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## Sustainability Statement

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Tech Hub  
REEC Twickenham

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## 1.0 EXECUTIVE SUMMARY

This document identifies how the Proposed Development of The Tech Hub, located in the Richmond Upon Thames, will meet the objectives of the London Plan Policy 5.3 Sustainable Design and Construction, and the principles outlined in the Mayor of London's Sustainable Design and Construction Supplementary Planning Guidance (SPG). This document requires Local Authorities to ensure future developments meet the highest standards of sustainable design and construction and reflect this principle in the Richmond Development Management Plan and Richmond Upon Thames Core Strategy policies. Please refer to Section 3 and 4 herein for further information on policies and specific local authority policy relating to Sustainability.

Haymarket Media Group is a global specialist media company involved in brand development and publications. The architectural brief for the technical hub is to provide a spaciouly bright, flexible open plan space to allow Haymarket staff to work collaboratively within one dynamic space and support its work with the extended campus. Due to the nature of their work there will be high end IT facilities suitable for mobile working and other support areas such as break out lounge areas, recreational games area, kitchen/tea facilities and meeting rooms. The new building is within the existing Richmond Education and Enterprise Campus on the north west corner position. Externally the brief will include 10 car parking spaces (one for disabled use), a service area to the rear and new landscaping. The sports building and residential developments have achieved Reserved Matters planning consent. There is also a new secondary free school and special needs school which were handed over to the schools in June 2018.

The design for the scheme has been developed with sustainable design principles at its core. An integrated and holistic approach to design has been adopted and this document contextualises the process by which sustainability has been addressed as part of the project.

The Sustainability Strategy aims to:

- Match or exceed today's requirements;
- Anticipate tomorrow's needs; and
- Adapt and remain relevant into the future.

In supporting this strategy, a number of legislative policies have been used to inform the design decisions of the Proposed Development. In doing so they have assisted in demonstrating the Sustainability merits of the proposed scheme through a considered design approach.

## 2.0 INTRODUCTION

This document has been produced to address how the energy and sustainability requirements will be met, in terms of design and construction of the Tech Hub development. It is structured following the objectives set out in the *Greater London Authority (GLA) London Plan (2016)* policies and the *New London Plan (2019)*.

The design for the scheme has been developed with sustainable design principles at its core. This document contextualises the process by which sustainability has been addressed as part of the project.

The Sustainability Strategy aims to:

- Match or exceed today's requirements;
- Anticipate tomorrow's needs; and
- Adapt and remain relevant into the future.

The sustainability measures incorporated within the development for energy and carbon emission reductions are categorised within the GLA's energy hierarchy:

- 'Be Lean' - energy-efficient design and construction;
- 'Be Clean' - supply energy efficiently (low-carbon technology); and
- 'Be Green' - use of renewable energy systems (zero-carbon technology).

A BREEAM New Construction UK 2018 office pre-assessment has been carried out for the Techhub to evaluate the Proposed Development's possible score. For the full Pre-Assessment report, please refer to Appendix C of the Energy Statement.

## 2.1 Site and Proposed Development

Haymarket Media Group is a global specialist media company involved in brand development and publications. The architectural brief for the technical hub is to provide a spaciouly bright, flexible open plan space to allow Haymarket staff to work collaboratively within one dynamic space and support its work with the extended campus. Due to the nature of their work there will be high end IT facilities suitable for mobile working and other support areas such as break out lounge areas, recreational games area, kitchen/tea facilities and meeting rooms. The new building is within the existing Richmond Education and Enterprise Campus on the north west corner position. Externally the brief will include 10 car parking spaces (one for disabled use), a service area to the rear and new landscaping. The sports building and residential developments have achieved Reserved Matters planning consent. There is also a new secondary free school and special needs school which were handed over to the schools in June 2018.

The site is situated in Twickenham in the London Borough of Richmond Upon Thames. The site is bounded by A316 Chertsey Road to the north, Egerton Road to the east, River Crane, Twickenham Rough and college playing fields are to the south and the council depot is to the south west.



Figure 1: Development site location

Table 1: Schedule of accommodation based on GIA

Zone	Gross External Area (GEA) m <sup>2</sup>
Office	1700

## 2.2 Approach

The planning policies as outlined by the Greater London Authority (GLA) London Plan have been used as a basis for assessing the sustainability strategy for the proposed development in this report. It is essential that the Proposed Development meets planning policy guidelines and aims to be another of London's exemplar buildings in sustainable design, adopting the latest sustainable design and construction methods as well as operational energy reduction methods.

### 3.0 POLICY BACKGROUND

This section outlines the policies which have been used to inform design decisions for the Proposed Development.

- The UK Government Sustainable Development Strategy;
- National Planning Policy Framework (2019) and Relevant Planning Policy Guidance documents (PPS 10);
- The London Plan (March 2016, consolidation of alterations since 2011);
- The draft New London Plan (January 2019);
- The London Plan Sustainable Design and Construction SPG, April 2014;
- Richmond Upon Thames; Core Strategy Adopted April 2009; and
- London Borough of Richmond Local Development Framework Development Management Plan; Adopted November 2011.

### 3.1 Government policy

#### UK Government Strategy for Sustainable Development

In 1999, the UK Government published its initial strategy for sustainable development, 'A Better Quality of Life: A Strategy for Sustainable Development in the UK.' This has four main objectives:

- Social progress which recognises the needs of everyone;
- Effective protection of the environment;
- Prudent use of natural resources; and
- Maintenance of high and stable levels of economic growth and employment.

The Sustainable Development Task Force reviewed this Strategy and a revised UK Government Sustainable Development Strategy "Securing the Future" was put into place on 7 March 2005.

A range of environmental and planning legislation and fiscal instruments for specific issues supports the UK Government Sustainable Development Strategy. For example, the Climate Change Levy, the Landfill Tax and the Environmental Protection Act. The UK Government's Sustainable Development Strategy is disseminated throughout its own estates through a variety of strategies.

This is also being delivered at a local level through Local Authorities' Unitary Development Plans and Local Development Plans.

### 3.2 National Planning Policy Framework and Planning Policy Statements (February 2019)

The National Planning Policy Framework (2019) sets out the Government's planning policies on the delivery of sustainable development through the planning system. It replaces the following documents: *Planning Policy Statement 1: Delivering Sustainable Development (January 2005)*, *Planning Policy Statement 9: Biodiversity and Geological Conservation (August 2005)*, *Planning Policy Guidance 13: Transport (January 2011)*, *Planning Policy Statement 22: Renewable Energy (August 2004)*, *Planning Policy Statement 23: Planning and Pollution Control (November 2004)*, *Planning Policy Guidance 24: Planning and Noise (October 1994)*, *Planning Policy Statement 25: Development and Flood Risk (March 2010)*.

DCLG published the revised version of the National Planning Policy Framework (NPPF) for consultation in March 2018. The revised version was updated on 19 February 2019 and sets out the governments planning policies for England and how these are expected to be applied. The NPPF outlines the strategic priorities to be applied in planning policies at regional and local level. The NPPF 2019 covers the following sections: Section 2; Achieving sustainable development, Section 9; Promoting sustainable transport, Section 12; Achieving well-designed places, Section 14; Meeting the challenge of climate change, flooding and coastal change, Section 15; Conserving and enhancing the natural environment.

The revised update provided a number of additional actions, more specifically in relation to sustainable development, the NPPF 2019 states that, 'The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.'



### 3.3 Building Regulation Part L Summary

The Proposed Development will comply with Building Regulation Part L 2013 (Conservation of fuel and power in buildings).

### 3.4 Greater London Authority (GLA) London Plan (2016)

The Greater London Authority (GLA) has set out guidance relating to sustainable design within the London Plan (Spatial Development Strategy for Greater London). The current adopted plan is dated March 2016, with alterations since 2011, and includes the following policies:

- 'Policy 5.2 Minimising Carbon Dioxide Emissions'
  - Make the fullest contribution to minimising CO<sub>2</sub> emissions in accordance with the following energy hierarchy; 'Be lean', 'Be clean', 'Be green'.
- 'Policy 5.3 Sustainable Design and Construction'
  - Demonstrate that sustainable design standards are integral to the proposal and ensure that they are considered at the beginning of the design process.
- 'Policy 5.6 Decentralised Energy in Development Proposals'
  - Evaluate the feasibility of Combined Heat and Power (CHP) systems, and where a new CHP system is appropriate.
- 'Policy 5.7 Renewable Energy'
  - Provide a reduction in expected carbon dioxide emissions using on-site renewable energy generation, where feasible.
- 'Policy 5.9 Overheating and cooling'
  - Demonstrate how the design, materials, construction and operation of the development would minimise overheating and meet its cooling needs.

### 3.5 Greater London Authority (GLA) London Plan (2016) Policy 5.3 Sustainable design and construction

The Mayor would, and boroughs should, ensure future developments meet the highest standards of sustainable design and construction and reflect this principle in UDP or LDF policies.

