medium risk’

during the construction phase. Mitigation measures have been recommended to reduce the risk of dust and PM being generated and re-suspended, and of construction related traffic and plant, following implementation of which the residual impact of construction phase air quality impacts is likely to be 'not significant'. Mitigation is highlighted in the Demolition and Construction Management Plan (DCMP), in accordance with best practice. Air quality impacts will be evaluated continuously throughout construction, and actions will be linked to the Trust's Clean Air Hospital Framework, and monitored against a baseline set by the Trust's existing BreatheLondon Air Monitor.

This assessment used detailed dispersion modelling software ADMS-Roads to quantify the effects of ambient air quality (with the development in place) on future site users and of additional road traffic attributable to the proposed development on air quality at existing discrete receptor locations.

Dispersion modelling was also used to evaluate impacts of the proposed development's operation, confirming the proposals will not adversely affect local air quality. The building does not propose any new combustion plant, and situates air exhausts at high level.

10.2 Land contamination

A land contamination sources analysis has been undertaken on the Site, and submitted alongside the planning application.

The Site is underlain by the superficial Lynch Hill Gravel Member over London Clay according to published geological data. There is also likely to be made ground associated with former development and current use. The radon potential is <1%, meaning no radon protection measures are necessary. The Site is not within a Coal Mining Reporting area and no other mining is recorded on or near the Site. Environmental receptors identified comprise:

- perched groundwater within superficial Lynch Hill Gravel Member classified as a secondary A aquifer
- perched groundwater within London Clay Formation classified as an unproductive aquifer and surface water River Thames located 1.3 km to the south-east

There were some potentially contaminative sources identified associated with the hospital on site including medical gas cylinders, flammable materials storage, electrical switch room and plant rooms. However, these sources are known to be properly contained so do not present a risk.

The design proposals will not result in land contamination during construction or operation.

10.3 Noise and vibration

Management and operational controls will be implemented in order to minimise adverse effects from noise arising from demolition and construction activities, if they occur. The timing and duration of mitigation measures, as described below, have all been designed to minimise impact on sensitive receptors.

There will be monitoring of noise, both on-site to protect employees, and off-site, to minimise potential disturbance to the sensitive receptors (the existing hospital and neighbouring residential properties on Great Ormond Street) and comply with noise control limits. This will occur prior to and throughout the main demolition and construction works.

Noise and its emission will be controlled in accordance with the recommendations established in BS 5228-1:2009 Code of practice for noise and vibration control on construction and open sites. Noise (+A1:2014).

Cumulative plant noise emissions associated with the GOSHCCC have been assessed with regard to the nearest Noise Sensitive Receptors (consisting of nearby residential premises and existing hospital estates), with advised mitigation measures provided and noise limits set at source for individual plant items. Following implementation of the advised mitigation

measures, noise limits as required by Camden Policies will be met. Refer to the Noise and Vibration Impact Assessment, submitted alongside the planning application, for further details.

10.4 Light pollution

The proposed development will aim to ensure that external lighting design directs and concentrates lighting to the appropriate areas and that upward lighting is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.

External lighting will be designed in line with best practice guidance such as BS 5489-1:2013 Code for the practice for the design of road lighting - lighting of roads and public amenity areas (Ref. 16), BS EN 12464- 2:2014 Light and lighting - lighting of workplaces - Part 2: Outdoor workplaces (Ref. 17) and Table 2 of ILP Guidance notes for the reduction of obtrusive light, 2011 (Ref. 18).

External lighting will be automatically controlled for prevention of operation during daylight hours and presence of detection in areas of intermittent pedestrian traffic, in line with BREEAM NC 2018 credit Pol04. Internal lighting will be linked with a monitoring system to incorporate daylight dimming and switch off when not in use.

Please refer to the Lighting Impact assessment for further details.

11 Health and wellbeing

Health and wellbeing forms a key consideration of the design proposals, particularly given the function of the building. The proposals place bedrooms along the south-east façade, providing patients with benefits of daylight and views out. Acoustics, lighting and indoor air quality have been designed to relevant HTM, CIBSE and BREEAM requirements, ensuring a comfortable internal environment is maintained.

CIBSE TM59 thermal dynamic studies have been carried out to inform the heating / cooling strategy, ensuring spaces remain comfortable for all building users, in accordance with HTM 03-01. To further test the risk of overheating in a changing climate, the model has been run against the DSY1 2050s high emissions 50 percentile scenario – no issues were identified.

To mitigate unwanted indoor noise levels and reduce exterior noise intrusion, a baseline noise survey has been undertaken to inform the servicing strategy and calculate sound insulation requirements of the building envelope.

The scheme also provides single patient bedroom occupancy which ensures quality and comfort for each patient. This allows for lower noise levels and allows personal control of each patient’s own environment. The design of the patient bedroom and surrounding spaces on the ward will give the patient and their family members access to activities that they do, as if they were at home.

The health and wellbeing of occupants is also nurtured through specifying out materials with health impacts such as PVC where feasible, and a welcoming interior, designed to provide delight and comfort to its young patients. Provision of accessible green space at the roof and balconies also supports the health and wellbeing of occupants and their families – including allotment space.

12 Conclusion

This Sustainability Statement outlines the environmental and sustainability principles that have been considered in the design proposals for the Great Ormond Street Children's Cancer Centre Hospital (GOSHCCC) development, in accordance with the relevant planning policy for the London Borough of Camden (LBC) and the Greater London Authority (GLA).

The proposals involve the replacement of the existing Great Ormond Street Hospital Frontage Building with a new build 18,288m^2 hospital building, as part of Phase 4 of the Great Ormond Street Masterplan. The new building will include a new Main Entrance to the Hospital and all of the essential elements and functions of the GOSHCCC .

The development will be assessed against the BREEAM New Construction 2018 methodology, with a target rating of 'Excellent'. A BREEAM pre-assessment has been completed, with the scheme achieving a score of 83.40%, translating to a high 'Excellent' rating.

The energy strategy for the development follows the be lean, clean, green, seen energy hierarchy. The proposals offer an optimised, high performing thermal envelope in line with the NHS Net Zero Brief guidance.The heat hierarchy is followed with connection to the existing site network prioritised to provide hot water, and high-efficiency electrically driven air source heat pumps are selected to provide 100% of the heating and cooling loads.

Low flow sanitary fittings are proposed throughout to reduce water consumption in cold and hot water systems, but also to reduce the energy used to heat the hot water service.

The design of the project gives consideration to environmental impact of materials. Prior to construction, the project team will target supply chains and manufacturers to minimise resource consumption and construction impacts. Attempts will be made to maximise the use of locally and responsibly sourced materials to maximise environmental, social and economic value.

A pre-demolition audit has been undertaken to identify opportunities to, where viable, reduce, re-use and recycle materials that are due to become waste with the demolition of the existing building. A Circular Economy Statement has been prepared that describes the circular economy principles included in the proposals to maximise material efficiency. A Demolition and Construction Management Plan (DCMP) including environmental impacts has also been produced by the appointed design and build contractor 'John Sisk & Son (Holdings) Ltd', which is included in the planning application submission.

The proposal provide internal, dedicated and appropriately labelled and segregated waste management facilities, to enable and encourage future occupants to recycle waste and manage flows effectively. Engagement with the GOSH NHS Trust has informed the design, aiming to overcome the existing challenges of managing goods in and out, including consumables, disposal holds, supplies, linen and uniforms.

The site is highly accessible, with a number of transport nodes in close proximity to the site. The proposed development is car free, and the site includes sufficient cycle parking facility.

A Preliminary Ecological Appraisal (PEA) has been undertaken and appropriate measures will be implemented for the avoidance, mitigation or compensation of the potential impacts of the proposed development on the identified ecological receptors. The site is of low ecological value, and proposals maximise enhancements to biodiversity. An Urban Greening Factor (UGF) of 0.334 is achieved for the building. Green space is prioritised and maximised through creation of a roof garden and balconies, aiding the health and well-being of the occupants.

The proposed development will mitigate against climate change by implementing the following measures:

- a fabric-first approach to the building envelope
- use of native and drought resistant planting
- a biodiverse (green) roof
- a drainage strategy accounting for future climate change
- provision of low water-use fittings

- use of durable and resilient materials.

A site-specific Flood Risk Assessment (FRA) has been prepared. Available data has been assessed to determine the potential risk of flooding at the site, and recommendations provided, where applicable. The FRA confirms the proposed development is located in Flood Zone 1, as defined in the NPPF as land having a less than 1 in 1,000 annual probability of river or sea flooding (less than 0.1% AEP). The drainage strategy aims to provide resilience for 1 in 100 year storm, with a 40% uplift for climate change, using attenuation tanks to reduce runoff to greenfield rates.

Dispersion modelling was used to evaluate impacts of the proposed development's operation, confirming the proposals will not adversely affect local air quality. The building does not propose any new combustion plant, and situates air exhausts at high level.

The proposed external lighting will be designed in line with best practice. It will be automatically controlled for prevention of operation during daylight hours and ensure that upward lighting will be minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.

Using measured survey data, limits for noise emissions from fixed plant installation associated with the development have been proposed. These are in accordance with the Technical Guidance for Noise compliance standards. Building services equipment will be appropriately attenuated to ensure that these limits are not exceeded.

Health and well-being forms a key consideration of the design proposals. This includes thermal comfort and daylight optimisation, as well as selection of low VOC emitting materials, an accessible roof garden and balconies supporting a welcoming interior design to provide a feeling of home for patients.

Appendix A – BREEAM Pre-assessment

BDP.

