ROYAL ARSENAL RIVERSIDE

THE ROPEYARDS

PLOTS D & K

SUSTAINABILITY STATEMENT

To Support a Reserved Matters Application

MARCH 2024

Berkeley
Designed for life

HODKINSON

Sustainability Statement

Berkeley Homes (East Thames) Ltd

The Ropeyards

Final

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BSc (Hons), MSc

March 2024

HODKINSON

DOCUMENT CONTROL RECORD
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ABOUT HODKINSON CONSULTANCY

Our team of technical specialists offer advanced levels of expertise and experience to our clients. We have a wide experience of the construction and development industry and tailor teams to suit each individual project.

We are able to advise at all stages of projects from planning applications to handover.

Our emphasis is to provide innovative and cost-effective solutions that respond to increasing demands for quality and construction efficiency.

Executive Summary

The purpose of this Sustainability Statement is to demonstrate that the proposed development at The Ropeyards, Royal Arsenal Riverside, Plots D&K by Berkeley Homes (East Thames) Ltd in the Royal Borough of Greenwich is considered sustainable, as measured against relevant local, regional and national planning policies.

The proposed development will comprise 663 residential units with ground floor commercial space.

Through the incorporation of sustainable design and construction methods, energy and water saving measures, sustainable transport methods, waste reduction techniques and measures to enhance the ecological value of the site, a good quality and sustainable development is proposed.

The key sustainability features outlined in this Sustainability Statement are listed below:

> **BREEAM:** All commercial units will be designed and built to achieve a BREEAM 'Excellent' rating under the New Construction scheme.

> **Energy efficiency:** The development will target a 76.7% reduction in Regulated CO_2 emissions for residential units and 40% reduction in Regulated CO_2 emissions for non-residential units through energy efficiency measures and PV panels.

> **Overheating:** The scheme has been designed to ensure overheating risk is reduced to acceptable levels in accordance with Building Regulations Approved Document Part O and CIBSE TM59:2017 requirements.

> **Water efficiency:** Flow control devices and water efficient fixtures and fittings will be installed in all dwellings to target a maximum internal daily water consumption of 105 litres/person/day.

> **Waste and recycling:** Adequate facilities will be provided for domestic and construction related waste, including segregated bins for refuse and recycling.

> **Circular Economy:** The principles of a circular economy shall be incorporated into the development, where possible.

> **Materials:** Where practical, new building materials will be sourced locally to reduce transportation pollution and support the local economy. New materials will be selected based on their environmental impact and responsible suppliers will be used where possible.

> **Pollution:** For specific façade areas, the use of openable windows to mitigate overheating may result in a significant adverse noise impact to a number of residential units. However, for air quality, the Environmental Statement concluded there would be no significant residual effects on air quality from the proposed development.

- **Flood Risk and Sustainable Urban Drainage Systems (SuDS):** The proposed development site lies in a low flood risk zone and will benefit from SuDs such as living roofs and rain gardens.
- **Security:** Consultation with a Security Specialist will take place to ensure the development is safe and secure for its residents.
- **Sound insulation:** The dwellings are to target an improvement on Building Regulations Part E through party walls and floors.
- **Inclusive access:** 90% of the new dwellings will be designed to meet Building Regulations Approved Document M4(2) and 10% will meet Part M4(3).
- **Sustainable transport:** The site will benefit from a good existing public transport network and sustainable modes will be encouraged through the provision of 1268no. cycle storage spaces.
- **Biodiversity and ecology:** The landscape design improves visual amenity value alongside increasing biodiversity and habitat creation, with an urban greening factor of 0.4.
- **Sustainable construction:** The site will aim to achieve a Excellent score with the Considerate Constructors Scheme and will closely monitor construction site impacts.

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Appendix A BREEAM New Construction Retail ‘Excellent’ Pre-Assessment

Appendix B Water Efficiency Calculator

1. INTRODUCTION

1.1 This Sustainability Statement has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development, appointed by Berkeley Homes (East Thames) Ltd.

1.2 This Statement sets out the sustainable design and construction measures included in the planning application for the proposed development at The Ropeyards, Royal Arsenal Riverside, Plots D&K in the Royal Borough of Greenwich.

Sustainability Statement Structure and Methodology

1.3 The formulation of the Sustainability Strategy for the proposed development has taken into account several important objectives, including:

> To address all national, regional and local planning policies and requirements;

> To achieve a viable reduction in CO_2 emissions with an affordable, deliverable and technically appropriate strategy;

> To provide a high quality development that is adaptable to future changes in climate;

> To minimise the negative impact of the proposed development on both the local and wider climate and environment;

> To achieve the highest viable levels of sustainable design and construction;

> To minimise emissions of pollutants such as oxides of nitrogen and particulate matter; and

> To create a pleasant, safe and friendly working and living environment that will be flexible to its occupants' needs.

1.4 This Sustainability Statement does not duplicate the work of the technical reports prepared in support of the application, but presents the findings in the overall context of sustainability.

1.5 **Chapter 2** provides an introduction to the site and the proposed development. **Chapter 3** sets out the relevant national, regional and local policy documents which have been used to guide and inform the sustainability strategy for the proposed development.

1.6 **Chapters 4 to 17** outline the sustainability strategy of the proposed development in relation to the policy documents listed in Chapter 3. **Chapter 18** provides a summary of the key sustainability features associated with the proposed development.

Berkeley Group 'Our Vision' (2030)

1.7 As part of the Berkeley Group, Berkeley Homes (East Thames) Ltd will ensure that the Proposed Development achieves the goals and targets set out in the 'Our Vision' document.

1.8 Berkeley Group's approach to sustainability is about considering the future. It is about developing the homes and places of the future without compromising the ability of the younger generations to meet their needs.

1.9 Berkeley Group consider the long term impacts of their activities an ensure that they take action to reduce them both in terms of running the business efficiently and considerately and by developing sustainable homes and places. Berkeley have a strong commitment to sustainability and environmental management across the business for many years, with their Sustainability and Climate Change policies launched in 2007. Berkeley Group's sustainability strategy sets out the approach to maintaining a leadership position by embedding sustainability within the business and setting out key focus areas which seek to protect, enhance and inspire. To meet these ambitions, Berkeley Group have five focus areas:

> Climate action.

> Communities and sustainable living.

> Nature.

> Environmental management.

> Resources.

1.10 The sustainability strategy supports the wider business strategy 'Our Vision' and is supported by sustainability standards that set out the detail on how Berkeley Group manage sustainability through their projects and in their business.

2. DEVELOPMENT OVERVIEW

Site Location

2.1 The proposed development site is located in the Royal Borough of Greenwich as shown in Figure 1 below.

Figure 1: Site Location – Map data © 2024 Google

2.2 The Site is located on the western edge of the wider Royal Arsenal Riverside masterplan and is approximately 2.3 ha. The Site currently sits on a temporary park and is bound to the south by the A206, the RAR A & B Building to the north (and north east) and RAR Phase 3, the Brass Foundry and The Guard House to the west.

2.3 Beyond the immediate site boundaries, to the north of the site is the River Thames and to the south and south east of the site is Woolwich Town Centre including the main shopping area along

Powis Street, General Gordon Square, the Woolwich Arsenal Overground Train Station and the Woolwich DLR Station.

2.4 There are two Crossrail tunnels that run below the site. The proposed development will ensure that the integrity of the tunnels is preserved.

Proposed Development

2.5 The proposed development is described as follows:

"Submission of Reserved Matters (Appearance, Landscaping, Layout and Scale) pursuant to Condition 2 of planning permission reference 16/3025/MA, dated 17.03.2017, for residential units and non-residential floorspace within Plots D and K, along with public / private landscaping details, car / cycle parking, refuse / recycling facilities and play provision."

2.6 Figure 2 and 3 below illustrates the proposed site layout.

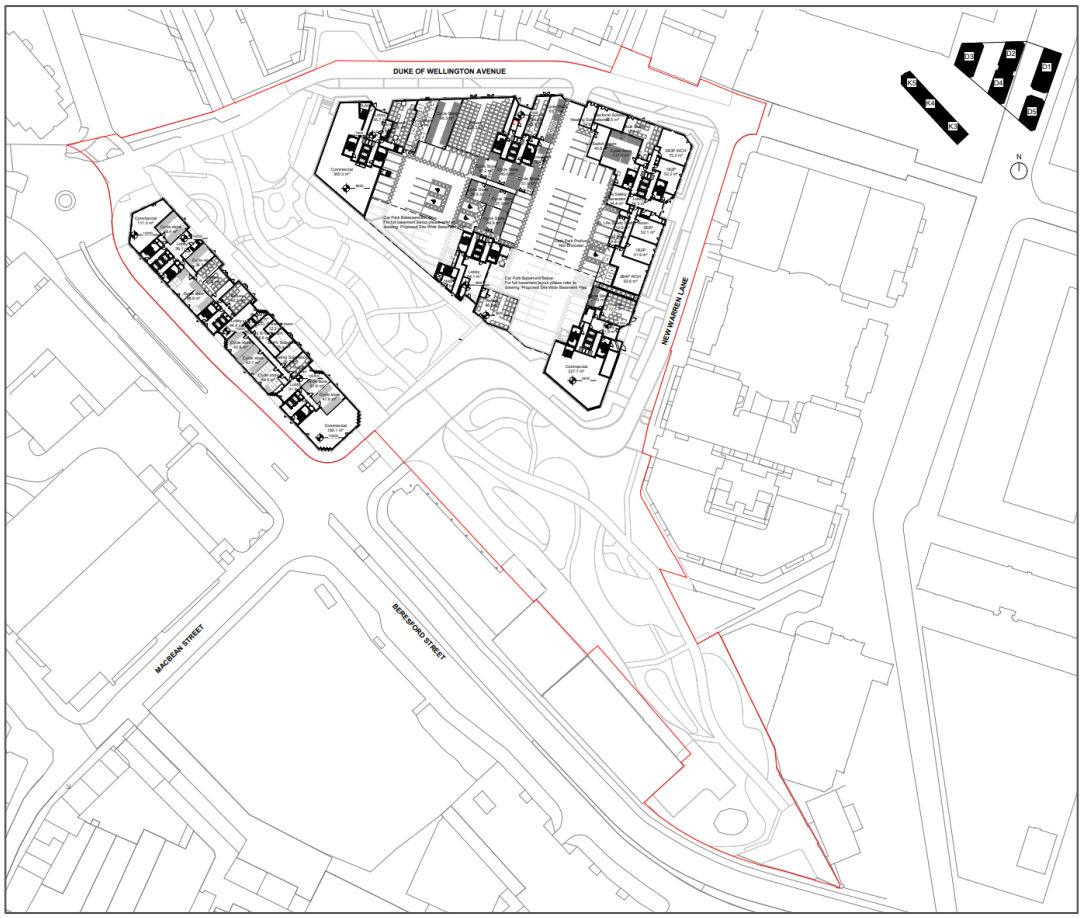


Figure 2: Proposed Sitewide Ground Floor Plan (PRP, February 2024)

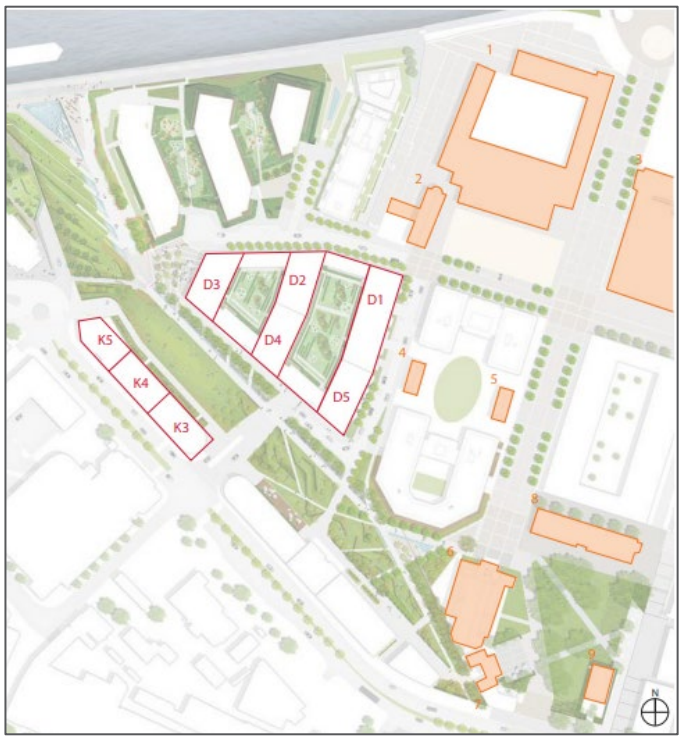


Figure 3: Site Layout (The Ropeyards Royal Arsenal Riverside, Pre-App 06 Meeting – January 2024)

3. RELEVANT PLANNING POLICY

3.1 The following planning policies and requirements have informed the sustainable design of the proposed development.

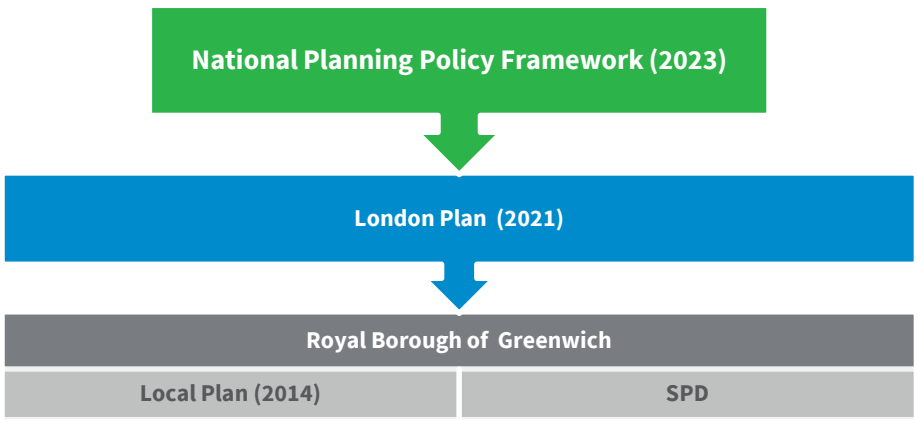


Figure 4: Relevant Planning Policy Documents

National Policy: NPPF

3.2 The revised National Planning Policy Framework (NPPF) was published on the 20th December 2023 and sets out the Government's planning policies for England.