These would include measures to:

- Minimise carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems)
- Avoiding internal overheating and contributing to the urban heat island effect
- Efficient use of natural resources (including water), including making the most natural systems both within and around buildings
- Minimising pollution (including noise, air and urban run-off)
- Minimising the generation of waste and maximising reuse or recycling
- Avoiding impacts from natural hazards (including flooding)
- Ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions
- Securing sustainable procurement of materials, using local supplies where feasible
- Promoting and protecting biodiversity and green infrastructure

### 3.6 GLA Policy 5.2 Update 2019- Energy Statement

The Greater London Authority (GLA) has set out guidance relating to sustainable design within the London Plan (Spatial Development Strategy for Greater London). The current adopted London plan is dated March 2016, however in January 2019 policy 5.2 has been updated and will adhere to the following guidance;

*"From January 2019, planning applicants are encouraged to use updated (SAP 10) carbon emission factors to assess the expected carbon performance of a new development. Applicants should continue to use the current Building Regulations methodology for estimating energy performance against Part L 2013 requirements (as outlined in Section 6) but with the outputs manually converted for the SAP 10 emission factors. A spreadsheet (version 1.1) has been developed for this purpose which should be submitted alongside an energy assessment. It should be noted that the use of the SAP 10 emission factors in this context is for demonstrating performance against planning policy targets and, as such, is separate to Building Regulation compliance. Applications should therefore ensure that compliance with Building Regulations is maintained.*

- Updated information requirements for applicants proposing to install heat pumps and CHP, including clarification on when CHP is appropriate.
- An appendix containing the existing emission limits for heating and energy plant has been added."

Note: some elements of the new guidance for writing energy statements only applies to buildings that are referable to the GLA.

### 3.7 Sustainable Design and Construction Supplementary Planning Guidance (SPG) (April 2014):

The guidance establishes that major developments should meet the Mayor's Priorities outlined in the Supplementary Planning Guidance. The document also set out best practice ambitions for several topic areas.

Sections 4.1 to 4.15 of this report address each of these topic areas, identifying how the development meets the Mayor's Priorities and where feasible the Mayor's Best Practice. Where any Mayor's Priorities have not been achievable, these reasons have been identified.

The Supplementary Planning Guidance provides detail on the policies in the London Plan, which promote sustainable design and construction. It provides details and guidance to support developers to achieve sustainable development in line with London Plan Policy 5.3.

### 3.8 Richmond Upon Thames; Core Strategy Adopted April 2009

This document sets the strategic policies to be adopted by developments seeking planning permission in the Borough. Policies relating to energy and sustainability are summarised below:

#### Policy CP1 – Sustainable Development

Minimising climate change and reducing its impact is an International and National priority and the Borough is committed to continue to play its part. Whilst this Borough has traditionally been conscious of the need to plan sustainably in terms of buildings and transport, the emissions from the Borough are still high due to an older housing stock, affluent population and high levels of car ownership. The proposed approach will encourage measures for existing buildings as well as for new ones to be designed to minimise the use of energy and other resources and for sustainable travel. The Borough's extensive and unique areas of biodiversity value will be protected, and waste will be dealt with sustainably. In this Borough one impact of climate change will be an increased likelihood of flooding from the Thames and other tributaries as sea levels rise and climate patterns alter – the preferred approach is to prevent new development in areas of high flood risk and if practicable increase the capacity of the floodplain through restoration and return of wetlands. The core policies for a sustainable future are:

- Sustainable Development
- Reducing Carbon Emissions
- Climate Change – Adapting to the Effects
- Biodiversity
- Sustainable Travel
- Waste

Part 1.A. of the policy states that development will be required to conform with the Sustainable Construction Checklist. This includes the requirement to achieve a BREEAM 'Excellent' rating.

The following principles will be promoted:

- 1.B Appropriate location of land uses
- 1.C making best use of Land
- 1.D Reducing environmental impact
- 1.E. Environmental gain to compensate for any environment cost of development will be sought.

**Policy CP2- Reducing Carbon Emissions**

2.A The Borough will reduce its carbon dioxide emissions by requiring measures that minimise energy consumption in new development and promoting these measures in existing development, particularly in its own buildings.

2.B The Council will require the evaluation, development and use of decentralised energy in appropriate development.

2.C The Council will increase the use of renewable energy by requiring all new development to achieve a reduction in carbon dioxide emissions of 20% from on-site renewable energy generation unless it can be demonstrated that such provision is not feasible, and by promoting its use in existing development.

**Policy CP3- Climate Change- Adapting to the Effects**

3.A Development will need to be designed to take account of the impacts of climate change over its lifetime, including:

- Water conservation and drainage
- The need for Summer cooling
- Risk of subsidence
- Flood risk from the River Thames and its tributaries

3.B Development in areas of high flood risk will be restricted, in accordance with PPS25, and using the Environment Agency's Catchment Flood Management Plan, Borough's Strategic Flood Risk Assessment and site level assessments to determine risk.

Other relevant policies include:

- CP4 Biodiversity
- CP5 Sustainable Travel
- CP6 Waste
- CP7 Maintaining and Improving the Local Environment

**3.9 London Borough of Richmond Local Development Framework Development Management Plan; Adopted November 2011**

In addition to the Core Strategy, the Richmond Council Development Management policies are required to be met. The council requires all new residential developments (creating 1 dwelling unit or more) and new non-residential developments of more than 100sqm floor space to:

- Follow sustainable construction policies and reduce carbon emissions
- Follow renewable energy and decentralised energy networks
- Complete a sustainable construction checklist

The relevant policies relating to Sustainable development are listed below:

**Policy DM SD 1 Sustainable Construction**

All development in terms of materials, design, landscaping, standard of construction and operation should include measures capable of mitigating and adapting to climate change to meet future needs.

New buildings should be flexible to respond to future social, technological and economic needs by conforming to the Borough's Sustainable Construction Checklist SPD.

They also must achieve a minimum 25 per cent reduction in carbon dioxide emissions over Building Regulations (2010) in line with best practice from 2010 to 2013, 40 percent improvement from 2013 to 2016, and 'zero carbon' standards (2) from 2016. It is expected that efficiency measures will be prioritised as a means towards meeting these targets. These requirements may be adjusted in future years to take into account the then prevailing standards and any other national guidance to ensure the standards are met or exceeded.

New non-residential buildings over 100sqm will be required to meet the relevant BREEAM 'Excellent' standards. For conversions see Policy DM SD 3 'Retrofitting'.

**Policy DM SD 2 Renewable Energy and Decentralised Energy Networks**

New development will be required to conform with the Sustainable Construction Checklist SPD and:

- a. Maximise opportunities for the micro-generation of renewable energy. Some form of low carbon renewable and/or de-centralised energy will be expected in all new development, and
- b. Developments of 1 dwelling unit or more, or 100sqm of non-residential floor space or more will be required to reduce their total carbon dioxide emissions by following a hierarchy that first requires an efficient design to minimise the amount of energy used, secondly, by using low carbon technologies and finally, where feasible and viable, including a contribution from renewable sources.
- c. Local opportunities to contribute towards decentralised energy supply from renewable and low-carbon technologies will be encouraged where there is no over-riding adverse local impact.
- d. All new development will be required to connect to existing or planned decentralised energy networks where one exists. In all major developments and large Proposals Sites identified in the (forthcoming) Site Allocations DPD, provision should be made for future connection to a local energy network should one become available.

#### **Policy DM SC 3 Retrofitting**

High standards of energy and water efficiency in existing developments will be supported wherever possible through retrofitting. Proposals for conversions and extensions will be encouraged to comply with the Sustainable Construction Checklist SPD as far as possible and opportunities for micro-generation of renewable energy will be supported.

Development in an area susceptible to flooding should include flood resistant and/or resilient measures to mitigate potential flood risks.

#### **Policy DM SD 4 Adapting to Higher Temperatures and Need for Cooling**

All new developments, in their layout, design, construction, materials, landscaping and operation, are required to take into account and adapt to higher temperatures, avoid and mitigate overheating and excessive heat generation to counteract the urban heat island effect, and meet the need for cooling.

All new development proposals should reduce reliance on air conditioning systems and demonstrate this in accordance with the following cooling hierarchy:

1. minimise internal heat generation through energy efficient design
2. reduce the amount of heat entering a building in summer through shading, reducing
3. solar reflectance, fenestration, insulation and green roofs and walls
4. manage the heat within the building through exposed internal thermal mass and
5. high ceilings
6. passive ventilation
7. mechanical ventilation
8. active cooling systems (ensuring they are the lowest carbon options).

Opportunities to adapt existing buildings, places and spaces to manage higher temperatures should be maximised and will be supported.

#### **Policy DM SD 9 Protecting Water Resources and Infrastructure**

The borough's water resources and supplies will be protected by resisting development proposals that would pose an unacceptable threat to surface water and groundwater quantity and quality. This includes pollution caused by water run-off from developments into nearby waterways.