Project title: **GOSH CCC BREEAM Pre-assessment**
Scheme: **New Construction 2018 [Healthcare]**
Date: **12/05/2022**

Achievable	83.40%
Potentially Achievable	95.42%

Credit Title	Credit Ref	Title	Available Credits	Compliance Requirements	Not Achievable	Potentially Achievable	Confirmed Achievable	Responsibility
Project Brief and Design	Man 01-01	Project Delivery Planning	1	Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery.			1	Design Team
	Man 01-02	Stakeholder Consultation (interested parties)	1	Prior to completion of the Concept Design stage, the design team consult with all interested parties on matters that cover the minimum consultation content. Demonstrate how the stakeholder contributions and consultation exercise outcomes influence the initial project brief and concept design.			1	Design Team
	Pre-req	BREEAM Advisory Professional	Y	The project team, including the client, formally agree strategic performance targets early in the design process.			Y	Client
	Man 01-03	BREEAM Advisory Professional (Concept Design)	1	Involve a BREEAM AP in the project at an appropriate time and level. Work with the project team to maximise the project's overall performance against BREEAM.			1	BREEAM Assessor
	Man 01-04	BREEAM Advisory Professional (Developed Design)	1	Involve a BREEAM AP in the project at an appropriate time and level to work with the project team to consider the links between BREEAM issues and to assist them in maximising the project's overall performance throughout Developed Design. Monitor progress and provide feedback.			1	BREEAM Assessor
Life Cycle Cost and Service Life Planning	Man 02-01	Elemental Life Cycle Cost (LCC)	2	An elemental life cycle cost (LCC) analysis has been carried out, at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design option appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:2008.			2	Cost Consultant
	Man 02-02	Component Level LCC Options Appraisal	1	A component level LCC plan has been developed by the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865:2008. The component level LCC includes Envelope, Services, Finishes, External Spaces.			1	Cost Consultant
	Man 02-03	Capital Cost Reporting	1	Report the capital cost for the building in pounds per square metre (£k/m²), via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section.			1	Client
Responsible Construction Practices	Pre-req	Legal Timber	Y	All timber and timber based products used on the project is 'Legally harvested and traded timber'			Y	Contractor
	Man 03-01	Environmental Management	1	The principal contractor operates an environmental management system (EMS) covering their main operations.			1	Contractor
	Pre-req	BREEAM AP (Site)	Y	The client and Contractor formally agree performance targets			Y	Client
	Man 03-02	BREEAM AP (Site)	1	Involve a BREEAM AP in the project at an appropriate time and level to work with the project team to consider the links between BREEAM issues and to assist them in maximising the project's overall performance against the agreed performance targets throughout the Construction, Handover and Close Out stages.			1	Contractor
	Man 03-03	Responsible Construction Management	2	One credit for achieving all required items in Table 4.1 for responsible construction management. Two credits where all required items are achieved and six additional items are achieved			2	Contractor
	Man 03-Ex	Exemplary Performance Criteria	1	Complete the full BREEAM checklist for monitoring and reporting on activities against risk evaluation documents.		1		Contractor
	Man 03-04	Monitoring of Construction Site Impacts	2	Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use, water consumption and transport data (where measured) resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme. One credit for monitoring energy and water consumption. Second credit for monitoring transportation of construction materials and waste.			2	Contractor
Commissioning and Handover	Man 04-01	Commissioning and testing schedule and responsibilities	1	A schedule of commissioning and testing that identifies and includes a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services and control systems and testing and inspecting building fabric.			1	Contractor
	Man 04-02	Commissioning - design and preparation	1	During the design stage, the client or the principal contractor appoints an appropriate project team member, provided they are not involved in the general installation works for the building services systems, with responsibility for: a. Undertaking design reviews and giving advice on suitability for ease of commissioning. b. Providing commissioning management input to construction programming and during installation stages. c. Management of commissioning, performance testing and handover/post-handover stages.			1	Contractor
	Man 04-03	Testing and inspecting building fabric	1	The integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of post construction testing and inspection.			1	Contractor
	Man 04-04	Handover	1	Prior to handover, develop two building user guides for the following users: 1. Non-technical user guide for distribution to the building occupiers 2. Technical user guide for the premises facilities managers.			1	Contractor
Aftercare	Man 05-01	Aftercare support	1	There is (or will be) operational infrastructure and resources in place to provide aftercare support to the building occupier(s), which includes the following as a minimum: - meeting between aftercare team and building occupier/management (prior to initial occupation) to introduce the aftercare team and present key information about the building. - on-site facilities management training - initial aftercare support for the first month of building occupation - longer term aftercare support for the first 12 months There are resources in place for collection and monitoring of energy and water consumption for a minimum of 12 months.			1	Contractor
	Man 05-02	Commissioning - implementation	1	Complete commissioning activities over a minimum 12-month period including: - Seasonal Commissioning - Monthly reports comparing sub-metered energy performance to the predicted one - Identify inefficiencies and areas in need of improvement - Re-commission systems (were required)			1	Contractor

	Man 05-03	Post occupancy evaluation	1	The client or building occupier makes a commitment to carry out a post-occupancy evaluation (POE) exercise one year after initial building occupation. This is done to gain in-use performance feedback from building users to inform operational processes, including re-commissioning activities, and maintain or improve productivity, health, safety and comfort. The POE shall cover: - a review of design intent and construction process - feedback from a wide range of building users including Facilities Management on design and environmental conditions of building. The client or building occupier makes a commitment to carry out the appropriate dissemination of information.			1	Client
Visual Comfort	Hea 01-01	Glare Control	1	A glare control strategy designs out potential glare in all relevant building areas where risk has been identified. This should be achieved through building form and layout or building design measures.			1	Architect
	Hea 01-02	Daylighting	2	Daylighting criteria have been met using either of the following options: a. The relevant building areas meet good practice daylight factor(s) and other criterion as outlined in Table - 5.1 and Table - 5.3 OR b. The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table - 5.2.	2			Architect
	Hea 01-03	View Out	2	95% of the floor area in 95% of spaces for each relevant building area is within 8m of a wall which has a window or permanent opening that provides an adequate view out. The window/opening must be ≥ 20% of the surrounding wall area.	2			Architect
	Hea 01-04	Internal and External Lighting	1	All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts. All internal and external lighting, where relevant, is specified in accordance with the appropriate maintained illuminance levels (in lux) recommended by CIBSE. In all relevant building areas, lighting is appropriately zoned and occupant controllable with the option for commonly required lighting settings to be selected quickly and easily.			1	M&E
	Hea 01-Ex	Exemplary Performance Criteria [Daylight]	1	Daylighting criteria have been met using either of the following options: a. Relevant building areas meet exemplary daylight factor(s) and the relevant criteria b. Relevant building areas meet exemplary average and minimum point daylight illuminance criteria.	1			Architect
Indoor Air Quality	Pre-req	Indoor Air Quality Plan	Y	An indoor air quality plan has been produced, with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building.			Y	Contractor
	Hea 02-01	Ventilation	1	The building has been designed to minimise the concentration and recirculation of pollutants			1	M&E
	Hea 02-02	Emissions from Construction Products	2	One credit where three out of the five product types meet the emission limits, testing requirements and any additional requirements listed in Table 5.1.1. Two credits where all of the products listed meet the requirements.			2	Architect
	Hea 02-04	Post -construction indoor air quality measurement	1	The formaldehyde concentration level is measured post construction (but pre-occupancy) and is found to be less than or equal to 100µg/averaged over 30 minutes (WHO guidelines for indoor air quality: Selected pollutants, 20102). The total volatile organic compound (TVOC) concentration level is measured post construction (but pre-occupancy) and found to be less than 300µg/over 8 hours, in line with the building regulation requirements. Where VOC and formaldehyde levels are found to exceed the limits defined in criteria 10 and 11, the project team confirms the measures that have, or will be taken, in accordance with the IAQ plan, to reduce the levels to within these limits.			1	Contractor
	Hea 02-Ex	Emissions from Construction Products	1	Three of the product types listed meet the emissions limits, testing requirements, and any additional requirements listed in Table 5.12		1		Architect
Thermal Comfort	Hea 04-01	Thermal Modelling	1	Thermal modelling has been carried out using software in accordance with CIBSE AM11 1 Building Energy and Environmental Modelling.			1	M&E
	Hea 04-02	Adaptability for Climate Change	1	The thermal modelling demonstrates that the relevant requirements set out in criteria 3 are achieved for a projected climate change environment. Where thermal comfort criteria are not met for the projected climate change environment, the project team demonstrates how the building has been adapted, or designed to be easily adapted in future using passive design solutions in order to subsequently meet the requirements under criterion 6.			1	M&E
	Hea 04-03	Thermal Zoning and Controls	1	The thermal modelling analysis (undertaken for compliance with criteria 1 to 4) has informed the temperature control strategy for the building and its users.			1	M&E
Acoustic Performance	Hea 05-01	Acoustic Performance	3	The building meets the appropriate acoustic performance standards and testing requirements defined in the checklists and tables section which defines criteria for the acoustic principles of: a. Sound insulation b. Indoor ambient noise level c. Room Acoustics			3	Acoustician
Safety and Security	Hea 06-01	Security	1	A suitably qualified security specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent) and develops a set of recommendations or solutions. These recommendations are incorporated.		1		Architect
	Hea 06-Ex	Security	1	A compliant risk based security rating scheme has been used. The performance against the scheme has been confirmed by independent assessment and verification.	1			Architect
Safe and Healthy Surroundings	Hea 07-01	Safe Access	1	Where external site areas form part of the assessed development, safe access for cyclists and pedestrians is provided. Vehicle delivery areas are not accessed through general parking areas.	1			Landscape Architect
	Hea 07-02	Outside Space	1	There is an outside space providing building users with an external amenity area			1	Landscape Architect
Emissions - Energy	Ene 01-01	Energy Performance	9	Calculate an Energy Performance Ratio for New Constructions (EPRNC) using BREEAM's Ene 01 calculator.	5		4	M&E
	Ene 01-02	Prediction of Operational Energy Consumption	4	Pre-req - Prior to completion of the Concept Design, relevant members of the design team hold a preliminary design workshop focusing on operational energy performance. Undertake additional energy modelling during the design and post construction stage to generate predicted operational energy consumption figures. Report predicted energy consumption targets.			4	M&E

