

Environmental Sustainability Plan

Coal Drops Yard

King's Cross Central General Partner Ltd

October 2015

King's Cross

Contents

- I. Environmental Sustainability Plan
2. Appendices
 - a. Environmental Wind Statement
 - b. Ecology Support Statement

Contents

1.0	Executive Summary	5
1.1	Energy Strategy	6
1.2	Sustainability Strategy	8
2.0	Introduction	11
2.1	Background and existing Outline Planning Permission	11
2.2	Approach to Part L of the Building Regulations	11
3.0	Planning and regulatory framework	13
3.1	National Planning Guidance	13
3.2	Regional Planning Guidance	13
3.3	Local Planning Guidance	13
3.4	Planning Conditions and Section 106 Agreement	14
4.0	Energy Strategy Summary, including response to Outline Planning Permission (OPP) Conditions 17 parts (a), (b) and (d) and Section 106 Agreement section X	15
4.1	Energy Efficiency measures proposed - 'Be Lean'. Also in line with OPP Condition 17(a) – energy efficiency measures and S106 Section X - Energy	15
4.2	Reduction in carbon emissions for the Coal Drops Yard development. Also in line with OPP Condition 17(b) – reduction in carbon emissions, and S106 Section X - Energy	17
4.3	Energy Supply – 'Be Clean'. Also in line with OPP Condition 17(d) – energy supply and S106 Section X - Energy	18
4.4	Energy Supply – 'Be Green'. Also in line with OPP Condition 17(d) – energy supply and S106 Section X - Energy	19
4.5	Development-wide energy and carbon reduction targets	22
5.0	Sustainability Strategy, including response to Outline Planning Permission (OPP) Condition 17 parts (c), (e), and (f) and conditions 45 and 46; and Section 106 Agreement, Sections Y, Z and AA	24

5.1	Green and / or Brown Roofs. Also in line with OPP Condition 17(c) and condition 46 – green and brown roofs	24
5.2	BREEAM Rating. Also relevant to OPP - Condition 17 (e) – BREEAM	25
5.3	Ecology. Also relevant to OPP - Condition 17 (f) – wildlife features	28
5.4	Drainage. Also relevant to OPP - Condition 45 – drainage infrastructure	29
5.5	Water Efficiency. Also relevant to S106 - Section AA - Water	33
5.6	Construction materials and waste. Also relevant to S106 - Section Y – Construction Materials and Waste	34
5.7	Operational waste management. Also relevant to S106 - Section Z - Waste	36
5.8	Sustainable transportation	38
6.0	Conclusion	39
6.1	Energy Strategy	39
6.2	Sustainability Strategy	40
7.0	Appendix A – Energy Strategy	43
8.0	Appendix B – Ecology Support Statement	44
9.0	Appendix C - BREEAM 2014 Refurbishment and Fit-out Pre-Assessment Report (Shell and Core – BREEAM Parts 1&2)	45
10.0	Appendix D - BREEAM 2014 New Construction Pre-Assessment Report (Shell and Core – BREEAM Parts 1&2)	46
11.0	Appendix E – Environmental Wind Statement	47
12.0	Appendix F – Overview of planning and regulatory framework	48
13.0	Appendix G – Surface water and foul drainage layout	56

1.0 Executive Summary

This Environmental Sustainability Plan has been prepared by Hoare Lea on behalf of King's Cross Central General Partner Limited to describe the contribution that the proposed refurbishment of the Coal Drops Yard development will make to sustainable development.

Specifically, this document describes the Energy and Sustainability Strategy for the proposals in full, including addressing the relevant planning conditions of the Outline Planning Permission (OPP) for the Kings Cross Central Site (reference 2004/2307/P), and relevant sections of the associated Section 106 agreement. The document provides an explanation of the BREEAM pre assessment scores targeted, and sets out the breakdown between new and refurbished elements of this site. The document additionally assesses the proposals against the relevant current planning policy, and provides the following reports in appendix:

- Energy Strategy
- BREEAM 2014 Refurbishment and Fit-out Pre-Assessment Report (Shell and Core – BREEAM Parts 1&2)
- BREEAM 2014 New Construction Pre-Assessment Report (Shell and Core – BREEAM Parts 1&2)
- Environmental Wind Statement
- Overview of planning and regulatory framework
- Ecology Support Statement

The development comprises the Eastern Coal Drops (ECD) and associated viaduct, Western Coal Drops (WCD) and associated viaduct, newly built areas connecting these two buildings, the Western Wharf Road Arches (WWRA), Lower Stable Street and the surrounding public realm. ECD is Grade II listed, and the whole development is situated within the Regent's Canal Conservation Area.

The Coal Drops Yard sits within Development Zones I and M of the King's Cross Central Development, which are subject to an Outline Planning Permission (OPP), granted in 2006, with reference (2004/2307/P).

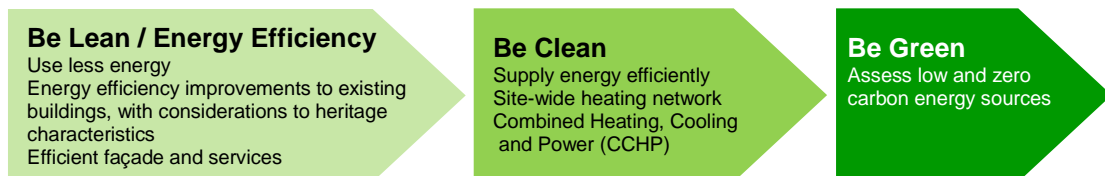
The proposal is being submitted as a combination of details of Reserved Matters Application, and with a full Planning Permission sought for aspects of the development where works were not originally envisaged under the OPP, namely the new upper level addition along with additional connecting bridges between Lower and Upper Stable Street.

The development has been designed to achieve a high level of sustainability with all areas targeting at least a BREEAM Very Good rating. The key sustainability and low carbon measures proposed in relation to current planning policy as well as to each relevant planning conditions are summarised below.

This Environmental Sustainability Plan forms a part of the suite of documents that support the Reserved Matters submission and Full Planning submission for the Coal Drops Yard, and should therefore be read in conjunction with those documents.

1.1 Energy Strategy

The strategy for the whole Coal Drops Yard development follows the principles established within condition 17 of the Outline Planning Permission, which are also in line with the energy hierarchy (Be Lean – Be Clean – Be Green).



A holistic approach has been adopted for the energy and carbon reduction strategy for the Coal Drops Yard development.

Energy Efficiency measures proposed for all refurbished areas and the new upper floor extension - 'Be Lean'. Also in line with OPP Condition 17(a) - energy efficiency measures and S106 Section X: Energy

Notwithstanding the desire to preserve as much of the historic structure of the buildings as possible, the proposals demonstrate an integrated and comprehensive approach to sustainability and low energy design. Measures include:

- Introduction of new double glazing with solar control where new windows are being introduced. Historic windows, where present, will be overhauled and re-glazed with single glazing. New shop fronts will be double glazed.
- New efficient services in areas that are being fitted out
- New energy efficient lighting to landlord areas and fit-out elements where present
- Insulation introduced to roofs and ground floors where possible
- Metering of heating, cooling, water and electricity to each unit, encouraging tenants to monitor and reduce consumption

The refurbishment will incorporate best practice standards respectful of listed buildings and conservation area constraints, with proposals developed in collaboration with heritage specialist Giles Quarme & Associates to identify acceptable improvements that minimise impact on the historic fabric.

As the proposals have been developed in collaboration with a heritage specialist and in consultation with Camden Council and Historic England to identify acceptable improvements, the current design represents a scheme that is considered to have maximised the potential for carbon emissions savings for a heritage site.

Energy efficiency measures proposed for all new-built areas (Lower Stable Street)

Lower Stable Street will apply a 'fabric-first' approach to energy efficiency (i.e. passive design with focus on energy efficiency of the fabric first and foremost), and will encourage the incorporation of very efficient mechanical and electrical systems from the tenant fit-out. The units will further be required to connect to the KXC district energy network for all heating, cooling and domestic hot water consumption (see 'energy supply' section below).

The retail units in Lower Stable Street will be built to Shell & Core standards with future tenants responsible for most of the energy-consuming systems (e.g. lighting). The target at this stage is therefore based on the assumption that default values for tenant systems will have to be used in the Part L modelling for these units at the Shell & Core stage, resulting in a less ambitious energy performance rating expected at this stage, but a better performance potentially available once the units have been fully fitted.

Reduction in carbon emissions for the Coal Drops Yard development. Also in line with OPP Condition 17(b) - reduction in carbon emissions and S106 Section X: Energy

The energy efficiency measures set out above are expected to lead to the following carbon emission reductions prior to the connection to the King's Cross Central (KXC) District Energy Network:

- For refurbished areas and new upper level extension: Estimated approximately 15-20% carbon emissions reduction over Part L2B 2013 prior to connection to the KXC District Energy Network.
- For new built areas (Lower Stable Street): Estimated up to 10% carbon emissions reduction over Part L2A 2013 prior to connection to the KXC District Energy Network.
- For the Coal Drops Yard development as a whole: This strategy is expected to result in a reduction in carbon emissions of approximately 15-20% over the combined Part L 2013 baseline (Part L2A/B) prior to connection to the KXC District Energy Network.

The feasibility of achieving these targets has been subject to an initial review through preliminary Part L modelling of sample representative areas of the buildings, and energy strategy calculations. This significant improvement is expected to be achieved despite the Coal Drops buildings' heritage status.

Attention has been given to the reduction of risk of overheating and cooling requirements through proportions of glazing and glazing specifications in the refurbishment proposals.

Energy Supply – 'Be Clean'. Also in line with OPP Condition 17(d) – energy supply and S106 Section X: Energy

District Heating including Combined Heat and Power (CHP) has already been implemented on the wider King's Cross site as part of King's Cross Central General Partner Ltd's overall commitment to low-carbon energy distribution for the wider site. As a new commitment, it has been decided to also implement cooling in the district energy network. This will be fed by a low carbon Combined Heating, Cooling and Power (CCHP) network.

This is a low carbon cooling method, and in line with the Mayor of London's preferred strategy.

It is estimated that this connection will lead to an over-all carbon emission reduction for the Coal Drops Yard development of 25-35% over the combined Part L 2013 baseline (Part L 2A/B) when added to the savings expected from the energy efficiency measures listed above.

Energy Supply – 'Be Green'. Also in line with OPP Condition 17(d) – energy supply and S106 Section X: Energy

A review of low carbon and renewable technologies has been carried out to assess their suitability for the Coal Drops Yard. The study considered lifecycle costs vs. estimated carbon emissions reductions, and the physical and visual impact on the historic fabric and setting of the buildings. The following technologies were investigated in greater detail:

Photovoltaic panels (PVs)

As part of the outline planning application, some roof areas of the Coal Drops Yard were identified as potentially suitable for PVs. A detailed assessment has now been undertaken, and only a small amount of roof area of the existing buildings would be technically suitable for photovoltaic panels due to their orientation. It has further been advised by the heritage consultant that PVs in these locations would have a negative impact on the character and setting of the listed building and conservation area, especially on the eastern roof at the south end of ECD where these would be very visible from Granary Square.

Only minimal benefits would be expected from the resulting potential PV array (CO₂ emission savings of 0.5-1% after the implementation of the CCHP system), and these are not considered to outweigh the resulting harm to the character and setting of the listed building. The potential carbon emission savings are small compared to the substantial savings expected from the proposed energy efficient strategy with connection to the KXC District Energy Network.

Opportunities for incorporating renewable technologies on Lower Stable Street have been investigated. Based on this appraisal, it is not currently proposed to implement renewable technologies in these very small retail units, which all have partially overshadowed roofs.

Ground Source Heat Pump (GSHP)

A detailed analysis of this technology was carried out as part of the Reserved Matters Application for the neighbouring Fish & Coal development, which concluded that connection to the King's Cross district energy network would provide greater carbon emissions savings. Reserved Matters approval was granted for the Fish & Coal development in 2014 based on this approach.

The proposal for the Coal Drops Yard follows in this vein, and the scheme is proposing to connect to the King's Cross (KXC) District Energy Network for all heating, hot water and cooling, providing greater carbon emissions savings than a GSHP system would be expected to provide.

1.2 Sustainability Strategy

The sustainability strategy explores opportunities for incorporating a wide range of sustainability measures within the development. An iterative process with both Camden Council and Historic England (formerly English Heritage) has informed the proposals in order to ensure the minimum possible impact on the historic significance and special interest of the Coal Drops Yard.

Green and / or Brown Roofs. Also in line with OPP Condition 17(c) and condition 46 – green / brown roofs

As this is mainly a refurbishment scheme and the majority of the existing structure is being retained, there is little scope for enhancing ecology through extensive integrated features in the existing buildings. This was recognised in the Outline Planning Permission, and the Coal Drops Yard is not designated as a priority zone for green/brown roofs within the KXC site. An Ecology report, prepared by RPS, is appended to this document.

No green or brown roofs are therefore proposed on the ECD and WCD, consistent with Parameter Plan KXC 021 and the Development Specification which formed part of the Outline Planning Permission. The roof of the WWRA however will be a planted and landscaped area, as already approved in the Fish & Coal Offices and EWRA Reserved Matters application.

BREEAM Rating. Also relevant to OPP - Condition 17 (e) – BREEAM

BREEAM for refurbished areas

The refurbished areas of the development are targeting a BREEAM 2014 Refurbishment and Fit-out (BREEAM RFO) rating of BREEAM 'Very Good' for all shell-and-core works. This target could potentially be uplifted to 'Excellent', subject to heritage constraints. As the retail area within the new roof structure accounts for less than 25% of the total area of the existing buildings, the roof area has been assessed using Part L2B for 'refurbishments with extensions' and therefore has also been assessed using BREEAM Refurbishment and fit-out 2014.

A pre-assessment has been carried out to ensure this target is achievable (see Appendix C). This currently estimates an overall target score of 61.4%, equating to a 'Very Good' BREEAM rating, and the project team has also identified potential additional credits which could amount to an 'Excellent' rating. This will be considered as the project develops.

BREEAM for new-built areas (Lower Stable Street)

New built areas will target a BREEAM New Construction 2014 'Very Good' rating for the shell and core areas.

A pre-assessment has been carried out to ensure this target is achievable. This is included in Appendix D. This currently estimates an overall target score of 59.0%, equating to a 'Very Good' BREEAM rating. The project team has also identified potential additional credits which could amount to an 'Excellent' rating which will be considered as the project develops.

Specific BREEAM section targets set in Camden Core Strategy

Specific targets against certain BREEAM Sections under the Energy, Materials and Waste categories as requested within Camden's Core Strategy and the Section 106 agreement are estimated to be met within the BREEAM RFO pre-assessment. The BREEAM NC assessment shows a shortfall in the baseline score for the energy category only, due to the dependence of these credits on the tenant fit-out e.g. lighting. Potential credits have been identified to bring this score above the Camden specific target, however this will be subject to tenant cooperation.

Ecology. Also relevant to OPP - Condition 17 (f) – wildlife features

The proposals seek to increase the ecological value of the site through the incorporation of biodiversity improvements incorporated in the design where possible.

An ecologist has been appointed and a site survey carried out to assess the existing biodiversity and ecological value of the site. The current site has been assessed to be of low ecological value; and any existing features of biodiversity value will be protected, if present. Biodiversity improvements including bird and bat boxes will be incorporated in the design in locations which are sympathetic to the heritage nature of the development. The full Ecology Support Statement is appended to this report.

Drainage. Also relevant to OPP - Condition 45 – drainage infrastructure

The Coal Drops Yard development forms part of the site-wide surface and foul water disposal strategy, and more specifically within the North West Drainage Infrastructure Area (one of three areas which cover the King's Cross Central site). Peak discharge flows for the buildings have been calculated, and these flows will contribute towards meeting the site wide 2,292l/s discharge limit and to an overall 10% reduction (1 in 30 year storm) in surface and foul peak flows across the King's Cross Central (KXC) development

A Flood Risk Assessment for the wider King's Cross site has been produced, and an assessment will also be carried out for the Coal Drops Yard development for the purpose of the BREEAM rating. The KXC land is within Flood Zone 1, as defined by the EA, and is therefore considered to be 'low-risk' from flooding. Surface water run-off from the site is not expected to be greater than it was for the pre-development sites and there is no increase in impermeable areas. The peak flows for Plots M1 and M2 are 107 l/s and 142l/s for surface water respectively and 16.2 l/s and 1.7 l/s foul water respectively. The peak foul flow for M3 is negligible (less than 0.1 L/s).

Water Efficiency. Also relevant to S106 - Section AA - Water

The development will incorporate water efficient sanitary ware in landlord areas. All parts of the buildings will be supplied with water meters with a pulsed output which allows effective water management and monitoring to take place, and sanitary supply shut off systems will be installed to avoid water waste when rooms are unoccupied. Major leak detection will also be provided to all mains water supply between and within the building.

Construction materials and waste. Also relevant to S106 - Section Y – construction materials and waste

Strategy for materials and responsible sourcing

Most of the façade and a great amount of the remaining envelope and structures at the Coal Drops Yard will be retained, either in-situ or used elsewhere on the Coal Drops Yard site.

A number of studies have been carried out since the early stages of design to ensure measures are implemented for efficient use of materials and flexibility for future uses of the buildings.

The King's Cross Central site-wide Construction Materials and Purchasing Strategy will be adopted and materials used in the development will be responsibly sourced where possible. All timber will be sourced following the UK Government's Timber Procurement Policy, and will be legally sourced.

Reduction in refurbishment and construction waste

The project team intends that best practice will be followed on the Coal Drops Yard development and surpassed wherever practicable, in order to maximise resource efficiency. The strategy to re-use great amounts of the envelope and structures, either in-situ or elsewhere within the development, will help to reduce the amount of waste created on site.

Packaging used to protect construction materials and assemblies in transportation will be kept to a minimum and wherever possible, will be returned to the supplier to be reused. Careful planning and effective control will ensure that waste during the construction phase is minimised.

The project team have held a workshop aimed at minimising waste during design, construction and operation of the development, and will continue to monitor progress for the conclusions of this workshop as the development progresses.

Operational waste management. Also relevant to S106 - Section Z - Waste

A sustainable waste strategy will be applied to the refurbished building, through the provision of segregated refuse storage, and the provision of Waste Information Packs to all occupiers. Coal Drops Yard commercial waste will be stored in a shared central waste room adjacent to the Gasholder Triplets basement and the Western Coal Drops building. The waste strategy will be monitored regularly to encourage waste minimisation.

2.0 Introduction

This Environmental Sustainability Plan (ESP) has been prepared to explain the contribution the Coal Drops Yard will make to delivering sustainable development on the King's Cross Central (KXC) site.

This document should be read in the context of other plans and documents forming the Coal Drops Yard submission of details of Reserved Matters, Full Planning Application and Listed Building application.

2.1 Background and existing Outline Planning Permission

The King's Cross Central development site is subject to an Outline Planning Permission, granted in 2006. The development is being submitted as a hybrid submission:

- A new detailed planning application for the Eastern Coal Drops (Excluding the South Anchor Unit), the Western Coal Drops, and Upper Level extension plus Lower Stable Street (see areas edged in red in figure 2.1).
- A Reserved Matters application for the existing Western Wharf Road Arches, the Eastern Coal Drops Southern Anchor Unit, and surrounding public realm areas (see areas edged in purple in figure 2.1).
- A Listed Building Consent application for the Grade II Listed Eastern Coal Drops (see area edged in green in figure 2.1)

This document addresses the environmental sustainability of the scheme as a whole, both the areas that are brought forward as details of Reserved Matters of the Outline Planning Permission, and the areas that are subject to a separate, full, planning application, responding both to national, and local planning policy requirements, and specifically to the relevant planning conditions of the King's Cross Central Outline Planning Permission (ref. 2004/2307/P) dated 22 December 2006, namely, Conditions 17 and 45, and also details how obligations contained within sections AA, Y and Z of the Section 106 Agreement will be met.

The development is located in Development Zone I and M of the KXC site, to the west of the Western Transit Shed and Granary Square, and north-west of the Fish & Coal offices.

2.2 Approach to Part L of the Building Regulations

The majority of the site will be a refurbishment, and is therefore being compared against Part L2B 2013 of the Building Regulations (*Conservation of Fuel and Power in Existing non-residential buildings*). As the upper floor extension comprises less than 25% of the existing building's total useful floor area, the upper floor extension is also being compared against Part L2B 2013 as an extension to an existing building.

Lower Stable Street will be compared against Part L2A 2013 requirements (*Conservation of Fuel and Power in New non-residential buildings*).

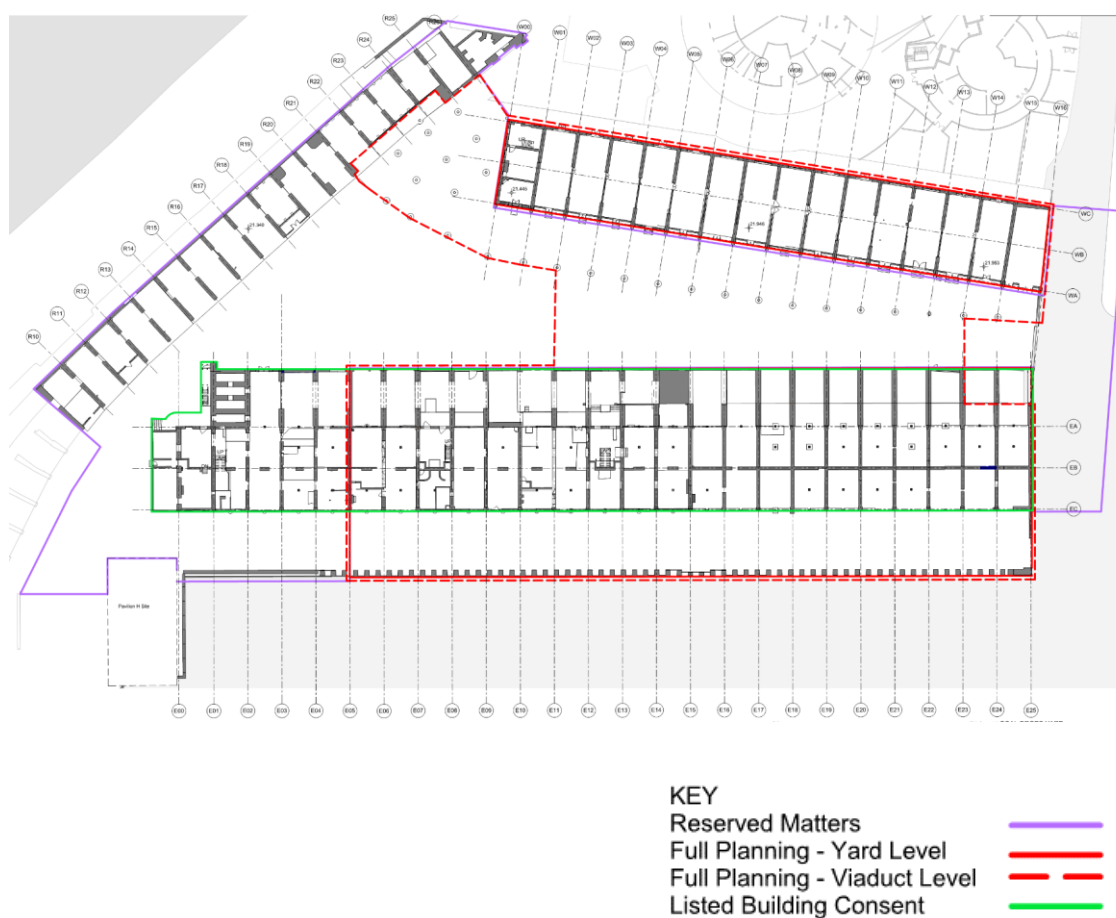


Figure 2.1: Coal Drops Yard submission boundaries.