3.3 The NPPF provides a framework for achieving sustainable development, which has been summarised as "*meeting the needs of the present without compromising the ability of future generations to meet their own needs*" (Resolution 42/187 of the United National General Assembly). At the heart of the framework is a **presumption in favour of sustainable development**.

3.4 The document states that the planning system has three overarching objectives which are interdependent and need to be pursued in mutually supportive ways:

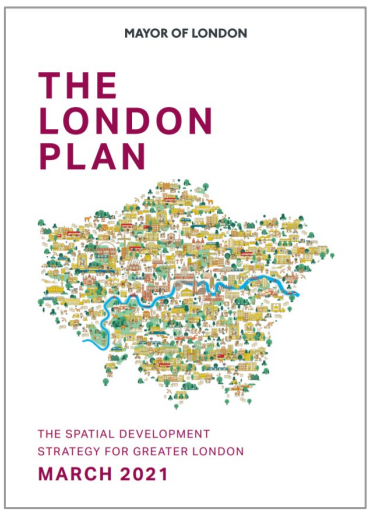
a) **An economic objective** – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

b) **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; and

c) **An environmental objective** – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

Regional Policy: The London Plan

The London Plan (2021)



3.5 The London Plan sets out an integrated economic, environmental, transport and social framework for the development of London. The following policies are considered relevant to the proposed development and this Statement:

3.6 **Policy G5 Urban Greening** states that urban greening should be included as a fundamental element of site and building design by incorporating measures such as landscaping, green roofs, green walls and nature-based sustainable drainage. Boroughs should

develop an Urban Greening Factor and in the interim, the Mayor recommends a target score of 0.4 for residential development 0.3 for commercial development.

3.7 **Policy SI1 Improving Air Quality** states that development should seek opportunities to identify and deliver further improvements to air quality. Where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site.

3.8 **Policy SI2 Minimising Greenhouse Gas Emissions** states that major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand.

3.9 **Policy SI3 Energy Infrastructure** states that energy masterplans should be developed for large-scale development locations which establish the most effective energy supply options.

3.10 **Policy SI4 Managing Heat Risk** states that major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the cooling hierarchy.

3.11 **Policy SI5 Water Infrastructure** states that in order to minimise the use of mains water, water supplies and resources should be protected and conserved in a sustainable manner. Development proposals should minimise the use of mains water in line with the Optional Requirement of the Building Regulations (residential development) achieving mains water consumption of 105 litres or less per head per day (excluding allowance of up to five litres for external water consumption). Commercial development should achieve at least the BREEAM excellent standard for the 'Wat 01' category.

3.12 **Policy SI7 Reducing Waste and Supporting the Circular Economy** states that referable applications should promote circular economy outcomes and aim to be net zero-waste.

3.13 **Policy T2 Healthy Streets** states that development should deliver patterns of land that facilitate residents making shorter, regular trips by walking or cycling. Development Plans should demonstrate the application of the Mayors Healthy Streets Approach.

Local Policy: Royal Borough of Greenwich

3.14 The Royal Borough of Greenwich's Local Plan sets out the spatial strategy, long-term spatial vision, spatial objectives and core policies for development within Greenwich to cover the period up until 2028. The following policies are considered relevant to this Statement:

3.15 **Policy H5 Housing Design** seeks to ensure residential development achieves a high quality of housing design and an integrated environment.

- The design of the development is consistent with Policy DH1 and the Mayor of London's Housing SPG.
- An acceptable level of noise insulation, private and amenity space, and safety and security are required.
- New housing should meet Lifetime Homes standards.
- In residential developments of 25 or more units, 10% of dwellings to be built to full wheelchair standard, or easily adaptable for wheelchair users.
- Adequate provision for waste recycling should be provided.

3.16 **Policy DH1 Design** seeks to ensure a high quality of design via the following:

- the quality and nature of materials, both traditional and modern;
- patterns of movement and circulation particularly for pedestrians and cyclists;
- acceptable noise insulation and attenuation.
- a safe and secure environment for users and the public;
- accessible and inclusive environments for all;
- maximised energy conservation, through effective layout, orientation, use of appropriate materials, detailing and landscape design;
- climate change mitigation and adaptation;
- enhanced biodiversity consistent with the Greenwich Biodiversity Action Plan;
- living roofs and/or walls;
- on-site waste management including evidence of waste reduction, use of recycled materials and dedicated recyclable waste storage space;
- water efficiency and demand management measures;
- building materials are responsibly sourced and minimise environmental impact;
- surface water flood risk is reduced, and the environment is landscaped to allow for permeable surfaces;
- a BREEAM rating of 'Excellent' for non-residential buildings.

3.17 **Policy OS4 Biodiversity** seeks to protect and enhance local biodiversity.

3.18 **Policy OS(f) Ecological Factors** requires landscaping schemes to include environmentally appropriate planting using locally native species and demonstrate appropriate irrigation plans for landscaping.

3.19 **Policy E1 Carbon emissions** requires carbon emissions to be reduced in accordance with the Mayor's energy hierarchy. Developments with a gross floor area greater than 500sqm should to connect to an existing decentralised energy network, implement a site-wide decentralised energy network, or provide sufficient infrastructure to enable a connection to a decentralised energy network in future.

3.20 **Policy E(f) Living Roofs and Walls** seeks to ensure development proposals incorporate living roofs or walls.

3.21 **Policy IM4 Sustainable Travel** seeks to ensure development contributes to improved accessibility and safety, reduces the need of the private care and the need to travel. Development should be designed for cyclists, pedestrians, and public transport users. The maximum car parking standards in the London Plan should be met.

3.22 **Policy IM(b) Walking and Cycling** requires provision of sufficient provision of changing and shower facilities for cyclists, cycle parking in line with policy IM(c), and safety via well lit, signed and well-maintained routes.

3.23 **Policy CH1 Cohesive Communities**: All development must include measures that help to create and maintain cohesive communities, that encourage diversity and reduce inequalities between areas. Developments are expected to:

> Create safe streets, including measures that allow for shared surfaces/spaces and improve the permeability of the environment;

> Encourage the successful integration of tenures in new developments, including a Community Development Strategy for developments of over 50 dwellings.

3.24 **Policy H5 Housing Design:** New residential development, redevelopment, refurbishment or conversions will be expected to achieve a high quality of housing design and an integrated environment.

> 10% of dwellings to be built to full wheelchair standard, or easily adaptable for residents who are wheelchair users;

> Adequate provision for waste recycling.

Royal Borough of Greenwich Urban Design SPD

3.25 The Urban Design Supplementary Planning Document (SPD) supports the Royal Borough of Greenwich's Local Plan. It is a formal supplement to the adopted Local Plan and forms part of the material considerations in decision-making on planning applications. The following principles are considered relevant to this Sustainability Statement:

3.26 **Principle B.1.1: Supporting Sustainable Growth** outlines developments requirements to:

> Strengthen and integrate with the character of development in Royal Greenwich - paying due attention to the local historic environment;

> Be located in sustainable locations where it is well supported by access to public transport, social infrastructures and local facilities; and

> Support the sustainable growth of the borough.

3.27 **Principle B.4: Creating Walkable Neighbourhoods** outlines the requirements for developments to:

> Support walking and cycling;

> Any major new development should ensure that development is generally located within a 10 minute walking distance of a local centre, a larger open space and a primary school, and that no development is 15 minutes or further away by walking from these facilities; and

> Facilitate and encourage cycling through safe and accessible cycle storage for all residents in close proximity.

3.28 **Principle B.9: Consider Flooding Proactively in Development** requires developments to be assessed early on to ensure that the development does not negatively impact on the flood risk for the local or wider area and develop proposals that proactively address flooding and establish a greater level of resilience for the site and local area.

3.29 **Principle B.10: Consider and Connect to Strategic Open Spaces / Green and Blue Infrastructure** requires developments from the outset to actively enhance, expand, connect, and improve the use, access and inclusivity of existing local green and blue infrastructure networks alongside integrating features such as mature trees, hedges, woodland and natural green spaces into the development design where possible.

3.30 **Principle B.11: Contributing to Net-Gains in Biodiversity and Ecology** recommends developments to consider design interventions and management practices that contribute to a Biodiversity Net Gain to align with the National Planning Policy Framework (2021), 2021 Environment Act, 25 Year Environment Plan, London Plan 2021, and the Royal Borough of Greenwich Core policies. This is also required in **Principle E.4.3: Design to Enhance Biodiversity**.

3.31 **Principle B.12: Reducing Carbon Impact** highlights that major developments should be designed to net zero standards and set out principles for reducing carbon impact over the full life cycle of the development from conception to end of life/reuse.

3.32 Developments should consider how the infrastructure may change and need to function in the future and should future proof for additional capacities in line with **Principle B.13: Planning for Smart City Infrastructure**.

3.33 **Principle D.1.7: Inclusive Spaces / Third Places** outlines developments requirements to deliver inclusive environments that are suitable and accessible for all, with different housing tenures to support social integration.

3.34 **Principle D.3.1: Reduce Reliance on the Private Car** requires developments to incentivise walking and cycling through the creation of an attractive network of safe and convenient routes integrated with the development and connecting with the wider area and adjacent sites.

3.35 **Principle D.3.6: Cycle Parking** requires developments to facilitate the ownership and use of bicycles through accessible, well-designed bike storage, in alignment with or exceeding the minimum standards set out in the London Plan.

3.36 **Principle E.3.5 Integrate Tree Planting and Soft Landscaping** details developments requirements to ensure street trees and soft landscaping are a prevalent feature along streets and incorporated throughout the public realm alongside a clear landscape and maintenance strategy. Native trees and shrubs and longer lived species should be selected where possible.

3.37 Development should consider lighting strategies early on to provide uniform lighting and brightness throughout the site to aid in legibility and the perception of safety in line with **Principle E.3.6: Lighting**.

3.38 Ensuring that developments consider how to manage surface water to minimise runoff, flood risk and flows to watercourses alongside considering all four pillars of sustainable urban drainage systems design to deliver a holistic and successful design is required under **Principle E.3.8: Sustainable Drainage Systems**.

3.39 **Principle F.1: Buildings to Minimise their Environmental Impact** outlines the requirements for developments to be of high-quality and should implement good ‘fabric first’ passive design measures, such as form, layout, orientation, massing, typology, and landscaping to reduce energy requirements.

3.40 Materials should be chosen based on their longevity, maintenance, sustainability credentials such as embodied carbon and recyclability in line with **Principle F.10.4: Materials**. Furthermore, climate responsive facades should be integrated in the overall concept from the outset of the design process in accordance with **Principle F.11: Climate Responsive Facades**.

3.41 **Principle F.12L Building Integrated PVs** notes where suitable, building integrated photovoltaics (BIPV) should be integrated.

3.42 All dwellings and spaces should benefit from daylight and sunlight levels that conform to BRE (Building Research Establishment) standards in line with **Principle G.2.2: Provide Homes with Sufficient Daylight and Sunlight** however, overheating risk and solar gain should be mitigated by following passive design principles such as glazing ratio, orientation and shading strategy.

3.43 **Principle G.2.3: Provide Clean and Comfortable Homes** outlines the requirement to minimise noise disturbance and air/light pollution through careful design.

Royal Borough of Greenwich Greener Greenwich SPD

3.44 The Greener Greenwich Supplementary Planning Document (SPD) provides guidance on how new development in Royal Greenwich should be designed and built so that it has a positive impact on the environment and achieves the highest standards of sustainable design and construction, covering the below key topic areas:

> Energy; Water; Biodiversity; Materials; Waste; Flood Risk; and Pollution.

4. BERKELEY GROUP SUSTAINABILITY STANDARDS

4.1 The following sustainability design requirements are required on each Berkeley Group development and as such, will be implemented at The Ropeyards, Royal Arsenal Riverside, Plots D&K.

Climate Change

4.2 All developments will aim to reduce their impact on climate change by achieving Berkeley Group's science-based targets. These are the following:

> Gas boilers should not be installed in any new developments or any new phase of a development, unless agreed by Group. All sites should be aiming for a Dwelling Emission Rate (DER) that aligns with the tighter requirements that are being set out in Building Regulations Part L.

> All sites to meet the minimum energy efficiency requirements of an EPC B unless they are refurbishments of existing buildings, these buildings should be aiming for an EPC C rating

> The development will incorporate 100% LED internal and external lighting.

> Ensure all domestic appliances achieve the Berkeley Group's minimum energy efficiency ratings.

> All homes will be fitted with a smart meter and energy display device.

> All developments with legal completions in financial year 2025/26 and beyond are required to undertake an embodied carbon assessment to achieve the Berkeley Group benchmark as a minimum and aim to meet the target for the type of building when completion dates are 2030 or after.

Nature

4.3 To protect the natural environment all developments will:

> Complete a net biodiversity gain assessment and achieve a minimum of a 10% net biodiversity gain on site.

> Include living roofs on all suitable roof space.

> Design all new homes to achieve an internal water use of less than 105 litres per person per day.

> Incorporate rainwater harvesting.

> Use the Wildfowl & Wetlands Trust (WWT) design guide for green and blue infrastructure for the design of all new sites.

Communities and Sustainable Living

4.4 Berkeley Group's ambition is to strengthen the local community, improve people's quality of life and have a lasting social impact. This will be carried out by:

> Completing a community or Social Value assessment.

> Developing and implementing a community plan.

> Designing all homes to the Berkeley Group healthy homes framework and scoring methodology to achieve at least a gold rating, including meeting the space standards requirements.

> Incorporating electric vehicle charging and cycle storage spaces.

> Ensuring that all commercial spaces, student accommodation and senior living housing achieve BREEAM Very Good as a minimum.

> Communicating information on specific sustainability features of the homes and how to live a sustainable life throughout the 'customer journey'.