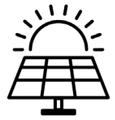
Reduction of CO_2	Ene 01-Ex	Exemplary Performance Criteria [Energy]	**3**	**Up to two credits** The building achieves an EPRnv≥0.9 and zero net regulated CO2 emissions **Three credits - Carbon negative** The building is deemed carbon negative where >100% of carbon emissions from unregulated (and regulated) energy use are offset by energy generated from on-site and near-site LZC sources.	**3**			M&E
	Ene 01-Ex	Post-occupancy stage	**2**	Achieve maximum available credits in Ene 02. The client or building occupier commits funds to pay for the post occupancy stage. This requires an assessor to be appointed and to report on the actual energy consumption compared with the targets set.			**2**	Client
Energy Monitoring	Ene 02-01	Sub-metering of End Use Categories	**1**	Energy metering systems are installed that enable at least 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-use categories of energy consuming systems. The energy consuming systems in buildings with a total useful floor area greater than 1,000m². are metered using an appropriate energy monitoring and management system.			**1**	M&E
	Ene 02-02	Sub-metering - High Energy Load and Tenancy Areas	**1**	An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas or departments within the building/unit.			**1**	M&E
External Lighting	Ene 03-01	External Lighting	**1**	The building has been designed to operate without the need for external lighting OR The average initial luminous efficacy of the external light fittings within the construction zone is not less than 70 luminaire lumens per circuit Watt. All external light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.			**1**	M&E
Low Carbon Design	Ene 04-01	Passive Design Analysis	**1**	The project team carries out an analysis of the proposed building design/development to influence decisions made during Concept Design stage (RIBA Stage 2 or equivalent) and identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services.			**1**	Architect / M&E
	Ene 04-02	Free Cooling	**1**	The passive design analysis carried out under criterion 2 includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions. The building uses ANY of the free cooling strategies listed below: 1. Night time cooling (which could include the use of a high exposed thermal mass) 2. Ground coupled air cooling 3. Displacement ventilation (not linked to any active cooling system) 4. Ground water cooling 5. Surface water cooling 6. Evaporative cooling, direct or indirect 7. Desiccant dehumidification and evaporative cooling, using waste heat 8. Absorption cooling, using waste heat 9. The building does not require any significant form of active cooling or mechanical ventilation (i.e. naturally ventilated).	**1**			M&E
	Ene 04-03	Low Zero Carbon Feasibility Study	**1**	A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialist to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development. A local LZC technology/technologies has/have been specified for the building/development in line with the recommendations of this feasibility study and this method of supply results in a meaningful reduction in regulated carbon dioxide (CO_2) emissions.			**1**	M&E
Energy Efficient Cold Storage	Ene 05-01	Refrigeration Energy Consumption	**1**	Design, install and commission the refrigeration system: 1.a In accordance with the Code of Conduct for carbon reduction in the refrigeration retail sector 1b. Using robust and tested refrigeration systems or components included on the Enhanced Capital Allowance (ECA) Energy Technology Product List (ETPL)(126) or an equivalent list (see Components on the ECA Energy Technology Product List below for a list of components).			**1**	Client
	Ene 05-02	Indirect Greenhouse Gas Emissions	**1**	Achieve criteria 1 and 2. Demonstrate a saving in indirect greenhouse gas emissions (CO -eq) from the installed refrigeration system over the course of its operational life.			**1**	M&E
Energy efficient transportation systems	Ene 06-01	Energy Consumption	**1**	An analysis of the transportation demand and usage patterns for the building has been carried out to determine the optimum number and size of lifts, escalators and/or moving walks. The energy consumption has been calculated in accordance with BS EN ISO 25745 Energy performance of lifts, escalators and moving walks, Part 2: Energy calculation and classification for lifts (elevators) and/or Part 3: Energy calculation and classification for escalators and moving walks.			**1**	Architect
	Ene 06-02	Energy Efficient Features	**1**	a. The lifts operate in a standby condition during off-peak periods. For example the power side of the lift controller and other operating equipment such as lift car lighting, user displays and ventilation fans switch off when the lift has been idle for a prescribed length of time. b. The lift car lighting and display lighting provides an average lamp efficacy, (across all fittings in the car) of >70 lamp lumens/circuit Watt. c. The lift uses a drive controller capable of variable speed, variable-voltage, and variable-frequency (VVVF) control of the drive motor.			**1**	M&E
Energy Efficient Equipment	Ene 08-01	Unregulated Energy Loads	**2**	Identify functions which will be responsible for the significant majority of unregulated energy consumption in the building. Ensure these function comply with relevant criteria.			**2**	Client
Transport Assessment and Travel Plan	Tra 01-01	Travel Plan	**2**	During the feasibility and design stages, develop a travel plan based on a site-specific travel assessment or statement.			**2**	Client
Sustainable Transport Measures	Tra 02-01	Sustainable Transport Measures	**10**	Implement additional sustainable transport measures and award credits based on number of measures achieved and public transport accessibility score	**1**	**1**	**8**	Client
Water Consumption	Wat 01-01	Water Consumption	**5**	An assessment of the efficiency of the building's domestic water consuming components is undertaken using the BREEAM Wat 01 calculator	**2**	**1**	**2**	Architect
	Wat 01-Ex	Exemplary Performance Criteria [Water]	**1**	All other information as above, where the water consumption (litres/person/day) for the assessed building is compared against a notional baseline performance and BREEAM credits awarded as follows: 65% improvement over baseline - Exemplary performance	**1**			Architect

Water Monitoring	Wat 02-01	Water Monitoring	1	A water meter with a pulsed output will be installed on the mains supply to each building/unit. Water-consuming plant or building areas, consuming 10% or more of the building's total water demand, are either fitted with easily accessible sub-meters or have water monitoring equipment integral to the plant or area			1	Public Health
Water Leak Detection and Prevention	Wat 03-01	Leak Detection System	1	A leak detection system which is capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter.			1	Public Health
	Wat 03-02	Flow Control Devices	1	A flow control device is fitted to each WC area/facility to ensure water is supplied only when needed (and therefore prevent minor water leaks):			1	Public Health
Water Efficient Equipment	Wat 04-01	Water Efficient Equipment	1	The design team has identified all unregulated water demands that could be realistically mitigated or reduced. System(s) or processes have been identified to reduce the unregulated water demand, and demonstrate, through either good practice design or specification, a meaningful reduction in the total water demand of the building.			1	Landscape Architect
Life Cycle Impacts	Mat 01-01	Environmental Impacts of Construction Products (Building Life Cycle Assessment)	7	Up to seven credits - carry out building LCA options appraisal of 2 of 4 significantly different superstructure design options to identify reductions in environmental impacts. Use a building LCA tool and produce an LCA options appraisal report. Additional credit for LCA options appraisal of substructure and hard landscaping options.			7	Architect
	Mat 01-Ex	Exemplary Performance Criteria [Materials]	3	Carry out building LCA options appraisal of at least 3 significantly different core building services design options to identify reductions in environmental impacts. Achieve Elemental LCC plan and Component Level LCC options appraisal credits. A suitably qualified 3rd party shall either carry out the building LCAs or produce a report verifying the building LCAs accurately represents the designs under consideration.	1		2	Architect
Environmental impacts of construction products	Mat 02-01	Environmental Impacts of Construction Products (Environmental Product Declarations)	1	Specify construction products with EPD that achieve a total EPD points score of at least 20.		1		Architect
Responsible Sourcing of Materials	Pre-req	Legal Timber	Y	All timber and timber-based products used on the project are legally harvested and traded timber as per the UK Government's Timber Procurement Policy			Y	Contractor
	Mat 03-01	Enabling Sustainable Procurement	1	The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan			1	Contractor
	Mat 03-02	Measuring Responsible Sourcing	3	Materials for major building elements are responsibly sourced. Credits are awarded based on the level of responsible sourcing and points awarded.		1	2	Contractor
	Mat 03-Ex	Exemplary Performance Criteria [Sourcing]	1	Where 50% of the available responsible sourcing points have been achieved.	1			Contractor
Designing for Durability and Resilience	Mat 05-01	Protecting Vulnerable Parts of the Building	1	The building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. The relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors.			1	Architect
Material Efficiency	Mat 06-01	Optimising Use of Material	1	At the Preparation and Brief and Concept Design stages, set targets and report on opportunities and methods to optimise the use of materials.			1	Architect
Construction Waste Management	Wst 01-01	Pre-demolition Audit	1	Complete a pre-demolition audit of any existing buildings, structures, or hard surfaces being considered for demolition.			1	Contractor
	Wst 01-02	Construction Resource Efficiency	3	Prepare a compliant Resource Management Plan. The amount of non-hazardous construction waste ($m^3/100m^2$ or tonnes/$100m^2$) generated on site by the development is the same as or better than good or best practice levels.		1	2	Contractor
	Wst 01-03	Diversion of resources from landfill	1	Significant majority of non-hazardous construction waste generated by the development will be diverted from landfill and reused or recycled			1	Contractor
	Wst 01-Ex	Exemplary Performance Criteria	1	Non-hazardous construction waste generated by the building's design and construction is no greater than the exemplary level resource efficiency benchmark. The percentage of non hazardous construction and demolition waste (if relevant) diverted from landfill meets or exceeds the exemplary level percentage benchmark.		1		Contractor
Recycled Aggregates	Pre-req	Use of recycled and sustainably sourced aggregates	Y	If demolition occurs on site, to encourage the reuse of site-won material on site, complete a pre-demolition audit of any existing buildings, structures or hard surfaces.			Y	Contractor
	Wst 02-01	Project Sustainable Aggregate Points	1	Identify all aggregates uses and type, determine the quantity in tonnes for each identified use and aggregate type. Identify region and distance and enter in the BREEAM Wst 02 calculator.		1		Contractor
	Wst 02-Ex	Exemplary Performance Criteria [Aggregates]	1	The Project Sustainable Aggregate points score meets or exceeds the exemplary level performance benchmark in Table 62.	1			Contractor
Operational Waste	Wst 03-01	Operational Waste	1	There is dedicated space(s) to cater for the segregation and storage of operational recyclable waste volumes generated by the assessed building/unit, its occupant(s) and activities. The space is clearly labelled and accessible.			1	Architect
Adaptation to Climate Change	Wst 05-01	Structural and Fabric Resilience	1	Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by the end of Concept Design (RIBA Stage 2 or equivalent),			1	C&S
	Wst 05-Ex	Exemplary Performance Criteria [Climate Change]	1	A holistic approach to the design and construction of the current building's life cycle, to mitigate against the impacts of climate change, is represented by the achievement of these criteria.	1			Design Team
Design for Disassembly and Adaptability	Wst 06-01	Design for Disassembly and Functional Adaptability - recommendations	1	Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios.			1	Architect
	Wst 06-02	Disassembly and Functional Adaptability - Implementation	1	Provide an update, during Technical Design, on how the recommendations or solutions proposed by Concept Design have been implemented where practical and cost effective.			1	Architect
Site Selection	LE 01-01	Previously Developed Land	1	At least 75% of the proposed development's footprint is on an area of land which has previously been developed for use by industrial, commercial or domestic purposes in the last 50 years.			1	Architect
	LE 01-02	Contaminated Land	1	The site is deemed to be significantly contaminated as confirmed by a contaminated land specialist's site investigation, risk assessment and appraisal. The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan.	1			Contractor
Identifying and Understanding the Risks & Opportunities for the Project	Pre-req	Assessment Route Selection	Y	An assessment route for the project has been determined using BREEAM Guidance Note GN34 BREEAM Ecological Risk Evaluation Checklist. The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.			Y	Contractor
	LE 02-01	Survey and Evaluation	2	One credit where a project team member completes the BREEAM Ecological Risk Evaluation Checklist. The ecological outcome for the site involves the identification, appraisal and selection of specific solutions. Two credits where a suitably qualified ecologist undertakes this.			2	Ecologist