3.0 Planning and regulatory framework

This section contains an overview of the Coal Drops Yard development's approach to meeting planning and regulatory requirements. Please refer to Appendix F for a summary of the planning and regulatory framework that has been considered.

3.1 National Planning Guidance

[Part L of the Building Regulations \(2013\)](#)

As this is predominantly a refurbishment project, it is therefore mainly subject to Part L2B of the Building Regulations 2013 and associated Approved Document concerned with 'Conservation of Fuel and Power in Existing Buildings other than Dwellings'. The building is considered to fall under the section 'Material Change of Use and Energy Status' as this addresses for example 'a previously unheated building, or parts of the building that have been designed and altered to be used separately and are to be heated in the future'. Under these regulations, minimum thermal insulation standards apply to thermal elements (walls, floors etc.) and 'controlled fittings' (e.g. fenestration, roof windows, etc.). The regulations also further impose minimum energy efficiency requirements on plant and equipment used in building services.

The proposed new upper floor extension will fall under the 'Extensions' section of Part L2B. It is anticipated that the thermal elements will meet the standards for extensions, specifically achieving compliance with the requirements for conservatories regarding effective thermal separation of this space from adjoining spaces. The building services in this area will also comply with the requirements and the minimum standards set out in the current Non Domestic Building Services Guide.

Preliminary Part L modelling has been undertaken for most areas of the development, and it is estimated that the development will achieve approximately 25-35% reduction in CO₂ emissions over Part L 2A/B 2013. Tests carried out have also identified a route in which a Criterion 3 'pass' can be achieved in all instances. This will be explored in further detail as the design develops.

3.2 Regional Planning Guidance

[The London Plan \(2015\) and The London SPG on Sustainable Design and Construction \(2014\)](#)

The proposals for the Coal Drops Yard development demonstrate an integrated and comprehensive approach to sustainability and low energy design. The development will follow the energy hierarchy: Be Lean – Be Clean – Be Green, and targets have been set as outlined elsewhere in this report.

A comprehensive approach to further sustainability measures such as responsible sourcing, waste minimisation, resilience to flooding etc. has also been set out within this report.

3.3 Local Planning Guidance

[LB Camden Core Strategy and Camden Development Policies \(2010\)](#)

A Transport Statement has been carried out as part of this planning application, and no new car parks will be incorporated as part of the development. The site is situated in a location with excellent public transport links, and pedestrian and cyclist traffic will be prioritised by provision of shared pedestrian and cyclist routes to the CDY (but car-free). Secure cycle storage and access to shower facilities will be provided for staff.

The Development will target a reduction in water consumption by use of water efficient fixtures and fittings, and a Flood Risk Assessment will be undertaken for the site.

Notwithstanding the desire to preserve as much of the historic structure of the buildings as possible, the proposals demonstrate an integrated and comprehensive approach to sustainability and low energy design. Proposals have been developed in collaboration with a heritage specialist and in consultation with Camden Council and Historic England to identify acceptable improvements.

A large amount of new, high quality public open space will be provided as part of the Coal Drops Yard development, providing a new and mostly pedestrianised connection from Granary Square and the Regent's Canal up to Cubitt Square and the park north of the Coal Drops Yard development.

Camden Planning Guidance (CPG) 3 - Sustainability

As a whole, the development is expected to achieve CO₂ savings of approx. 25-35% over the combined baseline (Part L2 A/B 2013) from passive design and energy efficiency and the connection to the KXC District Energy scheme.

As the proposals have been developed in collaboration with a heritage specialist and in consultation with Camden Council and Historic England to identify acceptable improvements, the current design represents a scheme that is considered to have maximised the potential for carbon emissions savings for a heritage site.

Attention has been given to the reduction of overheating risk and cooling requirements through proportions of glazing and glazing specifications.

A review of renewable technologies has been carried out to assess their suitability for the Coal Drops Yard in terms of lifecycle costs versus carbon emissions reductions achieved, and the physical and visual impact on the historic fabric of the buildings. No renewable technologies have been found suitable for the development – please refer to the Energy Strategy in Appendix A for further information.

3.4 Planning Conditions and Section 106 Agreement

The Planning Conditions and Section 106 agreement currently in place for the development will be relevant to the Reserved Matters application areas, however the new application areas will also aim to be in keeping with these targets.

The only exception is the small new-built areas (Lower Stable Street), which will be built to shell & core standards. Due to the tightening of Part L standards over the years, resulting in current standards requiring 30-35% less carbon emissions than Part L 2006 (please refer to appendix F for an overview), it is not feasible for these new retail units to target a further 5% improvement over Part L2013 from passive design and energy efficiency alone. Further, the energy efficiency of the units will rely heavily on the tenant fit-out e.g. lighting. The target at this stage is therefore based on the assumption that default values for tenant systems will have to be used in the Part L modelling for these units at the Shell & Core stage, resulting in a less ambitious energy performance rating expected at this stage, but a better performance potentially available once the units have been fully fitted.

The units will connect to the King's Cross Central District Energy Network for all heating and hot water, ensuring a low carbon supply.

4.0 Energy Strategy Summary, including response to Outline Planning Permission (OPP) Conditions 17 parts (a), (b) and (d) and Section 106 Agreement section X

The strategy for the whole Coal Drops Yard development follows the principles established within condition 17 of the Outline Planning Permission, which is also in line with the energy hierarchy (Be Lean – Be Clean – Be Green).

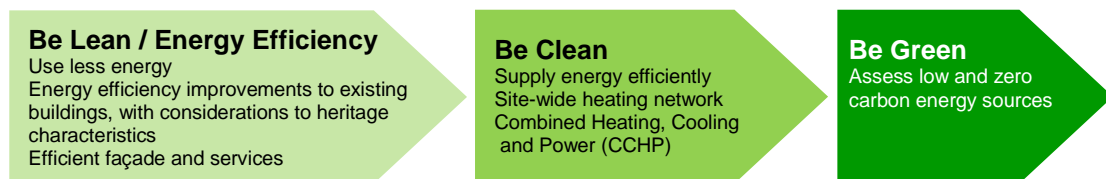


Figure 4.1: The Energy Hierarchy

In addition to following the principles of the Outline Planning Permission (OPP) and Section 106 Agreement for the site, a holistic approach has been adopted for the energy and carbon reduction strategy for the Coal Drops Yard development. A summary of this strategy is described in this section, along with how it corresponds to the planning and regulatory framework. Please also refer to Appendix A for the full Energy Strategy report, where further detail is provided.

4.1 Energy Efficiency measures proposed - 'Be Lean'. Also in line with OPP Condition 17(a) – energy efficiency measures and S106 Section X - Energy

In planning policy terms, energy requirements play a strong role in the construction process and within the built environment. For heritage buildings, an appropriate balance must be met between these requirements and building conservation to avoid lasting damage to the building's fabric and its historic significance.

The proposals demonstrate an integrated and comprehensive approach to sustainability and low energy design, whilst taking care to preserve as much of the historic structure of the buildings as possible. Proposed measures include:

- Introduction of new double glazing with solar control where new windows are being introduced. Historic windows have survived in various locations around the site, most notably on the eastern façade of the ECD. These windows are a mixture of timber sash windows, and cast iron windows with hinged casements, and are considered an important part of the appearance and character of the buildings. These windows will be overhauled and re-glazed with single glazing. These windows are predominantly the mezzanine windows on the East elevation of the ECD, a large portion are within the service corridor demise and thus outside of the thermal line, but the southern windows are within the South Anchor Unit. New shop fronts will be double glazed.
- New efficient services in areas that are fitted out
- New energy efficient lighting to landlord areas and turnkey units
- Insulation introduced to roofs and ground floors where possible
- Metering of heating, cooling, water and electricity to each unit, encouraging tenants to monitor and reduce consumption

No added insulation is proposed for the buildings' walls for the following reasons: first, exterior insulation would result in altering the building's character and lead to the loss of historic details; second, interior wall insulation would lead to a loss of floor area and historic details; third, the existing structure would have to be strengthened and reinforced before new insulation could be installed and fourth, adding insulation would result in the loss of the exposed thermal mass already provided by the existing masonry walls. All things considered, loss of building character and financial costs outweigh the potential benefits of adding wall insulation. It is also possible that by installing insulation, condensation could build up interstitially, leading to decay within roof and floor timbers.

The refurbishment will incorporate best practice standards respectful of listed buildings and conservation areas constraints, with proposals developed in collaboration with the heritage specialist Giles Quarme & Associates and in consultation with Camden Council and Historic England to identify acceptable energy efficiency improvements.

The existing masonry walls of Eastern Coal Drops, Western Coal Drops and Wharf Road Arches will provide substantial thermal mass, prolonging the period that natural ventilation can be used for cooling, and absorbing excess heat during the day that will be released during the cooler nights.



Figure 4.2a: New glazing will be installed throughout the development. Solar control film will be incorporated where required from a thermal comfort and energy efficiency point of view

Figure 4.2b: New energy efficient lighting will be installed as part of the shell-and-core design

Figure 4.2c: Energy metering will be installed to all units

Lower Stable Street will apply a 'fabric-first' approach to energy efficiency (i.e. passive design with focus on energy efficiency of the fabric first and foremost), and will encourage the incorporation of very efficient mechanical and electrical systems from the tenant fit-out. The units will further be required to connect to the KXC district energy network for all heating and domestic hot water consumption (see 'energy supply' section below).

The retail units in Lower Stable Street will be built to Shell & Core standards with future tenants responsible for most of the energy-consuming systems (e.g. lighting). The target at this stage is therefore based on the assumption that default values for tenant systems will have to be used in the Part L modelling for these units at the Shell & Core stage, resulting in a less ambitious energy performance rating expected at this stage, but a better performance potentially available once the units have been fully fitted.

Please refer to the full Energy Strategy in Appendix A for further details.

4.2 Reduction in carbon emissions for the Coal Drops Yard development. Also in line with OPP Condition 17(b) – reduction in carbon emissions, and S106 Section X - Energy

The requirements of Part L2B for historic buildings are clear; the aim should be to improve energy efficiency where feasible and to the extent that it is practically possible, provided that the work does not prejudice the character of the host building or increase the risk of long term deterioration to the building fabric or fittings.

The energy efficient design measures for the refurbished areas of the Coal Drops Yard, as summarised in section 4.1, seek to maximise efficiency as far as possible whilst being sensitive to the historic fabric of the building, and are thus consistent with Part L2B 2013.

The KXC Section 106 Agreement requires a 5% improvement on the TER for *new* buildings, using good passive design and energy efficient measures. As an existing building, this obligation does not apply to the refurbishment areas of the Coal Drops Yard. However, for completeness, an assessment against Part L of the Building Regulations 2013 has been undertaken to illustrate the impact of the proposed measures on carbon emissions.

The energy efficiency measures set out above are expected to lead to the following carbon emission reductions prior to the connection to the King's Cross Central (KXC) District Energy Network:

- For refurbished areas and new upper level extension: Estimated approximately 15-20% carbon emissions reduction over Part L2B 2013 prior to connection to the KXC District Energy Network.
- For new built areas (Lower Stable Street): Estimated up to 10% carbon emissions reduction over Part L2A 2013 prior to connection to the KXC District Energy Network, subject to tenant cooperation.
- For the Coal Drops Yard development as a whole: This strategy is expected to result in a reduction in carbon emissions of approximately 15-20% over the combined Part L 2013 baseline (Part L2A/B) prior to connection to the KXC District Energy Network.

The feasibility of achieving these targets has been subject to an initial review through preliminary Part L modelling of sample representative areas of the buildings, and energy strategy calculations. This significant improvement is expected to be achieved despite the Coal Drops buildings' heritage status.

As mentioned previously, due to the tightening of Part L standards over the years, resulting in current standards requiring 30-35% less carbon emissions than Part L 2006 (please refer to appendix F for an overview), it is not feasible for the new retail units in Lower Stable Street to target a further 5% improvement over Part L2013 from passive design and energy efficiency alone. The energy efficiency of the units will rely heavily on the tenant fit-out e.g. lighting. The target at this stage is therefore based on the assumption that default values for tenant systems will have to be used in the Part L modelling for these units at the Shell & Core stage, resulting in a less ambitious energy performance rating expected at this stage, but a better performance potentially available once the units have been fully fitted. The units will connect to the King's Cross Central District Energy Network for all heating and hot water ensuring a low carbon supply. Attention has been given to the reduction of risk of overheating and cooling requirements through proportions of glazing and glazing specifications in the refurbishment proposals.

Please refer to the full Energy Strategy in Appendix A for further details.

4.3 Energy Supply – 'Be Clean'. Also in line with OPP Condition 17(d) – energy supply and S106 Section X - Energy

Combined Heat and Power (CHP) has already been implemented on the wider King's Cross site as part of KCCLP's overall commitment to low-carbon energy distribution for the wider site. As a new commitment, it has been chosen to also implement cooling in the district energy network, making it a Combined Heating, Cooling and Power (CCHP) network, also known as trigeneration.

This is a low carbon cooling method, and in line with the Mayor of London's preferred strategy.

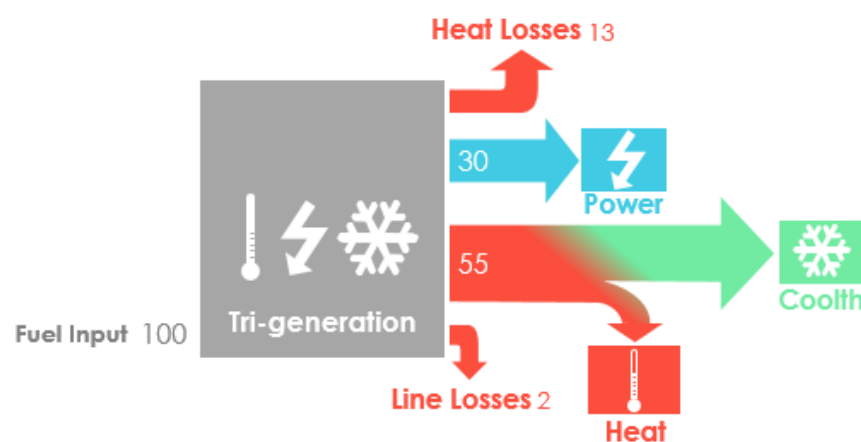


Figure 4.3: CCHP energy supply

All areas of the development will be linked to the King's Cross Central District Energy scheme for all space heating, hot water and cooling. It is estimated that this connection will result in further 10-15% reduction in carbon emissions on Part L 2013 after the implementation of fabric improvements and energy efficiency measures.

Future provision has been made within the KXC low-carbon district energy system for inclusion of biomass boilers. At this time, a robust commercial case to support the inclusion of biomass cannot yet be made, however, this position continues to be actively monitored.

4.4 Energy Supply – 'Be Green'. Also in line with OPP Condition 17(d) – energy supply and S106 Section X - Energy

A review of renewable technologies, including ground source heat pumps (GSHP) which are identified in the Section 106 Agreement for installation within Development Zone I, has been carried out to assess their suitability for the Coal Drops Yard in terms of lifecycle costs versus carbon emissions reductions achieved, and the physical and visual impact on the historic fabric of the buildings. Please refer to the Energy Strategy in Appendix A for further details of this appraisal.

Ground Source Heat Pump (GSHP)

A detailed analysis of this strategy was carried out as part of the Reserved Matters Application for the neighbouring Fish & Coal development, which concluded that connection to the King's Cross district energy network would provide greater carbon emissions savings. Reserved Matters approval was granted for the Fish & Coal Offices in 2014 based on this approach.

The proposal for the Coal Drops Yard follows in this vein, and the scheme is proposing to connect to the King's Cross District Energy Network for all heating, hot water and cooling, providing greater carbon emissions savings than a GSHP system would be expected to provide.

Opportunities for incorporating renewables on Lower Stable Street have been investigated, but this has been discounted due to the constraints of the very small units, which have partially over shaded roofs.

Photovoltaic panels

As part of the outline planning application, some roof areas of the Coal Drops Yard were identified as potentially suitable for PVs.

A detailed assessment has now been undertaken, and it has concluded that only a small amount of roof area of the existing buildings would be technically suitable for photovoltaic panels due to their orientation (see figure 4.4 on subsequent page). It has been advised by the heritage consultant that PVs in these locations would have a negative impact on the character and setting of the listed building and conservation area with the greatest impact by those at the south end of the listed Eastern Coal Drops.

The new areas of roof are proposed to be of a light tone, to ensure they are visually subservient from the existing roofs, and therefore PV panels are not proposed on these areas.

If PVs were implemented on the two available and technically suitable roof areas which are not a part of the listed Eastern Coal Drops, the combined CO₂ emission savings are estimated to be small: 0.5-1% after the implementation of the CCHP system. When viewed in comparison to the over-all development target (25-35% from passive design, energy efficiency and connection to the District Energy network), the carbon savings available from PVs is negligible.

These minimal benefits are not considered to outweigh the resulting harm to the character and setting of the listed building.

Site-wide Photovoltaic Panels commitment for the King's Cross Central Masterplan

As part of the outline planning application, Coal Drops Yard was identified as potentially suitable development zone for photovoltaic panels to contribute toward a defined total of 253kWp across the King's Cross Central (KXC) masterplan.

To date, it is estimated that between 430 and 470 kWp of PV array has either been installed or is proposed on plots which have been submitted for Reserved Matters approval. Of this total, between 180 and 205 kWp of PV are located on plots which were identified in the 2005 energy assessment for the KXC masterplan as suitable locations for wind turbines or solar hot water panels. Therefore these PV arrays fulfil the Low or Zero Carbon Technology (LZCT) commitment for the associated plot. It is therefore considered that these areas may not count toward the overall commitment to PV. This leaves approximately 225-290 kWp of PV installed or proposed that contributes to the site wide PV commitment made in 2005.

As demonstrated in table 4.1, installed or proposed PV arrays across the KXC masterplan exceeds the targets set out in the 2005 energy assessment, even before a large proportion of the site comes forward for Reserved Matters approval, which could lead to additional PV proposals.

However, if the contribution from PV arrays for sites which previously had other renewables proposed are subtracted, the current proposed arrays may fall short of the site-wide target in the worst case scenario. The total PV array for the King's Cross Central development is being closely monitored, and separate discussions undertaken to ensure this over-all target can be met.

It is estimated that the exclusion of PV at the Coal Drops Yard should not hinder site-wide commitments to PV made at outline planning for the KXC masterplan.

Table 4.1: King's Cross Central development-wide Photovoltaic Panel arrays proposed or already installed

	PV array size, kWp
KXC photovoltaic array target (2005 site wide energy assessment)	253 kWp
Design intent, to date	225-290kWp
Installed capacity, to date	~315 kWp
Total on completion of current proposals	430 - 470 kWp
Plots with commitments to other renewables replaced with PV	180 - 205 kWp
Total excluding plots with other renewable commitments in Outline plan	225 - 290 kWp

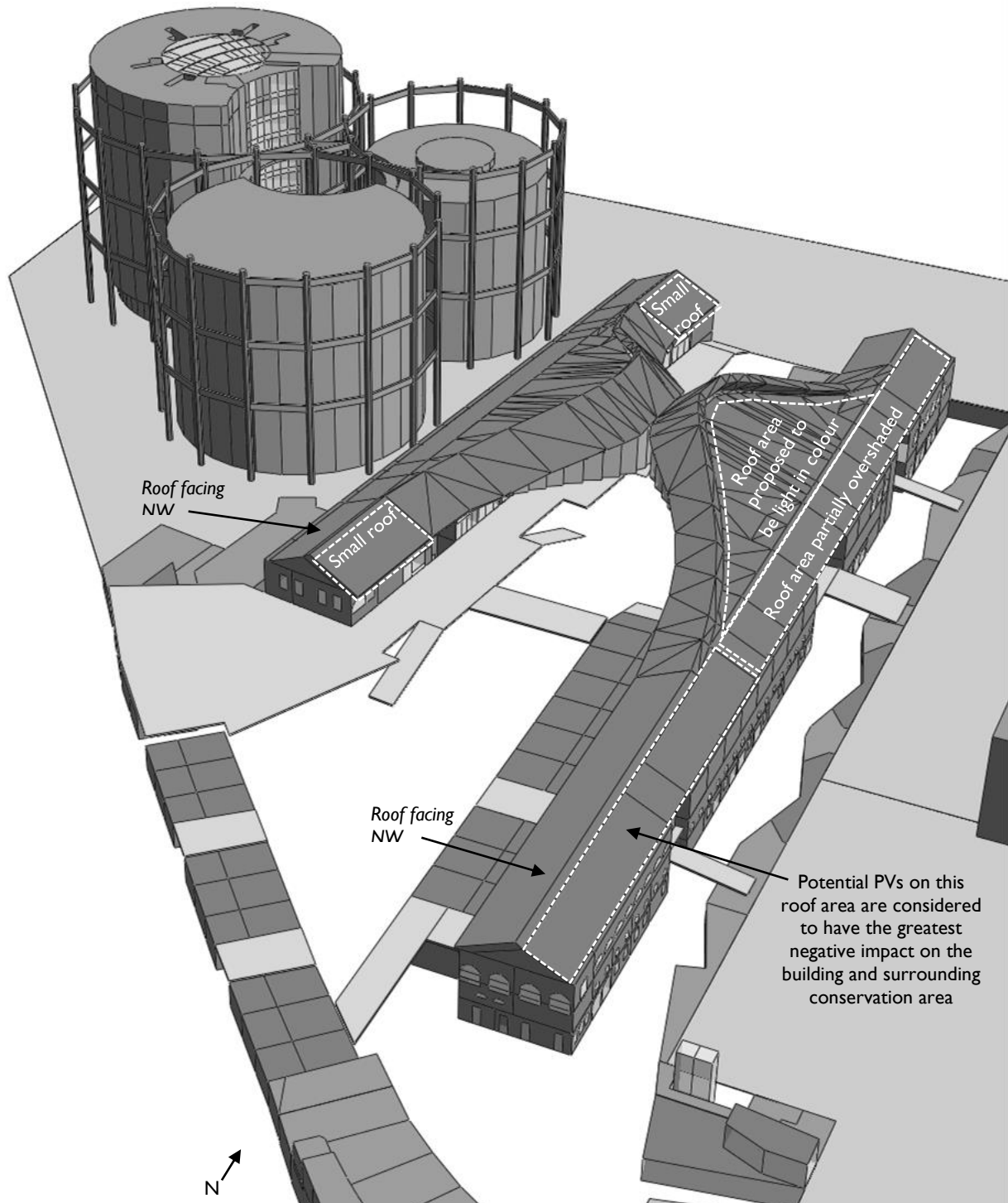


Figure 4.4: Aerial view of the thermal model created for the Part L assessment showing the roof area technically suitable for PV panels

4.5 Development-wide energy and carbon reduction targets

As a whole, the development is expected to achieve CO₂ savings of approx. 25-35% over the combined baseline (Part L2 A/B 2013) from passive design and energy efficiency and the connection to the KXC DE scheme. Please refer to the full Energy Strategy in Appendix A for further details. The carbon reduction strategy for the development currently proposes the below targets, which have been compared against baseline targets as shown in figures 4.5, 4.6 and 4.7.