New developments must achieve a high standard of water efficiency by:

1. meeting the minimum mandatory target for water consumption as set out in the Code for Sustainable Homes, or
2. meeting a minimum of 2 credits on water consumption for other types of developments (BREEAM "excellent"), or
3. meeting a minimum of 3 credits on water consumption for conversions (EcoHomes "excellent"), and
4. utilising rainwater harvesting for all external water uses to reduce the consumption of potable water wherever possible.

The above requirements may be adjusted in future years to take into account the then prevailing standards and any other national guidance to ensure that these standards are met or exceeded.

New developments should also consider the following:

1. utilising rainwater harvesting and greywater recycling for all non-potable uses to reduce the consumption of potable water wherever possible, and
2. designing of landscaping to minimise water demand.

Proposals that seek to increase water availability or protect and improve the quality of rivers or groundwater will be encouraged. The development or expansion of water supply or waste water facilities will normally be permitted, either where needed to serve existing or proposed new development, or in the interests of long-term water supply and waste water management, provided that the need for such facilities outweighs any adverse land use or environmental impact. The Council will support in principle the implementation of the Thames Tunnel project.

Where rivers have been classified by the Environment Agency as having 'poor' status (currently the River Crane, the Beverley Brook and the River Thames, upstream of Teddington), any development affecting such rivers is encouraged to improve the water quality in these areas.

Other relevant policies include:

- Policy DM SD 5 Living Roofs
- Policy DM SD 6 Flood Risk
- Policy DM SD 7 Sustainable Drainage
- Policy DM SD 8 Flood Defences
- Policy DM SD 9 Protecting Water Resources and Infrastructure

4.0 SUSTAINABLE DESIGN

This section formally outlines how the development would meet the objectives of the London Policy Plan 5.3 Sustainable Design and Construction, outlined in the Mayor of London's Supplementary Planning Guidance (SPG).

4.1 Land (SPG section 2.2)

Optimising the use of land	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Through both their Local Plans and planning decisions, boroughs should ensure development patterns reflect the strategic spatial vision for London's growth as set out in Chapter 2 of the London Plan.</li> <li>Through both their Local Plans and planning decisions, boroughs should aim for 100% of development to be delivered on previously developed land.</li> <li>Developers should optimise the scale and density of their development, considering the local context, to make efficient use of London's limited land.</li> </ol>	<p>Haymarket Media Group is a global specialist media company involved in brand development and publications. The architectural brief for the technical hub is to provide a spaciouly bright, flexible open plan space to allow Haymarket staff to work collaboratively within one dynamic space and support its work with the extended campus. Due to the nature of their work there will be high end IT facilities suitable for mobile working and other support areas such as break out lounge areas, recreational games area, kitchen/tea facilities and meeting rooms. The new building is within the existing Richmond Education and Enterprise Campus on the north west corner position. Externally the brief will include 10 car parking spaces (one for disabled use), a service area to the rear and new landscaping. The sports building and residential developments have achieved Reserved Matters planning consent. There is also a new secondary free school and special needs school which were handed over to the schools in June 2018.</p> <p>The Proposed Development is 100% on previously developed land. The site is currently occupied by a college sports hall which will be demolished and as part of a phased development include 2 new school buildings, residential development and the proposed techhub.</p> <p>The building design will ensure that the use of floor space is optimised, balancing the need to create a building with sufficient floor area, whilst ensuring that the building design/massing is in keeping with the surrounding buildings. The development is located in an area with good public transport accessibility and ties into a range of bus and rail services, in addition to existing pedestrian / cycle facilities which support an increase in density on the site.</p>
Basements and lightwells	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>When planning a basement development, developers should consider the geological and hydrological conditions of the site and surrounding area, proportionate to the local conditions, the size of the basement and lightwell and the sensitivity of adjoining buildings and uses, including green infrastructure.</li> <li>When planning and constructing a basement development, developers should consider the amenity of neighbours.</li> </ol> <p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>Where there is pressure for basement developments, boroughs should consider whether there are any particular local geological or hydrological issues that could particularly affect their construction and adopt appropriate policies to address any local conditions.</li> </ol>	<p>The Proposed Development does not include any basements.</p> <p>However, A flood risk assessment produced by Price Meyers for the planning submission of the Proposed Development has identified potential flood risk issues. The flood risk assessment confirms that the Proposed Development is considered to be a low risk from fluvial and groundwater flooding and a very low risk of flooding from watercourses and tidal, surface water and overland flows, reservoirs, canals and artificial water source flooding. Please refer to Flood Risk Assessment produced by Price Meyers.</p> <p>Geological mapping of this site indicates that the bedrock geology underlying the site is London Clay Formation which is not associated with groundwater flooding and has no aquifer designation. There are superficial deposits of Kempton Park Gravel Formation beneath the site and these are classified as a principal aquifer.</p>

Local food growing	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>To protect existing established food growing spaces.</li> </ol> <p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>To provide space for individual or communal food growing, where possible and appropriate.</li> <li>To take advantage of existing spaces to grow food, including adapting temporary spaces for food growing.</li> </ol>	<p>No existing or proposed food growing spaces are located on the site.</p>

**4.2 Site layout and building design (SPG section 2.3)**

Site layout and design	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>The design of the site and building layout, footprint, scale and height of buildings as well as the location of land uses should consider:                     <ul style="list-style-type: none"> <li>Existing features                             <ul style="list-style-type: none"> <li>the possible retention and reuse of existing buildings and structures; and</li> <li>the retention of existing green infrastructure, including trees and potential for its improvement and extension;</li> <li>access routes to public transport and other facilities that minimise the use of public transport;</li> </ul> </li> <li>New design of development                             <ul style="list-style-type: none"> <li>the existing landform;</li> <li>the potential to take advantage of natural systems such as wind, sun and shading;</li> <li>the principles set out London Plan policies 7.1 and 7.6;</li> <li>the potential for adaption and reuse in the future;</li> <li>potential for incorporating green infrastructure;</li> <li>potential for incorporating open space, recreation space, child play space;</li> <li>energy demands and the ability to take advantage of natural systems and low and zero carbon energy sources;</li> <li>site wide infrastructure;</li> </ul> </li> </ul> </li> </ol>	<p>It is recommended that a demolition contractor is appointed at RIBA Stage 2 (Concept Design) to undertake a pre-demolition audit. The Institute of Civil Engineers Demolition Protocol should be followed where applicable to ensure that the potential for reusing and recycling the materials currently on site will be maximised where practical. A full survey is recommended to be undertaken to review where materials can be reused on site e.g. aggregates and where they can be recycled as locally as possible.</p> <p>An Arboricultural Impact Assessment has been undertaken and accompanies this planning submission which outlines the findings of a tree survey at location and surrounding areas of the proposed development. Around 21 new trees are proposed to be planted as part of the development, predominately native species. A root protection area has been specified.</p> <p>The development is located in an area with public transport and ties into a range of bus and rail services, in addition to existing pedestrian/cycle facilities which support an increase in density on the site and the mix of services proposed for the redevelopment.</p> <p>In order to encourage alternative forms of transport to and from the development the following cycle facilities will be provided: A minimum of 15 cycle spaces with secured bike lockers / showers.</p> <p>A new vehicular access will be installed at the head of Langhorn Drive to permit a right turn on to the A316 which is currently left turn only. Pedestrian and cycle access points are via Marsh Farm Lane which in turn can be accessed from the A316 or Craneford Way. The Proposed Development also includes significant improvements to Marsh Farm Lane which links the new pedestrian route alongside the River Crane to Twickenham Station which is located approximately 0.7 miles away.</p> <p>The height and scale of the Proposed Development is not expected to result in unacceptable microclimatic impacts to the surrounding residential/pedestrian receptors.</p> <p>A glazing optimisation study has been undertaken to reduce the cooling load and overheating risk in the building.</p> <p>The building fabric will be designed to be highly thermally efficient, whilst balancing overheating risks with facade design and adaptation addressing other conflicting considerations such as daylight and views. Please refer to the Energy Statement accompanying this Planning Application for further details of energy efficiency, and low carbon design measures incorporated within the Proposed Development.</p> <p>The Proposed Development recognises that for buildings to be considered useable for at least the next 50 years, a considerable level of future flexibility will need to be incorporated into the design. The building services strategy has been based on the need to accommodate possible future scenarios including:</p>