Unde and	LE 02-Ex	Determining the ecological outcomes for the site	1	Achieve the exemplary-level performance.	1			Ecologist
Managing Negative Impacts on Ecology	LE 03-01	Planning, Liaison, Implementation and Data	1	Site preparation and construction works have been planned for and are implemented at an early project stage to optimise benefits and outputs. The project team liaising and collaborating with representative stakeholders, taking into consideration data collated and shared, have implemented solutions, and measures have been selected			1	Contractor
	LE 03-02	Managing Negative Impacts of the Project	2	Negative impacts from site preparation and construction works have been managed. Additional credit where there has been no loss of ecological value			2	Contractor
Change and Enhancement of Ecological Value	LE 04-01	Liaison, Implementation and Data Collation	1	The project team liaising and collaborating with representative stakeholders, taking into consideration data collated and shared, have implemented the solutions and measures selected in a way that enhances ecological value in the following order: 5.a On site, and where this is not feasible, 5.b Off site within the zone of influence.			1	Ecologist / Landscape Architect
	LE 04-02	Enhancement of Ecology	3	Credits are awarded on a scale of 1 to 3, based on the calculation of the change in ecological value occurring as a result of the project.		2	1	Ecologist
Long Term Ecology Management and Maintenance	LE 05-01	Planning, liaison, data, monitoring and review management and maintenance	1	The project team liaise and collaborate with representative stakeholders, taking into consideration data collated and shared, on solutions and measures implemented to: 3.a monitor and review implementation and the effectiveness 3.b develop and review management and maintenance solutions, actions or measures.			1	Ecologist / Contractor
	LE 05-02	Landscape and ecology management plan (or similar) development	1	Landscape and ecology management plan, or similar, is developed in accordance with BS 42020:2013(210) covering as a minimum the first five years after project completion			1	Contractor
Impact of Refrigerants	Pre-req	Refrigerant pre-requisite	Y	All systems (with electric compressors) must comply with the requirements of BS EN 378:2008 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice.			Y	M&E
	Pol 01-01	Impact of Refrigerants	2	Two credits where the systems using refrigerants have Direct Effect Life Cycle CO_2 equivalent emissions (DELC CO_2e) of ≤ 100 $kgCO_2e/kW$ cooling capacity OR where air-conditioning or refrigeration systems are installed the refrigerants used have a Global Warming Potential (GWP) ≤10. One credit can be awarded where the systems using refrigerants have Direct Effect Life Cycle CO_2 equivalent emissions of (DELC CO_2e) of ≤ 1000 $kgCO_2e/kW$ cooling capacity. Awarded by default where no refrigerants are present.		1	1	M&E
	Pol 01-02	Leak Detection	1	Where systems using refrigerants have a permanent automated refrigerant leak detection system installed; OR where an in-built automated diagnostic procedure for detecting leakage is installed. Awarded by default where no refrigerants are present.			1	M&E
NOx Emissions	Pol 02-01	NOx Emission Levels	2	Emissions from all installed combustion plant that provide space heating and domestic hot water do not exceed levels set in Table 12.4 and 12.5. Maximum Nox emission levels have been set based on fuel type and pollution location.			2	M&E
Surface Water Run-off	Pol 03-01	Flood Resilience	2	**Two Credits** Where the assessed development is situated in a flood zone that is defined by the relevant planning, policy and technical guidance documents, as having a low annual probability of flooding **One Credit** Where the assessed development is situated in a flood zone that is defined by the relevant planning, policy and technical guidance documents, as having a medium or high annual probability of flooding and is not within the Functional Floodplain			2	C&S
	Pre-req	Surface Water Run-Off - Rate	Y	Surface water run-off design solutions must be bespoke, i.e. they must take account of the specific site requirements and natural or man-made environment of and surrounding the site.			Y	C&S
	Pol 03-02	Surface Water Run-Off - Rate	1	Where drainage measures are specified to ensure that the peak rate of run-off from the site to the watercourses (natural or municipal), a 30% improvement must be shown for the developed site compared to the pre-developed site. This should comply at the 1-year and 100-year return period events.			1	C&S
	Pol 03-03	Surface Water Run-Off - Volume	1	Where flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance) and post development run-off volume is no greater than pre development for a 100 year 6 hour event. Any additional is prevented from leaving through the use of SUDS			1	C&S
	Pol 03-04	Minimising Water Course Pollution	1	No discharge for rainfall up to 5mm. Effective on site treatment such as Sustainable Drainage Systems (SUDs) or oil separators have been specified in areas that are or could be a source of watercourse pollution.	1			C&S
Reduction of Night Time Light Pollution	Pol 04-01	External Lighting Strategy	1	The external lighting strategy has been designed in compliance with the ILP Guidance notes for the reduction of obtrusive light, 2011			1	M&E
Reduction of Noise Pollution	Pol 05-01	Building Services Plant Noise	1	New sources of noise from the development do not give rise to the likelihood of complaints from existing noise-sensitive premises and amenity or wildlife areas that are within the locality of the site. The noise level from the proposed site or building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference to the background noise of at least -5dB throughout the day and night.		1		Acoustician

Appendix B – Low and Zero Carbon Feasibility Study

Renewable Energy Technology Summary Matrix

LZC Technology	Wind turbine	Roof top wind turbine	Photovoltaics	Solar Hot Water	Air/Ground Source Heat Pumps	Biomass Boiler	Combined Heat and Power	Earth Tubes	Anaerobic Digestion
									
RECOMMENDATIONS	DISREGARDED	DISREGARDED	DISREGARDED	DISREGARDED	RECOMMENDED	DISREGARDED	DISREGARDED	DISREGARDED	DISREGARDED
Limitations	The proximity to a number of buildings and availability of ground space restricts the potential for installing wind turbines.	Historic issues with roof top wind turbines in urban areas and poor publicity generated from image. Additionally, the relatively small roof area available will limit the efficiency of this option.	Cleaning required annually/ twice annually. The available roof space will limit the area of the PV array, with a green roof prioritised to further health and wellbeing in the context of a hospital building.	The building has low hot water demand, and the available flat roof space is being maximised for PV provision.	Both GSHPs and ASHPs are well equipped to handle the loads of the building and operational requirements. ASHPs are recommended due to lower cost, similar efficiency and carbon benefit and ability to meet heating/cooling loads. GSHPs would be more expensive, and have larger embodied carbon impact.	The design and operation of fuel handling / storage make this technology unviable for an already highly-serviced site. Delivery issues in terms of supply and logistics can create planning and operational risk.	Large cost impact on project, and maintenance of systems. Not consistent with London Plan's zero combustion policy	Site constraints prevent the excavation required for earth tubes within the footprint of the development. Coordination with below ground services will add to the complexity of the project.	Large cost impact on project, and maintenance of systems. Requires adequate product storage. If run inefficiently AD can cause an odour nuisance, this and delivery issues can create planning and operational risk.
Potential Energy generated	N/A	N/A	N/A	N/A	TBC	N/A	N/A	N/A	N/A
CO2 reduction	N/A	N/A	N/A	N/A	TBC	N/A	N/A	N/A	N/A
%CO2 reduction (excluding un-regulated energy consumption)	N/A	N/A	N/A	N/A	TBC	N/A	N/A	N/A	N/A
Annual Saving and Income (£)	N/A	N/A	N/A	N/A	TBC	N/A	N/A	N/A	N/A
Payback (Years)	N/A	N/A	N/A	N/A	TBC	N/A	N/A	N/A	N/A
Local planning considerations	Both visual and noise impact from installing wind turbine may cause concerns on planning application. 'Flicker' - the effect of the rotating blade and the flickering shadows that are cast must be considered to minimise impact on the learning environment.	Visual aspect of building and façade could potentially cause concerns.	No significant planning risk if sensitively integrated onto roof	No significant planning risk if sensitively integrated onto roof	Not visible, no local planning considerations. Negotiation with the Environment Agency may be required over details of the borehole drilling procedure, size of the borehole array and level of heat exchange with the ground.	Frequency of biomass deliveries together with associated noise and considerations of frequent heavy goods vehicle access represent a planning and maintenance risk.	There is no significant planning risk associated with CHP; however, exhaust outlets of CHP should be sited carefully to avoid any noise and pollution problems relating to CHP.	None	Frequency of vehicle movements together with associated noise, odour and visual impacts represent a planning risk.

Land Use	Wind turbines, generally, should be sited as high as possible, on the top of roofs or in the landscape facing the prevailing wind direction in unobstructed areas. Safety margins can exist in public areas for turbine fall-over distances, and they should be sited at least three blade diameters apart when grouped together.	Makes use of existing 'free space' on roof with minimal impact on site or other useable space. No requirement for safety zone around turbines.	Flat roof available for array. South facing installation available for maximum kwh/m2 of panel. Overshadowing must be considered.	Flat roof available for array. South facing installation available to maximise kwh/m2 of panel	Ground source heat pumps would be located under the building. Air source heat pumps require similar footprint to chillers.	Requires space for fuel storage and access for regular deliveries by large delivery vehicles.	Require adequate plant space available to accommodate CHP, Heat Exchanger, Thermal Storage and Standby Boilers.	Excavation and co-ordination with underground services and structure required - contamination risk.	Requires space for product storage and access for regular deliveries by large delivery vehicles.
Noise	Wind turbine potentially has two types of noise sources. One is produced by gearbox and generator and the other is due to the interaction of the air flow with the blades. These may cause noise nuisance on the surrounding area which would have an impact on the nearby buildings.	Generally quieter in operation than the single mast wind turbine reducing the risk of noise impact	A PV system is completely silent in operation.	Solar collector is silent in operation.	Noise levels of ground source heat pump installations are generally low. Air source heat pumps can be noisy but can be specified with attenuators if noise rating of the units exceeds acoustic specifications.	There may be noise and vibrations associated with production and subsequent transport (via road or rail) of wood fuels, but generally not with the bio fuelled plant itself.	Acoustic attenuation is necessary for CHP units. In addition, silencers must be fitted to the exhaust system and anti-vibration mountings and couplings are essential for most of the plant.	Earth tubes have no noise issues provided intake grilles are selected to an appropriate noise level	There may be low levels of noise associated with the digester, air compressors and extraction fans, however, where connected to a CHP engine acoustic attenuation is necessary.
Feasibility of exporting heat / electricity from the system	Yes	Yes	Yes	No	No	No	Yes	No	Yes
Grants	No	No	No	Renewable Heat Incentive (RHI)	Renewable Heat Incentive (RHI)	Renewable Heat Incentive (RHI)	No	No	Renewable Heat Incentive (RHI)

Appendix C – GOSH Sustainability Overview

NHS
Great Ormond Street Hospital for Children
NHS Foundation Trust

GOSH Sustainability

Programme Overview

Version 1.0

March 2022

Contents

Document Details

Title	GOSH Sustainability Programme Overview
Date	4 March 2022
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Authors	Rob Godfrey, Sustainability Manager Nick Martin, Head of Sustainability

Introduction

What do we mean by "Sustainability"?

The term "sustainability" is often used with little regard for its meaning. Though multiple definitions exist one commonly-referenced starting point is the UN's 1987 Brundtland Commission definition: ***"meeting the needs of the present without compromising the ability of future generations to meet their own needs."***. Sustainability is the achievement of a balance between the environment, equity, and economy; sustainable practices support ecological, human, and economic health and vitality. Sustainability recognises that resources are finite and must be used wisely and with a view to long-term consequences. Very simply, sustainability is about our children and our grandchildren, and the world we will leave them.

In this document, we present a framework for sustainability at GOSH – one that is clear, concrete, relevant, and action-orientated.

Why does it matter?

The human-caused depletion of natural resources, degradation of ecosystems, and dangerous destabilisation of climate pose a grave threat to not only our prosperity, but to our *health*, as well. Environmental toxicity, extreme weather, resource scarcity, and the spread of infectious diseases threaten to undermine years of health gains.

Vitally, for GOSH, **children are the face of the climate and ecological crisis**. While the WHO has named climate change as the greatest threat to public health globally – projected to contribute to at least 250,000 additional deaths per year from malaria, malnutrition, diarrhoea, and heat stress alone – it also estimates that **80%** of the illnesses, injuries, and deaths occurring due to climate change are in children. UNICEF estimates that environmental factors already claim the lives of 1.7M children under the age of five every year.