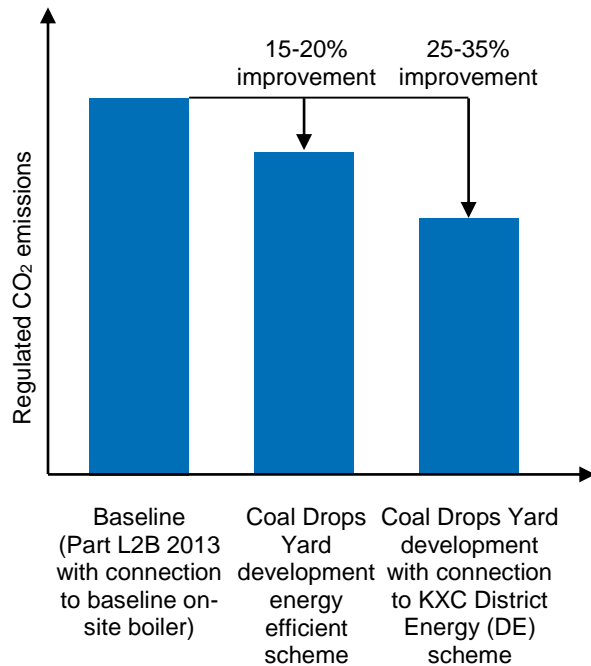


Figure 4.5: CO₂ reduction strategy for refurbished areas and Upper Level extension

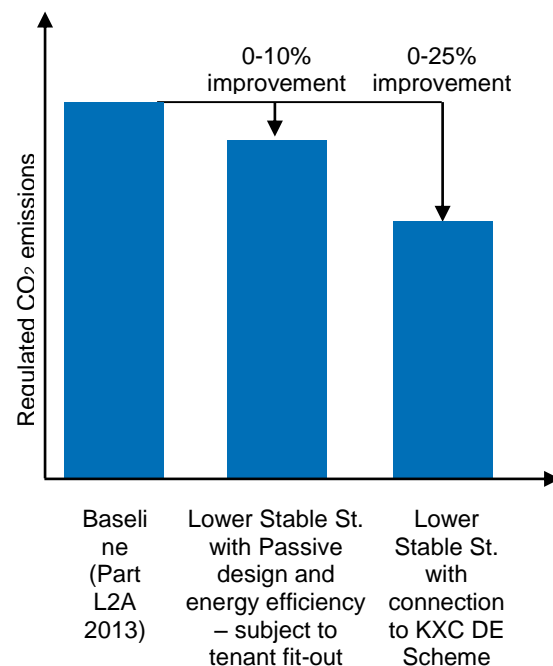


Figure 4.6: CO₂ reduction strategy for new-built areas (Lower Stable Street)

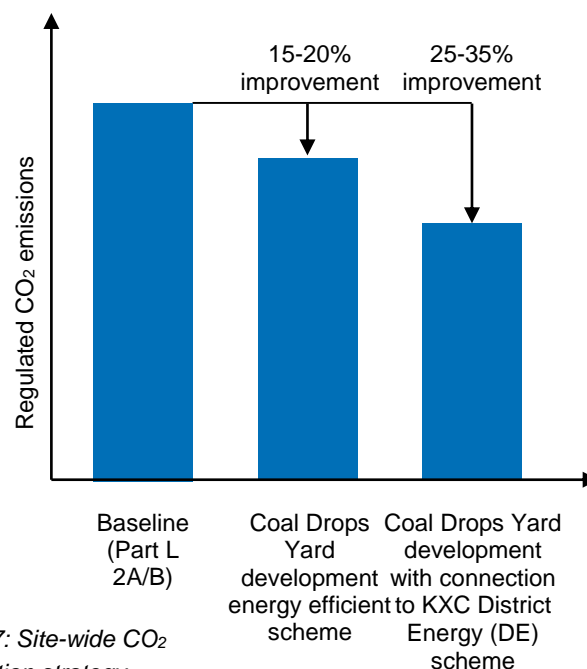


Figure 4.7: Site-wide CO₂ reduction strategy

The feasibility of achieving these target has been subject to an initial review through preliminary Part L modelling of representative sample areas of the buildings, and energy strategy calculations.

This significant improvement is expected to be achieved despite the Coal Drops buildings' heritage status (ECD is Grade II listed, and both Coal Drops buildings are constrained by the need to preserve heritage): measures include the introduction of new glazing with solar control throughout the buildings, new services and lighting, and connecting to the existing King's Cross Central District Energy (DE) scheme.

As these proposals have been developed in collaboration with a heritage specialist and in consultation with Camden Council and Historic England to identify acceptable improvements, the current design represents a scheme that is considered to have maximised the potential for carbon emissions savings for a heritage site.

5.0 Sustainability Strategy, including response to Outline Planning Permission (OPP) Condition 17 parts (c), (e), and (f) and conditions 45 and 46; and Section 106 Agreement, Sections Y, Z and AA

The sustainability strategy explores opportunities for incorporating a wide range of sustainability measures within the development. An iterative process with both Camden Council and Historic England (formerly English Heritage) has informed the proposals in order to ensure the minimum possible impact on the historic significance and special interest of the Coal Drops Yard. This strategy is detailed in this section, along with how it corresponds to the planning and regulatory framework.

5.1 Green and / or Brown Roofs. Also in line with OPP Condition 17(c) and condition 46 – green and brown roofs

The KXC Outline Planning Permission does not within Parameter Plan KXC021, identify the CDY as lying within a 'Priority Zone for Green or Brown Roofs'.

Further, as this is mainly a refurbishment scheme and the majority of the existing structure is being retained, there is little scope for enhancing ecology through extensive integrated features in the existing buildings. This was recognised in the Outline Planning Permission, and the Coal Drops Yard is not designated as a priority zone for green/brown roofs within the KXC site.

No green or brown roofs are therefore proposed on the ECD and WCD, consistent with Parameter Plan KXC 021 and the Development Specification which formed part of the Outline Planning Permission. The roof of the WWRA however will be a planted and landscaped area, as already approved in the Fish & Coal Offices and EWRA Reserved Matters application.

5.2 BREEAM Rating. Also relevant to OPP - Condition 17 (e) – BREEAM

BREEAM workshops have been held with the design team to ensure successful integration of BREEAM requirements into the design specification. Workshops have been led by a certified BREEAM Assessor and were initiated at an early stage of design to ensure all of the design team has a robust understanding of minimum standards, voluntary credits and best practice.

The individual BREEAM pre-assessments for the refurbished and new-built areas of the Coal Drops Yard are available in Appendices C and D of this ESP. A summary of the approach is provided below.

Refurbished areas - BREEAM Non-domestic Refurbishment and Fit-Out 2014

The refurbished areas of the development are targeting a BREEAM 2014 Refurbishment and Fit-out (BREEAM RFO) rating of with a target of BREEAM 'Very Good'. This target could potentially be uplifted to 'Excellent', subject to heritage constraints. The current pre-assessment is based on the assumption that Fabric & Structure and Core Services will be assessed (BREEAM RFO 2014 Parts 1 and 2).

A BREEAM RFO 2014 pre-assessment for the refurbished retail units has been carried out (See Appendix C), which predicts an overall score of 61.4%, equating to a 'Very Good' BREEAM rating. The project team has also identified additional credits which could achieve an 'Excellent' rating, and which will be considered as the project develops.

It should be noted that a number of credits, including the mandatory energy requirement for Excellent, rely on a detailed site survey and subsequent detailed assessment of heritage implications. The potential target rating of Excellent can therefore only be achieved subject to a detailed heritage, technical and viability assessment as the design progresses and following site surveys.

The current pre-assessment indicates the following:

- Score of 63.9%, equivalent to BREEAM 'Very Good', i.e. a 8.9% margin over the 55% required for BREEAM 'Very Good'
- Enhanced 'potential score' of 79.5%, equivalent to BREEAM 'Excellent' subject to heritage constraints

New-built areas (Lower Stable Street) - BREEAM New Construction 2014

New built areas will target a BREEAM New Construction 2014 'Very Good' rating for the shell and core areas.

A pre-assessment has been carried out to ensure this target is achievable. This is included in Appendix D. This currently estimates an overall target score of 59.0%, equating to a 'Very Good' BREEAM rating. The project team has also identified potential additional credits which could amount to an 'Excellent' rating which will be considered as the project develops.

Table 5.1: Summary of strategies for BREEAM 2014 Refurbishment and fit-out, and BREEAM New Construction 2014 for Lower Stable Street

Energy	<ul style="list-style-type: none"> Ambitious building emission rate based on passive design, energy efficiency, and connection to the KXC District Energy Network, resulting in a minimum overall 25-35% CO₂ reduction on Part L2B 2013 from: <ul style="list-style-type: none"> New glazing with solar control New insulation to roof and ground floor areas where possible New energy efficient lighting in shell & core areas
Transport	<ul style="list-style-type: none"> Provision of secure cycle storage spaces Provision of showers for staff use Excellent public transport links A Transport Statement has been produced for the site
Water	<ul style="list-style-type: none"> Water metering will be incorporated in the development, including separate meters to each retail unit. Flow control devices will be incorporated to taps and showers, and low flow dual-flush WCs will be installed in landlord areas Leak detection and flow control monitoring implemented on mains water supply
Materials	<ul style="list-style-type: none"> Reduced environmental impact and embodied carbon through the refurbishment and extended use of an existing building Materials will be responsibly sourced where possible. For timber products this will require FSC or similar certification, and for non-timber products that the materials have EMS certification at either the process stage or process <u>and</u> extraction phases. By means of consultation with the BRE Green Guide to Specification, the team will, as far as is practical and feasible, specify products of low environmental impact.
Surface Water Run-off	<ul style="list-style-type: none"> A Flood Risk Assessment has been carried out for the wider King's Cross site. A further assessment of the Coal Drops Yard development will also be carried out. Surface water run-off from the site is not expected to be greater than for the pre-development site as there is no increase in impermeable areas. The design for the treatment of storm water run-off incorporates, where practicable, filtration, attenuation and other techniques that is consistent with current best practice on SUDS, to control the timing and volume of flows.
Waste	<ul style="list-style-type: none"> A combination of centralised and individual waste storage areas will be provided for recyclable and non-recyclable waste. A BREEAM-compliant pre-demolition audit has been produced, and a Resource Management Plan will be implemented for the development.
Pollution	<ul style="list-style-type: none"> Insulants with a low global warming potential (GWP < 5) will be used in the refurbishment where feasible. The contractor will be expected to follow best-practise guidance in terms of minimising air (dust) and ground (water) pollution during refurbishment.
Health and well-being	<ul style="list-style-type: none"> The development will seek to incorporate advice from the local Architectural Liaison Officer and adhere to the principles of Secured by Design for the refurbishment where possible, and to incorporate secure windows and doors in the buildings where required and where acceptable from a heritage conservation perspective.
Management	<ul style="list-style-type: none"> A building user guide will be produced on completion to give details of operation and energy performance to each building occupant The main contractor will achieve a best practice score of at least 35 under the Considerate Constructors Scheme Energy, water use and waste related to the site procedures will be monitored for the duration of the construction.
Ecology	<ul style="list-style-type: none"> An ecologist has been appointed to advise on current ecological value and possible improvements An ecological survey has been carried out. The site is of low ecological value. The refurbishment is not expected to result in net loss of biodiversity or access to nature.

Specific BREEAM section targets set in the Camden Core Strategy

There is a specific requirement within the Camden Core Strategy and within the Outline Planning conditions for the King's Cross Central Development to achieve at least 60% of the credits (un-weighted score) under the Energy and Water headings, and 40% of the credits under the Material headings of BREEAM. The Coal Drops Yard development is currently targeting the following scores under these headlines (see table 5.2).

Table 5.2: Current estimated BREEAM targets against Camden Council specific requirements

Credit Section	Current target score baseline	Current estimated potential score	Comments
BREEAM Refurbishment and fit-out 2014			
Energy	68.7%	75.3%	The current Part L modelling estimates that the development can achieve enough energy credits to meet the target set with in the guidance from Camden, subject to heritage constraints.
Water	66.7%	77.8%	Guidance for 60% of credits targeted is met with baseline score.
Materials	46.1%	61.5%	Guidance for 40% of credits targeted is met with baseline score.
BREEAM New Construction 2014			
Energy	47.6%	61.9%	The energy efficiency measures that can be achieved on site are dependent on the tenant fit-out specifications (e.g. for lighting). Modelling has currently been carried out assuming that default values have to be used for tenant fit-out systems. This could potentially be improved by conditioning tenants to a certain energy efficiency standard for the fit-out. Without knowledge of the tenant fit-out, the model has to be run using default figures, thus limiting the theoretical performance of the shell & core design. The team will work towards achieving further credits under the 'energy' section, and have identified potentially achievable credits to get to the 60% target provisionally set by.
Water	68.7%	75.3%	Guidance for 60% of credits targeted is met with baseline score.
Materials	42.6%	69.2%	Guidance for 40% of credits targeted is met with baseline score.

5.3 Ecology. Also relevant to OPP - Condition 17 (f) – wildlife features

An ecologist has been appointed and a site survey carried out to assess the existing biodiversity and ecological value of the site. The current site is assessed to be of low ecological value, and no protected species have been found on the site. Any existing features found to be of biodiversity value will be protected.

The proposals seek to increase the ecological value of the site through the incorporation of biodiversity improvements incorporated in the design where possible.

It is proposed that bird and bat boxes are incorporated at high level, away from plant and accessible areas, and in locations which are sympathetic to the heritage nature of the buildings.

The ability to add such boxes must be balanced by the need to preserve the existing heritage fabric and limit their aesthetic impact. The ecology report forms appendix B to this document. It states possible locations for bird and bat boxes within the proposals, which will be confirmed as the design develops.



5.4 Drainage. Also relevant to OPP - Condition 45 – drainage infrastructure

Surface water run-off from the site is not expected to be greater than it was for the pre-development sites and there is no increase in impermeable areas. However some attenuation is still required. Sitewide there is a 10% improvement on the 1:30 year run off from the pre-development condition. The whole KXC site is divided into 15 surface water sub-catchments each with its own surface water and foul water networks and agreed peak discharge rates into the existing Thames Water infrastructure.

The Coal Drops Yard forms part of the site-wide surface and foul water disposal strategy, and more specifically within the North West Drainage Infrastructure Area (one of three areas which cover the King's Cross Central site).

The figure of 2,292 l/s in the wording to Condition 45 describes the maximum peak (storm and foul) discharge which is permissible for the site as a whole to discharge to the existing combined sewers. The peak discharge will be split between the Camden Sewer and York Way Sewer (for the Northern Area) and the Camley Sewer / Fleet Sewer (for the Southern Area).

The cumulative peak discharge from the many building plots and areas of infrastructure will exceed 2,292 l/s under certain weather conditions. In these instances, the site wide drainage infrastructure, including online and offline attenuation (see below), will attenuate peak flows discharging from individual plots, adopted highway and public realm, enabling cumulative peak flows to be reduced to 2,292 l/s or less.

The site wide surface and foul water disposal strategy can be summarised as follows:

- To provide separate surface and foul water networks, combining only at the final manhole prior to connection into the existing Thames Water sewerage network
- To provide online attenuation (for example oversized pipe work) and offline attenuation (for example proprietary modular underground storage systems / tanks) to buffer peak flows generated within the site down to the agreed discharge rates into the existing Thames Water sewerage network
- To ensure that no above ground flooding occurs during the worst case 1 in 30 year storm event
- To ensure that no internal building flooding occurs during the worst case 1 in 100 year (+20%) storm event
- To accord with PPS 25 and Sewers For Adoption 6th Edition
- To discharge at various locations into the sewerage network, and
- To design the above infrastructure such that combined surface and foul water flows do not exceed 2,292 l/s during a 1 in 30 storm event.

The site wide drainage infrastructure at the KXC development can be described in terms of three drainage infrastructure areas, incorporating both building plots and infrastructure/public realm. These are described under Table 5.3 below:

Table 5.3: Drainage Infrastructure Areas

Drainage Infrastructure Area	Plot developments	Infrastructure / Public Realm
Eastern Goods Yard	The Granary Complex, Q1, Q2, R1, R2, R3, R4, R5, 50% of T1, T2, J1, H1, K1, K2, K3, K4 and 50% of I1	Stable Street, Wharf Road, Handyside Street, Granary Square, Cubitt Park and Handyside Gardens
Southern Area Infrastructure	A1, A2, A3, A4, A5, B1, B2, B3, B4, B5, B6, D1, D2, F1 and V1	The Boulevard, Goods Way, Station Square and Pancras Square
Remainder of the Northern Area including the Triangle Site	50% of I1, M1, M2, M3, N1, P1, P2, S1, S2, S3, S4, S5, T3, T4, T5, T6 and W1	Canal Reach and Cubitt Square

Table 5.4 identifies the assumed peak foul and surface water flows from each of the building plots which underpin the design of the site-wide infrastructure. The foul water figures are based on CIRIA 177 Variable Peaking Factor and the assumed foul water discharges from various land uses identified in Table 5.5. The surface water peak flows are based on a 1 in 30 year storm. It should be noted that it is most unlikely that the foul and surface water peak discharges from each individual plot will coincide with each other.

Generally, foul water discharges represent small but consistent flows subject to diurnal patterns. For example, residential properties will exhibit two peaks within their diurnal flow pattern, one in the morning and one in the early evening.

Surface water discharges, on the other hand exhibit extreme variations in flow, directly related to rainfall intensity.

The surface water discharge from each plot development will have its own unique hydrograph (identifying the variation between flow and time – the peak of which only lasting for a few minutes in most cases). Each one of these peaks (within the hydrographs) combine within the main drainage infrastructure at different points in time during the storm event creating an averaged flow within the pipe network.

These flows will discharge into the Thames Water network via flow hydraulic controls at the downstream end of each network. These hydraulic controls limit the discharges to a combined maximum of 2,292l/s. Where the plot development discharges combine to produce flows in excess of the maximum allowable discharge, water will be held within the drainage infrastructure which has been specifically sized to accommodate these flows.

Table 5.4: Peak Surface and Foul Water Flows for the North West Area

Plot reference	Assumed Peak Flows (l/s)	
	Surface Water (1 in 30 year event)	Foul Water
North West		
I1	35	6.6
M1	107	16.2
M2	142	1.7
M3	Nil (considered as public realm)	<0.1
N1	252	5.5
P1	255	7.9
P2	210	11.5
S1	158	13.0
S2	162	13.0
S3	156	5.3
S4	175	7.5
S5	149	5.5
T3	138	6.7
T4	101	6.6
T5	78	4.8
T6	133	10.9
W1	308	7.3
Total	2,559	130

Table 5.5: Foul water discharges from various land uses

Land Use	Demand Options	Discharge to Sewer (l/day/hd)	l/s/head	Operational Hours	Population Density (m ² per person)
Residential	-	152	0.0023457	18	36.2
Student Accommodation	-	152	0.0023457	18	19.5
Retail	Large Retail	26.6	0.0009236	8	40
Food/Drink	Customer/day 2hr sittings	28.5	0.0009896	8	1.4
Education	General	19	0.0006597	8	10
Business	Without Canteen	41	0.0014236	8	12
Hotel		133	0.0046181	8	20
Leisure	Sports club	142.5	0.0049479	8	40

Drainage Infrastructure relating to plots M1, M2 and M3

Plots M1, M2 & M3 are serviced by the North West Area drainage systems (Table 5.1), which discharge via restricted discharges in to the combined Thames Water Camden Sewer. The drainage networks have been designed on SUDS principles providing an overall peak flow reduction of 10% (based on a 1 in 30 year storm).

Thames Water has approved the surface and foul water discharges into the Camden Sewer for the network serving these plots. The approved discharges reflect the assumptions described in Tables 5.4 and 5.5 above. The peak flows for M1 and M2 are 107 l/s and 142l/s for surface water respectively and 16.2 l/s and 1.7 l/s foul water respectively. The peak foul flow for M3 is negligible (less than 0.1 L/s). It should be noted that the figures in Table 5.4 do not specifically include public realm areas (which includes the surface area of plot M3 given the garden viaduct above). However, the North West Area public realm was included in the hydraulic model used during the design of the infrastructure to ensure that each of the drainage sub catchments (buildings and public realm) are attenuated and the flows into the combined Thames Sewer restricted so that the permissible discharges set out in the Outline Planning Permission are not exceeded.

A Flood Risk Assessment for the wider King's Cross site has been produced, and an assessment will also be carried out for the Coal Drops Yard development. The KXC land is within Flood Zone 1, as defined by the EA, and is therefore considered to be 'low-risk' from flooding

5.5 Water Efficiency. Also relevant to S106 - Section AA - Water

Water use and reuse

In the southeast, climate change is predicted to reduce summer rainfall by up to 30% by 2080. Furthermore, the transport, treatment and delivery of potable water involve the consumption of energy and resources. All these issues highlight the need to include design that reduces water demand in new developments.

The development will target a reduction in water consumption of at least 20% in line with the requirements of BREEAM by use of water efficient fixtures and fittings. Please refer to section 5.2 for an overview of the BREEAM credits targeted under the Water section for both refurbishment and new-built assessments.

All parts of the building will be supplied with a water meter, with a pulsed output, which allows effective water management and monitoring to take place and sanitary supply shut off systems will be installed to avoid wastage when rooms are unoccupied. Major leak detection will also be provided to all mains water supply between and within the building.

Water efficient sanitary ware will be installed as part of the shell & core works:

- Dual-flush WCs. This will also be encouraged for WCs provided as part of fit-outs.
- Low flow rates and / or aerators on hand basin taps
- Low flow rates for showers will be incorporated for the two proposed accessible staff showers for cyclists on Lower Stable Street. Low flow rates will also be encouraged for any showers provided as part of fit-outs.