Resources and Material Efficiency

4.5 All developments will reduce their impact on key resources and work collaboratively with the supply chain to procure sustainable materials by:

- Providing internal recycling facilities to all new homes where the combined capacity of internal recyclable facilities is a minimum of:
  - 30 litres for homes with 1 or 2 bedrooms.
  - 40 litres for homes with 3 or more bedrooms.
  - Space for at least 5 litres of additional storage for food waste.
- Ensuring that materials and products purchased by the Berkeley Group and by contractors are sourced responsibly.
- Ensuring that all timber and wood based products purchased by the Berkeley Group and contractors are FSC or PEFC certified and have a Chain of Custody.

5. BREEAM SUMMARY

5.1 In accordance with Policy of DH1, the commercial space will be assessed under the BREEAM New Construction assessment with a target of achieving the required 'Excellent' rating.

5.2 A full BREEAM Pre-Assessment has been presented in **Appendix A** and provides an illustrative route to achieving the 'Excellent' rating. The predicted score at this stage is 71.75%, where a 'Very Good' score is ≥55% and an 'Excellent' score is ≥70%. This represents a high level of sustainable design and construction.

5.3 The principles and requirements of many of the individual credits feature throughout this Sustainability Statement, where appropriate, however the mandatory credits for BREEAM 'Excellent' are listed as follows:

- **Man 03: Responsible Construction Practices** – A minimum of one credit is to be achieved, requiring a Considerate Constructors Scheme score of between 25 and 34.
- **Ene 01: Reduction in CO_2 emissions** – An Energy Performance Ratio (EPR) will be compared against benchmark figures to minimise operational energy demand and building carbon emissions. A minimum of four credits are to be achieved.

> **Wat 02: Water Monitoring** – A water meter is to be provided on the mains water supply which should have a pulsed output connected to a Building Management System (BMS).

> **Mat 03: Responsible Sourcing** – All timber used on the project must be sourced in accordance with the UK Government's Timber Procurement Policy.

> **Wst 03: Operational Waste** – A dedicated space(s) for the segregation and storage of operational recyclable waste is to be provided. This is to be clearly labelled, easily accessible (to building users and for waste collection) and of an adequate size.

5.4 Whilst this has been determined as the most appropriate route to certification, the actual route to certification may vary as the detailed design progresses.

6. SOCIAL SUSTAINABILITY

Social Value – Berkeley Group

6.1 Berkeley Group's ambition on every development is to strengthen the local community, improve people's quality of life and have a lasting social impact that can be felt beyond our site boundaries. Berkeley Homes (East Thames) have a commitment to measure the value to society of their developments.

6.2 A series of other measures including engagement with the local supply chain, access to high quality green and public space, good physical and mental health, and local air and water quality will be considered. Berkeley Homes (East Thames) use a healthy home design framework, structured around seven topic areas: thermal comfort, safety and security, noise, indoor air quality, light, adaptability and space and storage. The framework introduces a range of recommendations that could be applied to help create a 'healthier' home.

6.3 Berkeley launched the net biodiversity toolkit in 2017 and made a commitment to achieving a net biodiversity gain on all sites. This has been extended with a target to achieve a 10% gain on their sites.

6.4 During construction Berkeley Homes (East Thames) is committed to ensuring social value by achieving a minimum score of 40/50 in every Considerate Constructors Scheme (CCS) audit, engaging with young people, education providers and employers to transform perceptions of careers in the built environment and setting a target of 5% of indirect and 5% of direct employees to be apprentices, sponsored students or graduates on formalised training schemes.

Community Engagement

6.5 Berkeley Homes (East Thames) will provide the local community with regular engagement opportunities in order to encourage local people and new residents to have pride in the area and a strong local ownership of the development.

6.6 Statement of Community Involvement (SCI) prepared by Lowick (March 2024) notes the public engagement and consultation for the application was coordinated by Lowick, in conjunction with Berkeley Homes (East Thames) Ltd and the wider project team. Since October 2023 there has been extensive discussions with key stakeholders for consultation. The applicant has been particularly mindful of the need to engage closely with residents.

6.7 The SCI highlights there were two rounds of public consultation that have taken place, with 2 in person exhibitions held in December 2023, at Woolwich Works and an online webinar held on 21 February 2024. Newsletters informing residents of the exhibition and webinar were circulated in advance of each event. Additionally, political stakeholders were invited to attend the exhibitions and webinar.

6.8 The applicant has submitted proposals which will directly benefit the borough and local community. Please see the full report for further information.

Social Sustainability Through Design

6.9 Integrating the borough's Ropeyard history, the proposed development design has integrated a Historical Trail. The concept is formed of three main themes: The Ropemaking, The Warrens and The Kilns as shown in Figure 5 below.

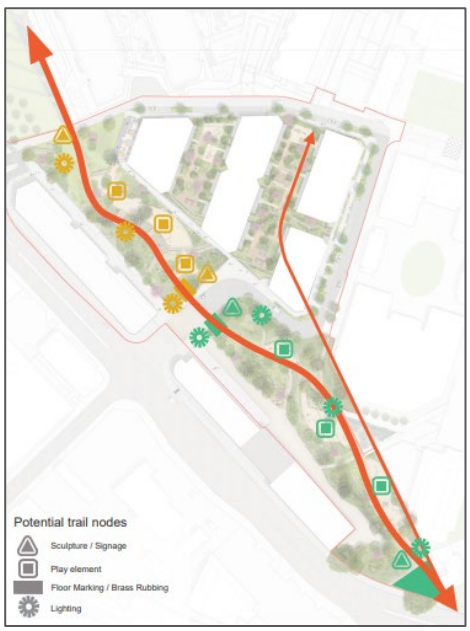


Figure 5: Historical Trail (The Ropeyards Royal Arsenal Riverside, Pre-App 06 Meeting – January 2024)

6.10 The integration of The Ropemaking routes to connect spaces throughout the development and The Warrens gathering spots, enrich community connectivity. Additionally, The Kilns, with playful landforms and site spoil utilisation, not only add aesthetic value but also encourage outdoor engagement. This holistic approach ensures the development becomes a dynamic, inclusive hub, fostering community cohesion and resilience. This is further complimented by seating areas for passive recreation, spaces for social and physical activities, and opportunities for multi-generational interaction - promoting well-being, inclusivity, and a sense of belonging. This multifaceted strategy contributes to the long-term social sustainability of the community.

7. ENERGY AND CO_2 REDUCTION

Energy Strategy

7.1 An Energy Statement has been prepared by Hodkinson Consultancy and is submitted as part of this planning application. A summary of this statement has been outlined as follows however this document should be referred to for greater detail.

7.2 The energy strategy has been formulated following the current London Plan Energy Hierarchy: ***Be Lean, Be Clean, Be Green*** and ***Be Seen***. The overriding objective in the formulation of the strategy is to maximise the reductions in Regulated CO_2 emissions through the application of this Hierarchy with a cost-effective, viable and technically appropriate approach.

7.3 All buildings in The Ropeyards will be connected to the existing Royal Arsenal Riverside heat network. To facilitate compliance with the project requirements, the network is decarbonising with the installation of air source heat pumps (ASHPs) outside The Ropeyards application area, as per the local Council and GLA approved strategy. In this way a single site network is retained, but low carbon heating is prioritised. Please see the Energy Statement (Hodkinson Consultancy, February 2021) for further detail.

Lighting

7.4 All external lighting, and any security lighting, will be energy efficient and adequately controlled using PIR sensors, daylight cut-off sensors or time switches where possible. This will ensure the conservation of energy when the lighting is not in use.

Appliances

7.5 Where provided, energy efficient white goods will be provided. The purchasing of energy efficient white goods will also be promoted through the provision of information on the EU Labelling Scheme contained within the Home Information Manual.

7.6 Berkeley Group minimum standards are:

> Fridges and fridge-freezers: F rating.

> Washing machines: C rating.

> Washer-dryers: E rating.

> Dishwashers: E rating.

> Appliances not included in this list, such as tumble dryers, remain under the old EU Energy Efficiency Labelling Scheme (A+++ to D) and should be A rated where possible or a B as an absolute minimum.

Energy Monitoring

7.7 Energy display devices, which can monitor electricity and primary heating fuel consumption, will be provided to each of the dwellings. This can empower the occupants to be more aware of their usage and therefore make energy and cost savings, where possible.

8. WATER REDUCTION

Internal Water Efficiency

8.1 Increased frequency of drought across Europe lines up with climate change projections, and water companies in the UK capture much less rain for our use than people assume.

8.2 The Environment Agency updated their determination of areas of water stress in 2021[1]. The water stress method takes a long-term view of the availability and the demand for public water supply, rather than a snapshot of shorter or peak periods. It accounts for future population growth, climate change, environmental needs and increased resilience. As of 2021, 15 out of the 23 water companies operating in England were classified as under 'serious' stress,

[1] https://www.gov.uk/government/publications/water-stressed-areas-2021-classification

including Thames Water, where the site is located. This indicates the need to reduce internal water use where possible and specify water efficient fixtures and fittings in new development.

8.3 Reducing water consumption will not only help to preserve our water sources but will also save energy. Approximately 15% of a typical gas-heated household's heating bill is from heating water for showers, baths and taps and the energy used to heat water for devices and appliances emits an average of 875 kg of CO_2 per household per year (Energy Saving Trust, 2013). As such, internal water consumption will be significantly reduced through the use of practical and hygienic water saving measures.

Residential Water Use

8.4 All new dwellings will target a minimum water efficiency standard of **105 litres/person/day** in accordance with The Greener Greenwich Supplementary Planning Document (SPD) requirement 4.1.5, Water Supply and Use; Demand Management and the optional tighter Building Regulations Approved Document G requirement (110 litres/person/day). An evaluation of the proposed fixtures and fittings will be undertaken during the detailed design however an illustrative strategy to achieve this water target is set out in the Water Efficiency Calculator in **Appendix B.**

Leak Detection and Prevention

8.5 Another method of reducing water consumption is to ensure that water leaks do not go undetected. In accordance with the BREEAM Assessment, a leak detection system may be installed which will be capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter.

Water Metering

8.6 In accordance with the BREEAM Assessment, a water meter with a pulsed output will also be installed on the mains supply. This will allow the water consumption of the development to be monitored and managed and therefore encourage reductions.

9. WASTE MANAGEMENT

9.1 Waste reduction and recycling is another key challenge of sustainable development and something which is strongly encouraged in the London Plan (Policy SI7). The waste hierarchy, illustrated in Figure 6 overleaf, prioritises those waste management options which are best for the environment.

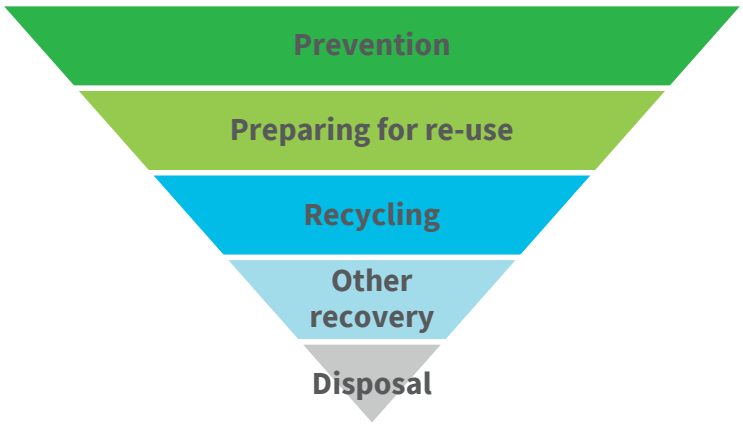


Figure 6: Waste Hierarchy

9.2 The waste hierarchy establishes waste management options according to what is best for the environment. It places great importance on preventing waste in the first place. When waste is created it prioritises preparing it for re-use, then recycling, recovery and lastly disposal (e.g. landfill).

Construction Waste

9.3 The reduction of construction waste not only minimises environmental impacts through ensuring the responsible use of resources and waste disposal but can also significantly reduce construction costs for the developer.

9.4 A designing out waste workshop was held by Berkeley in November 2023. Collaboration between design team members resulted in innovative methods to ensure waste generation is minimised during construction. Below are the key actions taken from this workshop:

> Reuse of soil to for landscaping, which has a varying topography, where possible.

> Temporary park street furniture, lighting and bin store fencing to be removed, stored and reused at the end of the project.

> Use of off-site construction for bathroom pods, shower rooms and utility rooms.

> Wall types, floor types and roof types are standardised.

> Brick dimensions made to fit for the building and openings.

9.5 Prior to construction, Berkeley Homes (East Thames) Ltd will develop a Site Waste Management Plan which will establish ways of minimising waste at source, assess the use, reuse and recycling of materials on and off-site and prevent illegal waste activities. This plan will then be disseminated to all relevant personnel on and off-site.

9.6 The following waste minimisation actions will be considered:

> Consider opportunities for zero cut and fill to avoid waste from excavation or groundworks;

> Design for standardisation of components and the use of fewer materials;

> Design for off-site or modular build;

> Return packaging for reuse;

> Consider community reuse of surplus materials or offcuts; and

> Engage with supply chains and include waste minimisation initiatives and targets in tenders and contracts.

9.7 As part of their commitment to divert construction waste from landfill, Berkeley Homes (East Thames) Ltd will regularly monitor and record the site's waste reduction performance. This will be compared against a target benchmark where at least 98% (by volume) of non-hazardous waste is to be diverted from landfill.

Household Waste

9.8 Berkeley Homes East Thames is committed to following the above waste hierarchy and reducing waste sent to landfill. As such, adequate storage is to be provided in communal stores located at ground floor level, where both recyclable and non-recyclable waste can be stored in accordance with Greenwich's waste collection service. Figure 7 below shows the refuse stores circled in red.

Figure 7: Refuse Store Locations on Proposed Site Wide Ground Floor Plan (PRP, February 2024)

9.9 In addition, space will be provided for segregated recycling waste bins within the kitchen areas. This will involve the installation of recycling bins, where waste can be segregated into paper, glass, cans, plastic and cardboard, if necessary.

9.10 Vehicular access to service the K building has been revised to provide egress onto Duke of Wellington Avenue and the refuse strategy is outlined in Figure 8 below.