Urgent action against climate change is not only required to avert disaster: in the UK, it is enshrined in law under the Climate Change Act. **The UK has established a legally binding net zero emissions target for 2050**.

Even more specifically, **NHS England announced its commitment to achieving net zero emissions by 2040.** The NHS accounts for roughly **4%** of national greenhouse gas emissions.

- **More info:**
  - UNICEF Report | The Climate Crisis is a Child Rights Crisis: Introducing the Children's Climate Risk Index
  - The *Lancet Countdown* on Health and Climate Change
  - NHS Report | Delivering a "Net Zero" National Health Service

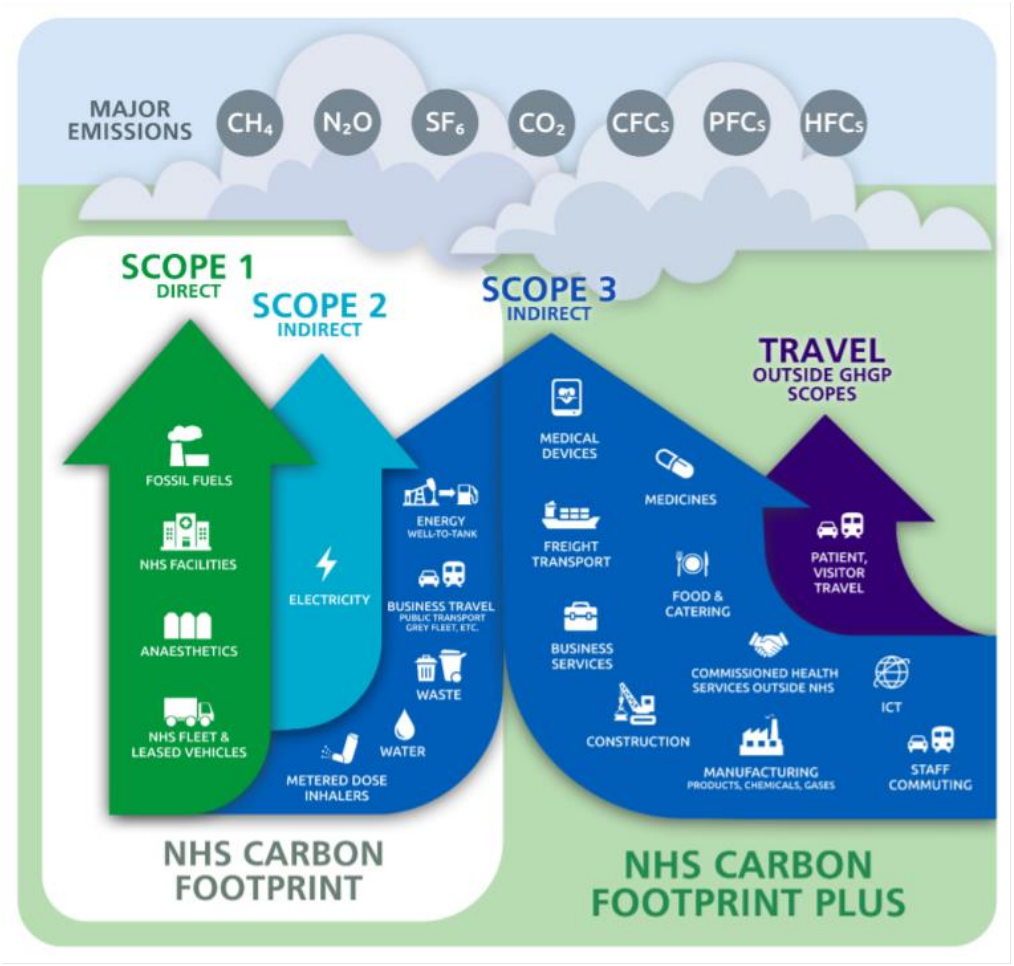


Figure 1. The components of the NHS carbon footprint across the three scopes of emissions.

Sustainability at GOSH

GOSH's sustainability function has, traditionally and until now, rested within the Built Environment/Redevelopment team (now Space and Place). Organisationally, despite significant evolution, it has not been conceived of as an embracing and transformational programme, but rather as a job for a small group of Sustainability Team members:

1. Nick Martin – Head of Sustainability & Environmental Management (joined April 2018 | 1.0 FTE)
2. Magali Thomson – Project Lead for Placemaking (joined October 2019 | 0.6 FTE)

A small group of volunteer staff "Green Champions" has existed for a number of years – evolving and growing significantly in the last 2.

The Trust's sustainability ambitions were articulated in a Sustainable Development Management Plan (SDMP), as required by the NHS Sustainable Development Unit (SDU; now Greener NHS).

Figure 2. GOSH's 2020-2023 SDMP framework, comprising 10 focus areas and four perspectives. The 10 focus areas have since been updated to better reflect GOSH priorities and new Greener NHS requirements.

The Trust's 2020-2025 Above and Beyond Strategy names "**Above and beyond for the Environment" as Principle 5**: **we aren't caring for children if we don't protect the environment**.

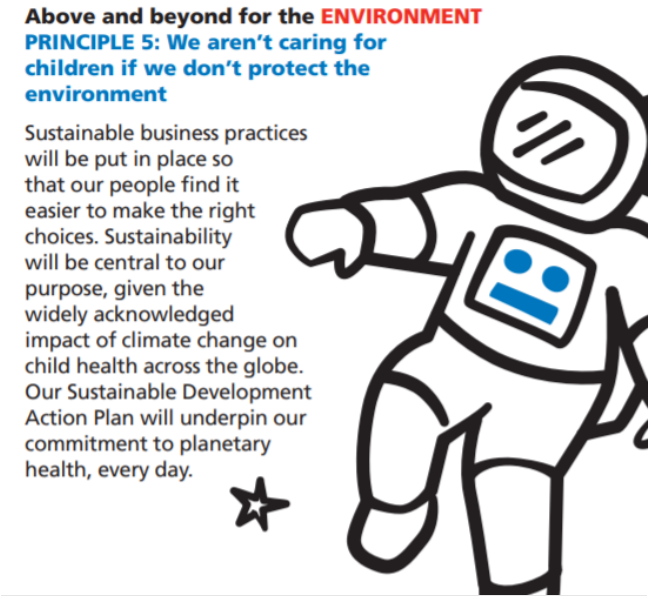


Figure 3. Above and beyond Principle 5, as articulated in our Above & Beyond strategy.

- **More info:**
  - GOSH Sustainable Development Management Plan

- GOSH Above & Beyond Strategy

Recent activities and achievements

In February 2021, GOSH formally declared a Climate & Health Emergency (CHE), becoming the first London-based NHS trust and the first standalone children's hospital nationally to do so (CHE launch webinar viewable here)**.** Our declaration acknowledges our special responsibility to respond to the CHE and offers a clear recognition that we are not looking after our children if we aren't protecting the planet. The CHE declaration was accompanied by a pair of formal net zero emissions targets, as expressed below:

Watch our CHE declaration video, with staff and patient statements, here.

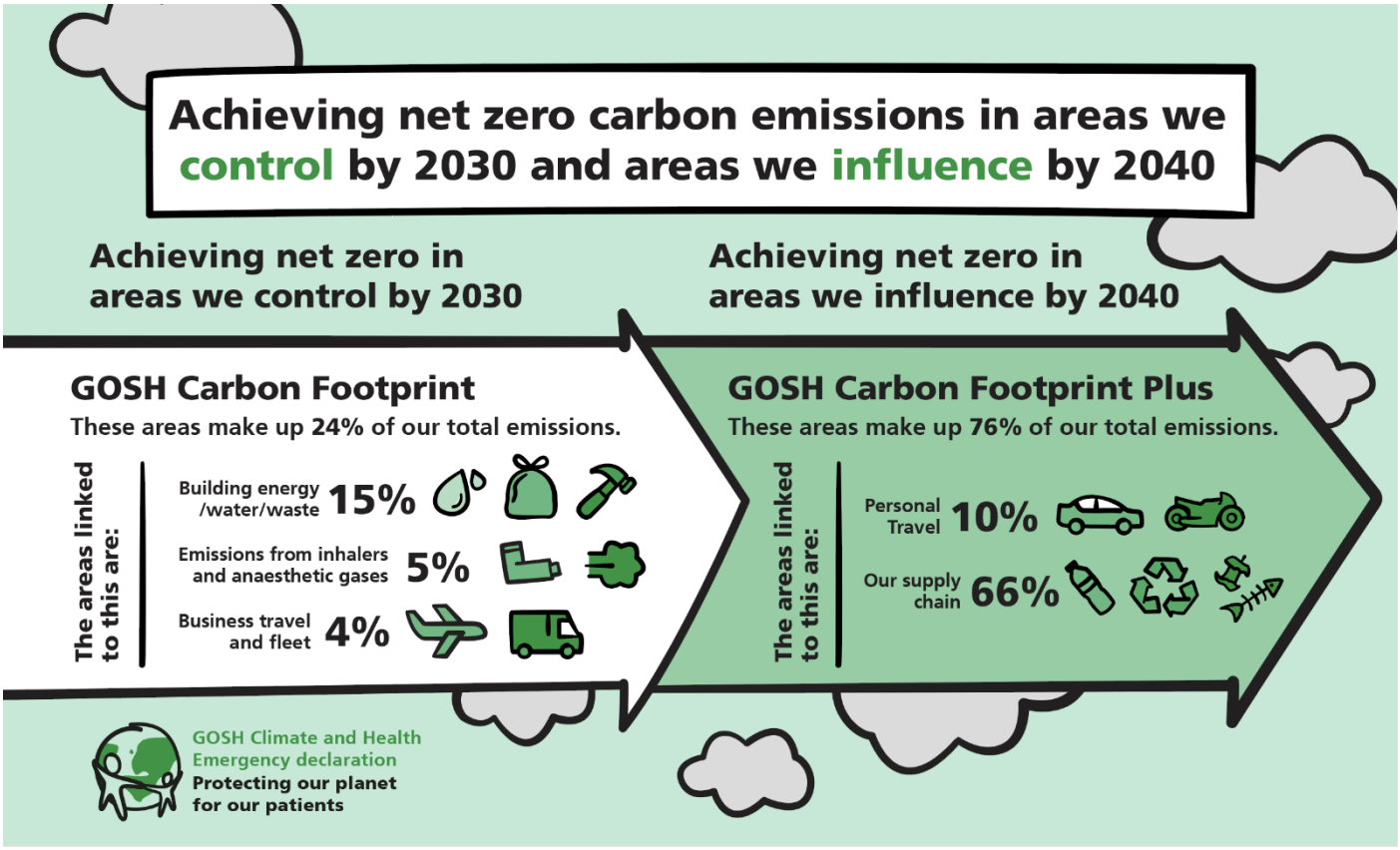


Figure 4. The GOSH net zero emissions targets announced alongside our Climate & Health Emergency declaration in February 2021.