After a detailed study during the design stage, rainwater harvesting has been discounted in the Coal Drops Yard development because of the engineering constraints which the long profile of each of the East and West Coal Drops buildings provide. It is not possible to group rainwater outlets from both buildings to a central collection tank given that the two buildings are not linked at ground or sub-floor levels. The Wharf Road Arches and Lower Stable Street retail areas are drained externally, and given that the external yard and Lower Stable Street areas are heavily congested below ground with a complex network of utilities, there is no opportunity to locate a below ground rainwater collection tank on the site.

Sustainable drainage

Surface water drainage methods that take account of quantity, quality and amenity issues are collectively referred to as Sustainable Urban Drainage Systems (SUDs) and are more sustainable than conventional drainage methods. The CDY site discharge has been incorporated in a hydraulic model for the site as a whole (see Section 5.4) and therefore attenuation is not required on an individual plot basis. Sitewide there is a 10% improvement on the 1:30 year run off from the pre-development condition. As a retained building, opportunities to integrate SUDs into the scheme are limited. For further details on the drainage strategy, please refer to Section 5.4 of this report.



5.6 Construction materials and waste. Also relevant to S106 - Section Y – Construction Materials and Waste

Strategy for materials and responsible sourcing

Conservation of the built environment is inherently sustainable because it retains the energy and materials embedded in the existing structures and facades. Existing buildings, including listed buildings, can be adapted and upgraded to improve their environmental performance and reduce their carbon footprint. Most of the façade and a great amount of the remaining envelope and structures at the Coal Drops Yard will be retained, either in-situ or used elsewhere on the Coal Drops Yard site. This also has heritage benefits, in retaining as much of the development's historic character as possible.

Items either retained and reused in situ or reinstated elsewhere in the proposed scheme, subject to further assessment of existing condition include:

Eastern Coal Drops:

- Cast iron beams and columns
- Metal framed windows at mezzanine and yard level
- Timber sash windows in east façade will be overhauled, and reglazed with single glazing
- The surviving timber floor structure in the southern part of the ECD will be substantially retained, but lowered to allow level access from the viaducts
- Roof trusses
- Timber joists

Western Coal Drops:

- Cast iron beams supporting upper floor
- Staircase in southern bay
- Existing timber windows will be overhauled, and reglazed with single glazing
- Roof trusses
- Viaduct balustrades

In general for the development:

- Existing bricks and granite setts are being re-used within the development where possible



Figure 5.1: Most of the envelope and structures of the existing Coal Drops Yard development will be retained

Reduction in refurbishment and construction waste

The project team have held a workshop aimed at minimising waste during design, construction and operation of the development, and will continue to monitor progress for the conclusions of this workshop as the development progresses. The project team intends that best practice will be followed on the Coal Drops Yard development and surpassed wherever practicable, in order to maximise resource efficiency.

Construction materials and purchasing strategy

The King's Cross Central Construction Materials and Purchasing Strategy will be adopted and materials used in the development will be responsibly sourced where possible. All timber will be sourced following the UK Government's Timber Procurement Policy, and will be legally sourced.

Packaging Waste

Packaging used to protect construction materials and assemblies in transportation will be kept to a minimum and wherever possible, will be returned to the supplier to be reused. Careful handling of materials and planning of their storage and delivery times will reduce unnecessary packaging to protect against damage.

Soil

As the development consists mainly of the refurbishment of existing buildings, little new sub-soil will be needed for or generated by the proposed works. Trial pit investigations for the CDY and neighbouring Coal Drops and Triplets sites have identified some contamination in certain areas of the KXC site. For neighbouring sites, most of this has been removed as part of constructions works. Contamination testing at CDY showed low levels of contaminants, and no asbestos was identified in any of the samples. Please refer to the submitted Earthworks and Remediation Plan for further details on the strategy for removal of spoil.

Please refer to section 5.2 for an overview of the BREEAM credits targeted under the Materials and Waste sections for both refurbishment and new-built assessments.

5.7 Operational waste management. Also relevant to S106 - Section Z - Waste

The refurbishment team intends that best practice will be followed and surpassed where possible, in order to maximise resource efficiency. Careful planning will reduce waste of materials. This will include undertaking a pre-refurbishment audit, careful handling and storage of materials, timely delivery and avoidance of excess packaging where possible.

A Resource Management Plan will be produced for the development, and the strategy for minimising waste will follow the waste hierarchy: Reduce – Re-use – Recycle – Energy Recovery – Disposal.

The Waste Hierarchy

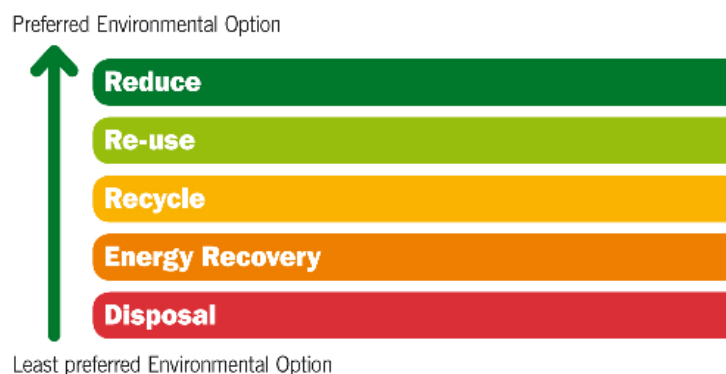


Figure 5.2: The Waste Hierarchy

A sustainable waste strategy will be applied to the development through the provision of segregated refuse storage, and the provision of Waste Information Packs to all occupiers. The refuse storage will be conveniently located and will provide sufficient space for general and recycled waste. The waste strategy will be monitored and updated regularly to encourage waste minimisation.

A number of studies have been carried out since the early stages of design to ensure measures are implemented for efficient use of materials.

Waste information packs

To encourage the minimisation of waste generated during the operational life of the building, Waste Information Packs will be provided to occupiers of the building and will include information on recycling, re-use of materials and sustainable purchasing. This information is intended to be provided within the Building User Guide. Arrangements will be made to monitor their effectiveness in encouraging waste minimisation.

Waste segregation area

Coal Drops Yard commercial waste will be stored in a shared waste room adjacent to the Triplets basement and the Western Coal Drops building. The Estates facilities management team will consolidate individual unit waste using carts or electric buggies during off peak hours (as currently practiced in Zone B and The Granary / Western Transit Shed).

Multiple streams – cardboard, glass, non-recyclable, mixed dry recyclable and organics – will be stored and collected.

The refuse will be collected by the KXC Estate Management Team and taken to a central waste room for collection by the refuse contractor, however the waste storage allows for two day's waste storage to account for peaks and disruptions in collection.

Further details of the Waste and Refuse Strategy for the building are provided in the submitted Transport Statement.

5.8 Sustainable transportation

Transport links

The King's Cross site benefits from excellent transport links, with both King's Cross and St Pancras stations for overland and underground trains and numerous bus routes within less than 10 minutes' walk from the Coal Drops Yard. The site has been assessed to have a Public Transport Accessibility Level (PTAL) of 6a (Excellent). Please refer to the Transport Statement for further information.

Pedestrian and cyclist facilities

The wider King's Cross site includes a number of public open spaces, and the Coal Drops Yard development will add another public space to this list. The wider site contains a number of pedestrianised walking routes as well as shared pedestrian and cycle routes, making walking and cycling the main expected modes of transport to and from the Coal Drops Yard. Cycle racks will be provided as part of the public realm around the Coal Drops Yard. In addition, secure and sheltered cycle racks will be provided for staff at the Coal Drops Yard retail units. Two accessible staff showers for cyclists are also proposed on Lower Stable Street.



Figure 5.2: Existing cycle storage in the public realm as part of the King's Cross Central development.

6.0 Conclusion

This report has set out the Energy and Sustainability strategies for the Coal Drops Yard development, being submitted as a hybrid planning application. This comprises an application for Full Planning Permission for the Western Coal Drops and Viaduct and the northern 20 arches of the Eastern Coal Drops and Viaduct, as well as the new Upper Level extension and new proposed units in Lower Stable Street. The remainder of the proposals fall within a submission of details of Reserved Matters: the southern 4 arches of the ECD and Viaduct, the Wharf Road Arches and the public realm.

The report explains how the development will comply with both current policy and Outline Planning Permission (OPP) Sections 17 (a, b, c, d, e and f) as well as sections 45 and 46, and Section 106 requirements, sections X, Y Z and AA as follows:

6.1 Energy Strategy

[Energy efficiency measures proposed for all refurbished areas and the new Upper Floor extension - 'Be Lean' - also in line with OPP Condition 17\(a\) and S 106 Section X](#)

The refurbishment will incorporate best practice standards respectful of listed buildings and conservation area constraints, with proposals developed in collaboration with heritage specialist. The current design represents a scheme that is considered to have maximised the potential for carbon emissions savings for a heritage site. Please refer to section 4.1 for further detail.

[Energy efficiency measures proposed for all new-built areas \(Lower Stable Street\)](#)

Lower Stable Street will apply a 'fabric-first' approach to energy efficiency (i.e. passive design with focus on energy efficiency of the fabric first and foremost), and will encourage the incorporation of very efficient mechanical and electrical systems from the tenant fit-out. The units will further be required to connect to the KXC district energy network for all heating, cooling and domestic hot water consumption. Please refer to section 4.1 for further detail.

[Reduction in carbon emissions for the Coal Drops Yard development - also in line with OPP Condition 17\(b\) and S106 Section X](#)

The energy efficiency measures set out above are expected to lead to the following carbon emission reductions prior to the connection to the King's Cross Central (KXC) District Energy Network:

- For refurbished areas and new upper level extension: Estimated approximately 15-20% carbon emissions reduction over Part L2B 2013 prior to connection to the KXC District Energy Network.
- For new built areas (Lower Stable Street): Estimated up to 10% carbon emissions reduction over Part L2A 2013 prior to connection to the KXC District Energy Network.
- For the Coal Drops Yard development as a whole: This strategy is expected to result in a reduction in carbon emissions of approximately 15-20% over the combined Part L 2013 baseline (Part L2A/B) prior to connection to the KXC District Energy Network.

Please refer to section 4.2 for further detail.

Energy Supply – 'Be Clean' - also in line with OPP Condition 17(d) and S106 Section X

District Heating including Combined Heat and Power (CHP) has already been implemented on the wider King's Cross site as part of King's Cross Central General Partner Ltd's overall commitment to low-carbon energy distribution for the wider site. As a new commitment, it has been decided to also implement cooling in the district energy network. This will be fed by a low carbon Combined Heating, Cooling and Power (CCHP) network. This is a low carbon cooling method, and in line with the Mayor of London's preferred strategy.

It is estimated that this connection will lead to an over-all carbon emission reduction for the Coal Drops Yard development of 25-35% over the combined Part L 2013 baseline (Part L 2A/B) when added to the savings expected from the energy efficiency measures listed above.

Please refer to section 4.3 for further detail.

Energy Supply – 'Be Green' - also in line with OPP Condition 17(d) and S106 Section X

A review of low carbon and renewable technologies has been carried out to assess their suitability for the Coal Drops Yard. The study considered lifecycle costs vs. estimated carbon emissions reductions, and the physical and visual impact on the historic fabric and setting of the buildings.

Photovoltaic panels and Ground Source Heat Pumps were assessed in greater detail, in line with the Outline Planning Permission requirements. However, both types of systems were discounted due to site limitations and heritage constraints, and due to the site's commitment to connect to the King's Cross District Energy Network for all heating, cooling and hot water, resulting in much greater savings in carbon emissions than either of these two systems would be expected to achieve. Please refer to section 4.4 for further detail.

6.2 Sustainability Strategy

The sustainability strategy explores opportunities for incorporating a wide range of sustainability measures within the development. An iterative process with both Camden Council and Historic England has informed the proposals in order to ensure the minimum possible impact on the historic significance and special interest of the Coal Drops Yard. The report responds to the following issues:

Green and / or Brown Roofs - also in line with OPP Condition 17(c) and condition 46

No green or brown roofs are therefore proposed on the ECD and WCD, consistent with Parameter Plan KXC 021 and the Development Specification which formed part of the Outline Planning Permission. Please refer to section 5.1 for further detail.

BREEAM Rating - also in line with OPP - Condition 17 (e)

- **BREEAM for refurbished areas**

The refurbished areas of the development are targeting a BREEAM 2014 Refurbishment and Fit-out (BREEAM RFO) rating of BREEAM 'Very Good' for all shell-and-core works. This target could potentially be uplifted to 'Excellent', subject to heritage constraints. Please refer to section 5.2 for further detail.

- **BREEAM for new-built areas (Lower Stable Street)**

New built areas will target a BREEAM New Construction 2014 'Very Good' rating for the shell and core areas. Please refer to section 5.2 for further detail.

Specific Camden Core Strategy BREEAM section targets

Specific targets against certain BREEAM Sections under the Energy, Materials and Waste categories as requested within Camden's Core Strategy and the Section 106 agreement are estimated to be met within the BREEAM RFO pre-assessment. The BREEAM NC assessment shows a shortfall in the baseline score for the energy category only, due to the dependence of these credits on the tenant fit-out of e.g. lighting. Potential credits have been identified to bring this score above the Camden specific target, however this will be subject to tenant cooperation.

Ecology - also in line with OPP - Condition 17 (f)

The proposals seek to increase the ecological value of the site through the incorporation of biodiversity improvements incorporated in the design in locations which are sympathetic to the heritage nature of the development. An ecologist has been appointed and a site survey carried out to assess the existing biodiversity and ecological value of the site. The current site is assessed to be of low ecological value.

Please refer to section 5.3 for further detail.

Drainage - also in line with OPP - Condition 45

Peak discharge flows for the buildings have been calculated, and these flows will contribute towards meeting the site wide 2,292l/s discharge limit and to an overall 10% reduction (1 in 30 year storm) in surface and foul peak flows across the King's Cross Central (KXC) development. Surface water run-off from the site is not expected to be greater than it was for the pre-development sites and there is no increase in impermeable areas.

A Flood Risk Assessment for the wider King's Cross site has been produced, and an assessment will also be carried out for the Coal Drops Yard development. The KXC areas have been confirmed to lie within a low flood risk zone.

Please refer to section 5.4 for further detail.

Water Efficiency - also in line with S106 - Section AA

The development will incorporate water efficient sanitaryware in landlord areas. All parts of the buildings will be supplied with water meters with a pulsed output which allows effective water management and monitoring to take place, and sanitary supply shut off systems will be installed to avoid water waste when rooms are unoccupied. Major leak detection will also be provided to all mains water supply between and within the building.

Please refer to section 5.5 for further detail.

Construction materials and waste - also in line with S106 - Section Y

Strategy for materials and responsible sourcing

Most of the façade and a great amount of the remaining envelope and structures at the Coal Drops Yard will be retained, either in-situ or used elsewhere on the Coal Drops Yard site. Studies have been carried out since the early stages of design to ensure measures are implemented for efficient use of materials and flexibility for future uses of the buildings.

The King's Cross Central site-wide Construction Materials and Purchasing Strategy will be adopted and materials will be responsibly sourced where possible. All timber will be sourced following the UK Government's Timber Procurement Policy, and will be legally sourced.

Please refer to section 5.6 for further detail.

Reduction in refurbishment and construction waste

The project team intends that best practice will be followed on the Coal Drops Yard development and surpassed wherever practicable, in order to maximise resource efficiency. The strategy to re-use great amounts of the envelope and structures, either in-situ or elsewhere within the development, will help to reduce the amount of waste created on site. Packaging used to protect construction materials and assemblies in transportation will be kept to a minimum and wherever possible, will be returned to the supplier to be reused. Careful planning and effective control will ensure that waste during the construction phase is minimised.

The project team have held a workshop aimed at minimising waste during design, construction and operation of the development, and will continue to monitor progress for the conclusions of this workshop as the development progresses.

Please refer to section 5.6 for further detail.

Operational waste management - also in line with S106 - Section Z

A sustainable waste strategy will be applied to the refurbished building, through the provision of segregated refuse storage, and the provision of Waste Information Packs to all occupiers. The waste strategy will be monitored regularly to encourage waste minimisation.

Please refer to section 5.7 for further detail.

Potential exceptions

As shown above, the development meets all current policy and Reserved Matters requirements for energy and sustainability unless otherwise stated in this report. Only two exceptions exist, both for the small Lower Stable Street areas:

- 1 Due to the tightening of Part L standards over the years, resulting in current standards requiring 30-35% less carbon emissions than Part L 2006 (please refer to appendix F for an overview), it is not feasible for the small new retail units in Lower Stable Street to target a further 5% improvement over Part L2013 from passive design and energy efficiency alone. As the energy efficiency of the units will rely heavily on the tenant fit-out e.g. lighting, the target at this stage is based on the assumption that default values for tenant systems will have to be used in the Part L modelling for these units at the Shell & Core stage, resulting in a less ambitious energy performance rating expected at this stage, but a better performance potentially available once the units have been fully fitted.
- 2 Due to the limitations mentioned in point 1 above, the new-built areas in Lower Stable Street are not achieving the Camden requirement of 60% of the energy credits as part of the base build score (current estimated score 47.7%, potential estimated max. score: 61.9%). This could potentially be improved by conditioning tenants to a certain energy efficiency standard for the fit-out. The team will work towards achieving further credits under the 'energy' section, and have identified potentially achievable credits to get to the 60% target provisionally set by Camden.

7.0 Appendix A – Energy Strategy



Coal Drops Yard
King's Cross Central General Partner Ltd.

Energy Strategy
Rev. B
October 2015

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N1C 4AB

Tel: +44 (0) 20 3668 7100

Audit Sheet

Rev.	Description	Prepared and checked by	Reviewed by	Date
A	Draft issue	S. Lloyd	L. Wille	04.09.2015
B	Incorporation of Argent comments	S. Lloyd	L. Wille	02.10.2015

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Contents

1.0	Executive Summary	4
2.0	Introduction	9
3.0	Approach	10
4.0	Planning and regulatory framework	11
4.1	National Planning Guidance	11
4.2	Regional Planning Guidance	12
4.3	Local Planning Guidance	13
4.4	Other notable Planning Guidance	14
4.5	Section 106 Agreement	14
5.0	Be Lean - Passive Design and Energy Efficiency measures	16
5.1	Passive Design measures	16
5.2	Energy Efficiency Measures	17
6.0	Energy Demand Assessment	20
7.0	Low and Zero Carbon Technology Appraisal	23
7.1	Be Clean - Supply Energy Efficiently	23
7.2	Be Green – Appraisal of Low or Zero Carbon Technology	26
8.0	Development-wide carbon reduction strategy	31

1.0 Executive Summary

This report describes the strategy for energy demand and carbon emission reduction for the proposed redevelopment of Coal Drops Yard which is central to the King's Cross Central masterplan.

The proposals for Coal Drops Yard seek to refurbish existing buildings within the development site into a boutique retail destination comprising primarily A1 retail with a small amount of A3 retail also proposed. Areas of new build A1 retail along Lower Stable Street are also included in this application.

The development lies within the Regent's Canal Conservation Area and includes proposals to refurbish the Grade II listed Eastern Coal Drops Building. These constraints have played an important role in defining the proposed strategy to minimise energy demand and reduce carbon emissions arising from the proposed development.

It is currently expected that the majority of retail spaces will be completed to a shell only provision, therefore design decisions have been mindful of this in order to provide design flexibility once a tenants are found. A small amount of areas will be fitted out, and it is currently assumed these will meet the same design approach as set out below.

The strategy for the whole development follows the energy hierarchy (Be Lean – Be Clean – Be Green) in reducing energy demand prior to the inclusion of and low or zero carbon technology, since controlling demand is the most effective way of reducing energy consumption and carbon dioxide emissions.

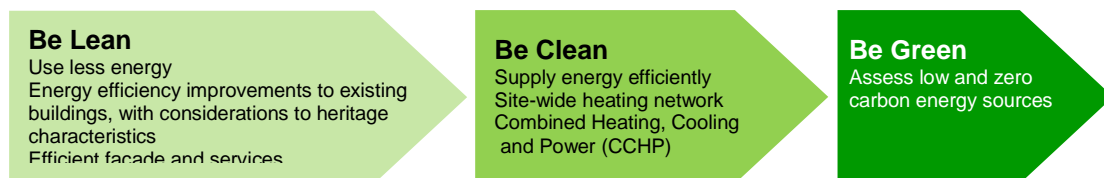


Figure 1.1: The energy hierarchy (Be Lean – Be Clean – Be Green).

The following steps are proposed:

Be Lean

- Improved thermal performance of the existing thermal envelope, where heritage constraints allow, to meet or exceed the requirements set out in Part L2B 2013.
- All newly proposed thermal elements will meet or exceed the requirements set out in Part L2B 2013 (refurbishment areas) and L2A 2013 (new build areas).
- New double glazing with solar control will be installed where new windows are being introduced. Historic windows, where present, will be overhauled and re-glazed with single glazing. New shop fronts will be double glazed.
- Reasonable areas of glazing within existing and newly proposed façades to help reduce excessive solar gains and help toward preventing overheating.

- Junctions between elements and details of openings designed in accordance with recommendations on robust construction details, where feasible, whilst also being respectful of the existing heritage fabric.
- All public access corridors, and stairwells are proposed to be located externally of the thermal envelope, thus eliminating energy use required for heating, cooling and mechanically ventilating these areas.
- All areas, refurbished and new build are currently targeting compliance with Criterion 3 of Part L2A of the Building Regulations in order to limit solar gains and help to mitigate excessive cooling loads in retail areas and help toward mitigating overheating.
- Provision of mechanical ventilation in each retail unit by future tenants will facilitate heat recovery from exhaust air, thus reducing heat losses from retail spaces and reducing energy demand for space heating.
- Maintaining the existing solid brick external walls in-situ, may provide some benefits in the mitigation of overheating by helping to provide some passive control of internal temperatures due to the relatively high amounts of exposed thermal mass.
- All areas will be serviced by a new centralised Low Temperature Hot Water (LTHW) loop for heating and hot water, and a new Chilled Water (CHW) loop for cooling via separate plate heat exchangers thus reducing plant requirements and providing flexibility for future adaptation. It is proposed that the LTHW and CHW loops will be connected to the King's Cross Central (KXC) low-carbon district energy system (see Be Clean section below)
- Heating and cooling in most retail units will be delivered via efficient 4-pipe fan coil units (FCUs), Except Lower Stable Street where radiators will provide heating (no cooling provided to Lower Stable Street units). Future tenants will be expected to meet or exceed target energy use for fans (in MVHR and FCUs) in line with Part L2A & L2B 2013 requirements in order to reduce auxiliary energy use where possible.
- All lighting to meet or exceed the requirements of 2013 Building Regulations in all retail areas including fit-out elements where provided. Improvements beyond the minimum requirements are currently targeted in all Back-of-House areas provided as part of the base-build.
- Metering of heating, cooling, water and electricity to each unit, encouraging tenants to monitor and reduce consumption
- A small amount of fit-out areas may be provided as part of the base-build design. This is currently expected to meet the same design efficiencies as described above with improvements targeted where technically feasible.