Figure 8: Refuse Strategy (The Ropeyards Royal Arsenal Riverside, Pre-App 06 Meeting – January 2024)

Organic Waste

9.11 All of the houses will be provided with individual compost bins for both food and garden waste. Internal kitchen bins, with a minimum capacity of 7 litres, will also be provided.

9.12 Communal composting facilities will be provided within the development, to allow residents to compost their food and garden waste.

9.13 Adequate internal and external food and garden waste storage will be provided in accordance with the Royal Borough of Greenwich's collection service.

Commercial Waste

9.14 Adequate space for the segregation and storage of commercial waste and recycling will be provided in designated communal stores at ground floor level. This space will meet the following BREEAM requirements:

> Bins will be clearly labelled to assist with waste segregation, storage and collection;

> The stores will be accessible to building occupants and facilities operators; and

> The storage will be of a capacity that is appropriate to the building's type, size and predicted volumes of waste.

10. CIRCULAR ECONOMY

10.1 Current and future trends point toward the need for a fundamental shift in the way resources are consumed. A shift to a circular economy will provide considerable economic opportunities as a result.

10.2 In contrast to a linear economy (take, make, dispose), a circular economy keeps products and materials circulating through the system at their highest value for as long as possible, through re-use, recycling, refurbishment and remanufacturing. As 60% of total UK waste is generated from construction, demolition and excavation (Defra and Government Statistical Service, 2019) this transition from linear to circular is essential.

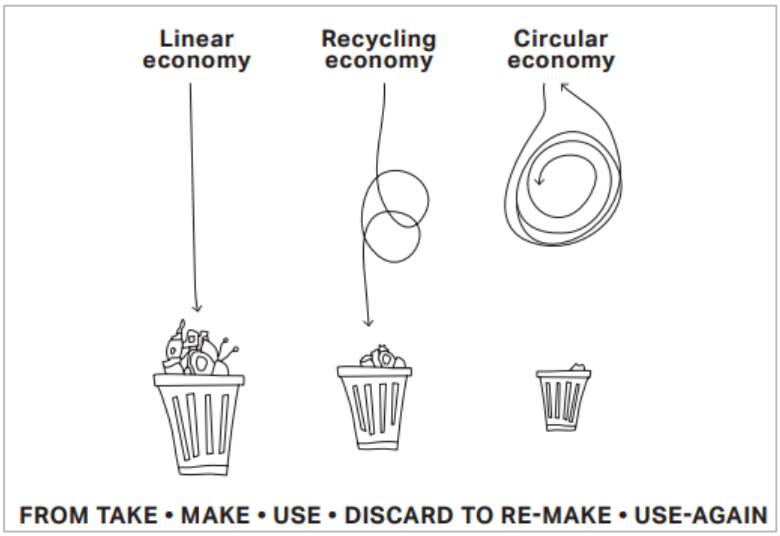


Figure 9: Linear, Recycling and Circular Economies (GLA, 2019)

10.3 The circular economy refers to a state whereby resources are kept in a continuous cycle of use so that:

> Virgin resources are no longer extracted;

> Existing products, once used, are reused or recycled to make new products without loss of value; and

> No resources are disposed of and no value is lost.

10.4 The end goal is to retain the value of materials and resources indefinitely, with no residual waste at all. This is possible but will require a fundamental change in the way that buildings are designed, built, operated, and deconstructed.

10.5 Applying circular economy thinking to the built environment is complex, with many overlapping issues and trade-offs to consider. However, there are some core guiding principles that promote a regenerative and restorative whole system approach that should be applied on every project. These are as follows:

> Conserve resources and source ethically;

> Design to eliminate waste (and for ease of maintenance); and

> Manage waste sustainably and at the highest value.

10.6 Berkeley Homes (East Thames) Ltd will adopt these three core principles in order to significantly reduce the amount of raw and new materials required for the development. Alongside this, a reduction in vehicle movements, air pollution, noise and greenhouse gas emissions will also be taken into consideration for this project.

10.7 Please refer to the full Circular Economy Statement (Hodkinson Consultancy, March 2024) submitted alongside this application for further detail.

11. MATERIALS

Environmental Impact

11.1 New building materials will be selected, where possible, to ensure that they minimise environmental impact and have low embodied energy – from manufacture, transportation and operational stages, through to eventual demolition and disposal.

11.2 All insulation materials will have an Ozone Depleting Potential (ODP) of zero and a Global Warming Potential (GWP) of less than 5. In addition, all decorative paints and varnishes will meet the relevant standards in order to reduce the emission levels of volatile organic compounds (VOCs).

Local and Responsible Sourcing

11.3 Preference will be given to the use of locally sourced materials and local suppliers, where viable. This will benefit the local economy as well as having environmental benefits through reduced transportation.

11.4 As part of the Berkeley Group, Berkeley Homes (East Thames) Ltd will follow their defined Sustainable Procurement Policy which ensures that new building materials are selected to ensure

that they minimise environmental impact and have low embodied energy – from manufacture, transportation and operational stages, through to eventual demolition and disposal.

11.5 The main building materials will be responsibly and legally sourced from manufacturers with environmental management systems and/or responsible sourcing credentials, such as BES 6001.

11.6 Timber used on site, including timber used in the construction phase, such as hoarding, fencing and scaffolding, will be sourced from sustainable forestry sources (e.g. PEFC and FSC) where possible.

Recycled Materials

11.7 Where feasible, Berkeley Homes (East Thames) Ltd will commit to using materials with higher recycled content. The use of recycled materials (e.g. crushed concrete from concrete waste streams, used for hard-standing) has less embodied energy impact, other than that expended in their processing or transport.

Life Cycle Impacts

11.8 As part of the BREEAM Assessment, it is expected that a full life cycle assessment will be used to assess the main building elements for the areas associated with the commercial units. This involves options appraisals of two to four different super/substructure designs to identify options to reduce overall environmental impact.

11.9 Whole Life Cycle Carbon Emissions (WLCCE) are the carbon emissions resulting from the construction and the use of a building over its entire life, through four stages described as life-cycle modules;

> Module A1 – A5 (product sourcing and construction);

> Module B1 – B7 (use);

> Module C1 – C4 (end of life);

> Module D (benefits and loads beyond the system boundary).

11.10 A full Whole Life Cycle Carbon Assessment has been undertaken for the planning application, please refer to the report by Hodkinson Consultancy (March 2024).

Designing for Durability and Resilience

11.11 Appropriate durability and protection measures will be incorporated in vulnerable parts of the internal and external building so as to minimise the frequency of replacing materials and therefore optimising material use. These measures are likely to include:

> Bollards and barriers to delivery areas;

> Hard-wearing floor finishes;

> Protection rails to corridor walls; and

> Kick plates on doors.

Berkeley Group Targets

11.12 Berkeley Group has committed to reducing the carbon impact of the materials and services it uses by 40% by 2030, using 2019 baseline.

12. POLLUTION

Noise Pollution

12.1 Berkeley Homes East Thames are committed to reducing noise disturbance to internal and external areas of dwellings to improve the health and wellbeing of the occupants and to help protect community cohesion.

12.2 A Noise Assessment report was undertaken in November 2023 by Sol Acoustics, concluding for specific façade areas, the use of openable windows to mitigate overheating may result in a significant adverse noise impact to a number of residential units and/or not comply with the acoustic requirements of RBG/Approved Document O.

Reduction of Night Time Light Pollution

12.3 The external lighting strategy will be designed in accordance with the ILP Guidance notes for the reduction of obtrusive light (2011). All external lighting, except from security lighting, will be automatically switched off between the hours of 23:00 and 07:00. This will aim to ensure that lighting is concentrated in the appropriate areas and that upward lighting is minimised, reducing unnecessary light pollution, energy consumption and nuisance to neighbouring properties.

Air Quality

12.4 Poor air quality is the greatest environmental risk to public health in the UK and is known to exacerbate the impact of pre-existing health conditions. It is not only a major risk to human health, but it also has significant damaging impacts on both plants and animals.

12.5 Between 1990 and 2017, the UK's estimated emissions of nitrogen oxides reduced by 70%, and the estimated emissions of PM_{10} particulate matter reduced by 55% (DEFRA, 2018). This must continue to fall in future years. Berkeley Homes East Thames are committed to reducing the proposed development's negative impact on air quality during construction and operation.

12.6 Chapter 10, Air Quality, of the 2013 Environmental Statement concluded there would be no significant residual effects on air quality from the proposed development. Below identifies the noted possible impacts from the report:

> Construction Phase Impacts: The 2013 ES did not assessment construction phase impacts.

> Operational Phase Impacts: Increases in traffic emissions as well as emissions from the energy centre would be considered *negligible* at all modelled receptor locations.

> Construction Stage Effects: The site is considered a "*High Risk Site*" overall and a Dust Management Plan is recommended incorporating a number of specific mitigation measures based on the site-specific risks.

Air Tightness and Ventilation

12.7 Air leakage is to be minimised and an air permeability of $3m^3/hr/m^2$ will be targeted.

12.8 It is proposed to install Mechanical Ventilation with Heat Recovery (MVHR). MVHR provides a constant supply of fresh air to dwellings which has been filtered to remove external pollutants. It operates regardless of external conditions and provides the additional benefit of incorporating boost modes for use during hot weather or when internal humidity levels increase beyond acceptable levels.

12.9 In addition to the MVHR unit, a peak-lopping bolt on module will be installed to mitigate overheating where passive means cannot achieve TM59 compliance alone, due to noise constraints at the site.

13. FLOOD RISK & SURFACE WATER RUN-OFF

Flood Risk

13.1 Developments in low flood-risk areas are promoted not only to protect homes and local communities and reduce the cost implications if flooding occurs but also to protect the environment from the transfer of pollutants during flooding events.

13.2 The site has been analysed against risk from surface water, tidal flooding and fluvial flooding. Surface water on the site is at very low risk of flooding as the site aims to capture falling rain onsite, as measures such as SUDs are in place to combat this.

13.3 Tidal flooding on the site is at low risk due to the protection from the Thames Barrier. The site is defined as having less than a 1 in 1000 annual probability of flooding.

13.4 Fluvial, artificial sources, sewers and groundwater are also considered to be at low risk for the development.

13.5 According to the Flood Risk Assessment by Herrington Consulting and the Environment Agency's Flood Map shown in Figure 10 below, the proposed development lies in a low-risk flood zone (Flood Zone 1).

Figure 10: Environment Agency Flood Map – https://flood-map-for-planning.service.gov.uk

Sustainable Drainage Systems

13.6 Sustainable drainage systems (SuDS) can deliver multiple benefits which broadly fit into four categories: water quantity, water quality, amenity and biodiversity, shown in Figure 11 below. The overarching principle of SuDS design is that surface water runoff should be managed for maximum benefit.

13.7 Long term environmental and social factors must be included in decisions regarding sustainable drainage. Sustainable drainage takes account of the quantity and quality of runoff, and the amenity and aesthetic value of surface water in the urban environment.

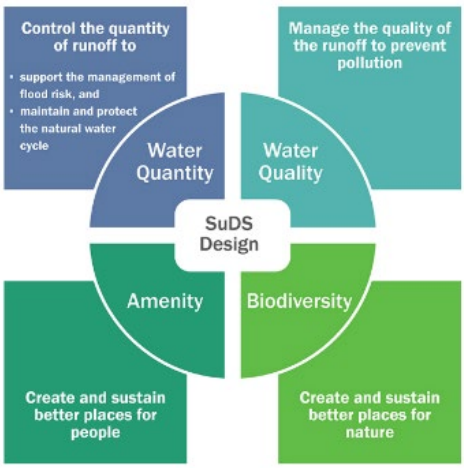


Figure 11: The four 'pillars' of SuDS – CIRIA SuDS Manual (2015)

13.8 On site there is an existing outfall into the Thames River that the site is able to use as a tidal water body. This outfall allows the overall development to connect into with a maximum discharge rate of 90l/s.

13.9 The following listed SuDS are proposed. These will not only help to attenuate surface water but will provide the necessary water treatment.

> **Rain gardens** will effectively manage storm water and reduce flooding risk alongside supporting biodiversity and enhancing green spaces.

> **Living roofs** will help to intercept and retain precipitation, reducing the volume of runoff and attenuating peak flows.

> **Swales** will allow surface water to be stored or conveyed and will allow much of the suspended particulate loads to settle, providing effective pollutant removal.

> **Retention ponds and wetlands** will provide both stormwater attenuation as well as treatment using bacteria and sunlight to break down pollutants before the water eventually flows into downstream watercourses.

13.10 The proposed drainage strategy will reduce the runoff from the site greenfield rates in line with the London Plan, reducing the risk of surface water flooding in the area of and surrounding the site. The surface water drainage arrangements will be sized to accommodate storm water flows for rainfall events up to and including the 1 in 100 year plus 40% climate change event with flows to the Thames Water sewer network restricted to greenfield rates. Therefore, the proposed surface water drainage strategy is considered robust and does not increase flood risk on or off-site. Please refer to the drainage strategy for further detail.

14. BUILDING QUALITY

Security

14.1 Berkeley Homes East Thames are committed to ensuring the development is safe and secure for the occupants; reduce the risks and costs associated with crime; and improve occupiers' quality of life by reducing the fear of crime.

14.2 As such, the proposed development will be aiming to incorporate the principles of Secured by Design where appropriate. This may involve consultation with a Security Consultant during the detailed design stage.

Safe Access

14.3 Berkeley Homes East Thames is committed to ensuring that the development is safe and secure for its users. As such, footpaths will provide direct access from the site's entrance to the main doors of the building. All paths will consider dedicated pedestrian crossings and will be appropriately lit and signposted.

14.4 As noted in the Design and Access Statement, CCTV will form part of the wider site security alongside a lighting scheme which will be developed to deliver light levels which support the safety initiatives in the area and provide navigation assistance for people with visual disabilities.

14.5 Cars will access the site from Duke of Wellington Avenue or Beresford Street, where there will be 144 dedicated parking bays across the development (including 21 disabled parking bays). Service vehicles, including those for refuse and skips, will have a similar means of accessing the site as it allows for manoeuvring. Dedicated spaces for the storage of refuse skips and pallets will be kept away from manoeuvring areas and car parking.