Our CHE declaration follow-up "Taking the Temperature" survey indicated strong staff support and enthusiasm for increased sustainability ambition (full results here). The declaration is merely a starting gun to galvanise the urgent and transformative action required to achieve our commitments. Some of our activities and achievements in sustainability since declaring include:

- **Re-launching and reinvigorating the GOSH Green Champions (GC) staff community**. The GC network now comprises over 100 members, with three active working groups and a digital home on MS Teams. Join here.

- **Continued dissemination and adoption of the Clean Air Hospital Framework (CAHF), co-developed by GOSH and Global Action Plan.** The CAHF is now a recommended piece of evidence under the NHS Premises Assurance model (Effectiveness Domain). 30 NHS Trusts have now downloaded the CAHF and committed to becoming clean air hospitals.

- **Achievement of Cycling UK Gold Employer Status, becoming the first NHS Trust to do so.** Delivered by the Safe, Active, and Sustainable (SAS) Travel working group. SAS also developed and delivered numerous staff resources to encourage active travel (infrastructure wayfinding, new hire info pack, new cycle repair stand, e-bike trials, new Brompton cycle trials)

- **Working with internal and external procurement** partners to integrate sustainability and social value considerations into supplier evaluations (eg. 10% weighting; non-emergency patient transport and total waste management services).

- **Regular and engaging visibility to staff at internal events and through internal communications channels.** Working with internal communications has helped sustainability be more visible than ever: Virtual Big Briefs, Wellbeing Wednesday Webinars, team meeting drop-ins, PGME Grand Rounds, Headlines, GOSHWeb, CHEER platform and app.

- **Implementation of a new EPIC best practice advisory and monitoring function for greener anaesthesia, supplemented by training materials.** A project of the Sustainable Care Green Champions Working Group, this has led to the nearly complete elimination of desflurane usage at GOSH. Medical gases constitute approximately 4% of GOSH's greenhouse gas footprint. See the first ever climate change section of the Anaesthesia@GOSH report here.

- **Launching a new Sustainable Care Working Group task force, comprising clinical, estates, external experts, suppliers, and Greener NHS representatives, focusing on nitrous dioxide usage and leakage**. Involving baselining via EPIC data and initiatives related to maintenance, behaviour, and new equipment to address related environmental impact.

- **Installation of a new air quality monitor at the main entrance and officially joining the Breathe London Hospitals Network.** We are partnering with London academics to improve the visibility of the air pollution problem and assist in mobilising health professionals. Sadiq Khan visiting imminently to discuss air quality and health care.

- **The launch of a new Climate Champion Staff STAR award**. This is a positive first step in recognising the significant contributions of staff towards climate action and sustainability leadership.

- **Development of a new five-part framework to guide and gauge sustainability performance for the GOSH estate and built environment, for both operations, retrofit, and new development.** Estates and facilities account for over 60% of the NHS's core carbon footprint.

- **Officially joining the UNFCCC Race to Zero net zero emissions campaign through Health Care Without Harm Europe Health Care Climate Challenge.** We became the 15th European health care provider to join the campaign, and the 5th NHS body (joining Sussex Community, Manchester University, Newcastle, and Highlands).

- **Partnerships and standing dialogue established with nationally leading NHS trusts**. We meet regularly with sustainability colleagues at some of the most progressive NHS hospitals in the UK: Newcastle, Manchester University, Sussex Community, Bristol, and Cambridge. Through our participation in Ride for their Lives, we have opened new avenues for collaboration and co-learning with NHS colleagues from across the country.

- **Development of a bold and transformative vision for Great Ormond Street's public realm.** This includes significant pedestrianisation and efforts to incorporate nature and play into the future streetscape. GOSH "Play Street" events organised by the Play and Sustainability teams have provided a glimpse of what could be: a truly safe, healthy, and child-friendly Great Ormond Street (Video here).

- **Significant advances in relationships with community and borough partners.** The London Borough of Camden has offered support to GOSH's public realm improvement efforts, including the implementation of modal filtering and assistance with baselining current conditions. The launch of a new Healthy Streets Alliance with UCLH and the Royal Free will support safe and sustainable local infrastructure projects within Camden by being credible health-focused advocates.

- **Leading the Ride for Their Lives (RFTL) COP 26 cycle and action campaign with a consortium of NHS Trusts and child health partners (incl. RCPCH, WHO)**. RFTL saw a team of child health professionals and GOSH patients, from across the UK and abroad, cycle 540 miles from London to Glasgow to coincide the COP26 UN climate summit, calling for urgent action on air pollution and climate.

- **Executive and Board agreement on a new governance structure and formalised programme for sustainability at GOSH**. The Sustainability Programme Board will form a critical element of this new structure.

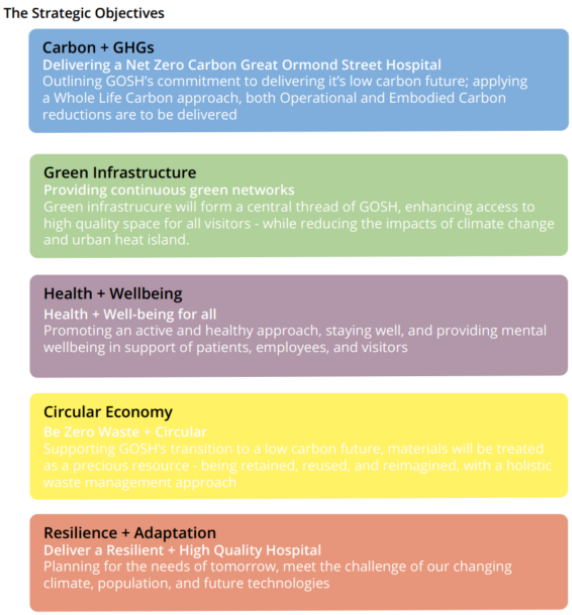


Figure 5. The five core pillars of the bespoke sustainability framework for GOSH estates and built environment. This was developed by the GOSH Sustainability Team in collaboration with consultants from Currie & Brown and Elementa. The draft framework can be accessed in the SSG documents library.

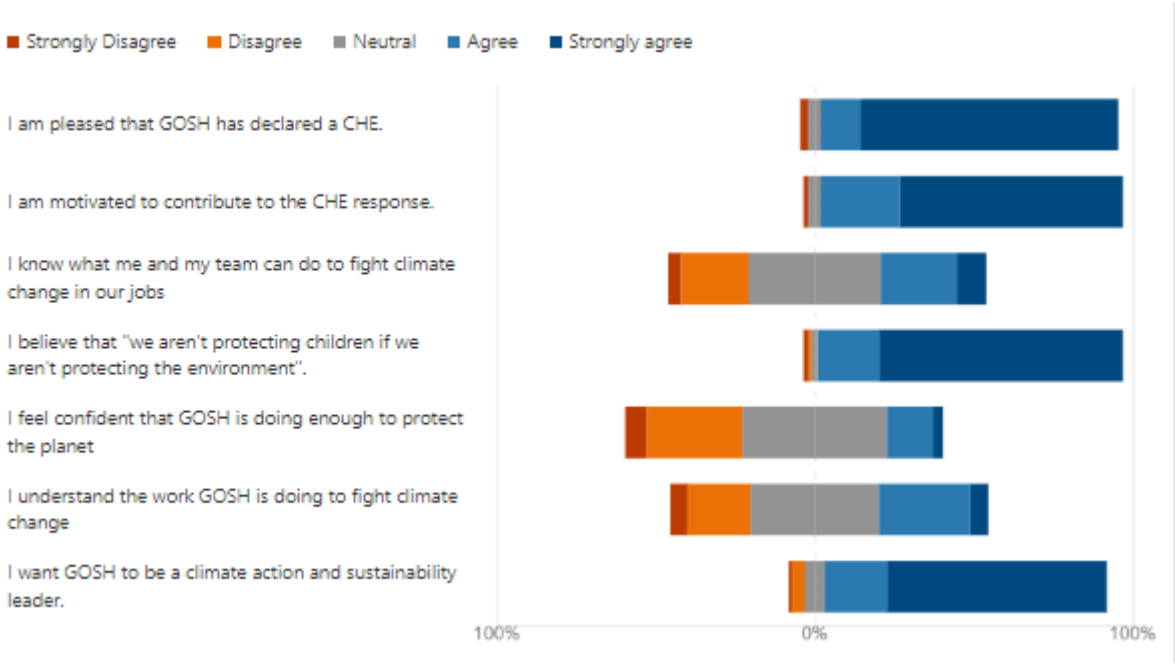


Figure 6. Summary results from the staff sentiment analysis section of our Taking the Temperature Survey (March 2021, n=91). Full results can be accessed in the SSG documents library.

Figure 7. A vision for the future of Great Ormond Street: green, safe, welcoming, playful, child-orientated. Developed by Magali Thomson and LDA Design. Further diagrams can be viewed in the LDA Sketchbook within the SPB documents library.

Our Ambition & Vision

At GOSH, we have a mission of putting the "child first and always". Our CHE declaration and Above and Beyond Principle 5 express our commitment to care for the environment as an essential element of our overarching responsibility to safeguard the wellbeing of our patients, staff, and community members. What's needed now is meaningful action to make good on admirable intentions. **We have just 8 years to achieve net zero across our core emissions footprint.**

To embed sustainability and achieve the Trust's climate action goals will require concerted, coordinated effort across the breadth and depth of the organisation. We are calling for a **"Sustainability Reset"** and embarking on a mission of transformation guided by a holistic programme framework, detailed below.

Perspectives

The sustainability programme will be guided by the following perspectives. These should be common threads running through our functional programmes of work targeting specific impact areas.

1. **Reaching Out.** *GOSH is not an island*. We are an anchor institution, a member of multiple communities, and a centre of excellence for health care, research, and teaching. We recognise that our impact is greater when we step up and step out beyond our four walls. We understand that we can go both further and faster when we share what we know, speak up for what we believe in, support others, stay humble, and learn from our peers. Through our sustainability efforts, we will connect with our local community, with other changemaking trusts, with organisations on a similar sustainability journey. We will be effective advocates, willing partners, and embody compassionate and progressive leadership.
2. **Self-Mastery.** *GOSH has a long way to go*. Sustainability must not be ad-hoc, optional, or extraneous. Credible leadership requires sincere and concrete action. Through our sustainability efforts, we will identify and consciously seize opportunities to embed cultures, policies, processes, documentation, training, and governance structures in-house. We will be self-critical and aim for impact. We will integrate sustainability as a lived core value, making it everyone's job.
3. **Health and Well-Being.** *GOSH is a health care institution.* Our unique mission, unique capabilities, and unique opportunities will not be lost in how we tackle sustainability and climate action. We will strive to be a leader in *sustainable health care*. Through our sustainability efforts, we will endeavour to make holistic win-win links back to health and well-being for the benefit of children, visitors, community members, and staff.
4. **Treading Lightly**. *GOSH has committed to reducing its footprint.* We will measure and tangibly reduce our environmental impact, seeking opportunities to not only "do less harm" but "do more good" on our way to net zero emissions. Through our sustainability efforts, we will be evidence-based in our approach, driven by sound data and a desire to optimise impact. We will aim to meaningfully move the needle and avoid greenwashing.