Modelling indicates that these proposals represent a 15-20% reduction in carbon emissions which equates to an EPC rating of C prior to the inclusion of any low or zero carbon technology.

Be Clean

It is proposed that Coal Drops Yard development will connect to the King's Cross Central (KXC) low-carbon district energy system for all heating, domestic hot water and cooling requirements.

Currently the KXC low-carbon district energy system delivers heat across the wider KXC development with a very low carbon content of heat incorporating Combined Heat and Power (CHP), thermal stores and gas fired boilers. As a further expansion is proposed to incorporate district cooling (Combined Cooling, Heating & power, 'CCHP') which will make use of some of the waste heat arising from the heat existing network.

As the district cooling network has not been fully developed yet, an estimate of performance has been made for delivery efficiency between a Co-efficient of Performance (CoP) of 3 and 5. The carbon content of heating arising from the currently operating KXC low-carbon district energy system (without cooling) of 0.0719kg/kWh has been used to estimate carbon emissions arising from heating and hot water for the Coal Drops Yard.

Further modelling undertaken estimates that an additional carbon saving of 10-15% could be made above the passive design and energy efficiency measures.

Be Green

A review of low carbon and renewable technologies has been carried out to assess their suitability for the Coal Drops Yard. The study considered lifecycle costs versus estimated achievable carbon emissions reductions, and the physical and visual impact on the historic fabric and setting of the buildings. The following technologies were considered technically suitable for the development and investigated in greater detail:

- Photovoltaic panels (PVs)
- Ground Source Heat Pump (GSHP) - identified in the Section 106 Agreement for installation within Development Zone I

Photovoltaic panels

As part of the outline planning application, some roof areas of the Coal Drops Yard were identified as potentially suitable for PVs. A detailed assessment has now been undertaken, and only a small amount of roof area of the existing buildings would be technically suitable for photovoltaic panels due to their orientation. It has further been advised by the heritage consultant that PVs in these locations would have a negative impact on the character and setting of the listed building and conservation area, especially on the eastern roof at the south end of ECD where these would be very visible from Granary Square.

Only minimal benefits would be expected from the potential PV array (CO₂ emission savings of 0.5-1% after the implementation of the CCHP system), and these minimal benefits are not considered to outweigh the resulting harm to the character and setting of the listed building.

The potential carbon emission savings are small compared to the substantial savings expected from the proposed energy efficient strategy with connection to the KX District Energy network (25-35% carbon emission reduction over Part L 2013 currently estimated across the development from this strategy)

Opportunities for incorporating renewables on Lower Stable Street have been investigated, but it is not currently estimated that renewables can be implemented in these very small retail units, which all have partially overshadowed roofs.

Ground Source Heat Pump (GSHP)

A detailed analysis of this technology was carried out as part of the Reserved Matters Application for the neighbouring Fish & Coal development, which concluded that connection to

the King's Cross district energy network would provide greater carbon emissions savings. Reserved Matters approval was granted for the Fish & Coal development in 2014 based on this approach.

The proposal for the Coal Drops Yard follows in this vein, and the scheme is proposing to connect to the King's Cross (KXC) District Energy Network for all heating, hot water and cooling, providing greater carbon emissions savings than a GSHP system would be expected to provide.

Development-wide carbon reduction strategy

Modelling undertaken to for the Coal Drops Yard design proposals indicates that estimated carbon emission savings of between 25-35% could be achieved when compared to a 'notional building' which meets the minimums standard set out in Part L 2013 (2A & 2B).

As these proposals have been developed in collaboration with a heritage specialist and in consultation with Camden Council and Historic England to identify acceptable improvements, the current design represents a scheme that is considered to have maximised the potential for carbon emissions savings for a heritage site. This significant improvement is expected to be achieved despite the Coal Drops buildings' heritage status (ECD is Grade II listed and the whole development lies within the Regent's Canal Conservation Area).

The carbon reduction strategy is shown graphically in figures 1.2, 1.3 & 1.4 below:

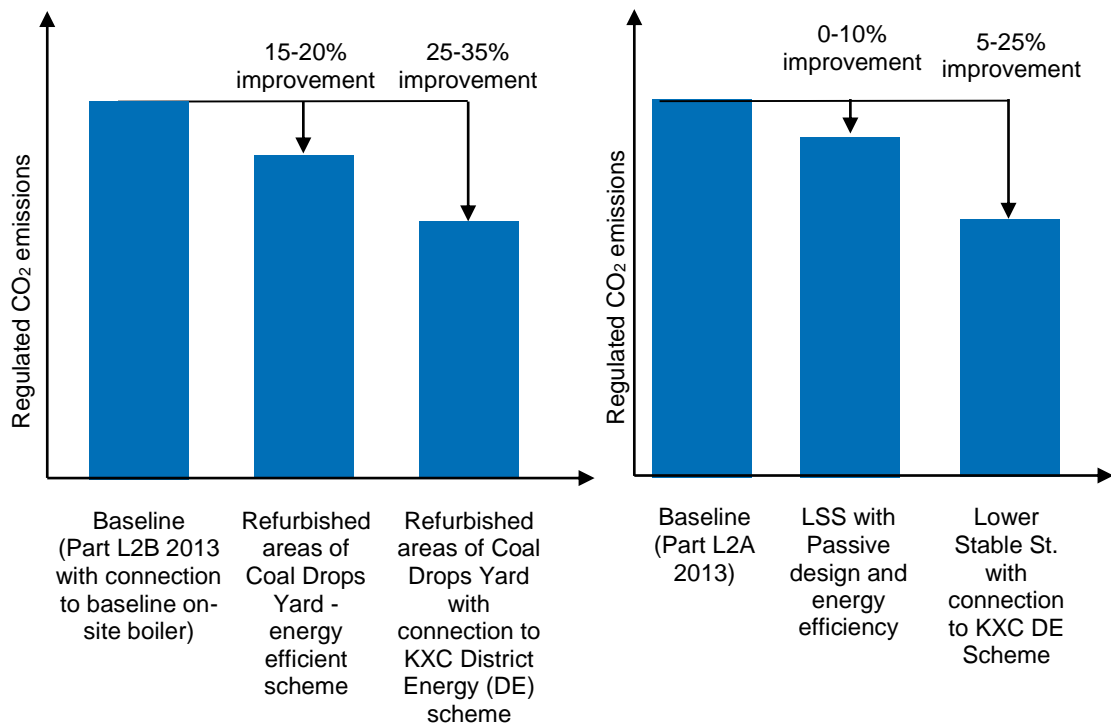


Figure 1.2: CO₂ reduction strategy for refurbished areas and Upper Level extension

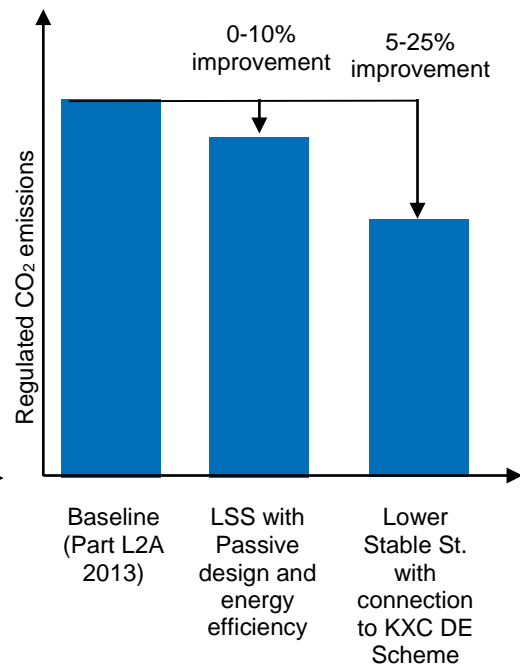


Figure 1.3: CO₂ reduction strategy for new-built areas (Lower Stable Street)

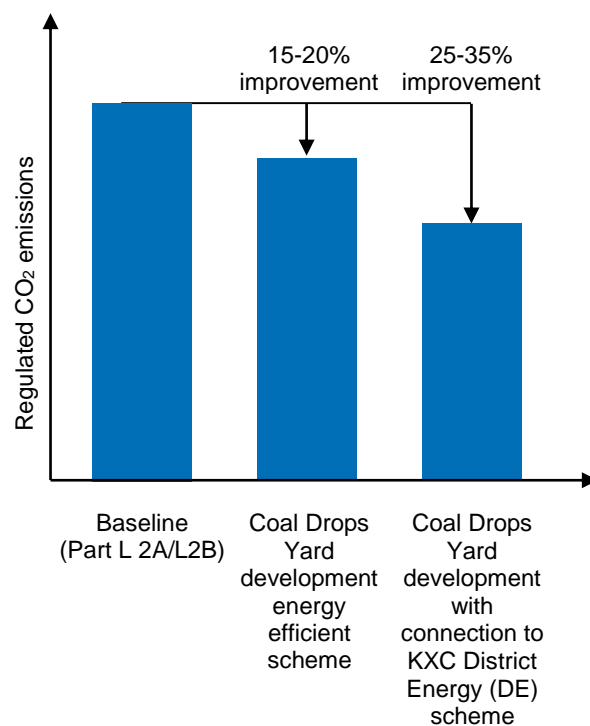


Figure 1.4: Site-wide CO₂ reduction strategy

2.0 Introduction

This Energy Strategy has been prepared by Hoare Lea on behalf of King's Cross Central General Partner Limited to describe the holistic strategy to design out energy consumption and reduce carbon emissions from the proposed refurbishment of the Coal Drops Yard development. The development comprises the Eastern Coal Drops (ECD) and associated viaduct, Western Coal Drops (WCD) and associated viaduct, newly built areas connecting these two buildings, the Western Wharf Road Arches (WWRA), Lower Stable Street and the surrounding public realm. ECD is Grade II listed, and the whole development is situated within the Regent's Canal Conservation Area.

The Coal Drops Yard sits within Development Zones I and M of the King's Cross Central Development, which are subject to an Outline Planning Permission (OPP), granted in 2006. The proposal is being submitted as a combination of details of Reserved Matters Application, and with a full Planning Permission sought for aspects of the development where works were not originally envisaged under the OPP, namely the new upper level addition along with additional connecting bridges between Lower and Upper Stable Street.

Proposals seek the approval for new A1/A3 uses which it is proposed will be completed to a shell only provision for fit-out by future tenants in the majority of cases with a small amount of fit-out elements potentially provided as part of the base-build. Decisions throughout the design process have been mindful of the need to allow design flexibility for future tenant fit-outs whilst remaining sensitive to the conservation requirements of the Grade II listed Eastern Coal Drops Building and the Regent's Canal Conservation Area.

This report should be read in conjunction with the 'Environmental Sustainability Plan' submitted as part of this application.

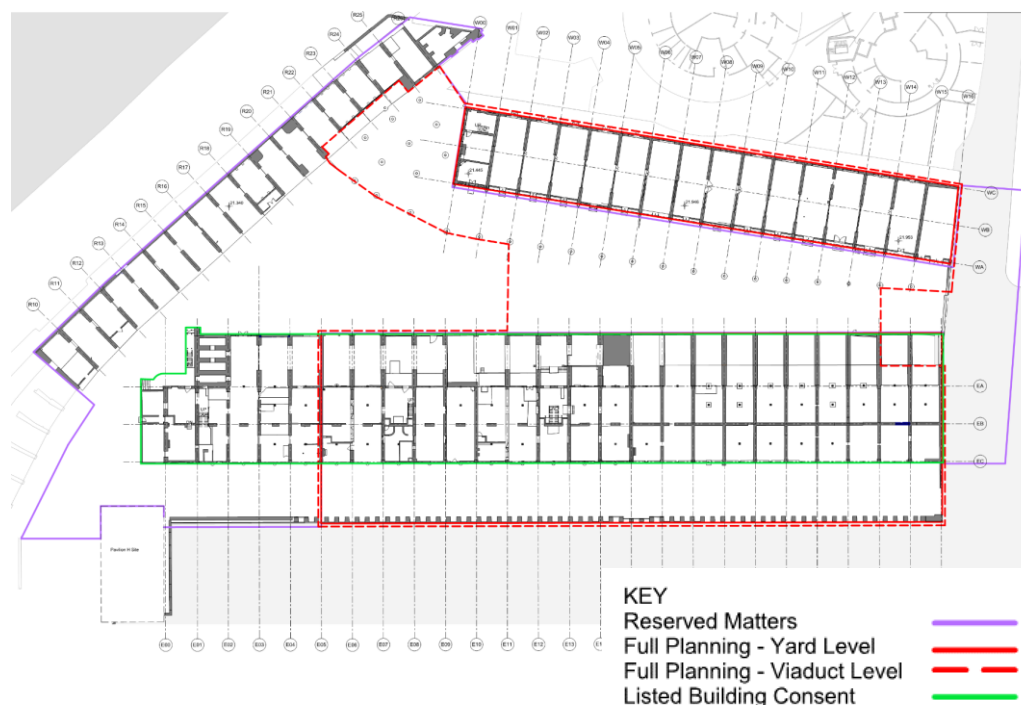


Figure 2.1: Coal Drops Yard submission boundaries.

3.0 Approach

The strategic and fundamental approach to the design of the development has been to reduce demand for energy consumption in the first instance and prior to the consideration of integrating low carbon energy sources, since controlling demand is the most effective way of reducing energy consumption and carbon dioxide emissions.

This work on passive design and energy efficiency has involved the use of an IES thermal model to inform and validate design choices.

Following the inclusion of passive design and energy efficiency measures, various options have been investigated to further reduce carbon emissions associated with energy supply.

For the purpose of clarity the approach to energy efficiency and the integration of renewable energy sources and Combined Heat and Power (CHP) / Combined Heating Cooling and Power (CCHP) is split up into four sections:

- The main section (Section 5.0) is dedicated to the passive design and energy efficiency measures which are proposed;
- Section 6.0 presents the assessment of the estimated energy consumption and CO₂ emissions for the Coal Drops Yard development prior to any contribution from Low or Zero Carbon Technologies;
- The final section (Section 7.0) is dedicated to Low or Zero Carbon technologies (i.e. CHP/CCHP and renewable energy technologies).

This approach is consistent with the London Plan 'Be Lean, Be Clean, Be Green' energy hierarchy:

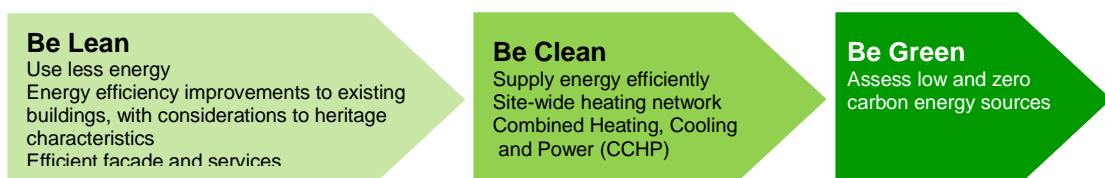


Figure 3.1: The energy hierarchy (Be Lean – Be Clean – Be Green).

4.0 Planning and regulatory framework

A number of National, Regional and Local planning guidance documents have helped form the strategy for energy conservation and reduction in carbon emissions for the proposed development. The most notable are described below:

4.1 National Planning Guidance

Part L of the Building Regulations (2013)



On a national level, the leading requirement applicable to the project's energy strategy is Part L of the Building Regulations: Part L2A is applicable to new non-domestic buildings, and Part L2B is relevant for refurbished non-domestic buildings and extensions if less than 25% of the total useful floor area of the existing building.

Under Building Regulations Approved Document Part L2B: Conservation of Fuel and Power (2013), depending on the extent of the refurbishment, requirements vary and include minimum standards for new or replaced elements, requirements for upgrade of retained elements to minimum standards, and potentially the requirement for consequential improvements.

An option exists to achieve compliance by demonstrating that the Building Emission Rate (BER) does not exceed the emissions of an identical building refurbished to minimum requirements as set out in Part L2B 2013 (which, for services, refers to the Non-Domestic Services Compliance Guide 2013 for existing buildings). This is the approach that has been taken for the Coal Drops Yard model at this stage.

Similarly, for new buildings, compliance with Part L2A is shown by demonstrating that the Building Emission Rate (BER) does not exceed the emissions of an identical building refurbished to minimum requirements as set out in Part L2A 2013.

Scale-back from future zero carbon target

Since 2007 there has been a target set by the UK Government for all new residential development to achieve Zero Carbon status for regulated energy uses from 2016, and all new commercial development to achieve this standard from 2019 onward.

However, in July of 2015 the UK Government issued a statement as part of the HM Treasury's Productivity Report in which it is proposed that, for house builders:

The government does not intend to proceed with the zero carbon Allowable Solutions carbon offsetting scheme, or the proposed 2016 increase in on-site energy efficiency standards, but will keep energy efficiency standards under review, recognising that existing measures to increase energy efficiency of new buildings should be allowed time to become established.

It has since been confirmed that the removal of the Zero Carbon target also applies to non-domestic buildings.

This does not change the over-all target for the UK, set within the EU Directive on the Energy performance of buildings, which states that all new buildings must be nearly zero energy buildings by 31 December 2020 (and public buildings by 31 December 2018). This target is subject to a cost-optimum analysis to be carried out by the UK Government in 2017.

4.2 Regional Planning Guidance

The London Plan (2015)



The London Plan is the overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. It forms part of the development plan for Greater London. The first London Plan was published in 2004 with the latest version published in March 2015.

One of the main objectives of the London Plan is to improve the environment and reduce climate change by:

- Reducing CO₂ emissions and heat loss from new developments
- Managing flood risk, ensuring water supply and quality
- Improving London's recycling performance and waste management.

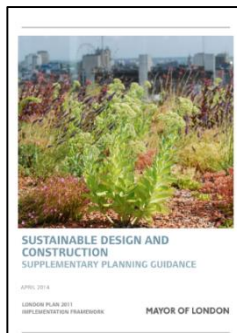
The London Plan and the Supplementary Planning Guidance sets a target of 35% carbon emissions reduction compared with Part L 2013.

Policy 5.4 on retrofitting states:

"The environmental impact of existing urban areas should be reduced through policies and programmes that bring existing buildings up to the Mayor's standards on sustainable design and construction. In particular, programmes should reduce carbon dioxide emissions, improve the efficiency of resource use (such as water) and minimise the generation of pollution and waste from existing building stock."

Major developments within the London Borough of Camden are subject to the policy requirements of the London Plan 2015.

The London SPG on Sustainable Design and Construction (2014)



In support of Policy 5.3 (Sustainable Design and Construction) of the London Plan, the GLA have published a Supplementary Planning Guidance (SPG) which supersedes the May 2006 version of the guidance document.

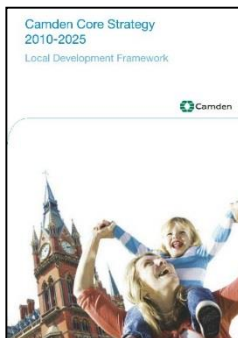
It is acknowledged within this guide that for many schemes involving existing buildings it will be a challenge to meet the London Plan target for carbon emission reductions, and therefore it is implied that flexibility may be available. It is recommended within this guidance that boroughs develop local policies to maximise the reduction in carbon dioxide emissions from these schemes.

The SPG was released in April 2014 and provides guidance on how to achieve the London Plan Objectives through 'Mayor's priority' and 'Mayor's best practice' standards to which proposed developments should aim. In relation to this energy strategy, the SPG on Sustainable Design and Construction provides guidance on:

- Energy efficient design and meeting the carbon dioxide reduction targets
- Decentralised energy
- How to off-set carbon dioxide where the targets set out in the London Plan are not met
- Retro-fitting measures
- Support for monitoring energy use during occupation
- An introduction to resilience and demand side response

4.3 Local Planning Guidance

LB Camden Core Strategy



Local policies applicable to the Proposed Development are set out in the Camden Core Strategy, which was adopted in November 2010. The Core Strategy defines how Camden will change up to 2025.

Relevant policies include:

- CS11 – Promoting Sustainable and Efficient Travel
- CS13 – Tackling Climate change through promoting higher environmental standards
- CS15 – Protecting and improving our parks and open spaces and encouraging biodiversity
- CS18 – Dealing with our waste and encouraging recycling

The Core Strategy is the key element of the Local Development Plan and sets out the elements of the Council's planning visions and plan for the borough's future. The strategy contributes to Camden's Community Strategy.

Camden Planning Guidance (CPG) 3 - Sustainability

The SPD provides information on ways to achieve carbon reductions and more sustainable developments. The SPD contains tables and checklists which should be completed and submitted with planning applications alongside relevant supporting evidence. There is guidance to help protect and enhance biodiversity and natural habitats.

This document sets out requirements and guidelines to support the policies: CS13 from the Core Strategy and DP22 and DP23 from the Development Policies. Key targets include:

- Developments of >500m² require an energy statement to be submitted;
- Developments involving a change of use or a conversion of >500m² of any floorspace will be expected to achieve 60% of the un-weighted credits in the Energy category in the BREEAM assessment.

- 20% of CO₂ reduction to be met via on site renewables as per policy CS13
- Assess the feasibility to connect to an existing or upcoming (within 3 years) decentralised energy network within 1km of the development
- Design development to enable its connection to a decentralised energy network in the future
- Where there is no connection and or no agreement to connect your development within 3 years to a decentralised energy network, on site CHP will be expected where heating demand makes it feasible
- If there is more than one occupier, use of building a community heating network will be expected

If no connection or agreement to connect to a decentralised energy network occurs within 3 years and the scheme does not include CHP, a financial contribution will be expected to enable future expansion and connection to energy network.

4.4 Further notable Planning Guidance

Further planning guidance documents have been considered at National, Regional and Local levels and have been discussed as part of the Environmental Sustainability Plan submitted as part of this planning application. These include:

National Planning Guidance

National Planning Policy Framework (2012)

Local Planning Guidance

Camden Development Policies (2010)

- DP22 - Promoting sustainable design and construction
- DP25 - Conserving Camden's Heritage

4.5 Outline Planning Permission (OPP) and Section 106 Agreement

The Section 106 agreement currently in place for the development is only relevant to the reserved matters application areas, however all areas of the development will aspire to adhere to the requirements within this where possible. This part of the application will respond specifically to the relevant planning conditions of the King's Cross Central Outline Planning Permission (ref. 2004/2307/P) dated 22 December 2006, namely, Conditions 17 in regards to energy and carbon emissions, for which the requirements are set out below:

Outline Planning Permission (OPP) Condition 17 (a): Energy efficiency

The approach to reducing energy consumption and carbon emissions has followed the energy hierarchy, from passive design, energy efficiency, and incorporation of low-carbon district energy, which will result in significant regulated CO₂ emission reductions relative to Building Regulations Part L 2013 compliance levels. Please refer to section 5.0 below for details of energy efficiency measures incorporated in the scheme, and carbon reductions targeted for all refurbished areas of the site.