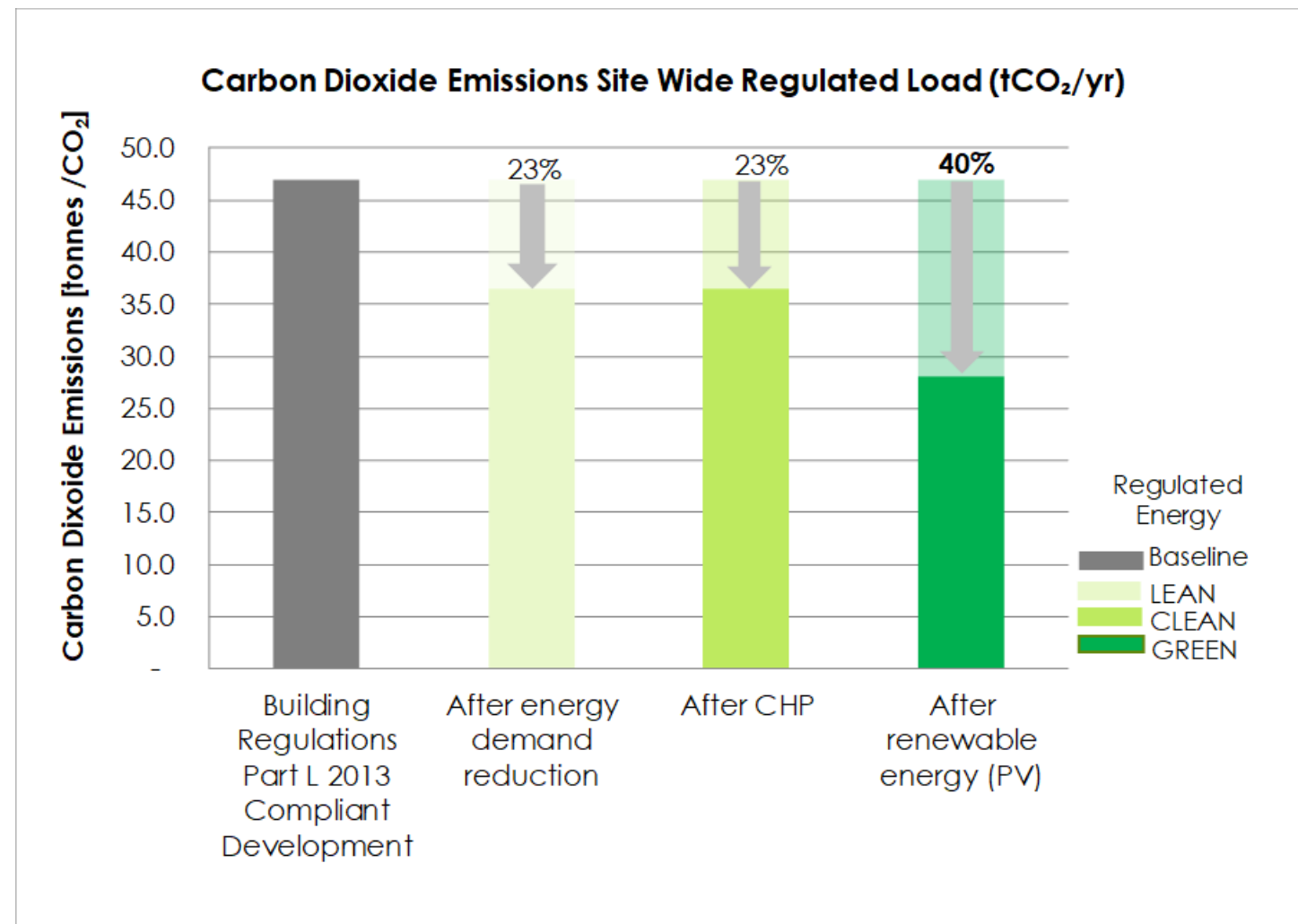
<ul style="list-style-type: none"> <li>• access to low carbon transport modes;</li> <li>• potential to address any local air quality, noise disturbance, flooding and land contamination issues; and</li> <li>• The potential effect on the micro-climate.</li> </ul> <p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>1. Any existing buildings that can be practically refurbished, retrofitted, altered, or extended should be retained and reused.</li> <li>2. A mix of uses, where suitable should be included to provide a range of services commensurate to the public transport accessibility</li> </ol>	<ul style="list-style-type: none"> <li>• Climate change, including the predicted increases in both external temperature and intensity of rainfall over the coming decades;</li> <li>• Increase in transient nature of business practise; and</li> <li>• Market sector demand.</li> </ul> <p>The application site is situated in easy reach of all necessary amenities to support a development of this nature, including areas of open space and connections to the wider transport network. This enables the development to knit well within the existing area and support the enhancement of the existing neighbourhood in place.</p> <p>The proposed design has evolved through an iterative process with planning officers and key stakeholders and embodies the highest quality design. Further detail on the design of the development and how this is appropriate to the context of the site is provided within the accompanying Design and Access Statement (DAS) and application drawings.</p>
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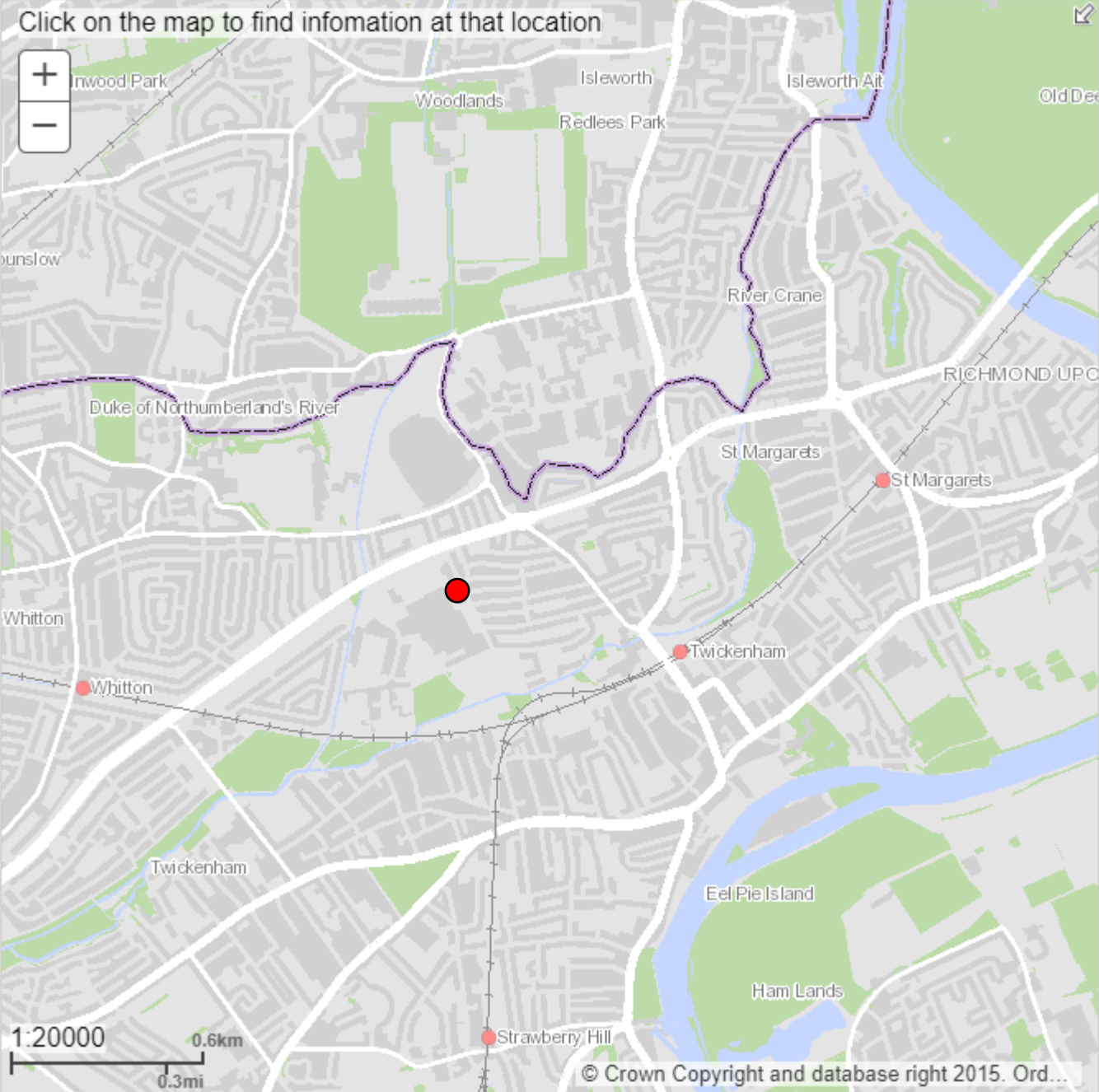
4.3 Energy and carbon dioxide emissions (SPG section 2.4)