Sound Insulation

14.6 In order to reduce the likelihood of noise complaints and to ensure a high quality development is created, the development will be aiming to achieve airborne sound insulation values that will improve upon the performance standards outlined within the Building Regulations for England and Wales, Approved Document E.

14.7 The commercial element of the building will meet the appropriate acoustic performance standards and testing requirements for sound insulation, indoor ambient noise level and reverberation times in order to achieve the Hea 05 credit of the BREEAM assessment.

Inclusive Design

14.8 Berkeley Homes East Thames' commitment to inclusivity will ensure that the proposed development is scaled appropriately so as to respond to the needs of all its users. Berkeley Homes East Thames will endeavour to incorporate the requirements of the Equality Act (2010) into their design, making reasonable adjustments to enable disabled access, regularly reviewing whether the buildings are accessible and effective, and providing necessary design adjustments where it is practical to do so.

14.9 In addition, 90% of the new dwellings will be designed and built to Building Regulations Approved Document M4(2) standards, with 10% to Part M4(3) in accordance with London Plan Policy D7. These standards will ensure accessible and adaptable accommodation for everyone; young families, older people, individuals with a temporary or permanent physical impairment, and allow residents to stay in their home despite developing disabilities. They also enable flexibility, visitability (facilitating ease of visiting access to the homes by everyone, regardless of mobility or disability) and future-proofing i.e. the accommodation will be adaptable and able to respond to changing technological and environmental conditions.

Daylight and Sunlight

14.10 The promotion of good daylighting levels contributes to sustainability through improving the occupant's quality of life and reducing the building's energy consumption by minimising the need for artificial lighting.

14.11 Chapter 12 of the 2013 Environmental Statement reported the likely significant daylight, sunlight and overshadowing effects of the development on existing receptors during the construction and operational phase, concluding no increase or significant alteration in massing to that which was previously consented, and as such will have no further effect to neighbouring sensitive receptors.

Visual Comfort

14.12 Glare will aim to be minimised using a glare control strategy, either through building form and layout and/or building design measures. This will avoid increasing energy consumption from lighting and maximising daylight levels.

14.13 The building will be designed to provide an adequate view out through either a window or permanent opening.

14.14 All external lighting will be designed in accordance with BS5489-1:2013 'Code of practice for the design of road lighting' and will provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately.

Overheating

14.15 Minimising the risk of summer overheating and high uncontrollable temperatures is important so as to ensure that homes are comfortable for their occupants and remain comfortable in the future. Berkeley Homes East Thames commits to ensuring that all dwellings will not have a high risk of summer overheating and will adopt appropriate measures to ensure this is delivered.

14.16 A Dynamic Overheating Assessment of representative units and communal corridors across the proposed scheme has been undertaken by Hodkinson Consultancy (March 2024). The analysis has been undertaken in line with the Greater London Authority's guidance on preparing energy assessments and the Cooling Hierarchy in Policy SI4 of the London Plan (2021).

14.17 The following passive mitigation measures have been explored as far as practicable to avoid the need for active cooling:

> Openable areas of windows have been maximised, to ensure adequate natural ventilation;

> For dwellings at first floor level and above, window casements open inwards to allow maximum openability;

> Guarding heights are 1.1 m from finished floor level enabling windows to be fully open without the need for restrictors;

> External shading is provided to some windows in form of balconies and external reveal depth of 215 mm;

> Highly efficient fabric envelope including concrete floor slabs to provide thermal capacity and high performance solar control glazing with g-values optimised to mitigate overheating risk; and

> A background mechanical ventilation system providing ventilation rates between minimum Part F and 2.0 ACH, in accordance with the level of overheating risk.

14.18 Passive mitigation measures have been explored as far as practicable to avoid the need for active cooling. This includes adaptation of window designs to ensure maximised openable areas external shading in the form of large reveal depths and external balconies, high performance solar glazing and enhanced background ventilation.

14.19 Due to noise risk at the site, the development is not able to achieve compliance with CIBSE TM59 criteria through passive mitigation measures alone. Hence, for units affected by noise risk, some form of cooling (either full comfort cooling or through bolt-on cooling modules to MVHR system) is proposed. Please see the full report for further information.

15. TRANSPORT AND LOCAL AMENITIES

Sustainable Transport

15.1 Sustainable transport links are central to the sustainability debate. They provide a positive contribution to environmental, societal and economic sustainability of the places they serve.

15.2 The provision of alternative sustainable transport options and associated facilities reduces dependency on traditionally fuelled cars and has the following benefits:

> Encourages active travel and helps improve people's health and wellbeing;

> Reduces congestion and encourages clean travel which helps to improve the air quality of the local area; and

> Provides cost savings compared with maintaining and running traditionally fuelled cars.

15.3 The site is located adjacent to the main strategic road (A206 / Beresford Street), with 17 bus routes within 400m. The Woolwich Elizabeth Line Station is within 400m and the Woolwich Arsenal Station (DLR / National Rail) is within 500m. The Thames Clipper is within walking distance (10 min), providing river services to Canary Wharf, the City and West End. Vehicular access to the site is from Beresford Street, via New Warren Lane and Duke of Wellington Avenue as shown in Figure 12 below. The site introduces a new key pedestrian route through the park, joining up with others from Royal Arsenal Riverside, Woolwich Town Centre and the Thames Path.

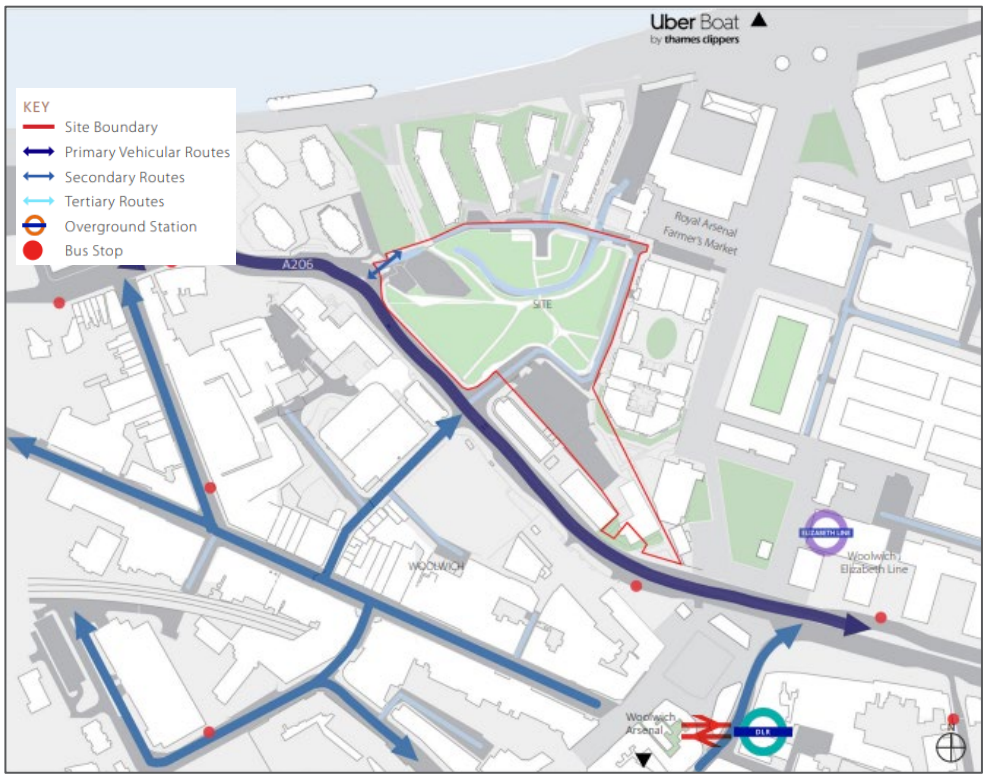


Figure 12: Access and Movement, Vehicular and Public Transport (PRP Pre-app 05 Design Presentation, January 2024)

Local Amenities

15.4 The proposed development has access to the following key amenities in the local area which will help to reduce dependency on private transport:

> Administrative services (e.g. Woolwich Post Office 0.2miles/5 minute walk, Tesco Express ATM o.2miles/4 minute walk)

> Health services (e.g. Royal Arsenal Medical Centre 0.4miles/9 minute walk, Royal Arsenal Pharmacy 0.4miles/9 minute walk)

> Small/large scale retail services (e.g. shops and restaurants);

> Recreation and leisure facilities (e.g. Waterfront Leisure Centre 0.2miles/4 minute walk and ODEON Greenwich Cinema 22minute bus journey); and

> Education and community facilities (e.g. Zeeba Daycare Royal Arsenal 0.4miles/9minute walk and Mulgrave Primary School 0.7miles/16 minute walk).

Public Transport

15.5 The site is well located within close proximity to a number of transport links, such as:

- > **Woolwich Elizabeth Line,** which provides services across the Elizabeth line. This is within 5 minutes walking distance of the development.
- > **Woolwich Arsenal Pier** provides reliable ferry services to Barking Riverside Pier and Westminster Pier.
- > **Woolwich Ferry** provides a free service to carry pedestrians, cyclists, cars, vans and lorries to Woolwich and North Woolwich.
- > **Woolwich Arsenal DLR Station** provides services to Bank, Stratford International and Lewisham.
- > **Local bus services** within the immediate vicinity of the site, providing frequent trips in all directions.

15.6 The Transport for London Public Transport Accessibility Level (PTAL) map for the site is presented in Figure 13 below. The site's PTAL rating of 6a represents a very good level of transport accessibility.

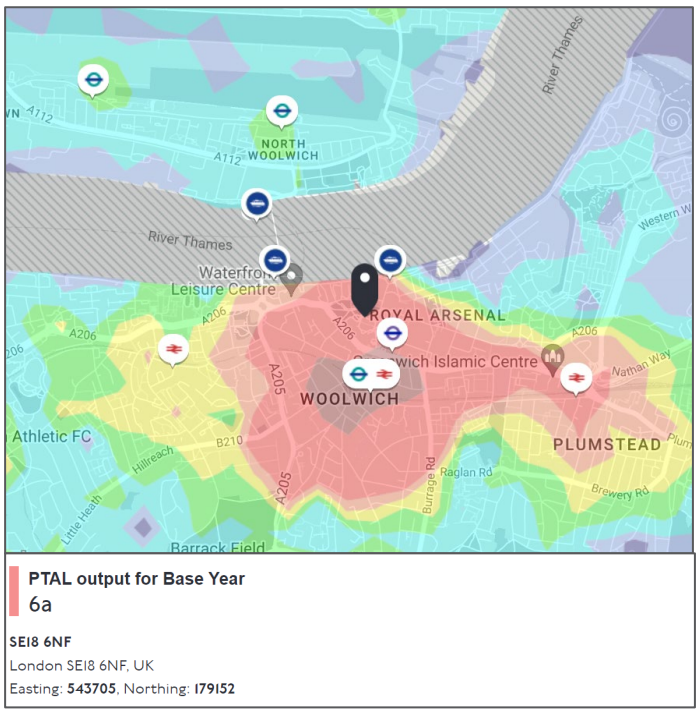


Figure 13: PTAL Map – www.tfl.gov.uk

Cycle and Car Parking

15.7 Encouraging cycling not only makes a positive contribution to health and well-being, but also reduces pressure on existing transport systems in accordance with Policy T5 of the London Plan.

15.8 All of the dwellings will have access to secure cycle stores. Cycling is promoted through the design with ample cycle stores with brightly lit and welcoming storage facilities. A total of 1268 cycle spaces will be provided.

15.9 A total of 120 car parking spaces are to be provided across the development. 15no. spaces are to be for disabled use.

Electric Car Charging

15.10 Electric vehicles have the benefit of eliminating emissions, including carbon dioxide, oxides of nitrogen, carbon monoxide and particulates that normal cars emit. With road transport accounting for 66% of particulate emissions and 42% of NO_x emissions in London, measures such as electric vehicle charging points are strongly encouraged.

15.11 All on-street car parking bays will be provided with active electric vehicle charging facilities.

Travel Plan

15.12 During the feasibility and design stage, a site specific Travel Plan will be developed.

15.13 Transport for London define a Travel Plan as a '*long term management strategy for an organisation or site that seeks to deliver sustainable transport objectives through action and is articulated in a document that is regularly reviewed*'.

15.14 This will begin with an assessment of the existing travel patterns, current local environment for walkers and cyclists, disabled access arrangements and local public transport links. Then a package of measures will be proposed to promote sustainable modes of transport, such as walking and cycling. These measures are used to meet the specific targets of the Travel Plan, often relating to a specific increase in cycling rates or to minimise the need to travel to and from the site, especially by private car, taken from a baseline situation. It also includes a monitoring regime, whereby surveys will be done to assess progress towards these targets.

15.15 A site-wide Travel Plan has been developed to promote sustainable transport and is submitted with this application.

15.16 The targets for this development will be finalised within the conditioned Travel Plan, however, the below provides an early indication on what these are likely to be:

> Appointing a Travel Plan Co-Ordinator (TPC) prior to the first residential occupation of the Site;

> Undertaking a monitoring survey on an annual basis, starting 6-months after first occupation;

> Aim for 80% of trips to be made by walking, cycling or using public transport, as per the aspirations of the Mayor's Transport Strategy;

> Promote the opportunities to travel by walking, cycling and public transport.

15.17 To ascertain whether the objectives and targets set out within the Travel Plan have been met, annual monitoring will be conducted at the end of each year for a 5-year period. As outlined in the Transport Report (Iceni, March 2024), this process will start with the baseline surveys 6 months after first and full occupation. The monitoring will then be undertaken on the anniversary of this date each year. The TPC will form a contact point for communication with the local authority who will be involved in the monitoring process. Please see the full Transport Report (Iceni, March 2024) for further details.

16. BIODIVERSITY AND ECOLOGY

Protection of Ecological Value

16.1 The Ecology Report by Ecology Solutions (February 2024) identified the development to surpass the minimum 10% Biodiversity Net Gain, and meets with overall net gains set out in national and local policy.

16.2 Recommendations for improving ecology include landscape design to include a mosaic of habitats in the west of site including species-rich grassland, swale planting and pockets of woodland planting creating a distinct green corridor in the west of the site.