Outline Planning Permission (OPP) Condition 17 (b): Reduction in carbon emissions

Refurbished areas of the Coal Drops Yard development are subject to Building Regulations Part L2B 2013 alongside the heritage and other parameters encapsulated on Parameter Plan KXC

020. All refurbished areas of the site are expected to meet Part L 2B 2013 requirements for reduction of carbon emissions. Please refer to sections 5.0 & 7.0 for details of energy efficiency measures incorporated in the scheme, and carbon reductions targeted for all refurbished areas of the site.

Outline Planning Permission (OPP) Condition 17 (d): Energy supply

All areas will be connected to the King's Cross Central (KXC) low-carbon district energy system for space heating, hot water and cooling.

S106 Section X – Energy

This sets out further detail on how to achieve the OPP requirements. It is required that the developer shall use reasonable endeavours to meet King's Cross site-wide targets for:

- Energy efficient building design and technology
- Efficient energy supply via district energy provision with incorporation of CCHP
- Using renewable energy technologies

As the requirements set within this section are site-wide for the entire King's Cross Central development, specific targets are not referenced within this report, however the targets set within this report will help to meet the wider King's Cross central development targets.

5.0 Be Lean - Passive Design and Energy Efficiency measures

Passive design and energy efficiency measures have been explored in the first instance, since controlling demand is the most effective way of reducing energy consumption and carbon dioxide emissions.

Due to the Grade II listed status of the Eastern Coal Drops Building and location of the entire Coal Drops Yard development within the Regent's Canal Conservation Area all measures have had to be considered in a way that is sensitive to the existing buildings and surrounding location.

5.1 Passive Design measures

From a fabric efficiency perspective, the main measures being considered are currently as follows:

- New double glazing with solar control will be installed where new windows are being introduced. Historic windows, where present, will be overhauled and re-glazed with single glazing. This relates to windows along the Eastern Coal Drops Eastern elevation and some individual glazed units on the southern gable ends of the ECD and WCD. New shop fronts will be double glazed.
- Reasonable areas of glazing with the existing and newly proposed façades will help to reduce excessive solar gains entering the proposed internal environments.
- All refurbished and newly proposed floors in refurbished and extension areas will be upgraded to incorporate thermal insulation and are currently expected to exceed the minimum requirements set out in Part L2B 2013.
- All refurbished and newly proposed roofs in refurbished and extension areas will, as a minimum, be upgraded to incorporate thermal insulation in line with the thermal performance requirements in Part L2B 2013.
- Junctions between elements and details of openings designed in accordance with recommendations on robust construction details, where feasible, whilst also being respectful of the existing heritage fabric.
- New build areas along Lower Stable Street are currently targeting fabric thermal performance in line with the Part L2A 2013 reference building in order to minimise excessive heat loss through the building fabric. This represents an uplift on Part L2A 2013 minimum standards for all building elements.
- All public access corridors, and stairwells are proposed to be located externally of the thermal envelope, thus eliminating energy use required for heating, cooling and mechanically ventilating these areas.
- All areas, refurbished and new build are currently targeting compliance with Criterion 3 of Part L2A of the Building Regulations in order to limit solar gains and help to mitigate excessive cooling loads in retail areas and help toward mitigating overheating.
- Upgrades to the existing solid brick external walls are not expected, as it is not desirable from a heritage perspective. This approach may provide some benefits in the mitigation of overheating as the exposed thermal mass could help to regulate heat gains within the retail units.

5.2 Energy Efficiency Measures

Ventilation

The proposals seek to incorporate mechanical ventilation via individual MVHR units in each retail unit within the refurbished areas. This approach will allow for significant heat recovery from exhaust air (target ~70%), thus reducing heat losses from retail spaces and reducing heating loads in winter. A larger Variable Air Volume (VAV) system is proposed in the upper retail unit within the new roof extension operating on a similar principle. Auxiliary energy use as a result of fans required to operate such mechanical systems will meet or exceed targets defined in the 2013 Non-Domestic Building Services Compliance Guide (N-DBSCG, 2013) which is referred to in Parts L2A and L2B. Summer bypass will allow heat recovery to be avoided in summer so allow excessive solar gains to escape each retail unit.

Further reductions in Specific Fan Power (SFP) beyond the N-DBSCG 2013 minimum standards have been tested to assess the overall impact on the proposed developments carbon emissions. However, as the majority of retail units are being provided to a shell only provision for tenant fit-out, a commitment beyond N-DBSCG 2013 minimum standards is not currently targeted.

Energy use associated with ventilation, heating and cooling in public circulation spaces has been negated by moving these spaces outside of the thermal envelope.

Back of house areas that require extract ventilation include the core provision toilets. It is proposed these will be provided with a central extract system minimising auxiliary energy use by minimising the number of fans required and targeting an improvement in Specific Fan Power of approximately 40% over the N-DBSCG 2013.

Heating, Cooling & Domestic Hot Water

All areas will be serviced by new a Low Temperature Hot Water (LTHW) loop for heating and hot water via separate plate heat exchangers. This approach negates the need for individual plant in each retail space and enables a fully flexible system, optimised for future upgrades and potential further carbon emission reduction opportunities that may arise at a later date.

The cooling strategy will follow the London Plan Cooling Hierarchy where possible (shown in Figure 5.1).

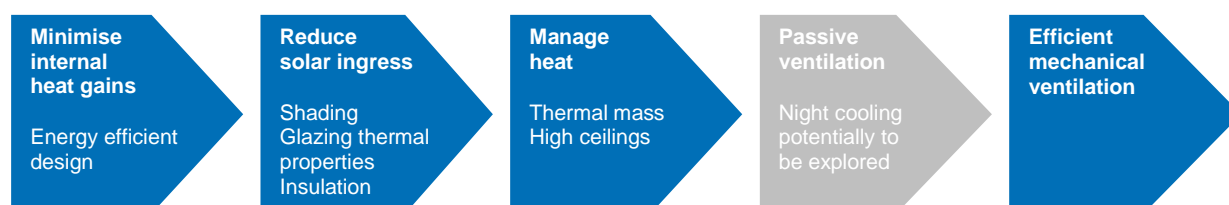


Figure 5.1: London Plan Cooling Hierarchy

The development will be provided with comfort cooling via a Chilled Water Loop (CHW) for marketing purposes, but it should be noted that the building benefits from reasonable proportions of glazing with solar control in order to minimise excessive solar gains where possible. Units in Lower Stable Street are not expected to be provided with cooling.

Modelling has demonstrated that a significant reduction in cooling requirements has been achieved as a result of the proposals to maintain the existing solid brick walls, which means that

excessive heat is able to escape through the building fabric. This is particularly beneficial for a building use which is typically cooling led. Relatively high thermal mass also helps to regulate heating loads within the development.

Heating and cooling will be delivered in most retail units via 4-pipe fan coil units (FCU) aiming to reduce energy consumption by targeting Specific Fan Powers in line with the N-DBSCG 2013 minimum standards. Heating to Lower Stable Street units will be provided via radiators, and these units will not be provided with cooling. Further improvements will be investigated as part of tenant fit-out works for each unit.

Pumps serving the LTHW and CHW loops are proposed to be of variable speed pumping type allowing them to ramp down when demand is reduced and conserve excessive energy use.

Back of house areas are not expected to be cooled.

Lighting

As most of the development will be constructed to a shell only provision with future tenants providing the fit-out, the lighting strategy in most retail spaces will be dictated by the individual fit-out design.

Future tenants will however be required to design in accordance with the 2013 Non-Domestic Building Services Compliance Guide (N-DBSCG, 2013).

In back-of-house areas, lighting will be provided as part of the shell provision. In these areas improvements on the N-DBSCG, 2013 are currently targeted. The target values are shown in table 5.1 below.

It is currently proposed that energy use associated with lighting will be reduced through the use of photocell daylight controls in areas near a glazed perimeter that will respond to daylight levels in the associated space and reduce the artificial lighting level provided where possible.

Back of house lighting will be provided with auto-on-auto-off dimming controls which respond to occupants entering the associated spaces, thus reducing lighting energy demand when necessary.

A small amount of fit-out areas may be provided as part of the base-build design. This is currently expected to meet the same design efficiencies as described above with improvements targeted where technically feasible.

Table 5.1: Target lighting efficiencies

Area	Values Used	NCM Lux levels (for reference only)	Notes
A1/A2: Retail or Office (Retail)	60 lm per circuit Watt Display lighting 22 lm/circuit Watt	600	In line with minimum requirement in Non-Domestic Building Compliance Guide (referred to in Part L2B 2013). Would require tenant cooperation to improve upon.
A3/A4/A5: Restaurant or public house	60 lm per circuit Watt Display lighting 22 lm/circuit Watt	150	In line with minimum requirement in Non-Domestic Building Compliance Guide. Would require tenant cooperation to improve upon.
Circulation spaces	5.0 W/m ² /100lux	100	Represents an improvement on Part L minimum requirements
Plant rooms	3.5 W/m ² /100lux	200	Represents an improvement on Part L minimum requirements
Back of House Cupboards, Stores	3.5 W/m ² /100lux	50	Represents an improvement on Part L minimum requirements
Toilets	5.5 W/m ² /100lux	200	Represents an improvement on Part L minimum requirements

Metering and Control Strategy

A number of measures will be implemented in order to facilitate energy management.

Meters will be fitted on each energy supply (electricity, heating, cooling) and sub-meters will be installed in sufficient numbers to enable an accurate understanding of energy consumption: by energy use (e.g. lighting / small power / etc.) and by control zone.

All meters and sub-meters will be linked to the Building Management System (BMS), with data automatically logged. This is highly valuable when identifying abnormal consumption, prioritising remediation action when necessary, benchmarking buildings against good practice and encouraging tenants to monitor and reduce consumption.

The following controls have been assumed for the LTHW central heating system connected to the KXC low-carbon district energy system.

- Central Time Control
- Optimum start/stop control
- Local time control (room by room)
- Local temperature control (room by room)

6.0 Energy Demand Assessment

The refurbished and extension areas have been modelled in IES Virtual Environment version 2014.2.1.0. In order to estimate the savings arising from the passive design and energy efficiency measures it has been assumed that development would be served by heating and cooling plant that would meet the requirements of the N-DBSCG, 2013 (84% efficient gas fired boiler and cooling plant with an SEER of 2.65

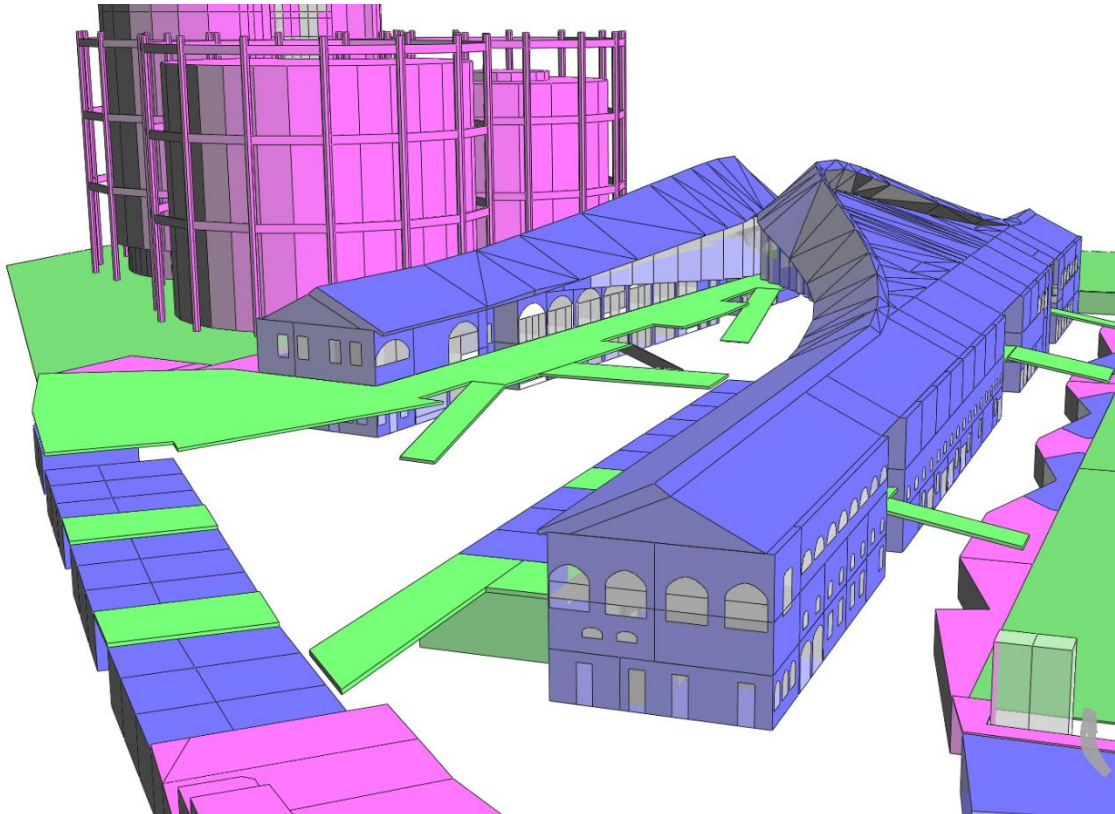


Figure 6.1: A view from the Fish & Coal offices of the proposed Coal Drops Yard development modelled in IES VE

Results have then been compared against a Part L2B Notional building in order to quantify the level of improvement made against the minimum requirements of Part L.

The performance of the new build areas along Lower Stable Street have been included in this strategy based on benchmark data. These areas are currently assumed to meet Part L2A through passive measures and energy efficiency measures as a minimum.

Table 6.1 below gives a breakdown of the estimated energy consumption by end use for the proposed development.

Table 6.1: Breakdown of estimated energy consumption by end use.

	Heating	Cooling	Auxiliary	Lighting	Hot Water	Total (Regulated)	Unregulated	Total (Combined)
	(kWh/year)	(kWh/year)	(kWh/year)	(kWh/year)	(kWh/year)	(kWh/year)	(kWh/year)	(kWh/year)
Refurbished and Extension areas	378,700	533,000	395,800	1,196,600	95,200	2,599,200	844,300	3,443,500
Lower Stable Street	2,100	0	2,700	8,900	1,000	14,700	9,700	24,400
Total	380,800	533,000	398,500	1,205,500	96,200	2,613,900	854,000	3,467,900

Table 6.2 gives a breakdown of the estimated carbon emissions arising from the proposed development prior to the inclusion of any low or zero carbon technology. These have been calculated using the following carbon dioxide emission factors (source: Part L 2013):

- Natural gas: 0.216 kgCO₂/kWh
- Grid supplied electricity: 0.519 kgCO₂/kWh

Table 6.2: Breakdown of estimated carbon emissions by end use.

	Heating	Cooling	Auxiliary	Lighting	Hot Water	Total (Regulated)	Unregulated	Total (Combined)
	(kgCO ₂ /year)	(kgCO ₂ /year)	(kgCO ₂ /year)	(kgCO ₂ /year)	(kgCO ₂ /year)	(kgCO ₂ /year)	(kgCO ₂ /year)	(kgCO ₂ /year)
Refurbished and Extension areas	97,400	104,400	200,300	605,500	24,500	1,032,000	438,200	1,470,200
Lower Stable Street	500	0	1,300	4,500	200	6,600	5,100	11,600
Total	97,900	104,400	201,600	610,000	24,700	1,038,600	443,300	1,481,800

The following figures show how the energy consumption (figure 6.2) and carbon emissions (figure 6.3) are proportioned prior to the integration of any low or zero carbon technology.

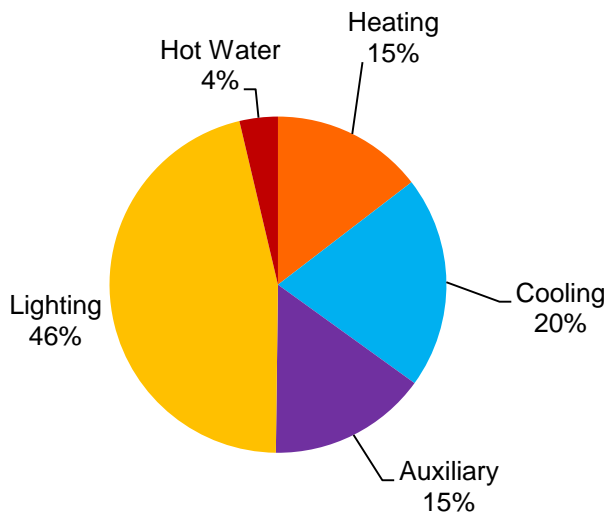


Figure 6.2: Estimated Regulated Part L Energy Consumption breakdown by energy use

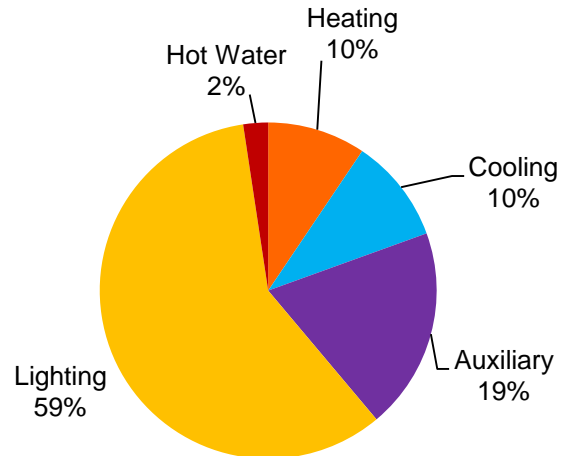


Figure 6.3: Estimated Regulated Part L CO₂ emissions breakdown by energy use

Modelling predicts that the passive design and energy efficiency are estimated to provide a reduction in annual carbon emissions of approximately 15-20% from passive design and energy efficiency measures alone which equates to an EPC rating of C prior to the inclusion of low or zero carbon technology.

7.0 Low and Zero Carbon Technology Appraisal

7.1 Be Clean - Supply Energy Efficiently

This section covers a low carbon, or 'clean' energy source, Combined Cooling, Heating and Power (CCHP). This low carbon energy source can help to reduce total project carbon dioxide emissions, as shown in figure 7.1.

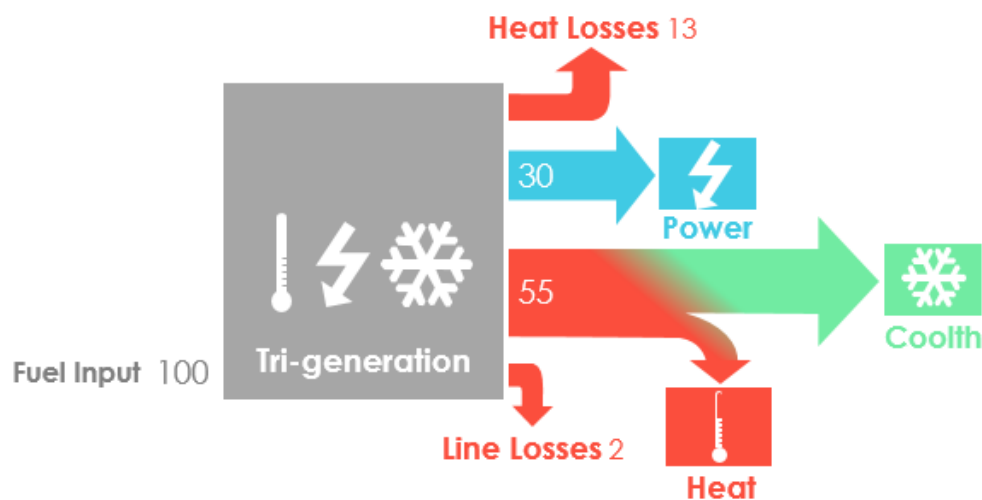


Figure 7.1: CCHP energy supply breakdown.

Combined Cooling, Heating and Power (CCHP) is the on-site generation of electricity and the utilisation of the heat that is a by-product of the generation process. Due to the utilisation of heat from electricity generation and the avoidance of transmission losses because electricity is generated on site, CHP typically achieves a 30% reduction in primary energy usage compared with power stations and heat only boilers. CHP is considered here to be a gas-fired engine or gas turbine. If used in conjunction with absorption chillers, CHP is referred to as CCHP (Combined Cooling, Heating and Power). CCHP systems utilise heat generated by the CHP system (sometimes excess heat that would otherwise be dumped) to generate coolth which can further reduce carbon emissions.

KXC low-carbon district energy system

A the Coal Drops Yard is located within the King's Cross Central Masterplan an opportunity exists to provide the proposed development with heat from the KXC low-carbon district energy system located in the T1 Energy Centre.

The T1 Energy Centre has already been approved, constructed and partially commissioned to meet the heat and hot water demands of the first occupiers at KXC, including the University of the Arts London, commercial tenants in the Western Transit Shed, buildings in Zone B, and residents of Buildings T6, J, R4 and R5 North.

KCCLP and its partners have established the Energy Services Company ('ESCO') to run the district heating, and the necessary heat and power distribution infrastructure has been and is being installed across the KXC site to enable the connection of each new building, and where appropriate retained buildings, to the district energy network. The combined heat and power

('CHP') engines within the T1 Energy Centre also generate electrical power, which will offset a significant percentage of the demand from this and other buildings.

When fully operational, it is anticipated that the T1 Energy Centre will include the following principal items:

- 3no. 1.8MWth gas fired CHP engines
- A thermal store, integral to the CHP operating hours strategy
- 3no. 9 MWth gas boilers

These items will be installed on a phased basis as the scheme reaches critical mass, in order to meet peak demands and optimise efficiency.

Currently the KXC low-carbon district energy system delivers heat across the wider KXC development with a carbon content of heat of 0.719kgCO₂/kWh (approximately 30% of heat delivered via a mains gas fired boiler).

As a further expansion of the KXC low-carbon district energy system it is proposed that district cooling will also be provided from absorption chillers, making use of some of the waste heat arising from the existing heat network.

Although design work is at a very early stage and performance figures are not yet available, it is estimated that the proposed cooling network could provide cooling with an effective Co-efficient of Performance (CoP) of between 3 and 5.

Connection to the KXC low-carbon district energy system (district heating & cooling)

Further modelling has been undertaken using IES VE software which estimates that if all heating and hot water is taken from the district heating network and all space cooling is taken from the proposed cooling network, a further carbon saving of 10-15% could be made in addition to the passive design and energy efficiency measures assessed previously.

A breakdown of carbon emissions by end use and compared to the notional development is shown in figure 7.2 below.