Energy and carbon dioxide emissions	Development Response																																																																							
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>The overall carbon dioxide emissions from a development should be minimised through the implementation of the energy hierarchy set out in London Plan policy 5.2.</li> <li>Developments should be designed to meet the following Regulated carbon dioxide standards, in line with London Plan policy 5.2.</li> </ol> <p><b>Residential buildings</b></p> <table border="0"> <tr> <td>Year</td> <td>Improvements beyond 2010 Building Regulations</td> </tr> <tr> <td>1st October 2013 - 2016</td> <td>40 per cent (or 35% below 2013 Building Regulations)</td> </tr> <tr> <td>2016 - 2031</td> <td>Zero carbon</td> </tr> </table> <p><b>Non-domestic buildings</b></p> <table border="0"> <tr> <td>Year</td> <td>Improvements beyond 2010 Building Regulations</td> </tr> <tr> <td>1st October 2013 - 2016</td> <td>40 per cent (or 35% below 2013 Building Regulations)</td> </tr> <tr> <td>2016 - 2019</td> <td>As per the Building Regulation requirements</td> </tr> <tr> <td>2019 - 2031</td> <td>Zero carbon</td> </tr> </table> <p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>Developments should contribute to ensuring resilient energy infrastructure and a reliable energy supply, including from local low and zero carbon sources.</li> <li>Developers are encouraged to include innovative low and zero carbon technologies to minimise carbon dioxide emissions within developments and keep up to date with rapidly improving technologies.</li> </ol>	Year	Improvements beyond 2010 Building Regulations	1st October 2013 - 2016	40 per cent (or 35% below 2013 Building Regulations)	2016 - 2031	Zero carbon	Year	Improvements beyond 2010 Building Regulations	1st October 2013 - 2016	40 per cent (or 35% below 2013 Building Regulations)	2016 - 2019	As per the Building Regulation requirements	2019 - 2031	Zero carbon	<p>An Energy Statement detailing the energy strategy for the Proposed Development accompanies this Planning Application.</p> <p><b>The Proposed Development will aspire to meet the intent of policy by delivering a minimum on-site carbon dioxide emissions reduction of 35% over the existing building and extension (baseline building).</b></p> <p>The Proposed Development is currently predicting a 40% carbon dioxide emissions reduction over the existing building.</p> <p>The London Plan also requires that developments follow an energy hierarchy when considering reducing CO<sub>2</sub> emissions. The energy hierarchy must consider incorporation of energy efficiency measures including passive design, supplying energy efficiently (with particular emphasis on decentralised energy generation including CHP) and using renewable energy technologies. The responses to the subsequent topic areas include specific measures incorporated in the design.</p> <p>The total CO<sub>2</sub> saving achieved by the energy strategy is predicted to be up to <b>19 tonnes</b> when compared against the baseline scenario. The table below shows the breakdown in predicted savings for each stage of the energy hierarchy. The combined savings equate to a predicted <b>40% reduction</b> in regulated CO<sub>2</sub> emissions over the existing building delivering <b>+5% above</b> policy (35%) targets, and a <b>22.5 % reduction</b> when including unregulated CO<sub>2</sub> emissions.</p> <p>Table 2 and 3 below show the breakdown in savings for each stage of the energy hierarchy.</p> <p><b>Table 2: Predicted carbon dioxide emissions for each stage of the Energy Hierarchy</b></p> <table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="3">Carbon Dioxide Emissions (tCO<sub>2</sub>/yr)</th> </tr> <tr> <th>Regulated</th> <th>Unregulated</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Building Regulations Part L 2013 Compliant Development (TER)</td> <td>47</td> <td>37.3</td> <td>84.3</td> </tr> <tr> <td>Be Lean - Local Gas Boilers</td> <td>36.4</td> <td>37.3</td> <td>73.7</td> </tr> <tr> <td>Be Clean</td> <td>36.4</td> <td>37.3</td> <td>73.7</td> </tr> <tr> <td>Be Green - PV and Heat Pumps</td> <td>28</td> <td>37.3</td> <td>65.3</td> </tr> </tbody> </table> <p><b>Table 3: Predicted regulated carbon dioxide emissions savings from each stage of the Energy Hierarchy</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Savings from:</th> <th colspan="2">Regulated carbon dioxide savings</th> <th colspan="2">Regulated &amp; unregulated carbon dioxide savings</th> </tr> <tr> <th>Tonnes CO<sub>2</sub> per annum</th> <th>(%)</th> <th>Tonnes CO<sub>2</sub> per annum</th> <th>(%)</th> </tr> </thead> <tbody> <tr> <td>Be Lean - Local Gas Boilers</td> <td>10.6</td> <td>22.5%</td> <td>10.6</td> <td>12.5%</td> </tr> <tr> <td>Be Clean</td> <td>0.0</td> <td>0.0%</td> <td>0.0</td> <td>0.0%</td> </tr> <tr> <td>Be Green</td> <td>8.4</td> <td>17.9%</td> <td>8.4</td> <td>10%</td> </tr> <tr> <td><b>Total cumulative savings</b></td> <td><b>19</b></td> <td><b>40%</b></td> <td><b>19</b></td> <td><b>22.5%</b></td> </tr> <tr> <td><b>GLA 35% Carbon Reduction Target:</b></td> <td><b>16.3</b></td> <td><b>35%</b></td> <td></td> <td></td> </tr> </tbody> </table>		Carbon Dioxide Emissions (tCO <sub>2</sub> /yr)			Regulated	Unregulated	Total	Building Regulations Part L 2013 Compliant Development (TER)	47	37.3	84.3	Be Lean - Local Gas Boilers	36.4	37.3	73.7	Be Clean	36.4	37.3	73.7	Be Green - PV and Heat Pumps	28	37.3	65.3	Savings from:	Regulated carbon dioxide savings		Regulated & unregulated carbon dioxide savings		Tonnes CO <sub>2</sub> per annum	(%)	Tonnes CO <sub>2</sub> per annum	(%)	Be Lean - Local Gas Boilers	10.6	22.5%	10.6	12.5%	Be Clean	0.0	0.0%	0.0	0.0%	Be Green	8.4	17.9%	8.4	10%	<b>Total cumulative savings</b>	<b>19</b>	<b>40%</b>	<b>19</b>	<b>22.5%</b>	<b>GLA 35% Carbon Reduction Target:</b>	<b>16.3</b>	<b>35%</b>		
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Figure 1: Summary of total carbon dioxide emissions for each stage of the hierarchy



<p><b>Energy demand assessment</b></p>	<p><b>Development Response</b></p>
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Development applications are to be accompanied by an energy demand assessment.</li> </ol>	<p>An energy statement detailing the energy strategy for the Proposed Development accompanies this Planning Application. It includes an energy demand assessment following the approach to energy statements as detailed in the 'Energy Planning - GLA Guidance on preparing energy assessments' (March 2016) document.</p>
<p><b>Use less energy</b></p>	<p><b>Development Response</b></p>
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>The design of developments should prioritise passive measures.</li> </ol> <p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>Developers should aim to achieve Part L 2013 Building Regulations requirements through design and energy efficiency alone, as far as is practical.</li> </ol>	<p>In line with the energy hierarchy set in the London Plan, the demand reducing measures below were incorporated in the design, with priority given to passive measures.</p> <p>The preliminary calculations included in the Energy Statement indicate that the development is in line to surpass London Borough of Richmond upon Thames on carbon emission reduction requirements through design and energy efficiency alone.</p> <p><b>Energy Reducing/Efficiency Measures (Be Lean):</b> Detailed analysis has been undertaken to assess the impact of various building fabric and passive design solutions. The resulting design includes the following key features:</p> <ul style="list-style-type: none"> <li>The glazing g-value specification has been optimised to control solar gain.</li> </ul>

	<ul style="list-style-type: none"> <li>• Glazed areas have been optimized in order to increase the benefits from natural daylighting and reducing the need for electric lighting, whilst minimizing heat loss from the building.</li> <li>• The building fabric (glazing, walls, roof etc.) has been optimised for the construction element type.</li> <li>• The development will be designed with an air permeability target of 5 m<sup>3</sup>/m<sup>2</sup>/hr. at 50 Pa.</li> </ul>
<p><b>Energy efficient supply</b></p>	<p><b>Development Response</b></p>
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Where borough heat maps have identified district heating opportunities, boroughs should prepare more detailed Energy Master Plans (EMPs) to establish the extent of market competitive district heating networks.</li> <li>2. Developers should assess the potential for their development to:             <ul style="list-style-type: none"> <li>• connect to an existing district heating or cooling network;</li> <li>• expand an existing district heating or cooling network, and connect to it; or</li> <li>• Establish a site wide network and enable the connection of existing buildings in the vicinity of the development.</li> </ul> </li> <li>3. Where opportunities arise, developers generating energy or waste heat should maximise long term carbon dioxide savings by feeding the decentralised energy network with low or zero carbon hot water, and where required, cold water.</li> </ol>	<p>Existing and planned heat networks and anchor heat loads in the vicinity of the site have been investigated, but no opportunities for connection have been identified.</p> <p>The Proposed Development will be served by Variable Refrigerant Flow (VRF) with heat recovery. The heating system will be fed by VRF combined with Air Source Heat Pumps and Electric Vented Water Heaters located in a central plant room, meeting all of the DHW and space heating requirements.</p>  <p>The map shows the Twickenham area in London, including the River Crane and the Duke of Northumberland's River. A red dot marks the location of the proposed development. The map includes a scale bar (1:20000) and a copyright notice: © Crown Copyright and database right 2015. Ord...</p>