16.3 New tree planting is also proposed through the site increasing tree coverage across the development. Biodiverse green roofs and podium gardens will bolster ground level planting and provide species-rich habitats across various heights and will contribute to the increase of green infrastructure over the current baseline of the site.

16.4 To offer further nesting opportunities, a series of bird boxes are recommended to be integrated into new buildings across the site.

16.5 To protect existing biodiversity, a series of measures will be implemented to reduce any impact on local wildlife. These include the following:

> All site operatives to be made aware of current legislation, including the protection of certain species;

> Site clearance works to be timed to avoid the main bird nesting season. If this is not possible, a check should be carried out prior to the works to determine the presence of any active nests;

> Suitable fencing should be erected to reduce the possibility of any damage to established vegetation; and

> Native species, or species of known wildlife value, should be used for the proposed new planting.

Enhancement of Ecological Value

16.6 Enhancing a site's ecological value not only helps to reduce a development's environmental impact but improves the health and wellbeing of the occupants through their interaction with the natural environment.

16.7 At podium level, a prairie/steppe character landscape is proposed that is resilient to lower soil volumes and reduces the extent of irrigation and maintenance required. This more naturalised approach has the added benefit of creating a biophilic landscape that has the qualities of a garden.

16.8 The landscape design incorporates the historic themes of the site into the park narrative. The 'wavy rope' meandering through the site improves visual amenity value alongside increasing biodiversity and habitat creation.

16.9 The landscape proposal further boosts biodiversity through new habitat creation within the public realm, on podiums and roofs of the D and K blocks. It also supports the site wide water management strategy via a series of dry swales incorporated into the topography of the park.

16.10 The material excavated to create the swales has been repurposed to create mounding, providing interesting, elevated landscapes and attractive play spaces utilising the escarpments and site level conditions.

16.11 Additionally, water will be attenuated within the permeable paving, which will be interlinked with swale system. This will create seasonal ponding, improving biodiversity and adding to the experience of park users.

16.12 A green street with tree and low level planting wraps around the D blocks, linking the park with the surrounding pockets of green. The green and blue infrastructure can be seen in Figure 14 below.

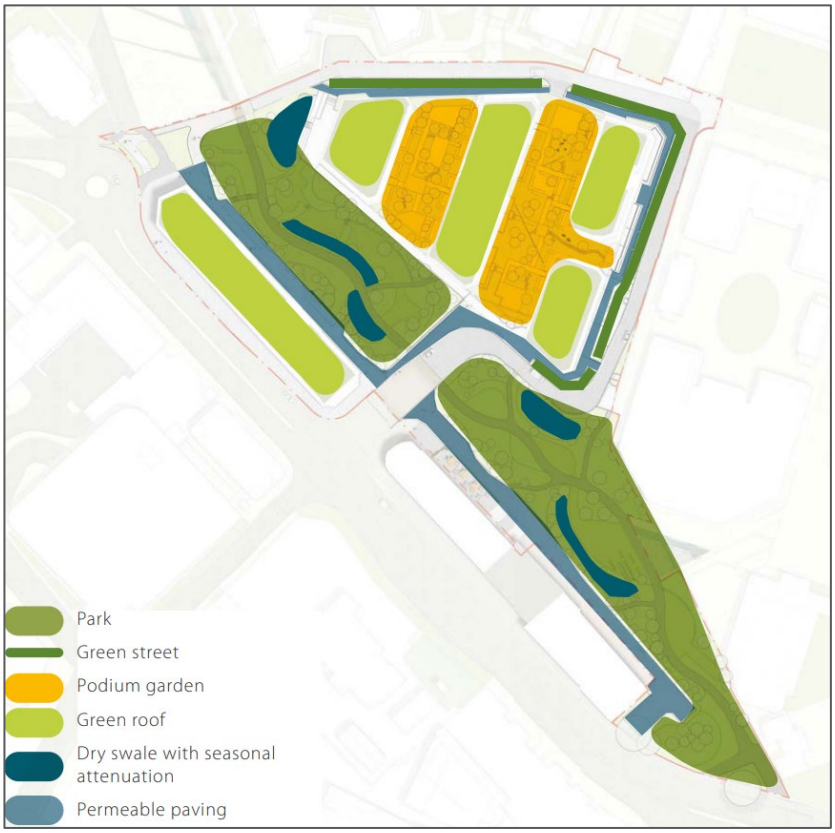


Figure 14: Green and Blue Infrastructure Principles (The Ropeyards Royal Arsenal Riverside, DAS – February 2024)

16.13 The Urban Greening Factor of 0.4 for the proposed development is in line with the Mayor's recommended target score for predominately residential developments.

16.14 The strategy for the new planting will include the following where possible:

> Maximize biodiversity and making space for nature.

> Increase tree canopy cover.

> Consider resilient species to mitigate climate change and disease.

> Provide verdant gardens that are biodiverse and seasonal, low water demanding and low in maintenance.

Green Roofs

16.15 3170sqm of green roof is to be provided in order to meet Policy G5 of the London Plan. Green roofs have demonstrable sustainability benefits, including:

> Reduction in urban heat island effect (localised cooling through increased evaporation);

> Provision of ecological habitats for fauna and flora, particularly where these roofs can replicate pre-existing ecological conditions; and

> Reduction in surface water run-off.

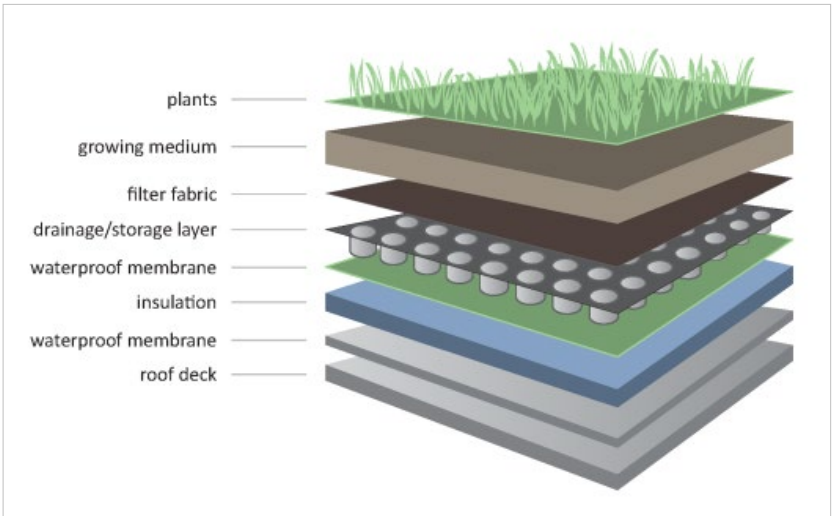


Figure 15: Indicative Build-up of Green Roof

17.SUSTAINABLE CONSTRUCTION

17.1 Sustainable construction involves the prudent use of existing and new resources and the efficient management of the construction process. This includes the following measures:

> Reducing waste during construction and demolition and sorting waste on site where practical;

> Reducing the risk of statutory nuisance to neighbouring properties as much as possible through effective site management;

> Controlling dust and emissions from demolition and construction; and

> Complying with protected species legislation.

17.2 Berkeley Group's Sustainability Standards for Construction Sites and Contractors were adopted in January 2021. These standards clearly set out Berkeley's requirements for environmental management, climate action, waste, material sourcing, timber, water and nature. The standards will be implemented and followed at The Ropeyards, Royal Arsenal Riverside, Plots D&K.

Considerate Constructors Scheme

17.3 The development site will be registered with the Considerate Constructors Scheme. This is designed to encourage environmentally and socially considerate ways of working, to reduce any adverse impacts arising from the construction process. As commonly known, the Considerate Constructors Scheme aims are as follows:

> Respecting the community (includes appearance)

> Care for the environment;

> Value their workforce (includes site safety).

17.4 The site will target a Excellent score of at least 39 out of 45, with all three sections scoring at least eleven points.

Monitoring Construction Site Impacts

17.5 During the construction processes, control procedures will be put in place to minimise noise and dust pollution and roads will be kept clean. The management systems will generally comprise procedures and working methods that are approved by the development team together with commercial arrangements to ensure compliance.

17.6 Further to the above, additional measures will be adopted to minimise the impact on the local area during construction. This will include the limiting of air and water pollution in accordance with best practice principles, as well as the recording, monitoring and displaying of energy and water use from site activities during construction.

17.7 In terms of construction traffic, this will be minimised by restricting deliveries and arrival times in order to manage potential impacts on existing and future occupants. Work will be limited to appropriate hours to be agreed with the Council, and suppressors will be used to reduce noise from machinery.

17.8 The construction programme and phasing are outlined below:

> Construct Blocks K3, K4 and K5 – C.2026 – C.2028.

> Construct Blocks D1 and D5 – C.2026 – C.2029.

> Construct Blocks D2 and D4 – C.2026 – C.2030.

> Construct Block D3 – C.2026 – C.2031

18.CONCLUSION

18.1 The issue of sustainable development has been considered throughout the design of the proposed development at The Ropeyards, Royal Arsenal Riverside, Plots D&K by Berkeley Homes East Thames in the Royal Borough of Greenwich. In particular, the incorporation of sustainable design and construction methods, energy and water saving measures, waste reduction techniques as well as measures to enhance the ecological value of the site, a good quality and sustainable development is proposed.

18.2 The key sustainability features outlined in this Sustainability Statement are listed below:

> **BREEAM:** All non-residential/commercial units will be designed and built to achieve a BREEAM 'Excellent' rating under the New Construction 2018 scheme.

> **Energy efficiency:** The development will target a 76.7% reduction in Regulated CO_2 emissions for residential units and 40% reduction in Regulated CO_2 emissions for non-residential units through energy efficiency measures and PV panels.

> **Overheating:** The scheme has been designed to ensure overheating risk is reduced to acceptable levels in accordance with CIBSE TM59:2017 requirements.

> **Water efficiency:** Flow control devices and water efficient fixtures and fittings will be installed in all dwellings to target a maximum internal daily water consumption of 105 litres/person/day.

> **Waste and recycling:** Adequate facilities will be provided for domestic and construction related waste, including segregated bins for refuse and recycling.

> **Circular Economy:** The principles of a circular economy shall be incorporated into the development, where possible.

> **Materials:** Where practical, new building materials will be sourced locally to reduce transportation pollution and support the local economy. New materials will be selected based on their environmental impact and responsible suppliers will be used where possible.

- **Pollution:** For specific façade areas, the use of openable windows to mitigate overheating may result in a significant adverse noise impact to a number of residential units. However, for air quality, the Environmental Statement concluded there would be no significant residual effects on air quality from the proposed development.
- **Flood Risk and Sustainable Urban Drainage Systems (SuDS):** The proposed development site lies in a low flood risk zone and will benefit from SuDs such as living roofs and rain gardens.
- **Security:** Consultation with a Security Specialist will take place to ensure the development is safe and secure for its residents.
- **Sound insulation:** The dwellings are to target an improvement on Building Regulations Part E through party walls and floors.
- **Inclusive access:** 90% of the new dwellings will be designed to meet Building Regulations Approved Document M4(2) and 10% will meet Part M4(3).
- **Sustainable transport:** The site will benefit from a good existing public transport network and sustainable modes will be encouraged through the provision of 1268no. cycle storage spaces.
- **Biodiversity and ecology:** The landscape design improves visual amenity value alongside increasing biodiversity and habitat creation, with an urban greening factor of 0.4.
- **Sustainable construction:** The site will aim to achieve a Excellent score with the Considerate Constructors Scheme and will closely monitor construction site impacts.

19. REFERENCES

- Greater London Authority (2021) The London Plan
- Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework. MHCLG: London
- HM Government (2016) The Building Regulations Approved Document L1A: Conservation of Fuel and Power. NBS: London
- Energy Saving Trust (2013) *At home with water*
- Department for Environmental Food and Rural Affairs (2018) *Air Pollution in the UK 2017*

APPENDICES

Appendix A

BREEAM New Construction Retail 'Excellent' Pre-Assessment

Appendix B

Water Efficiency Calculator

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Appendix A

BREEAM New Construction Retail ‘Excellent’ Pre-Assessment

BREEAM 2018 TRACKER

The Ropeyards - Retail/Office Units

Project name & number	The Ropeyards, Royal Arsenal Riverside, Plots D&K	**BREEAM assessor**	Zoe Lowther
Client	Berkeley Homes East Thames	**Project manager**	Kate Paxton
Local authority & postcode	Royal Borough of Greenwich	**Rating required**	Excellent
Reason for BREEAM	Planning requirement	**Building type**	Retail
Status of project	Pre Assessment	**Assessment scope**	Shell Only
Development description	Submission of Reserved Matters (Appearance, Landscaping, Layout and Scale) pursuant to Condition 2 of s73 Planning Permission, dated 17.03.2017 (Ref: 16/3025/MA), for 688 residential units and 985 (GEA) sqm of non-residential floorspace within Plots D and K3, K4, K5, and revised landscaping details.		

BREEAM assessment details	
Reference number	N/A
Scheme	New Construction 2018
Version	v.2
GIFA	949.4m^2 total

Target score
71.75%
Excellent

Awarded score
0.00%

BREEAM rating benchmarks	
Pass	≥ 30
Good	≥ 45
Very Good	≥ 55
Excellent	≥ 70
Outstanding	≥ 85

Meeting log

Date	Location	Key actions from DTM

BREEAM credits

Section	Available credits	Target credits	Section weighting	% credits targeted	Category score
Management	15	9	12.00%	60.00%	7.20%
Health & Wellbeing	8	5	7.00%	62.50%	4.37%
Energy	13	6	9.50%	46.15%	4.38%
Transport	12	10	14.50%	83.33%	12.08%
Water	2	2	2.00%	100.00%	2.00%
Materials	14	8	22.00%	57.14%	12.57%
Waste	10	7	8.00%	70.00%	5.60%
Land Use & Ecology	13	12	19.00%	92.31%	17.53%
Pollution	6	5	6.00%	83.33%	5.00%
Innovation	10	1	10.00%	10.00%	1.00%
Rating		**Excellent**			

Revision	Date	Revision details	Author	QA
v1	25.01.24	Planning Pre-Assessment	RD	ZC

Producing BREEAM Evidence:
- All pieces of information need to have a clear source for the audit trail i.e. company branding, name of author and date;
- The BRE require calculator tools to be completed for specific issues. These will be completed by the assessor once all information required for the calculation is provided;
- Drawings produced for BREEAM should be annotated to show how each criterion is met. Notes can be added directly to the drawing, or annotated by hand.