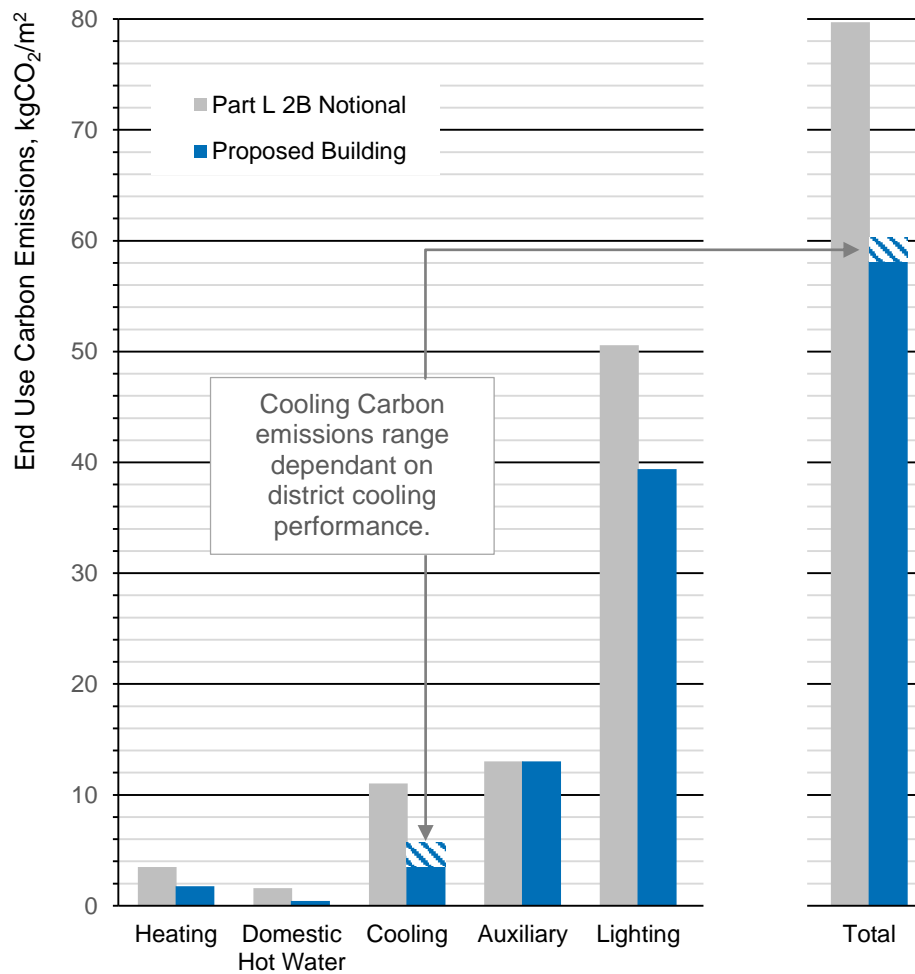


Figure 7.2: Graph showing the estimated carbon emissions for the proposed development once connected to the KXC low-carbon district energy system to provide heating, domestic hot water and cooling.

7.2 Be Green – Appraisal of Low or Zero Carbon Technology

In line with the Energy Hierarchy, renewable energy sources have been considered for the Coal Drops Yard. The following technologies have been considered:



Solar Water Heating

Solar water heating systems use energy from the sun to pre-heat domestic hot water. Solar water heating systems are generally composed of solar thermal collectors and a fluid system to move the heat from the collector to a storage tank to stock the heat for subsequent use. The system requires solar panels on the roof, ideally south facing, linked to hot water storage cylinders.



Ground Source Heat Pump

Ground source heat pumps can be used to extract heat from the ground by circulating a fluid through a system of pipes to a heat exchanger which transfers the energy to the distribution network. This can provide space heating and/or pre-heat domestic hot water. Ground source heat pumps have the advantage that they can act as a source of both heating and cooling for the buildings. Ground source heat pumps are either open-loop (extracting and rejecting water to the aquifer below the site) or closed-loop.



Biomass

Biomass heating systems combust biomass material in a biomass boiler in order to heat water in the same way that gas boilers combust gas. Biomass materials include all land and water based vegetation, e.g. wood chips, wood pellets. The carbon dioxide emitted from burning biomass is balanced by that absorbed during the fuel's production. Biomass heating therefore approaches a carbon neutral process. Biomass boilers require storage adjacent to the boiler to be provided. The fuel is then delivered on a regular basis.



Wind Power

Wind turbines use the wind's forces to turn a rotor which in turn generates electricity. Wind power is used in large scale wind farms for national electrical grids as well as in small individual turbines or building integrated turbine.



Photovoltaic Electricity Generation

Photovoltaic modules are devices or banks of devices that use the photovoltaic effect to generate electricity directly from sunlight. Current applications to buildings include roof-mounted PVs, PV curtain walling systems and PV louvred external shading devices.

A review of the low or zero carbon technology highlighted above had concluded that the following technology would not be technically feasible for the Coal Drops Yard development.

Solar Water Heating

It is proposed that the Coal Drops Yard will connect to the KXC low-carbon district energy system which will meet all of its domestic hot water and space heating demand. As a result any solar thermal installation, if installed, would directly compete with the KXC district energy system and would effectively reduce the carbon savings made by connecting to the KXC low-carbon district energy system.

For this reason, solar thermal panels have not been pursued further in this project.

Ground Source Heat Pump

A detailed analysis of a Ground Source Heat Pump strategy was carried out as part of the Reserved Matters Application for the neighbouring Fish & Coal development. This concluded that connection to the King's Cross district energy network would provide greater carbon emissions savings. Reserved Matters approval was granted for the Fish & Coal Offices in 2014 based on this approach.

The proposal for the Coal Drops Yard follows in this vein, and the scheme is proposing to connect to the King's Cross District Energy Network for all heating, hot water and cooling, which, as discussed in the detailed analysis is expected to provide greater carbon emissions savings than a GSHP system would be expected to provide.

Biomass

As outlined in previously submitted (and approved) ESPs, future provision has been made within the KXC low-carbon district energy system for inclusion of biomass boilers. At this time, a robust commercial case to support the inclusion of biomass cannot yet be made, however, this position continues to be actively monitored.

Wind Turbines

The British Wind Energy Association (BWEA) suggests that for a large wind turbine to be viable, a minimum wind speed of 7m/s or above is required. The table below, taken from the BERR wind speed database, indicates that the likely wind speeds found at the KXC site are likely to be insufficient when compared with this minimum value benchmark.

Further to this turbulence created from surrounding buildings (expected to increase as the KX development moves forward) will disrupt constant wind speeds making this an even less reliable source of renewable energy.

Wind speed across King's Cross site at various heights (Source - BERR database)	
10 meters above ground level	4.8 m/s
25 meters above ground level	5.5 m/s
45 meters above ground level	6.0 m/s

Table 3.4: Wind speed data for King's Cross site from BERR wind speed database

Consequently any wind turbine positioned between ground level and 45 metres is unlikely to receive a high enough wind speed to turn the blades and generate power. Some vertical access wind turbines do have the capability to 'kick-start' at low wind speeds using an electric motor. However these have been known to become net-consumers of electricity when intermittent

gusts of wind (common in a city location) mean the turbine repeatedly 'kick-starts' and decelerates as there is not a continuous provision of wind.

In addition, it is considered that wind turbines would be incongruous in long and short range views of the building, especially given the context of the adjacent Grade II listed Granary Complex and East Coal Drops building and the development's location within the Regent's Canal Conservation Area. Wind turbines are therefore not considered to be a viable renewable energy solution for the Coal Drops Yard development.

Photovoltaic Electricity Generation

As part of the outline planning application for Coal Drops Yard, some roof areas of the Coal Drops Yard were identified as potentially suitable for PVs (shown in Figure 7.3 below). It should be noted however that it has been advised by the heritage consultant that PVs in these locations, especially the eastern part of the ECD roof, 'would have a negative impact on the character and setting of the listed building and conservation area.'

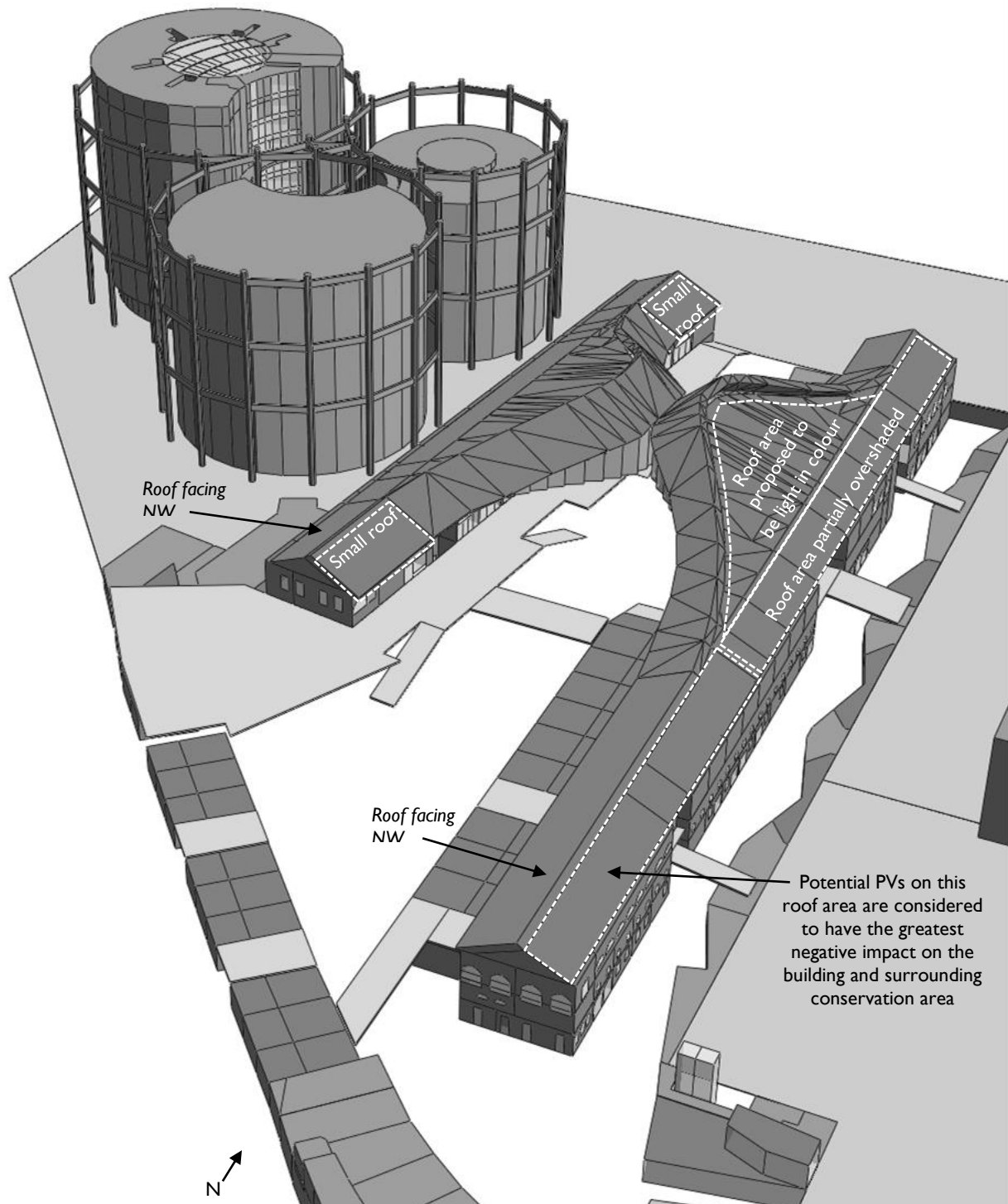


Figure 7.3: Aerial view of the thermal model created for the Part L assessment showing the roof area technically suitable for PV panels

A detailed assessment was undertaken to assess the potential carbon savings that could arise from the installation of a PV array. The following assumptions in order to evaluate estimated performance:

- PV is not proposed on the southern end of the South East facing pitched roof of the Grade II listed Eastern Coal Drops, in line with the heritage consultant's recommendation.
- PV is not proposed on the mid- and northern end of the South East facing pitched roof of the Grade II listed Eastern Coal Drops due to overshadowing from the Granary Building and Western Transit Shed.
- PV is not proposed along the NW facing roofs of WCD & ECD due to poor orientation and significant overshadowing from the Gas Holder Triplets.
- PV is not proposed on the new roof cheeks as the design proposes these areas are light in colour to ensure they are visually subservient from the existing heritage roofs.
- PVs would not be suitable along Lower Stable Street or the Western Wharf Road Arches as the roof areas comprises accessible public realm.
- PV's could potentially be implemented on two areas of the WCD and the following assumptions have been made:
 1. A typical PV panel is assumed i.e. not solar slates or PV tiles, which operate at a lower efficiency than typical PV panels.
 2. PVs would follow the existing roof pitch (~35-45° East-South East) and are therefore not aligned with optimised PV arrangement (30° inclination, due south).

Results of the estimated carbon savings from the resultant potential PV array are shown in table 7.1 below:

Table 7.1: Overview of LZC feasibility appraisal

System size assessed	Estimated annual electrical output, (kWh/yr)	Estimated net annual CO ₂ savings, (kgCO ₂ /yr)	Estimated net CO ₂ reduction beyond 'Be Clean', (Regulated, %)	Estimated net CO ₂ reduction beyond 'Be Lean', (Regulated, %)
Photovoltaic Array, ~200m²	18,900	~9,800	1.1%	0.9%

Only minimal benefits would be expected from the potentially feasible PV array (CO₂ emission savings of approximately 1% after the implementation of the CCHP system). When viewed in comparison to the over-all development target (25-35% from passive design, energy efficiency and connection to the District Energy network), the carbon savings available from PVs is negligible, and these minimal benefits are not considered to outweigh the resulting harm to the character and setting of the listed building.

The visual impact might be overcome with the use of solar slates or tiles, however should such a system be proposed it could be expected that for a system of the same area there would be a further reduction in yield as these systems are typically less efficient than photovoltaic panels.

8.0 Development-wide carbon reduction strategy

The carbon reduction strategy for the whole development follows the energy hierarchy (Be Lean – Be Clean – Be Green) reducing energy demand prior to the inclusion of and low or zero carbon technology since controlling demand is the most effective way of reducing energy consumption and carbon dioxide emissions.

Modelling has been undertaken to validate estimates for carbon savings which indicate that estimated carbon emissions savings of between 25-35% could be achieved when compared to a 'notional building' which meets the minimum standard set out in Part L 2013 (2A & 2B).

This significant improvement is expected to be achieved despite the Coal Drops buildings' heritage status (ECD is Grade II listed, and the whole development sitting within the Regent's Canal Conservation Area). This result is achieved through a number of measures, as follows:

1. Be Lean (Refurbished areas) - Passive design and energy efficiency measures to reduce energy demand in the first instance could achieve an estimated carbon saving of 15-20% over Part L2B 2013. Measures include:
 - Introduction of new double glazing with solar control where new windows are provided
 - New efficient services in landlord areas
 - New energy efficient lighting to landlord areas
 - Insulation introduced to roofs and ground floors
 - Metering of heating, cooling, water and electricity to each unit, encouraging tenants to monitor and reduce consumption
2. Be Lean (New build areas) - Lower Stable Street will meet Part L2A 2013 requirements as a minimum.
3. Be Clean - Connection to the KXC low-carbon district energy system with CCHP for all space heating, domestic hot water and cooling requirements is estimated achieve a further carbon saving across the development of 10-15% over the passive design and energy efficient scheme.
4. Be Green – due to heritage constraints a potential PV array that would be technically feasible would provide minimal yield. These minimal benefits are not considered to outweigh the resulting harm to the character and setting of the listed building, and PVs have therefore been discounted.

As these proposals have been developed in collaboration with a heritage specialist and in consultation with Camden Council and Historic England to identify acceptable improvements, the current design represents a scheme that is considered to have maximised the potential for carbon emissions savings for a heritage site.

The carbon reduction strategy is shown graphically in figures 8.1, 8.2 & 8.3 below:

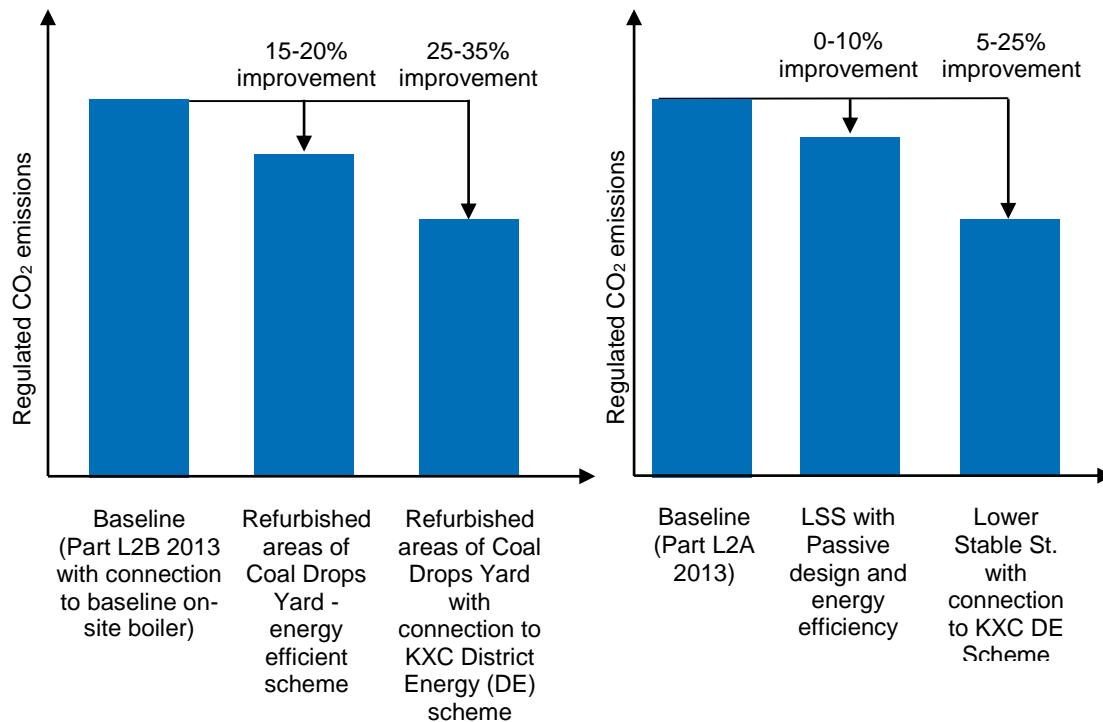


Figure 8.1: CO₂ reduction strategy for refurbished areas and Upper Level extension

Figure 8.2: CO₂ reduction strategy for new-built areas (Lower Stable Street)

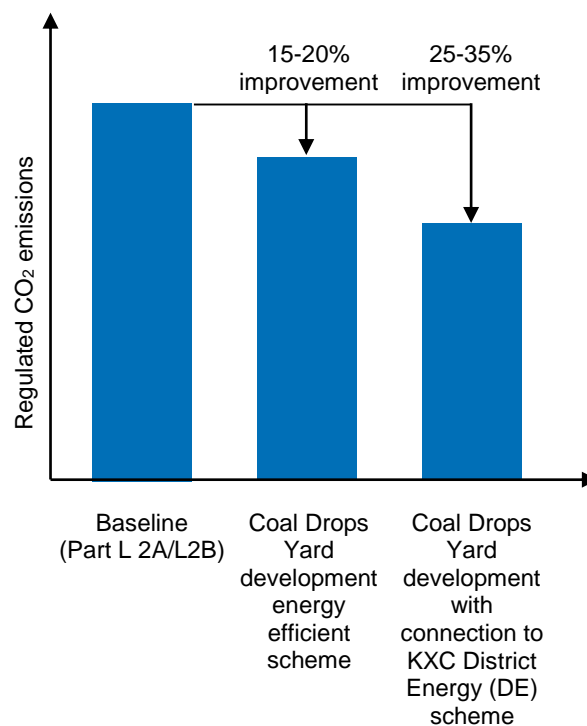


Figure 8.3: Site-wide CO₂ reduction strategy

8.0 Appendix B – Ecology Support Statement



Coal Drops Yard – Ecology Support Statement

Existing Baseline

The Coal Drops Yard site located within the Urban Regeneration project at Kings Cross is of low ecological value, this was verified during an ecological walkover in January 2015. The planning boundary is dominated by hardstanding, with large areas now under construction (refer to Figure 1).

No protected species have been recorded within the Coal Drops Yard site. None of the buildings present on the site provide roosting opportunities for bats. Bats have been foraging and commuting recorded immediately adjacent to the site along Regent's canal, the Gas Governor site and the Western Transit Shed.

No birds have been recorded on the land at the Coal Drops Yard. The site does provide nesting opportunities for breeding birds but no nests were observed at the time of the 2015 verification walkover. The lack of nesting birds at present is probably attributed to the highly disturbed nature of the site.

No invasive weeds have been recorded within the Coal Drops Yard planning boundary to date.

Mitigation Measures

Protection measures will be implemented prior to the site construction commencing at the actual Eastern and Western Coal Drop buildings on the site, these will include:

Black restarts are known to use the wider Kings Cross site for breeding and foraging so care will be taken on site to ensure piles of aggregate, spoil piles etc. are covered with netting or a plastic covering to deter nesting;

The Western Wharf Road Arches will remain netted over to deter nesting birds; and

The plastic roof covering and exposed areas on the Western and Eastern Coal Drops will be covered and continue to be monitored to deter nesting birds during the construction period.

Enhancement Measures

The Coal Drops Yard site is set within a highly urbanised environment. In order to enhance the site for local wildlife a number of measures will be incorporated into the final design. A number of protected bird and bat species are known to use the wider Kings Cross regeneration site, house sparrow, black redstart and common pipistrelle, so these species will be focused on during the design process. Built in bat tubes and bricks, plus external wall boxes will be considered for bats and a variety of built-in or external bird boxes.

Site specific locations for these measures will be provided as the scheme progresses and in consultation with the projects ecologist. Wildlife boxes are a very effective but a simple enhancement measure within this type of environment and will work well within this redevelopment.

Ecology Overview

In summary the Coal Drops Yard site is of low ecological value. The future landscape proposals for the site will be produced in consultation with the projects ecologist to benefit local wildlife. The new landscape proposals for the redevelopment will use native planting to provide high quality landscaping and to promote nature conservation by attracting local wildlife. Any planting will also tie in with the existing vegetation on the site. Planting will attract seed eating birds and foraging bats. The Coal Drops Yard site will be further enhanced for wildlife through the incorporation of ecological enhancement measures such as bird and bat boxes.