## 4.4 Renewable energy (SPG section 2.5)

Renewable energy	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Boroughs and neighbourhoods should identify opportunities for the installation of renewable energy technologies in their boroughs and neighbourhoods.</li> <li>Major developments should incorporate renewable energy technologies to minimise overall carbon dioxide emissions, where feasible.</li> </ol>	<p>A feasibility study has been undertaken to determine the most appropriate renewable energy source for the development (for more details please refer to the Energy Statement included with the Planning Application submission).</p> <p>Photovoltaics are being specified for the Proposed Development. The number of PVs and proposed layout will be optimised to make best use of the available roof area. Confirmation of precise details will follow as the design develops.</p>
Carbon dioxide off-setting	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Boroughs should establish a carbon dioxide off-set fund and identify suitable projects to be funded.</li> <li>Where developments do not achieve the Mayor's carbon dioxide reduction targets set out in London Plan policy 5.2, the developer should make a contribution to the local borough's carbon dioxide off-setting fund</li> </ol>	<p>The combined savings equate to a predicted <b>39.2% reduction</b> in regulated CO<sub>2</sub> emissions over a baseline model delivering <b>4.2 %</b> above policy (35%) target CO<sub>2</sub> emissions reduction. Therefore, there will be no costs in relation to offsetting any shortfall CO<sub>2</sub> emissions.</p>
Retrofitting	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Boroughs should set out policies to encourage the retrofitting of carbon dioxide and water saving measures in their borough.</li> <li>Where works to existing developments are proposed developers should retrofit carbon dioxide and water saving measures.</li> </ol>	<p>The proposed development is new build therefore retro fitting requirements are not applicable. However, the design will incorporate CO<sub>2</sub> saving measures in line with the energy hierarchy of the London Plan as detailed in section 4.3 above.</p> <p>The Proposed Development aims to ensure the specification of sanitaryware that demonstrates compliance with the BREEAM standards to achieve at least 40% improvement per person per day against the BREEAM baseline, please refer to section 4.5 for further details.</p>
Monitoring energy use	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Developers are encouraged to incorporate monitoring equipment and systems where appropriate to enable occupiers to monitor and reduce their energy use.</li> </ol>	<p>Extensive sub-metering will be present to allow monitoring as well as separate billing of individual tenants.</p>
Supporting a resilient energy supply	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Developers are encouraged to incorporate equipment that would enable their schemes to participate in demand side response opportunities.</li> </ol>	<p>The Proposed Development's overall energy demand has been minimised through the implementation of the sustainable design measures outlined in this statement; this will reduce overall impact on the wider energy network.</p> <p>Furthermore, photovoltaics have been proposed.</p> <p>The Proposed Development will also be provided with comprehensive sub-metering and smart meters to allow better management of the energy demand and better response to wider network energy availability through the central Energy Management System (EMS).</p>

4.5 Water efficiency (SPG section 2.6)

Water efficiency	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Developers should maximise the opportunities for water saving measures and appliances in all developments, including the reuse and using alternative sources of water.</li> <li>Developers should design residential schemes to meet a water consumption rate of 105 litres or less per person per day.</li> <li>Where a building is to be retained, water efficiency measures should be retrofitted.</li> <li>New non-residential developments, including refurbishments, should aim to achieve the maximum number of water credits in a BREEAM assessment or the 'best practice' level of the AECB (Association of Environment Conscious Building) water standards.</li> <li>All developments should be designed to incorporate rainwater harvesting.</li> </ol> <p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>All residential units, including individual flats / apartments and commercial units, and where practical, individual leases in large commercial properties should be metered.</li> </ol>	<p>The design recognises that the threat of future water shortage is a serious issue for London; whilst demand is growing due to increasing population and higher temperatures, climate change will increase the seasonality of water supply. Sustainable water sourcing and usage will be of utmost importance for adapting to the changing climatic conditions, and water efficiency and recycling has been made a key priority in the design.</p> <p>The approach to water efficiency for the development has three stages:</p> <ul style="list-style-type: none"> <li>Reduce mains water consumption on site</li> <li>Reuse water on site where possible thus reducing water to sewerage</li> <li>Specify water efficient internal sanitary ware and appliances</li> </ul> <p>The development will install water saving devices as detailed below.</p> <p><b>Methods to Reduce Consumption and Wastage</b> – incorporate water-sensitive design and conserve water resources.</p> <p>Pulsed output water meters will be installed at the site boundary and the building entry points to provide leak detection between the building and site boundary, as well as for monitoring large water uses in the building. Water sub meters will be installed to allow metering of high-water consuming plant and areas within the building.</p> <p><b>Water Saving Devices</b> – The following range of water efficient measures have been incorporated into the design to reduce water consumption demand:</p> <ul style="list-style-type: none"> <li>Dual flush WCs</li> <li>Reduced-flow taps and showers</li> </ul> <p><b>Water recycling systems</b> – At present no rainwater or grey water recycling have been specified.</p> <p>77% of BREEAM credits have been targeted under the water section.</p>

4.6 Materials and waste (SPG section 2.7)

Design phase	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>The design of development should prioritise materials that:                     <ul style="list-style-type: none"> <li>have a low embodied energy, including those that can be reused intact or recycled - at least three of the key elements of the building envelope (external walls, windows roof, upper floor slabs, internal walls, floor finishes / coverings) are to achieve a rating of A+ to D in the BRE's <i>The Green Guide</i> of specification;</li> <li>can be sustainably sourced - at least 50% of timber and timber products should be sourced from accredited Forest Stewardship Council (FSC) or Programme for the</li> </ul> </li> </ol>	<p>Materials will be chosen that have a minimal environmental impact, are from sustainable or recycled sources and, where feasible, are locally sourced to reduce transportation impacts, prioritising the following factors:</p> <ul style="list-style-type: none"> <li><i>Life cycle costing (£ and CO<sub>2</sub>)</i></li> <li><i>Use renewable materials</i></li> <li><i>Source materials locally</i></li> <li><i>Recycled content</i></li> <li><i>Minimise waste to landfill</i></li> <li><i>Specification of materials with zero exotoxins</i></li> <li><i>Synthetic or non-sustainably-sourced materials to be minimised</i></li> <li><i>Off-site manufacturing</i></li> <li><i>Ethical sourcing</i></li> <li><i>Minimise embodied energy</i></li> <li><i>Design for deconstruction</i></li> <li><i>Recyclability of materials</i></li> </ul>

<p>Endorsement of forestry Certification (PEFC) source;</p> <ul style="list-style-type: none"> <li>• are durable to cater for their level of use and exposure; and</li> <li>• Would not release toxins into the internal and external environment, including those that deplete stratospheric ozone.</li> </ul> <p><b>Mayor's Best Practice</b></p> <p>2. The design of developments should maximise the potential to use pre-fabrication elements.</p>	<ul style="list-style-type: none"> <li>• <i>Design mechanical fixings to facilitate deconstruction</i></li> <li>• <i>Specify materials and plant that can be re-used</i></li> <li>• <i>Lowest available embodied carbon option MEP Materials Specification</i></li> <li>• <i>Minimise gluing and composite materials</i></li> </ul> <p>The project team will recognise and encourage measures to optimise construction product consumption efficiency and the selection of products with a low environmental impact, including embodied carbon, over the life cycle of the building.</p> <p>The team will endeavour to use any structural timber from FSC compliant sources. The team will also endeavour to use non-structural timber in from a known source with a sustainable purchasing policy, and not be included on the CITES (Convention on International Trade in Endangered Species) list.</p> <p>Insulation materials for building elements and building services will be specified with low embodied environmental impact (minimal global warming potential and zero ozone depleting properties).</p> <p>The opportunity to source construction materials from a factory/plant, quarry, railhead or recycling centre close of the site will be investigated, with priority given to use of pre-fabricated elements, where feasible.</p> <p>Appropriately sourced aggregates and durable materials will be emphasised in the hard landscaping.</p> <p>The specification of recycled and reused materials will be a main design consideration.</p> <p>The development will aim to maximise the proportion of materials and components that can be re-used at the end of the building's life. 'Designing for robustness' will ensure that damage to the building due to wear and tear, for example in areas of heavy usage, is minimised and can be repaired with minimal environmental or cost impact.</p>
Construction phase	Development Response
<p><b>Mayor's Priorities</b></p> <p>1. Developers should maximise the use of existing resources and materials and minimise waste generated during the demolition and construction process through the implementation the waste hierarchy.</p>	<p>The Proposed Development will adhere to sustainable design principles with high standards of environmental performance. As such, consideration has been given to the waste generated by the building during all phases of the development from demolition, construction, during its operation and through to its eventual decommissioning. As a result, the waste strategy has the following aims:</p> <ul style="list-style-type: none"> <li>• To contribute towards achieving current and long-term government GLA and London Borough of Richmond targets for waste minimisation, recycling and reuse.</li> <li>• To ensure that all legal requirements for the handling and management of operational waste are complied with.</li> <li>• To provide tenants with a convenient, clean and efficient waste management systems that enhance the operation of the building and promote high levels of recycling.</li> </ul> <p>The following points are key to the design and construction of the project and will be considered within the CMP as it is developed during the progression of the project:</p> <p>During Construction:</p> <ul style="list-style-type: none"> <li>• Site wide waste management plan</li> <li>• Opportunities for prefabrication</li> <li>• Recycling target</li> <li>• Site travel efficiency</li> </ul> <p>During Operation:</p> <ul style="list-style-type: none"> <li>• Sufficiently sized and centralised space for recycling collection</li> </ul>