Links to Trust Strategy

Above and Beyond Principle 5 ("Above and Beyond for the Environment") cements sustainability and climate action as a core Trust priority, guiding our planning, decision making, and day-to-day work. As a Principle, it is recognised that *protecting the planet for our patients* is essential to achieving our purpose and our priorities. It is integral to our work, not separate from it. Examples of links to Above and Beyond priorities are provided below.

Priorities

- **Make GOSH a great place to work by investing in the wellbeing and development of our people**. Our Taking the Temperature survey results are clear: GOSH staff support our sustainability mission. It resonates with our purpose. (65% of UK workers say they are more likely to work for an organisation with strong organisational policies)

- **Deliver a Future Hospital Programme to transform outdated pathways and processes**. Digital Transformation is identified as a core impact area for sustainability and emissions reduction (eg. virtual clinics, reduced paper usage, smart buildings, data driven decision making).

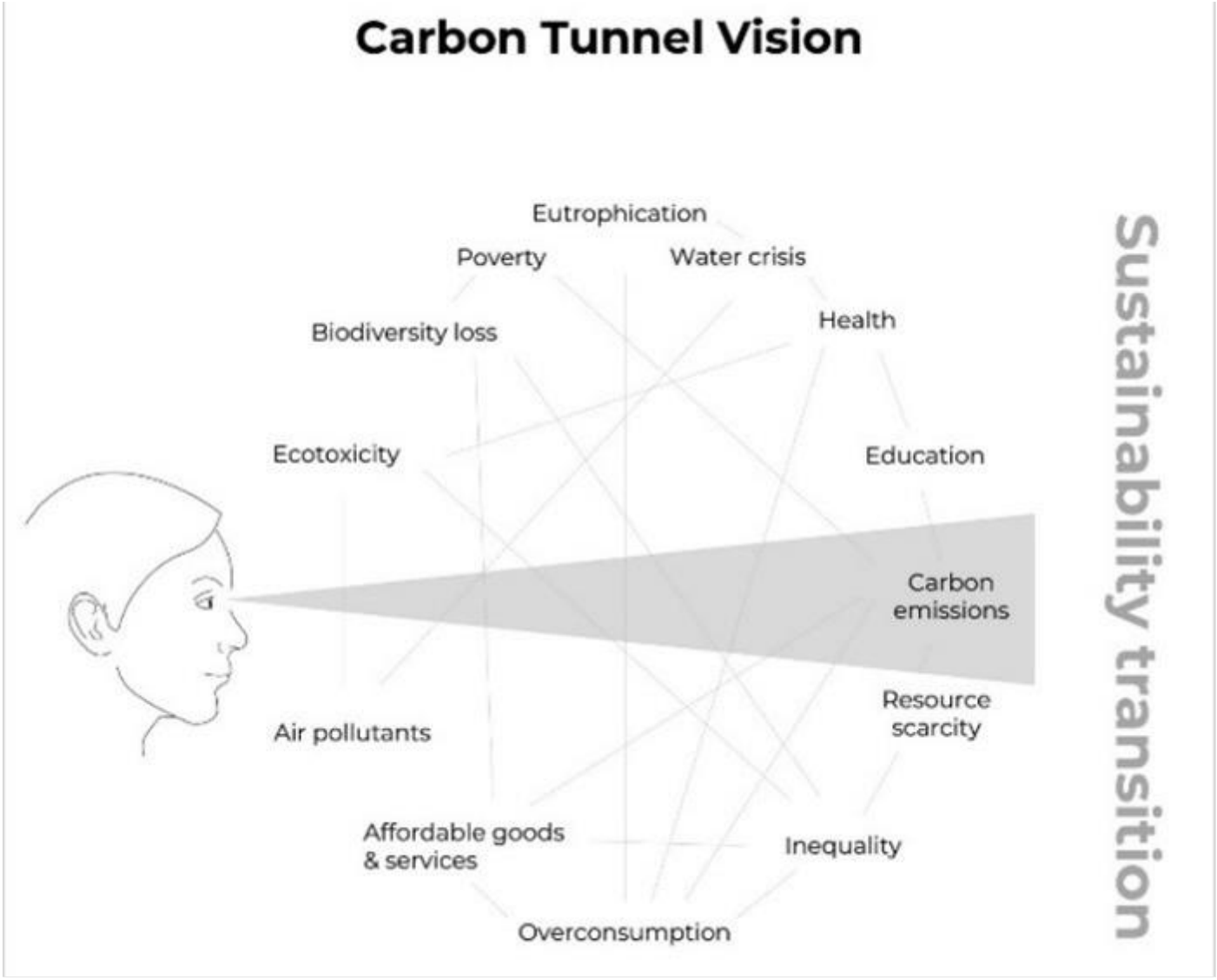
- **Develop the GOSH Learning Academy as the first-choice provider of outstanding paediatric training**. We have significant opportunities to develop and share knowledge in sustainable paediatrics via the GOSH Learning Academy, for clinical and non-clinical staff. A GOSH DEN page for environmental sustainability has already been created. (63% of UK workers expressed a desire to learn more green skills so they can become more valuable in the workspace)

- **Accelerate translational research and innovation to save and improve lives**. The journey towards net zero will necessarily be a journey of innovation. GOSH has a chance to undertake research at the intersection of environmental and paediatric health (eg. preventative and proactive care, understanding the environmental determinants of health). The GOSH Research and Innovation team are already highly engaged and enthusiastic.
- **Create a Children's Cancer Centre to offer holistic, personalised, and co-ordinated care**. The CCC should embody GOSH's commitment to sustainability. The GOSH Sustainability Team have been working directly with architects, planners, and constructors to ensure this is so: it will achieve BREEAM Excellent as a minimum requirement.

Benefits

To organise the sustainability programme and ensure an *outcomes-orientated approach* to delivery, we have defined a set of key overarching **benefits**. A benefit is the measurable improvement from change, which is perceived as positive by one or more stakeholders, and which contributes to organizational objectives. Enshrining these, with key metrics, is central to tracking and reporting the impact of our work. Taken together, our set of benefits statements helps to answer the question, "What are we trying to do?".

Our benefits ensure we are focused but not myopic. Though achieving net zero is undoubtedly a priority, we recognise that sustainability is about so much more (and can offer so much more to GOSH) than just emissions reductions. As such, we have articulated benefits across five key themes: Emissions Reduction, Non-Carbon Environmental Impacts, Health & Wellbeing, Finance and Investment, and Reputation & Leadership.



Please see below for a list of overarching programme benefits statements and associated metrics. To keep tracking and reporting manageable, statements describe a set of *end benefits*. There may be numerous *intermediate benefits* to projects, which connect causally to (and help to realise) these end benefits. Working with the Sustainability Programme Board and Sustainability Steering Group, the GOSH Sustainability Team will continually review and refine this core benefits set, to ensure it is embracing, valuable, and fit-for-purpose.

Ref	Description	Theme	Metric(s)
ER1	Achieve net zero for Scope 1 and 2 GHG emissions by 2030.	Emissions Reduction	tCO2e
ER2	Achieve net zero for Scope 3 emissions by 2040.	Emissions Reduction	tCO2e
ER3	Decrease carbon intensity across all scopes.	Emissions Reduction	tCO2e/m^2 tCO2e/patient contact
NC1	Eliminate harmful air pollution generated by our transport and logistics activities.	Non-Carbon Environmental Impacts	NOx SOx PM10 PM2.5 CAHF score

NC2	Increase proportion of people accessing site by active and sustainable travel methods.	Non-Carbon Environmental Impacts	% arriving by SAS methods
NC3	Decrease total waste generated.	Non-Carbon Environmental Impacts	kg
NC4	Decrease waste disposal intensity.	Non-Carbon Environmental Impacts	kg per patient contact
NC5	Decrease total energy usage.	Non-Carbon Environmental Impacts	KWh
NC6	Decrease energy use intensity.	Non-Carbon Environmental Impacts	KWh/m^2 KWh/patient contact
NC7	Increase water efficiency.	Non-Carbon Environmental Impacts	M^3/m^2 m^3/patient contact
NC8	Decrease water usage.	Non-Carbon Environmental Impacts	M^3
NC9	Decrease proportion of products deemed to be ecotoxic.	Non-Carbon Environmental Impacts	% of procurement by spend/volume/item numbers
HW1	Increase job fulfillment for GOSH staff	Health and Wellbeing	staff survey score
HW2	Increase staff satisfaction with GOSH as an employer	Health and Wellbeing	staff survey score
HW3	Increase staff retention	Health and Wellbeing	attrition rate
HW4	Create opportunities for professional development	Health and Wellbeing	training hours delivered new skills appraisal
HW5	Increased recruitment success	Health and Wellbeing	recruitment statistics market benchmark
FI1	Increase charitable donations to GOSH Charity or specific Green Fund	Finance and Investment	£ - overall Charity funding £ - donations attributable to sustainability
FI2	Increase in Pro Bono support, expertise & mentoring in support of CHE	Finance and Investment	£ - value of in-kind support obtained
FI3	Increase in Trust CHE resource and funding	Finance and Investment	£ - dedicated to sustainability & CHE response
FI4	Increase % of Trust expenditure that benefits the CHE response	Finance and Investment	% of Trust spend allocated to sustainability
FI5	Decrease operational costs as a result of investment in sustainability.	Finance and Investment	£ - operational costs (incl. utilities)
RL1	Increase GOSH standing and profile on sustainability and child health.	Reputation and Leadership	# of media mentions # of awards # of external partners # of publications
RL2	Increase positive perception of GOSH by local community.	Reputation and Leadership	% of respondents with positive perception.

RL3	Increase community investment (esp. in-kind)	Reputation and Leadership	Value of hours committed + financial
RL4	Increase social value creation (locally and for society at-large)	Reputation and Leadership	Social return on investment

All sustainability projects will contribute to at least one of these core benefits. When conceiving of and justifying projects, these benefits and metrics should be consulted; each project will be tagged with its relevant benefits to facilitate tracking and ensure connection to overall programme goals.

Impact Areas – Programmes of Work Overview

Our overall sustainability programme will be broken down into the following functional programme of work (POW) areas. An accountable owner and manager/s will be assigned as responsible for delivery of each. These align to, and build upon, the core Green Plan chapters recommended by Greener NHS.

1. Procurement & Circular Economy

This POW is concerned with what and how GOSH buys (both goods and services), and should consider the use of purchasing power/decisions and supplier engagement in driving scope 3 emissions reductions (and promoting sustainability more broadly, in line with the goals and procurement best practice shared by NHSE/I). This workstream will advance circular economy and waste hierarchy principles for resource efficiency. Procurement decisions should consider whole-life-costing (both financially and environmentally) and adopt a cradle-to-grave (or cradle-to-cradle) perspective. Key partners will be colleagues in procurement, supply chain, finance, and estates and facilities (waste management).