Hodkinson Consultancy can provide you with a wide range of templates to help demonstrate compliance. Your assessor will discuss these with you.

BREEAM New Construction 2018 Tracker

Issue				Credits				Notes
Issue		Issue sub-title	RIBA Stage	Credit description	Available	Targeted	Minimum standards	
Management	Man 01	Project brief and design	Project delivery planning	RIBA 2	The project delivery stakeholders will meet to identify and define roles, responsibilities and contributions for each key phase of project delivery. The project team will demonstrate how the project delivery stakeholders' contributions and the consultation process outcomes influence the Initial Project Brief, Project Execution Plan, Communication Strategy and Concept Design.	1	1		
			Stakeholder consultation	RIBA 2	All interested parties will be consulted and the design team will demonstrate how the consultation exercise influences the Project Brief and Concept Design. Prior to completion of the detailed design all interested parties give and receive consultation feedback.	1	1		
			Prerequisite - BREEAM Advisory Professional	RIBA 1	The project team, including the client, formally agree strategic performance targets early in the design process.	-	-		
			BREEAM Advisory Professional - Concept Design	RIBA 2	A BREEAM AP will work with the project team to maximise the project's overall performance against BREEAM. They will monitor progress against the performance targets and identify risks and opportunities related to the achievement of the rating.	1	1		
			BREEAM Advisory Professional (AP) - Detailed Design	RIBA 3	A BREEAM AP will continue to work with the project team to maximise the project's overall performance against BREEAM. Feedback will be provided to support them in taking corrective actions and achieving their agreed rating.	1	1		
	Man 02	Life cycle cost and service life planning	Elemental Life Cycle Cost (LCC)	RIBA 2	An entire asset LCC Plan will be produced with design options appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865: 2008. This will include an indication of future replacement costs over a period of analysis and will include service life, maintenance and operation cost estimates. Details of how the LCC Plan has been used to influence building and systems design and specifications to minimise life cycle costs and maximise critical value will be demonstrated by the team.	2	0		
			Component level life options appraisal	RIBA 4	A component level LCC options appraisal will be produced in line with PD 156865: 2008 and will include details on the building envelope, building services, finishes and external spaces. Appropriate examples provided by the design team will be used to demonstrate how this appraisal has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.	1	0		
			Capital cost reporting		Report the capital cost for the building in pounds per square metre of gross internal floor area (£k/ m^2).	1	1		
	Man 03	Responsible construction	**Prerequisite -** Legally harvested and traded timber		All timber and timber-based products used during the construction process of the project are 'legally harvested and traded timber'.	-	-		
			Environmental management		The principal contractor will operate an Environmental Management System covering their main operations (e.g. ISO 14001). All parties who manage the construction site will also implement best practice pollution prevention policies and procedures on site.	1	0		
			Prerequisite - BREEAM Advisory Professional		The client and the contractor formally agree performance targets.	-	-		
			BREEAM Advisory Professional - Site		The BREEAM AP will also monitor construction progress throughout all stages where decisions critically impact BREEAM performance and will proactively identify risks and opportunities related to the procurement and construction process.	1	0		
			Responsible construction management		The principal contractor evaluates the risks (on site and off site), plans and implements actions to minimise the identified risks. Compliance with Considerate Constructors is required for 1 credit.	1	1	1 credit - Excellent 2 credits - Outstanding	
					Compliance with Considerate Constructors is required whilst also undertaking additional responsible construction practices.	1	1		
			Monitoring of construction site impacts - Utility		Assign responsibility to an individual for monitoring, recording and reporting energy use and water consumption from all on-site construction processes throughout the build programme.	1	1		
			Monitoring of construction site impacts - Transport		Assign responsibility to an individual for monitoring, recording and reporting transportation data resulting from all on-site construction processes throughout the build programme.	1	1		
	Man 04	Commissioning and handover	Testing and inspecting building fabric		Post-construction testing and inspection will be undertaken by a suitably qualified professional who will undertake the survey and testing in accordance with the appropriate standard. Any defects identified during post-construction testing and inspection will be rectified prior to building handover and close out.	1	0		
					Total for management	**15**	**9**		

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BREEAM New Construction 2018 Tracker

	Issue				Credits				Notes
	Issue		Issue sub-title	RIBA Stage	Credit description	Available	Targeted	Minimum standards	
Health and wellbeing	Hea 01	Visual comfort	View Out		95% of the floor area in 95% of spaces for each relevant building area will be within 8m of an external wall. The external wall must have a window or permanent opening that provides an adequate view out. The window or opening must be ≥ 20% of the surrounding wall area.	1	0		
			Daylighting		At least 80% of floor area in occupied spaces (or 35% in retail sale areas) is adequately day lit with an average daylight factor of 2% or more.	2	0		
			External lighting		All external lighting located within the construction zone will be specified in accordance with BS 5489-1:2013 Code for the practice for the design of road lighting. Lighting of roads and public amenity areas and BS EN 12464-2:20145 Light and lighting - Lighting of work places - Part 2: Outdoor work places.	1	1		
	Hea 05	Acoustic performance	Acoustic performance		Demonstrate that all spaces in the building achieve, and for the relevant areas exceed, the performance standards required by BS for sound insulation, indoor ambient noise levels and reverberation times.	1	1		
	Hea 06	Security	Security of site and building	RIBA 2	A Suitably Qualified Security Specialist (SQSS) will conduct an evidence-based Security Needs Assessment (SNA). This SNA will be used to identify attributes of the site and surroundings which may influence the approach to security for the development. The SQSS will develop a set of security controls and recommendations and these will be incorporated in the design.	1	1		
	Hea 07	Safe and healthy surroundings	Safe access		Dedicated and safe cycle paths will be provided from the site entrance to any cycle storage, and connect to off-site cycle paths where applicable. Also, dedicated and safe footpaths are provided on and around the site providing suitable links. Pedestrian drop-off areas are designed off, or adjoining to, the access road and should provide direct access to other footpaths and it will ensured that any delivery areas are not accessed through general parking areas and do not cross or share pedestrian and cyclist paths. There will be dedicated parking or waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking. Also, parking and turning areas will be designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting.	1	1		
			Outdoor space		There will be outside space providing building users with an external amenity area.	1	1		
					Total for health and wellbeing	8	5		
Energy	Ene 01	Reduction of energy use and carbon emissions	Energy performance		An Energy Performance Ratio for New Construction (EPR_{NC}) will be calculated. The EPR_{NC} achieved will be compared with the benchmarks below in order to award the corresponding number of BREEAM credits.	9	4	4 credits - Excellent 6 credits - Outstanding	
	Ene 03	External lighting	External lighting		External light fittings within the construction zone will have an average initial luminous efficacy of not less than 70 luminaire lumens per circuit Watt, automatic control to prevent operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.	1	1		
	Ene 04	Low carbon design	Passive design analysis	RIBA 2	Note - To achieve this the first credit under Hea 04 Thermal Modelling must be achieved. The project team will analyse the proposed building design and development during Concept Design to identify opportunities for the implementation of passive design measures. Passive design measures will be implemented to reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumption in line with the passive design analysis findings and the reduced total energy demand and carbon dioxide (CO_2) emissions resulting from the passive design measures will be calculated.	1	0		
			Free cooling		Note - To achieve this credit the passive design analysis credit must be awarded. A free cooling analysis will be included in the passive design analysis and it will identify opportunities for the implementation of free cooling solutions. The building will be naturally ventilated or will use a combination of free cooling strategies.	1	0		
			Low and zero carbon technologies	RIBA 2	An energy specialist will completes a feasibility study by the end of Concept Design, this will establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy sources for the building or development. The LZC technologies for the building will be specified in line with the feasibility study recommendations. The reduced regulated carbon dioxide (CO_2) emissions resulting from the feasibility study will be quantified.	1	1		
					Total for energy	13	6		

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BREEAM New Construction 2018 Tracker

	Issue				Credits				Notes
	Issue		Issue sub-title	RIBA Stage	Credit description	Available	Targeted	Minimum standards	
Transport	Tra 01	Transport assessment	Travel plan	RIBA 1	A travel plan is developed based on a site-specific travel assessment or statement.	2	2		
	Tra 02	Sustainable transport	Transport options implementation		Note - At least one credit must be achieved for Tra 01 for any credits to be awarded in this issue. Credits will be awarded based on the Accessible Index (AI) of the project, and the number of transport measures implemented.	10	8		
					Total for transport	12	10		
Water	Wat 02	Water meter	Water meter		A pulsed water meter is installed on the mains water supply to each building. This includes instances where water is supplied via a borehole or other private source. For water-consuming plant or building areas consuming 10% or more of the building's total water demand sub meters should be used or water monitoring equipment should be used. The water meter should connect to a BMS or utility monitoring system or should be capable of connecting to one.	1	1	Good Very Good Excellent Outstanding	
	Wat 03	Leak detection	Leak detection system		A leak detection system capable of detecting a major water leak on the utilities water supply within the building will be installed AND A leak detection will be installed between the buildings and the utilities water supply. This leak detection will be a permanent automated water leak detection system that alerts the building occupants to the leak and is activated when the flow of water passing through the water meter. Also, it will be able to identify different flow and therefore leakage rates and also programmable to suit the owner's or occupier's water consumption criteria.	1	1		
					Total for water	2	2		
Materials	Mat 01	Environmental impacts - LCA	Environmental impacts from construction products - Building life cycle assessment (LCA)		During the Concept Design and Technical Design, demonstrate the environmental performance of the building as follows: - Carry out a building LCA on of the superstructure design using either the BREEAM Simplified Building LCA tool or an IMPACT Compliant LCA tool according to the methodology Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications).	7	3		
	Mat 02	Environmental impacts – EPD	Specification of products with a recognised environmental product declaration (EPD)		Construction products with an EPD that achieve a total EPD points score of at least 20 will be undertaken. Enter the details of each EPD into the Mat 01/02 Results Submission Tool, including the material category classification. The Mat 01/02 Results Submission Tool will verify the EPD points score and credit award.	1	1		
	Mat 03	Responsible sourcing of construction products	**Prerequisite**		All timber and timber-based products used on the project will be legally harvested and traded as per the UK Government's Timber Procurement Policy (TPP)	-	-	All ratings	
			Enabling sustainable procurement	RIBA 2	A sustainable procurement plan will be used to guide the specification towards sustainable construction products. This plan will include sustainability aims, objectives and strategic targets to guide procurement activities and will also include a requirement for assessing the potential to procure construction products locally. There must be a policy to procure construction products locally where possible. Details of the checking and verifying the effectiveness of the procurement plan will also be included. In addition, if the plan is applied to several sites or adopted at an organisational level it will identify the risks and opportunities of procurement against the process set out in BS ISO 20400:2017.	1	1		
			Measuring responsible sourcing		Superstructure, internal finishes, substructure and hard landscaping are responsibly sourced in accordance with the below targets: 3 credits > 30% of points achieved 2 credits > 20% of points achieved 1 credit > 10% of points achieved	3	2		
	Mat 05	Designing for durability and resilience	Protecting vulnerable parts of the building from damage		Protection measures will be incorporated into the building's design and construction to reduce damage to the building's fabric or materials.	1	1		
			Protecting exposed parts of the building from material degradation		Provide a detailed assessment of the element's resilience when exposed to the applicable material degradation and environmental factors and provide convenient access to the roof and façade for cost-effective cleaning, replacement and repair in the building's design will be implemented and the design the roof and façade to prevent water damage, ingress and detrimental ponding will also be undertaken.				
	Mat 06	Material efficiency	Material efficiency	RIBA 1	Targets will be set and opportunities and methods to optimise the use of materials will be reported for all RIBA stages. The implementation of material efficiency will be reported on during developed design through to construction.	1	0		
					Total for materials	14	8		

BREEAM New Construction 2018 Tracker

	Issue				Credits				Notes
	Issue		Issue sub-title	RIBA Stage	Credit description	Available	Targeted	Minimum standards	
Waste	Wst 01	Construction waste management	Pre demolition audit	RIBA 2	A pre-demolition audit of any existing buildings, structures or hard surfaces will be carried out This will be used to determine whether refurbishment or reuse is feasible and to maximise the recovery of material for subsequent high grade or value applications.	1	1	1 credit - Outstanding	
			Construction resource efficiency		A compliant Resource Management Plan (RMP) covering non-hazardous waste materials, demolition and excavation waste will be produced. The site will meet or improve on the benchmarks as shown below: - One credit - <11.1 tonnes per 100m^2 - Two credits - <6.5 tonnes per 100m^2 - Three credits - <3.2 tonnes per 100m^2	3	1		
			Diversion of resources from landfill		Waste materials will be sorted into separate key waste groups either on-site or through a licensed contractor for recovery. The diversion from landfill benchmarks for non-hazardous construction waste and demolition and excavation waste generated will meet the following: - Non Demolition - 80% (tonnage) - Demolition - 90% (tonnage)	1	1		
	Wst 02	Recycled aggregates	**Pre-requisite**	RIBA 2	To encourage the reuse of site material, a pre demolition audit of any existing buildings, structures or hard surfaces will be undertaken.	-	-		
			Project Sustainable Aggregate Points		Aggregate uses, types and quantities will be identified for each identified use and aggregate type. The region in which the aggregates are sourced will be calculated (km).	1	0		
	Wst 03	Operational waste	Operational waste		Provide a dedicated space for the segregation and storage of operational recyclable waste generated. This will be appropriately labelled, accessible to building users and waste management contractors and be of a sufficient size. If large amounts of waste are expected, waste compactors or balers will be provided and if appropriate, organic waste facilities (with a water outlet).	1	1	Excellent Outstanding	
	Wst 05	Adaptation to climate change	Resilience of structure, fabric, building services and renewables installation	RIBA 2	A climate change adaptation strategy appraisal will be undertaken using a systematic risk assessment to identify the impact of expected extreme weather conditions arising from climate change on the building over its projected life cycle. Following this study develop recommendations or solutions based on the climate change adaptation strategy appraisal that aim to mitigate the identified impact.	1	1		
				RIBA 4	An update will be provided during Technical Design demonstrating how the recommendations or solutions proposed at Concept Design have been implemented where practical and cost effective.				
	Wst 06	Design for disassembly and adaptability	Design for disassembly and functional adaptability - recommendations	RIBA 2	A study to explore the ease of disassembly and the functional adaptation potential of different design scenarios will be carried out. Following this recommendations or solutions will be developed, based on the study that aim to enable and facilitate disassembly and functional adaptation.	1	1		
			Disassembly and functional adaptability – implementation	RIBA 4	The team will provide an update on how the recommendations or solutions have been implemented where practical and cost effective. Omissions will also justified in writing to the assessor. Any changes to the recommendations and solutions during the development of the Technical Design should also be recorded. A building adaptability and disassembly guide will be produced to communicate the characteristics allowing functional adaptability and disassembly to prospective tenants.	1	1		
					Total for waste	10	7		