	<ul style="list-style-type: none"> <li>• Minimise volume of waste to landfill</li> </ul> <p>The principal contractor will have responsibility for writing, implementing and updating the Site Waste Management Plan (SWMP) throughout the development process. The SWMP will identify all waste streams and will discuss the potential to reduce, re-use, and recycle all materials wherever possible. This commitment to minimisation will be achieved in a number of ways, including but not limited to, the following:</p> <ul style="list-style-type: none"> <li>• Agreements with material suppliers to reduce the amount of packaging or to participate in a packaging take back scheme</li> <li>• Implementation of a 'Just in Time' material delivery system to avoid materials being stockpiled on site for long periods of time, which increases risk of damage and disposal as waste</li> <li>• Attention to material quantity requirements to avoid over ordering and generation of waste materials</li> <li>• Re-use of materials wherever feasible</li> <li>• Segregation of waste at source where practical</li> <li>• Re-use and re-cycling of materials off-site where re-use on-site is not practical</li> </ul> <p>Modular construction/off site prefabrication will be considered (where feasible), which will result in less time on site and reduced impact on the site's neighbours.</p>
Occupation phase	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Developers should provide sufficient internal space for the storage of recyclable and compostable materials and waste in their schemes.</li> <li>2. The design of development should meet borough requirements for the size and location of recycling, composting and refuse storage and its removal.</li> </ol>	<p>Recycling collection facilities will be implemented in the building. Space will be allowed for the collection of separate recyclable waste streams on the site. The waste storage facility is located externally at ground level.</p>

4.7 Nature conservation and biodiversity (SPG section 2.8)

Nature conservation and biodiversity	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. There is no net loss in the quality and quantity of biodiversity.</li> <li>2. Developers make a contribution to biodiversity on their development site.</li> </ol>	<p>The landscaping scheme will be developed to optimise ecological improvement and provide environmental benefit, particular focus should be given to the following areas:</p> <ul style="list-style-type: none"> <li>• Preserving / enhancing species</li> <li>• Indigenous planting</li> <li>• Encouraging local birds</li> </ul> <p>Around 21 new trees are proposed to be planted as part of the development, predominately native species. 70% of the roof will be a green roof made of native wildflower species. In addition, a bat and bird box are included in the Proposed Development. The Western ecology corridor along Marsh Farm Lane will be enhanced with hedgerows.</p> <p>As a result, there could be a net increase in species on site with potential connectivity to the local sites of interest:</p> <ul style="list-style-type: none"> <li>• Murray park, located approximately 0.9 miles North of the development</li> <li>• Marble Hill Park, located approximately 1.3 miles South of the development,</li> <li>• Ham Land, a nature reserve, located approximately 1.8 miles South of the development,</li> </ul>

4.8 Tackling increase temperature and drought (SPG section 3.2)

Overheating	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Developers should include measures, in the design of their schemes, in line with the cooling hierarchy set out in London Plan policy 5.9 to prevent overheating over the scheme's lifetime.</li> </ol>	<p>Knowledge and experience of the design team helped develop the scheme from inception with advanced dynamic thermal simulation being deployed on the project to assess the evolving design's risk of overheating with the aim of ensuring occupant thermal comfort is predicted to an acceptable level of risk for the Client and in keeping with the intention of policy.</p> <p>The overheating assessment complies with Building Regulations Approved Document Part L compliance requirements (Criterion 3 Summertime Overheating). Further overheating studies (CIBSE TM52 and CIBSE TM49) have been completed and show compliance which demonstrates a minimal risk of overheating.</p> <p>The following findings of the thermal studies have been incorporated into the design enabling predicted compliance with Criterion 3 of the Building Regulations:</p> <ul style="list-style-type: none"> <li>• The solar performance of the glazing units has been optimised to a g-value of 0.3</li> </ul> <p>As can be seen this analysis influenced the facade treatment and specification, implementing a couple of 'fine tuning' elements to the passive design principles and further reducing the need for mechanical ventilation and cooling systems whilst balancing the aspiration for passive heat, daylight and views out, where possible.</p>



Heat and drought resistant planting	Development Response
<p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>The design of developments should prioritise landscape planting that is drought resistant and has a low water demand for supplementary watering.</li> </ol>	<p>The landscaping design will specify native species where feasible which do not require regular watering post establishing.</p>
Resilient foundations	Development Response
<p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>Developers should consider any long-term potential for extreme weather events to affect a building's foundations and to ensure they are robust.</li> </ol>	<p>The foundations are sufficiently deep to not be affected by temperature or rainfall patterns. The site is located outside of an area with permeable superficial deposits.</p>

**4.9 Increasing green cover and trees (SPG section 3.3)**

Urban greening	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Developers should integrate green infrastructure into development schemes, including by creating links with wider green infrastructure network.</li> <li>Major developments in the Central London Activity Area (CAZ) should be designed to contribute to the Mayor's target to increase green cover by 5% in this zone by 2030.</li> </ol>	<p>Opportunities for incorporation of green areas have been optimised despite the development being in a dense urban location. Additional green coverage will be provided with the incorporation of new trees and soft landscaping. The Proposed Development includes 600 m<sup>2</sup> of green roof. Around 21 new trees are proposed to be planted as part of the development, predominantly native species. 70% of the roof will be a green roof made of native wildflower species. Improvement are also proposed to Marsh Farm Lane with an ecological corridor providing connectivity for pollinators as well as providing benefits for visual screening, cooling of the adjacent buildings, and providing benefits to storm water drainage.</p>

Trees	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>Developments should contribute to the Mayor's target to increase tree cover across London by 5% by 2025.</li> <li>Any loss of a tree/s resulting from development should be replaced with an appropriate tree or group of trees for the location, with the aim of providing the same canopy cover as that provided by the original tree/s.</li> </ol>	<p>Around 21 new trees are proposed to be planted as part of the development, predominately native species.</p> <p>Additional landscaped areas will be provided and may include increased tree coverage where deemed possible. A site wide landscape proposal including trees, shrubs, hedges and wildflowers has been proposed as well as a green roof.</p>

4.10 Flooding (SPG section 3.4)

Surface water flooding and sustainable drainage	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Through their Local Flood Risk Management Strategies boroughs should identify areas where there are particular surface water management issues and develop policies and actions to address these risks.</li> <li>2. Developers should maximise all opportunities to achieve greenfield runoff rates in their developments.</li> <li>3. When designing their schemes developers should follow the drainage hierarchy set out in London Plan policy 5.13</li> <li>4. Developers should design Sustainable Drainage Systems (SuDS) into their schemes that incorporate attenuation for surface water runoff as well as habitat, water quality and amenity benefits.</li> </ol>	<p>The Proposed Development has been designed to reduce flooding events, and improve water quality locally and beyond the site through consideration of the following factors and following the drainage hierarchy:</p> <ul style="list-style-type: none"> <li>• 1. Water Reuse</li> <li>• 2. Living Roofs</li> <li>• 3. Basins and Ponds</li> <li>• 4. Infiltration Devices</li> <li>• 5. Permeable Surfaces</li> <li>• 6. Tank Systems</li> </ul> <p>As per the Flood Risk Assessment and Drainage Strategy Report produced by Price &amp; Myers:</p> <ul style="list-style-type: none"> <li>• The site is located in Flood Zone 1 and is considered to be at low risk of fluvial flooding from the River Thames. The annual probability of flooding from fluvial sources for the site is less than 0.1% (or 1 in 1000).</li> <li>• The existing development utilises infiltration techniques to manage the surface water generated by rainfall events. Six soakaways were identified within the site boundary;</li> <li>• The run-off rate for the proposed development shall be restricted to 5l/s. This was agreed in the site wide surface water drainage strategy supplied by Atkins (2016), which was previously granted outline planning permission (ref:15/3038/OUT). The attenuation tank was designed for the 1 in 100-year storm event plus 30% allowance for climate change, allowing for the future connection of the building roof area of the Haymarket Tech Hub, as well as the Sports Hall and STEM building roof areas. The flow control device was designed to discharge to the Thames Water surface water public sewer located in Chertsey Road – design and route by others.</li> </ul> <p>The Proposed Development will aspire to achieve a reduction in on-site run-off rate through deploying an appropriate SuDS solution. The detail of the system(s) solution will be developed during the design stage of the project for implementation during construction. Current considerations are one or a mixture of the following technologies:</p> <ul style="list-style-type: none"> <li>• Rainwater attenuation tank</li> <li>• Trees</li> <li>• Green Roof</li> <li>• Permeable paving</li> </ul> <p>Improvement are also proposed to Marsh Farm Lane with an ecological corridor providing connectivity for pollinators as well as providing benefits for visual screening, cooling of the adjacent buildings, and providing benefits to storm water drainage.</p>