2. Travel & Transport

This workstream is concerned with reducing the environmental impact arising from travel (of people) and transport (of goods and services; logistics). Areas of related work include efforts to increase active and sustainable travel (business and commuting, patients and families), investment in zero-emission vehicles (and/or engagement with suppliers to reduce fleet emissions), and maximising transport efficiencies. Key partners will include procurement, internal communications, and Space & Place.

3. Food & Nutrition

This workstream considers ways to reduce the environmental impact (including carbon emissions) of the food that is procured, prepared, processed, and served within GOSH. This could include reducing overall food waste and ensuring provision of healthier, locally-sourced and seasonal menus high in fruits and vegetables. Opportunities exist to reach out to improve community access to healthy food, as well as local growing. Key partners will be colleagues in catering, procurement, and waste management.

4. Our People

This workstream covers efforts to engage, educate and develop our workforce in defining and delivering carbon reduction initiatives and the achievement of our broader sustainability goals. It includes the operation of working groups and committees, employee engagement efforts, training and education, and investment in staff, alongside broader efforts to create an organisational culture of sustainability. Key partners will include HR & OD, Learning, and Internal Comms colleagues.

5. Sustainable Care

This workstream endeavours to embed net zero principles across clinical services, considering the *way* in which care is delivered. This could include promotion of -- or default preference for – lower carbon and lower waste

interventions, provision of care closer to home, and changes to medical practices and material usage (eg. PPE). Key partners will include clinical colleagues of all kinds, the EPR team, materials management, and pharmacy.

6. Medicines

This workstream will examine and seize opportunities to reduce carbon emissions and the broader environmental and social impacts associated with the prescribing and use of medicines and medical products. This includes reducing wastage, optimising usage, consideration of lower impact alternatives. The NHS Standard Contract demands specific action on inhalers and anaesthetic gases. Key partners will be colleagues in pharmacy and a variety of clinical roles.

7. Digital Transformation

This workstream focuses on ways to harness digital technology and systems to streamline service delivery and support efforts to track and reduce carbon emissions and the Trust's broader environmental impacts. Examples include the use of EPIC and ERIC data to indirectly monitor carbon emissions and target interventions, expanding the use of telemedicine, and using digital systems to reduce paper usage and postage. Key partners will include colleagues in ICT, DRIVE, and EPR.

8. Space & Place

This POW focuses on GOSH's own estates, facilities, and built environment (which account for 60% of core emissions). Examples of work include identification of opportunities for energy and water efficiency interventions, efforts to achieve 100% renewable energy purchasing (a requirement of the NHS Standard Contract), delivery of a sustainable Children's Cancer Centre, and a solid embedding of sustainability considerations in all design brief templates and guiding documents for capital projects. Key partners will include colleagues in Space & Place.

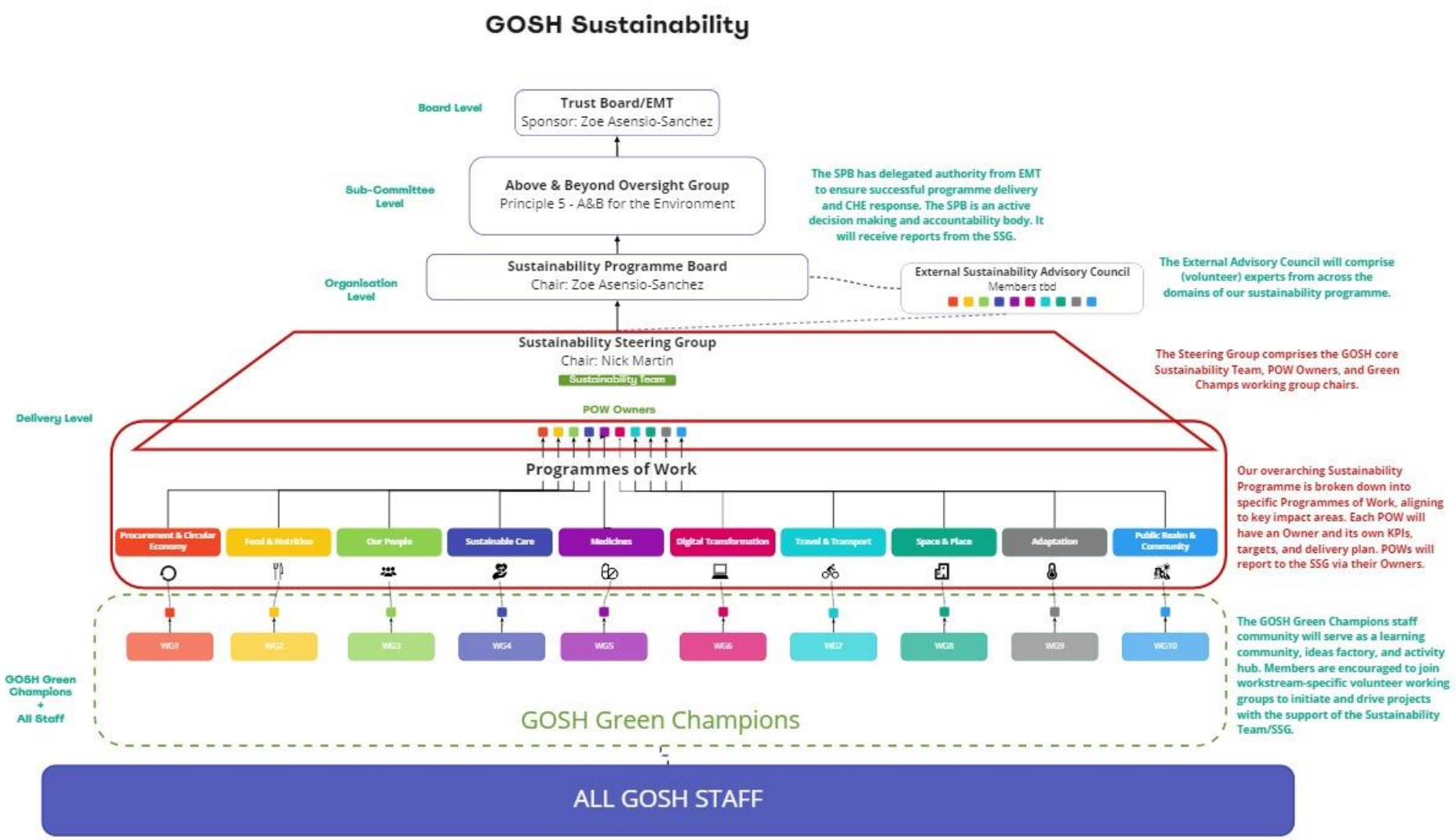
9. Community & Public Realm

This POW focuses on reaching out beyond GOSH's four walls to ensure our sustainability efforts benefit (and benefit from) the communities of which we are a part. Examples include the development of a community engagement plan, continued liaison and partnership with local stakeholders (including neighbours, local authorities), development of a process for tracking community benefits, and the delivery of a transformed green and child-friendly Great Ormond Street. Key internal partners will include Space & Place and external communications.

10. Adaptation

This workstream is concerned with plans to mitigate the effects of climate change and extreme weather on GOSH's functioning. This includes planning and projects to mitigate the impact of heatwaves on Trust infrastructure, patients, and staff. This workstream is concerned with ensuring that GOSH is a "future fit" organisation that is adaptable and resilient to the effects of climate change (capital projects, estates, procurement, clinical care, business planning). Key internal partners will include colleagues in Space & Place, procurement, governance, and risk management.

Each POW has been assigned an accountable POW owner and manager/s who will be responsible for its delivery and the development of a programme brief and management plan, with support from the core Sustainability Team and relevant GOSH Green Champions Working Group (together comprising the Sustainability Steering Group [SSG])**.** They will each report progress against KPIs into the SSG, from which a consolidated 'Climate & Health Emergency Progress report' will be compiled for the SPB every 2 months.


GOSH Sustainability
Board Level
Trust Board/EMT
Sponsor: Zoe Asensio-Sanchez
Sub-Committee Level
Above & Beyond Oversight Group
Principle 5 - A&B for the Environment
The SPB has delegated authority from EMT to ensure successful programme delivery and CHE response. The SPB is an active decision making and accountability body. It will receive reports from the SSG.
Organisation Level
Sustainability Programme Board
Chair: Zoe Asensio-Sanchez
External Sustainability Advisory Council
Members tbd
The External Advisory Council will comprise (volunteer) experts from across the domains of our sustainability programme.
Sustainability Steering Group
Chair: Nick Martin
Sustainability Team
The Steering Group comprises the GOSH core Sustainability Team, POW Owners, and Green Champs working group chairs.
Delivery Level
POW Owners
Programmes of Work
Procurement & Circular Economy
Food & Nutrition
Our People
Sustainable Care
Medicines
Digital Transformation
Travel & Transport
Space & Place
Adaptation
Public Realm & Community
Our overarching Sustainability Programme is broken down into specific Programmes of Work, aligning to key impact areas. Each POW will have an Owner and its own KPIs, targets, and delivery plan. POWs will report to the SSG via their Owners.
WG1
WG2
WG3
WG4
WG5
WG6
WG7
WG8
WG9
WG10
GOSH Green Champions + All Staff
GOSH Green Champions
The GOSH Green Champions staff community will serve as a learning community, ideas factory, and activity hub. Members are encouraged to join workstream-specific volunteer working groups to initiate and drive projects with the support of the Sustainability Team/SSG.
ALL GOSH STAFF
All GOSH staff have a responsibility (and an opportunity) to contribute to our Sustainability Programme and the fulfillment of our net zero commitments. We will endeavour to identify and empower Climate & Health Emergency Responders (CHERs) across the Trust, to act as ambassadors and grasp opportunities to embed sustainability within their own teams and areas of work. "Professionalising" our organisational commitment to addressing the Climate & Health Emergency should include the delivery of sustainability education and incorporation into recruitment and appraisal processes.
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The GOSH Sustainability governance structure

A message from GOSH's Young People's Forum

"The Young People's Forum needs YOU. Climate change and environmental degradation are subjects that are really important to focus on as it will be children and young people who have to deal with it in the future. We would like to have a comfortable and sustainable world to live in as previous generations have enjoyed. This is a subject that cancreally bring up feelings of worry and stress about the future and one that comes up a lot in conversations with friends. We need to find ways to make the subject both fun and enjoyable and to get more people involved in taking action. Furthermore, to ensure we are not doing things now that will affect future generations around waste and pollution.

"We believe that climate change is an important health issue as well as an environmental one. GOSH has a responsibility to take serious action and use its profile. The Young People's Forum supports GOSH's declaration of a climate emergency and for the hospital's commitment to set a highly ambitious carbon neutrality target."

See here for video statements from the YPF.

If you would like to get involved with sustainability around the Trust, please join our GOSH Green Champions community and MS Team workspace by completing this intake form.

Questions can be directed to the Sustainability Team at sustainability@gosh.nhs.uk

Thank you!