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BREEAM New Construction 2018 Tracker

	Issue				Credits				Notes
	Issue		Issue sub-title	RIBA Stage	Credit description	Available	Targeted	Minimum standards	
Land Use and Ecology	Lue 01	Site selection	Previously occupied land		At least 75% of the proposed development's footprint is on an area of land which has previously been occupied.	1	1		
			Contaminated land		A contaminated land professional's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified the degree of contamination, contaminant sources or types and the options for remediating sources of contamination. The remediation of the site will be carried out in accordance with the remediation strategy.	1	1		
	Lue 02	Risks and opportunities	**Prerequisite -** Assessment route selection		An assessment route for the project has been determined using BREEAM Guidance Note GN34 BREEAM Ecological Risk Evaluation Checklist.	-	-		
			Survey and evaluation	RIBA 1	Route 2 only: An appropriate individual is appointed at an early stage for the involvement of site configuration and to ensure that they can influence strategic planning decisions. An appropriate level of survey and evaluation will be carried out to determine the ecological baseline of the site, taking account of the zone of influence to establish: - Current and potential ecological value and condition of the site, and related areas within the zone of influence; - Direct and indirect risks to current ecological value; - Capacity and feasibility for enhancement of the ecological value of the site and areas within the zone of influence.	1	1		
			Determining the ecological outcomes for the site	RIBA 2	To achieve this credit the survey and evaluation criteria must have been achieved. The project team will liaise and collaborate with representative stakeholders to identify and consider ecological outcome for the sites for the project. When determining the ecological impact of the site this will involve the identification, appraisal and selection of specific solutions and measures sufficiently early to influence key project planning decisions. The optimal ecological outcome for the site will be selected after liaising with representative stakeholders and the project team.	1	1		
	Lue 03	Managing negative impacts on ecology	**Prerequisite –** Identification and understanding the risks and opportunities		To achieve this credit the credits under LE 02 must be achieved.	-	-		
			Planning, liaison, implementation and data	RIBA 2	Roles and responsibilities will be clearly defined, allocated and implemented to support successful delivery of project outcomes at an early enough stage to influence the concept design or design brief. Site preparation and construction works will be planned and implemented at an early project stage to optimise benefits and outputs. The project team will implement the solutions, and measures that have been selected (see LE 02) during site preparation and construction works.	1	1		
			Managing negative impacts of the project		Route two only: Negative impacts from site preparation and construction works will be managed according to the hierarchy and either: - No overall loss of ecological value has occurred (2 credits) OR - The loss of ecological value has been limited as far as possible (1 credit)	2	2		
	Lue 04	Change and enhancement of ecological value	**Prerequisite -** Identifying and understanding the risks and opportunities		To achieve this credit the credits under LE 03 must be achieved.	-	-		
			Liaison, implementation and data collation		Route two only: The project team will implement the solutions and measures selected in a way that enhances ecological value in the following order: - On site, and where this is not feasible; - Off site within the zone of influence.	1	1		
			Enhancement of ecology		Route two only: Credits will be 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.	3	2		
	Lue 05	Long term ecology management and maintenance	**Prerequisite -** Roles and responsibilities, implementation, statutory obligations		The client or contractor will confirm that compliance is being monitored against all relevant UK, EU and international standards relating to the ecology of the site.	-	-		
			Planning, liaison, data, monitoring and review management and maintenance		The project team will liaise and collaborate with representative stakeholders to: - Monitor and review implementation and the effectiveness; - Develop and review management and maintenance solutions, actions or measures. The monitoring and reporting of on the ecological outcomes/successes for site implemented at the design and construction stage and the arrangements of ongoing management of the new landscape and habitats will be reviewed. Also, he ecological value of the site and its relationship to its zone of influence and any linked sustainable activities will be maintained. As part of the tenant or building owner information supplied a section on Ecology and Biodiversity to inform the owner or occupant of local ecological features will be included.	1	1		
			Landscape and ecology management plan		A landscape and ecology management plan will be developed in accordance with BS 42020:20131 covering the first five years. The landscape and management plan will be updated as appropriate to support maintenance of the ecological value of the site.	1	1		
					Total for land use and ecology	**13**	**12**		

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	Issue				Credits				Notes
	Issue	Issue sub-title	RIBA Stage	Credit description	Available	Targeted	Minimum standards	
Pollution	Pol 03 Flood and surface water management	**Prerequisite**		An appropriate consultant is appointed to carry out the following requirements; an appropriate consultant is one who has qualifications and experience relevant to designing SuDS and flood prevention measures and completing peak rate of run-off calculations.	-	-		
		Flood resilience		A site-specific flood risk assessment (FRA) confirms the development is in a flood zone that is defined as having a low annual probability of flooding. The FRA takes all current and future sources of flooding into consideration.	2	2		
		Prerequisite - Surface water run-off		Surface water run-off design solutions must be bespoke.	-	-		
		Surface water run-off - volume		Drainage measures will be specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) shows a 30% improvement for the developed site compared with the pre-developed site. This should comply at the 1-year and 100-year return period events. Relevant maintenance agreements for the ownership, long term operation and will also be in place and all calculations will include an allowance for climate change.	1	1		
		Surface water run-off - volume		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 Drainage design measures will be specified so that the post-development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development. This must be for the 100-year 6-hour event, including an allowance for climate change. Any additional predicted volume of run-off for this event will be prevented from leaving the site by using infiltration or other SuDS techniques.	1	1		
		Minimising watercourse pollution		Drainage strategy confirms that there is no discharge from the developed site for rainfall up to 5 mm and that areas with a low risk source of watercourse pollution will have an appropriate level of pollution prevention treatment provided. Areas with a high risk of contamination or spillage of substances have separators installed in surface water drainage systems. All water pollution prevention systems will be designed and installed in accordance with the recommendations of documents such as the SuDS manual and other relevant industry best practice. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS will also be in place.	1	0		
	Pol 04 Reduction of night time light pollution	Reduction of night time light pollution		The external lighting strategy has been designed in compliance with Table 2 (ILP) Guidance notes for the reduction of obtrusive light, 2011. Also All external lighting will have the capabilities to be automatically switched off between 23:00 and 07:00. If safety or security lighting is provided and will be used between 23:00 and 07:00, this will comply with the lower levels of lighting recommended during these hours in Table 2 of the ILP guidance notes. Illuminated advertisements will be designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements.	1	1		
				Total for pollution	6	5		

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	Issue			Credits				Notes
	Issue	Issue sub-title	RIBA Stage	Credit description	Available	Targeted	Minimum standards	
Innovation	Man 03 Responsible construction	Responsible construction management		The principal contractor evaluates the risks (on site and off site), plans and implements actions to minimise the identified risks, covering the items included in the Responsible Construction Management Template. All criteria must be met to achieve this credit.	1	1		
	Hea 01 Visual comfort	Daylighting		At least 80% of floor area in occupied spaces (or 50% in retail sale areas) is adequately day lit with an average daylight factor of 3% or more.	1	0		
	Hea 02 Indoor air quality	Emissions from construction products		Three of the product types noted below will meet the emission limits, testing requirements and any additional requirements as listed in the HEA02 table: - Paints and varnishes; - Wood based products; - Flooring materials; - Ceiling, wall, acoustic, thermal insulation materials; - Interior adhesives and sealants.	1	0		
	Hea 06 Security	Security of site and building		A compliant risk based security rating scheme has been used. The performance against the scheme has been confirmed by independent assessment and verification.	1	0		
	Ene 01 Reduction of energy use	Beyond zero net regulated carbon		The building will achieve an EPR NC ≥ 0.9 and zero net regulated CO_2 emissions. Energy generation from on-site and near-site LZC sources will be sufficient to offset carbon emissions from regulated energy use plus a percentage of emissions from unregulated energy use. The exemplary credits will be awarded as follows: 1 credit - 10% 2 credits - 50% 3 credits - 100% (carbon negative)	3	0		
	Wat 01 Water consumption	Water consumption		The standard Wat 01 methodology will be used to compare the water consumption (litres/person/day) for the assessed building against a baseline performance. Exemplary credits will be awarded where a 65% improvement on the baseline has been achieved.	1	0		
	Mat 01 Environmental impacts	Third party verification		A suitably qualified third party will carry out the building LCAs OR produces a report verifying the building LCAs accurately represent the designs under consideration during Concept Design and Technical Design. For each LCA option, the findings of the verification checks made by the suitably qualified third party will be itemised in the report including. The suitably qualified third party's relevant skills and experience will be provided and a declaration of their third party independence from the project client and design team will be included in their report.	1	0		
	Mat 03 Responsible Sourcing	Measuring responsible sourcing		Superstructure, internal finishes, substructure and hard landscaping and core services are responsibly sourced in accordance with the below targets: 3 credits plus 1 exemplary credit > 50% of points achieved.	1	0		
	Wst 01 Construction waste management	Construction waste management		Prepare a compliant Resource Management Plan (RMP) covering non-hazardous waste materials, demolition and excavation waste and less than <1.9 tonnes of waste per 100m^2 will be generated. Sort waste materials into separate key waste groups either on-site or through a licensed contractor for recovery. Meet the diversion from landfill benchmarks for non-hazardous construction waste and demolition and excavation waste generated: Non Demolition - 95% (tonnage) Demolition - 85% (tonnage)	1	0		
	Wst 02 Recycled aggregates	Project sustainable aggregate points		Identify all aggregate uses and types on the project and determine the quantity in tonnes for each identified use and aggregate type. Identify the region in which the aggregate source is located and calculate the distance in kilometres travelled by all aggregates by transport type.	1	0		
	Wst 05 Adaptation to climate change	Responding to climate change		In addition to the Wst 05 criteria the following credits will also need to be achieved: - Hea 04 thermal comfort; - Ene 01 reduction of energy use and carbon emissions; - Ene 04 low carbon design; - Wat 01 water consumption; - Mat 05 designing for durability and resilience; - Pol 03 Flood and surface water management.	1	0		
	Le 02 Risks and opportunities	Determine the ecological outcomes for the site		When determining the optimal ecological outcome for the site the wider site sustainability-related activities and the potential for ecosystem service related benefits will be considered. This will include opportunities for integrating ecology with wider site sustainability-related activities and ecosystem service related benefits. The following must also be achieved: - Hea 07 Safe and healthy surroundings; - Pol 03 Flood and surface water management - Achieve credits for 'Surface water run-off' and 'Minimising watercourse pollution'; - Pol 05 Reduction of noise pollution.	1	0		
				Total for Innovation	**10**	**1**		

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Appendix B

Water Efficiency Calculator

Water Efficiency Calculator
The Ropeyards

	Internal Water Consumption			
Installation Type	**Unit of Measure**	**Capacity / Flow Rate**	**Litres/person/day**	**Notes**
WC	Full Flush Volume (Litres)	**6**	8.76	Low flush WCs will be installed to reduce the volume of water consumed during flushing. All WCs will have dual flush cisterns which will provide both part (4L) and full (6L) flushes.
	Part Flush Volume (Litres)	**4**	11.84	
Basin Tap	Flow Rate (Litres/minute)	**4**	7.90	All taps (excluding kitchen taps) will be reduced to 4 litres/minute using flow restrictors. Where multiple taps are to be provided the average flow rate will be used.
Bath	Capacity (Litres to overflow)	**160**	17.60	All baths will have reduced capacities of 160 litres (excluding displacement). The bath taps are not included in this calculation as they are already incorporated into the use factor for the baths.
Shower	Flow Rate (Litres/minute)	**8**	34.96	Shower flow rates will be reduced to a maximum of 8 litres/minute using flow restrictors fixed to the shower heads. These contain precision-made holes or filters to restrict water flow and reduce the outlet flow and pressure.
Kitchen Tap	Flow Rate (Litres/minute)	**5**	12.56	Kitchen taps will be reduced to 5 litres/minute using flow restrictors which will be fitted within the console of the tap or in the pipework.
Washing Machine	Water Consumption (Litres/kg)	**8.17**	17.16	Water efficient washing machines or washer-dryers will be specified. The make and model numbers of the appliances are unknown at this stage therefore a default figure of 8.17 litres/kg has been assumed.
Dishwasher	Water Consumption (Litres/place setting)	**1.25**	4.50	All dishwashers will be water efficient. The make and models numbers are unknown therefore a default figure of 1.25 litres/place setting has been assumed at this stage.
		Net Internal Water Consumption (Litres/person/day)	**115.3**	
		Normalisation Factor	**0.91**	
		Total Internal Water Consumption (Litres/person/day)	**104.9**	The total *internal* water consumption target of ≤105 litres/person/day will be achieved in accordance with Regulation 36 para (2)b optional requirement Approved Document G.
		Allowance for External Water Consumption (Litres/person/day)	**5**	
		Total Water Consumption (Litres/person/day)	**109.9**	The *total* water consumption target of ≤110 litres/person/day will be achieved in accordance with Regulation 36 para (2)b optional requirement of Approved Document G.