<p><b>Flood resilience and resistance of buildings in floor risk areas</b></p>	<p><b>Development Response</b></p>
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Development in areas at risk from any form of flooding should include flood resistance and resilience measures in line with industry best practice.</li> </ol>	<p>The Site does not lie within any of the Environment Agency's classified Source Protection Zones.</p> <p>The site is located within Flood Zone 1, whereby the annual probability of flooding is classified as being less than 1 in 1000.</p> <p>The Proposed Development is considered to be at a low risk of flooding and would not increase surface water runoff through an increase in impermeable area and the application of green roofs, rainwater harvesting and permeable paving.</p>
<p><b>Flood risk management</b></p>	<p><b>Development Response</b></p>
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Developments are designed to be flexible and capable of being adapted to and mitigating the potential increase in flood risk as a result of climate change.</li> <li>2. Developments incorporate the recommendation of the TE2100 plan for the future tidal flood risk management in the Thames estuary</li> <li>3. Where development is permitted in a flood risk zone, appropriate residual risk management measures are to be incorporated into the design to ensure resilience and the safety of occupiers.</li> </ol>	<p>The Site does not lie within any of the Environment Agency's classified Source Protection Zones.</p> <p>The site is located within Flood Zone 1, whereby the annual probability of flooding is classified as being less than 1 in 1000.</p> <p>The Proposed Development is considered to be at a low risk of flooding and would not increase surface water runoff through an increase in impermeable area in part due to the application of SuDS. The Proposed Development will aspire to achieve a reduction in on-site run-off rate through deploying an appropriate SuDS solution. The detail of the system(s) solution will be developed during the design stage of the project for implementation during construction. Current considerations are one or a mixture of the following technologies:</p> <ul style="list-style-type: none"> <li>• Rainwater attenuation tank</li> <li>• Green Roof</li> <li>• Permeable paving</li> </ul> <p>Improvement are also proposed to Marsh Farm Lane with an ecological corridor providing connectivity for pollinators as well as providing benefits for visual screening, cooling of the adjacent buildings, and providing benefits to storm water drainage.</p>
<p><b>Flood defences</b></p>	<p><b>Development Response</b></p>
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Development should maximise all opportunities to achieve an 8m setback on fluvial watercourses between built development and watercourses, flood defences and culverts.</li> <li>2. Development should maximise all opportunities to achieve a 16m setback on tidal watercourses between built development and watercourses and flood defences.</li> </ol>	<p>The Proposed Development is approximately 0.2 miles from Duke of Northumberland's River, approximately 0.4 miles from the River Crane, approximately 1 mile from The River Thames and approximately 4 miles from Pen Ponds in Richmond Park and no other watercourse, flood defence or culvert has been identified closer to the development.</p>
<p><b>Other sources of flooding</b></p>	<p><b>Development Response</b></p>
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. All sources of flooding need to be considered when designing and constructing developments.</li> </ol>	<p>The design has considered all sources of flooding and further SuDS drainage detailing will be undertaken during design. Refer to other responses in Section 4.10 above.</p>

4.11 Land contamination (SPG section 4.2)

Land contamination	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Developers should set out how existing land contamination would be addressed prior to the commencement of their development.</li> <li>2. Potentially polluting uses are to incorporate suitable mitigation measures.</li> </ol>	<p>Proposed uses of the building do not represent high polluting risk.</p> <p>On completion of the Proposed Development, the majority of the site will be covered in hard standing or structures which will form a physical barrier between any potential shallow soil contaminants and human health receptors, thereby significantly reducing the potential for exposure. Based on the lack of historical contaminative uses on the site and the post development reduction of exposure due to the presence of surface cover, the risk to human health receptors is considered to be low.</p> <p>A contaminated land risk assessment based on site investigation data from 2008, and a data search, desk study and site walkover undertaken in 2014 has concluded that the majority of the Site contains soil contaminants below screening criteria for commercial use of the Site. These criteria would apply to the college, schools and tech hub development zones. However, there is one exceedance of the relevant criterion for benzo[a]pyrene (a polycyclic aromatic hydrocarbon). This could pose a risk to human health and will require mitigation. Mitigation will take the form of further site investigation and soil testing to characterise the nature and extent of contamination followed by excavation and removal of contaminated soil for treatment off-site.</p> <p>The potential effects of ground gases (carbon dioxide) are rated moderate adverse across the site. However, after mitigation, which would involve incorporation of gas barriers into the floor slabs of any sensitive structures, the residual effects would be negligible.</p> <p>A Ground Condition assessment report focuses on the impacts of contaminated land during demolition, excavation and construction as there are not expected to be any contaminated land impacts during the operational phase of the proposed development. This is because there will be no new sources of contaminants nor any significant changes to the site that would affect the potential impacts of residual contaminants on site, and all mitigation measures will be complete by the end of the construction phase or will have been incorporated into the design of the development.</p>

4.12 Air pollution (SPG section 4.3)

Air pollution	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Developers are to design their schemes so that they are at least 'air quality neutral'.</li> <li>2. Developments should be designed to minimise the generation of air pollution.</li> <li>3. Developments should be designed to minimise and mitigate against increased exposure to poor air quality.</li> <li>4. Developers should select plant that meets the standards for emissions from combined heat and power and biomass plants set out in Appendix 7.</li> <li>5. Developers and contractors should follow the guidance set out in the emerging minimising dust and emissions from construction and demolition SPG when constructing their development.</li> </ol>	<p>The Proposed Development would include the use of a VRF combined with Air Source Heat Pumps and Electric Vented Water Heaters which has improved efficiencies and low emissions as a result of tightened legislation. The detailed specification and installation of this plant would be in line with best practice guidance.</p> <p>Pedestrian movement and cyclist routes will be prioritised over vehicular and a minimum of 15 cycle spaces and secured bike lockers will be allocated.</p>

## 4.13 Noise (SPG section 4.4)

Noise	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Areas identified as having positive sound features or as being 'quiet areas' should be protected from noise enhanced, where possible.</li> <li>2. Noise should be reduced at source and then designed out of a scheme to reduce the need for mitigation measures.</li> </ol>	<p>The site is not in close proximity to any identified 'quiet zones'.</p> <p>An acoustic assessment will be completed for the site, prior to commencement of construction, to be able to conclude that suitable noise levels can be achieved using appropriate construction methods such as temporary screening and that the plant specification has been designed to meet the Richmond upon Thames Council requirements in which case there would be no significant effects from fixed plant noise on noise sensitive locations surrounding the proposed site.</p>

## 4.14 Light pollution (SPG section 4.5)

Light pollution	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. Developments and lighting schemes should be designed to minimise light pollution.</li> </ol>	<p>Light pollution will be minimised by considerate selection of external light fittings to avoid light spillage as well as time clock and dusk-to-dawn controls.</p>

## 4.15 Water pollution (SPG section 4.6)

Surface water runoff	Development Response
<p><b>Mayor's Priorities</b></p> <ol style="list-style-type: none"> <li>1. In their aim to achieve a greenfield runoff rate developer should incorporate sustainable urban drainage systems (SuDS) into their schemes which also provide benefits for water quality.</li> </ol> <p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>2. Encourage good environmental practice to help reduce the risk from business activities on the London water environment.</li> <li>3. Encourage those working on demolition and construction sites to prevent pollution by incorporating prevention measures and following best practice.</li> </ol>	<p>The Proposed Development will aspire to achieve a reduction in on-site run-off rate through deploying an appropriate SuDS solution. The detail of the system(s) solution will be developed during the design stage of the project for implementation during construction. Current considerations are one or a mixture of the following technologies:</p> <ul style="list-style-type: none"> <li>• Rainwater attenuation tank</li> <li>• Green roof</li> <li>• Permeable paving</li> </ul> <p>Refer to Section 4.10 Flooding above.</p> <p>Best practice water management and pollution control will be employed during construction.</p>
Water treatment	Development Response
<p><b>Mayor's Best Practice</b></p> <ol style="list-style-type: none"> <li>1. Residential developments discharging domestic sewage should connect to the public foul sewer or combined sewer network where it is reasonable to do so.</li> <li>2. Commercial developments discharging trade effluent should connect to the public foul sewer or combined sewer network where it is reasonable to do so subject to a trade effluent consent from the relevant sewerage undertaker.</li> <li>3. Developments should be properly connected, and post-construction checks should be made by developers to ensure that misconnections do not occur.</li> </ol>	<p>The development would be connected to the public foul sewer. Please note no trade effluent is generated as a result of the proposed development.</p>

**5.0 CONCLUSION**

The Proposed Development broadly meets all of the Mayor's 'best practice' policy requirements for sustainability.