9.0 Appendix C - BREEAM 2014 Refurbishment and Fit-out Pre-Assessment Report (Shell and Core – BREEAM Parts 1&2)

Coal Drops Yard

BREEAM Refurbishment and Fit-out 2014 Pre-Assessment Report

Revision T5
September 2015



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Western Transit Shed
12-13 Stable St
London
N1C 4AB

Rev.	Description	Prepared and checked by	Reviewed by	Date
P1	First draft for discussion with team	L. Wille	S. Lloyd	19.12.2014
P2	Incorporating Stage 2 comments from HS, Arup and BAM	S. Lloyd	L. Wille	15.05.2015
T1	Incorporating Stage 3 comments from Argent and BAM	L. Wille	L. Doherty	12.06.2015
T2	Incorporating changes from workshop on 29/06/2015	L. Wille	-	10.07.2015
T3	Incorporating changes from workshop on 29/06/2015	L. Wille / S. Lloyd	-	12.08.2015
T4	Incorporating changes from workshop on 13/08/2015	S. Lloyd	L. Wille	04.09.2015
T5	Updated with team comments for inclusion in ESP	L. Wille	S. Lloyd	16.09.2015

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BREEAM Refurbishment and Fit-out - Pre Assessment

Contents

1.0 Executive Summary4

1.1 Targets.....4

2.0 Introduction5

2.1 Mandatory credit issues5

2.2 Design team members5

3.0 Summary Indicative Assessment Score Sheet6

4.0 Credits Requiring Early Action.....7

Appendix A: Detailed Credit Assessment.....9

BREEAM Refurbishment and Fit-out - Pre Assessment

1.0 Executive Summary

This document contains the initial pre-assessment score against BREEAM 2014 Refurbishment and Fit-out (BREEAM RFO) for the retail units at the Coal Drops Yard, part of the King's Cross Central development. The score given within this document applies to the **assessment of the shell and core areas (envelope and base build services)**. The proposed retail destination will consist of a number of smaller retail spaces and one large anchor unit at the top floor, with outdoor areas and a basement.

A BREEAM rating of 'Very Good' is being targeted, and this report also sets out a route to achieving a rating of BREEAM 'Excellent'. Under BREEAM UK Non-Domestic Refurbishment and Fit-Out 2014, the scope of an assessment can consist of up to four parts, at the discretion of the team. It has been agreed to assess the following parts of the Coal Drops Yard:

- **Part 1 - Fabric and Structure: Assessed** – included within the scope of this assessment
- **Part 2 - Core Services: Assessed** – included within the scope of this assessment
- **Part 3 – Local Services: Excluded** (a fit-out assessment can be undertaken by retailers at a later date to obtain a 'fully fitted' BREEAM rating)
- **Part 4 - Interior Design: Excluded** (a fit-out assessment can be undertaken by retailers at a later date to obtain a 'fully fitted' BREEAM rating)

1.1 Targets

The target for the Coal Drops Yard development is to achieve a BREEAM 'Very Good' rating (>55%) with an aspiration to 'Excellent' (>70%) where possible.

Current estimate score

The current estimated score is 63.9%, equivalent to a BREEAM 'Very Good' rating. A minimum score of 55% is required to achieve the targeted rating of 'Very Good'. In addition, a margin of minimum 3-5% is recommended above the minimum required score to ensure that the targeted rating can be achieved at the final post fit-out stage.

Potential Additional Credits

Possible additional credits have been identified throughout this document. Which, if all are achieved, could bring the total score to 79.5% and a rating of 'Excellent' (see Section 5.0 for more detail).

Please note: The score calculator tool provided by the BRE is still undergoing development, and therefore some minor discrepancies from the score reported here could occur.

Camden Council Requirements

There is a specific requirement within the Camden Core Strategy to achieve at least 60% of the credits (un-weighted score) under the Energy and Water headings of BREEAM as well as 40% of credits under the Materials headings of

BREEAM. The Coal Drops Yard development is currently targeting the below scores under these headlines (see table 1.2).

Coal Drops Yard	Score	Rating
BREEAM RFO 2014 – Indicative baseline score	63.9%	'Very Good'
BREEAM RFO 2014 – Potential score	79.5%	'Excellent'

Table 1.1 Current target score and potential achievable score.

Credit section	Current target score baseline	Current estimated potential score for uplift to Excellent	Comment
Energy	68.7%	75.3%	Due to the heritage nature of the development the energy efficiency measures that can be achieved on site are limited. The refurbishment will incorporate best practice standards respectful of listed buildings and conservation areas constraints, with proposals developed in collaboration with the heritage specialist and in consultation with Camden Council and English Heritage to identify acceptable improvements. The current model shows that the CDY can achieve enough energy credits to reach this target, however this should be monitored as the project moves forward.
Water	66.7%	77.8%	Requirement for 60% of credits targeted is met with the baseline score.
Materials	46.2%	61.5%	Requirement for 40% of credits targeted is met with the baseline score.

Table 1.2: Current estimated BREEAM targets against Camden Council specific section requirements

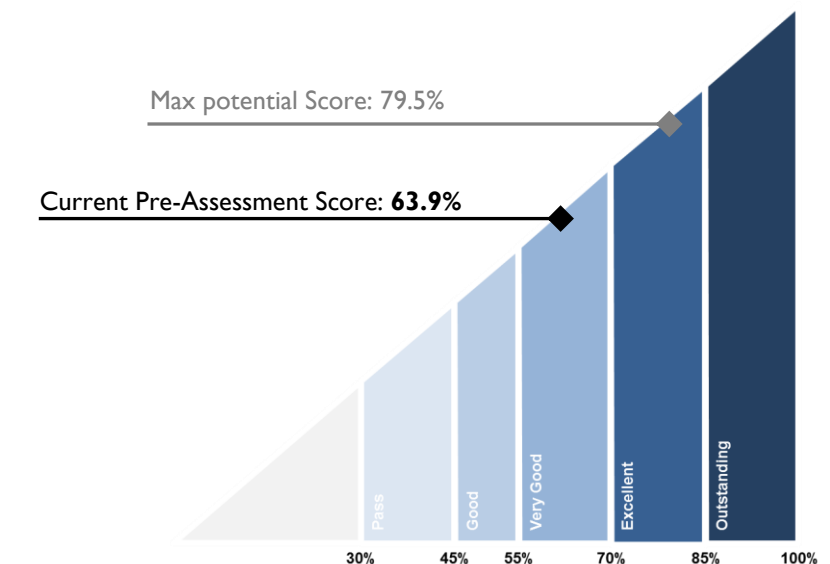


Figure 1.1 BREEAM refurbishment and Fit-Out 2014 scale showing Pre-Assessment 'indicative rating' and 'potential achievable' Scores

BREEAM Refurbishment and Fit-out - Pre Assessment

2.0 Introduction

The 'Building Research Establishment Environmental Assessment Method' (BREEAM) 2014 Refurbishment and Fit-out is being used as a benchmarking tool in the design of refurbished non-domestic developments. The aim is to estimate the sustainability of buildings and to promote a programme of design improvement

2.1 Mandatory credit issues

BREEAM sets minimum standards of performance in key areas e.g. energy, water etc. These must be met to achieve the overall performance score. The required minimum standards vary depending upon the applicable assessment parts. Table 2.2 identifies the mandatory requirements relevant to the assessment of the Coal Drops Yard shell and core areas.

Failure to meet the mandatory criteria may restrict a development to an UNCLASSIFIED rating, regardless of the overall percentage achieved.

2.2 Design team members

Team member/s has been identified as responsible for each credit issue. Table 2.1 summarises the appointed responsible team members.

Responsibility	Team Member Shell and Core
Project Manager	Argent
Architects	Heatherwick Studios (up to Stage 3) & BAM Design Architecture (BAM D A - Stage 4 onwards)
MEP	Hoare Lea MEP (HL) (Up to Stage 3) including Acoustics & Vertical Transportation & BAM Design MEP (BAM D MEP – Stage 4 onwards) Hoare Lea Acoustics & Vertical Transportation
Contractor	BAM Construction (BAM C)
Structural Engineers	Arup
Landscape Architects	Townshend
Civil Engineers	Peter Brett Associates
Ecologist	RPS
Transport Consultant	Arup
Heritage consultant	Giles Quarme & Associates

Table 2.1: Responsible team members

BREEAM Rating		Pass	Good	Very Good	Excellent	Out-standing
Minimum Score Required		30%	45%	55%	70%	85%
MANAGEMENT	Man 03: Responsible Construction Practices	-	-	-	One credit (Considerate construction)	Two credits (Considerate construction)
	Man 04: Commissioning and handover	-	-	-	Criterion 9 (Building User Guide)	Criterion 9 (Building User Guide)
	Man 05: Aftercare	-	-	-	One credit (Seasonal Commissioning)	One credit (Seasonal Commissioning)
ENERGY	Ene 01: Reduction of energy use and carbon emissions	-	-	-	Six credits	Ten credits
	Ene 02: Energy Monitoring	-	-	One credit (First submetering credit)	One credit (First submetering credit)	One credit (First submetering credit)
WATER	Wat 01: Water consumption	-	One credit	One credit	One credit	Two credits
	Wat 02: Water monitoring	-	Criterion I	Criterion I	Criterion I	Criterion I
MATERIALS	Mat 03: Responsible sourcing of materials	Criterion I	Criterion I	Criterion I	Criterion I	Criterion I
WASTE	Was 01: Project Waste Management	-	-	-	-	One credit
	Was 03: Operational Waste	-	-	-	One credit	One credit

Table 2.2: Minimum score and mandatory requirements for BREEAM 2014 New Construction

BREEAM Refurbishment and Fit-out - Pre Assessment

3.0 Summary Indicative Assessment Score Sheet

The credits assumed in the pre-assessment score and associated weightings are shown in the score breakdown below.

Overall Credit Allocation	Mandatory elements currently targeted	Value of 1 credit	No. Credits Available	No. Credits Assumed Baseline score	% of Available Credits Assumed Baseline score	Overall Weighted POINTS score (Baseline)	No. Credits Assumed Potential score	% of Available Credits Assumed Potential score	Overall Weighted POINTS score (Potential)
Management	✓	0.69%	21	17	81.0%	11.7%	18	85.7%	12.4%
Health and Wellbeing	n/a	0.82%	16	4	25.0%	3.3%	8	50.0%	6.6%
Energy	✓	0.69%	19	14.4	75.8%	10.0%	15.4	70.5%	10.7%
Transport	n/a	0.80%	9	7	77.8%	5.6%	7	77.8%	5.6%
Water	✓	0.80%	9	6	66.7%	4.8%	7	77.8%	5.6%
Materials	✓	1.15%	13	6	46.2%	6.9%	8	61.5%	9.2%
Waste	✓	0.75%	11	5	45.5%	3.8%	9	81.8%	6.8%
Land Use and Ecology	n/a	2.40%	4	4	100.0%	9.6%	4	100.0%	9.6%
Pollution	n/a	0.92%	13	9	69.2%	8.3%	12	92.3%	11.1%
Tradable score						63.9%	Tradable score		77.5%
Exemplary Level Credits						0%	Exemplary Level Credits		2%
Total BREEAM score						63.9%	Total BREEAM score		79.5%
Rating targeted						'VERY GOOD'	Rating targeted		'EXCELLENT'

10.0 Appendix D - BREEAM 2014 New Construction Pre-Assessment Report (Shell and Core – BREEAM Parts 1&2)

Coal Drops Yard

BREEAM New Construction 2014 Pre-Assessment Report

Revision T2
September 2015



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Western Transit Shed
12-13 Stable St
London
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Rev.	Description	Prepared and checked by	Reviewed by	Date
T1	First draft for Planning / RMA Application	L. Wille	-	04.09.2015
T2	Updated with Argent & BAM comments	L. Wille	S. Lloyd	17.09.2015

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Contents

1.0 Executive Summary4

1.1 Targets.....4

2.0 Introduction5

2.1 Mandatory credit issues5

2.2 Design team members5

3.0 Summary Indicative Assessment Score Sheet6

4.0 Credits Requiring Early Action.....7

Appendix A: Detailed Credit Assessment.....9

BREEAM New Construction 2014 - Pre Assessment

1.0 Executive Summary

This document contains the initial pre-assessment score against BREEAM 2014 New Construction (BREEAM NC) for the new-built retail units at the Coal Drops Yard, part of the King's Cross Central development in the London Borough of Camden. The score given within this document applies to the **assessment of the shell and core areas (envelope and base build services)**. The proposed retail destination will consist of a number of smaller retail spaces and one large anchor unit at the top floor, with outdoor areas and a basement. The new-built areas covered in this pre-assessment are located at Lower Stable Street.

A BREEAM rating of 'Very Good' is being targeted, and this report also sets out a route to achieving a rating of BREEAM 'Excellent'.

Under BREEAM UK Non-Domestic Refurbishment and Fit-Out 2014, the scope of an assessment can consist of up to four parts, at the discretion of the project team. The following parts of the Coal Drops Yard are being assessed:

- **Part 1 - Fabric and Structure: Assessed** – included within the scope of this assessment
- **Part 2 - Core Services: Assessed** – included within the scope of this assessment
- Part 3 – Local Services: Excluded (a fit-out assessment can be undertaken by retailers at a later date to obtain a 'fully fitted' BREEAM rating)
- Part 4 - Interior Design: Excluded (a fit-out assessment can be undertaken by retailers at a later date to obtain a 'fully fitted' BREEAM rating)

1.1 Targets

The target for the Coal Drops Yard development is to achieve a BREEAM 'Very Good' rating (>55%) with an aspiration to 'Excellent' (>70%) where possible.

Current estimate score

The current estimated score is 59.0%, equivalent to a BREEAM 'Very Good' rating. A minimum score of 55% is required to achieve the targeted rating of 'Very Good'. In addition, a margin of minimum 3-5% is recommended above the minimum required score to ensure that the targeted rating can be achieved at the final post fit-out stage.

Potential Additional Credits

Possible additional credits have been identified throughout this document. These, if achieved, could bring the total score to 75.1% and a rating of 'Excellent' (see Section 5.0 for more detail).

Camden Council Requirements

There is a specific requirement within the Camden Core Strategy to achieve at least 60% of the credits (un-weighted score) under the Energy and Water headings of BREEAM as well as 40% of credits under the Materials headings of BREEAM. The Coal Drops Yard development is currently targeting the adjacent scores under these headlines (see table 1.2).

Coal Drops Yard	Score	Rating
BREEAM NC 2014 – Indicative baseline score	59.0%	'Very Good'
BREEAM NC 2014 – Potential score	75.1%	'Excellent'

Table 1.1 Current target score and potential achievable score.

Credit section	Current target score baseline	Current estimated potential score for uplift to Excellent	Comment
Energy	47.6% Camden target 60%	61.9%	The energy efficiency measures that can be achieved on site are dependent on the tenant fit-out specifications (e.g. for lighting). Without knowledge of the tenant fit-out, the model has to be run using default figures, thus limiting the theoretical performance of the shell & core design. The team will work towards achieving further credits under the 'energy' section, and have identified potentially achievable credits to get to the 60% target provisionally set by Camden in the core strategy.
Water	66.7%	77.8%	Requirement for 60% of credits targeted is met with the baseline score.
Materials	46.2%	69.2%	Requirement for 40% of credits targeted is met with the baseline score.

Table 1.2: Current estimated BREEAM targets against Camden Council specific section requirements

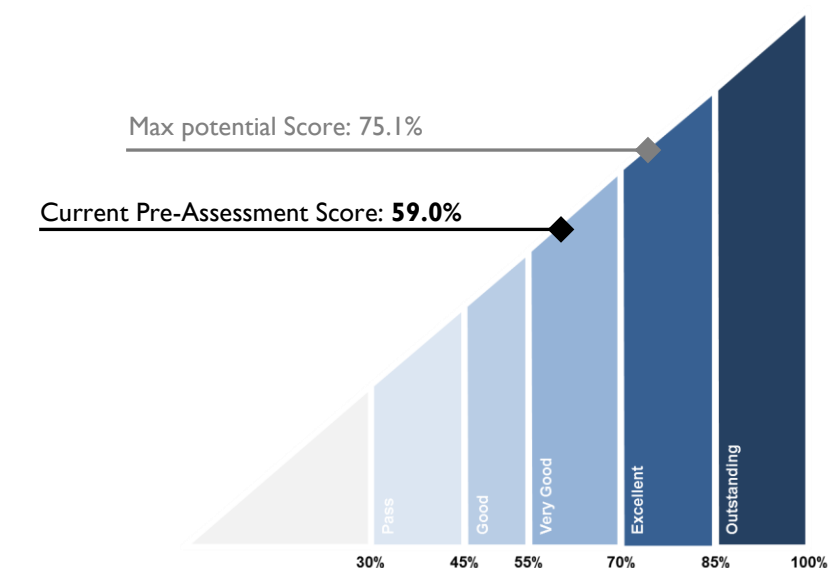


Figure 1.1 BREEAM 2014 New Construction scale showing Pre-Assessment 'indicative rating' and 'potential achievable' Scores

BREEAM New Construction 2014 - Pre Assessment

2.0 Introduction

The 'Building Research Establishment Environmental Assessment Method' (BREEAM) 2014 Refurbishment and Fit-out is being used as a benchmarking tool in the design of refurbished non-domestic developments. The aim is to estimate the sustainability of buildings and to promote a programme of design improvement.

2.1 Mandatory credit issues

BREEAM sets minimum standards of performance in key areas e.g. energy, water etc. These must be met to achieve the overall performance score. The required minimum standards vary depending upon the applicable assessment parts. Table 2.2 identifies the mandatory requirements relevant the assessment of the Coal Drops Yard shell and core areas.

Failure to meet the mandatory criteria may restrict a development to an UNCLASSIFIED rating, regardless of the overall percentage achieved.

2.2 Design team members

Team member/s has been identified as responsible for each credit issue. Table 2.1 summarises the appointed responsible team members.

Responsibility	Team Member Shell and Core
Project Manager	Argent
Architects	Heatherwick Studios (up to Stage 3) & BAM Design Architecture (BAM D A - Stage 4 onwards)
MEP	Hoare Lea MEP (HL) (Up to Stage 3) including Acoustics & Vertical Transportation & BAM Design MEP (BAM D MEP – Stage 4 onwards) Hoare Lea Acoustics & Vertical Transportation
Contractor	BAM Construction (BAM C)
Structural Engineers	Arup
Landscape Architects	Townshend
Civil Engineers	Peter Brett Associates
Ecologist	RPS
Transport & Waste Consultant	Arup

Table 2.1: Responsible team members

BREEAM Rating		Pass	Good	Very Good	Excellent	Outstanding
Minimum Score Required		30%	45%	55%	70%	85%
MANAGEMENT	Man 03: Responsible Construction Practices	-	-	-	One credit (Considerate construction)	Two credits (Considerate construction)
	Man 04: Commissioning and handover	-	-	-	Criterion 10 (Building User Guide)	Criterion 10 (Building User Guide)
	Man 05: Aftercare	-	-	-	One credit (Seasonal Commissioning)	One credit (Seasonal Commissioning)
ENERGY	Ene 01: Reduction of energy use and carbon emissions	-	-	-	Five credits	Eight credits
	Ene 02: Energy Monitoring	-	-	One credit (First submetering credit)	One credit (First submetering credit)	One credit (First submetering credit)
WATER	Wat 01: Water consumption	-	One credit	One credit	One credit	Two credits
	Wat 02: Water monitoring	-	Criterion 1	Criterion 1	Criterion 1	Criterion 1
MATERIALS	Mat 03: Responsible sourcing of materials	Criterion 1	Criterion 1	Criterion 1	Criterion 1	Criterion 1
WASTE	Wst 01: Construction Waste Management	-	-	-	-	One credit
	Was 03: Operational Waste	-	-	-	One credit	One credit
LAND USE & ECOLOGY	LE 03: minimising impact on existing site ecology	-	-	One credit	One credit	One credit

Table 2.2: Minimum score and mandatory requirements for BREEAM 2014 New Construction

BREEAM New Construction 2014 - Pre Assessment

3.0 Summary Indicative Assessment Score Sheet

The credits assumed in the pre-assessment score and associated weightings are shown in the score breakdown below.

Overall Credit Allocation	Mandatory elements currently targeted	Value of 1 credit	No. Credits Available	No. Credits Assumed Baseline score	% of Available Credits Assumed Baseline score	Overall Weighted POINTS score (Baseline)	No. Credits Assumed Potential score	% of Available Credits Assumed Potential score	Overall Weighted POINTS score (Potential)
Management	✓	0.61%	18	14	77.8%	8.6%	15	83.3%	9.2%
Health and Wellbeing	n/a	0.88%	12	3	25.0%	2.6%	7	58.3%	6.1%
Energy	✓	0.71%	21	10	47.6%	7.1%	13	61.9%	9.3%
Transport	n/a	1.11%	9	7	77.8%	7.8%	7	77.8%	7.8%
Water	✓	0.83%	9	6	66.7%	5.0%	7	77.8%	5.8%
Materials	✓	1.12%	13	6	46.2%	6.7%	9	69.2%	10.0%
Waste	✓	1.19%	8	4	50.0%	4.8%	5	62.5%	5.9%
Land Use and Ecology	n/a	1.10%	10	8	80.0%	8.8%	8	80.0%	8.8%
Pollution	n/a	0.85%	13	9	69.2%	7.6%	12	92.3%	10.2%
Tradable score						59.0%	Tradable score		73.1%
Exemplary Level Credits						0%	Exemplary Level Credits		2%
Total BREEAM score						59.0%	Total BREEAM score		75.1%
Rating targeted						'VERY GOOD'	Rating targeted		'EXCELLENT'

11.0 Appendix E – Environmental Wind Statement



Coal Drops Yard
King's Cross Central General Partner Ltd.

Environmental Wind Statement
Rev. B - **Draft**
September 18th 2015

Western Transit Shed
12-13 Stable Street
London
N1C 4AB

Tel: +44 (0) 20 3668 7100

Audit Sheet

Rev.	Description	Prepared and checked by	Reviewed by	Date
A	Draft plan for comments	D. Woolf	R. Macpherson	25.08.2015
B	Draft plan for comments	D. Woolf	R. Macpherson	18.09.2015

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Contents

1.0	Executive summary	4
2.0	Introduction	5
3.0	Risks	5
4.0	Wind assessment	6
5.0	Results	8
6.0	Discussion of results	9

1.0 Executive summary

Pedestrian wind comfort was assessed for the proposed Coal Drops Yard development and landscaping scheme. This assessment included generation of a pedestrian wind comfort index (Lawson Criteria) applied to different activities, focussed on walking, standing, entrance doors and sitting. Also predictions of velocities in all of the pedestrian areas within and around the Development were completed to increase understanding of windiness and its causes.

A computational fluid dynamics (CFD) model was constructed including buildings surrounding Kings Cross Central measuring approximately 1.8km in diameter with Coal Drops Yard at the centre. The geometry of Coal Drops Yard was included in fine detail, such as having representations for hedges, planters and balustrades with different open areas (porosities).

The impact of wind from twelve directions was assessed with risks for the different activities assigned as 'Acceptable', 'Tolerable' and 'Unacceptable'. It should be noted that increased risk due to increased windiness was likely to lead to reduction in amenity for the particular activity at the assigned locations for it.

Following an initial assessment of the proposed geometry without designing in wind mitigation features, a series of studies were carried out coordinating desired activity areas with levels of acceptable windiness and applying mitigation where needed. The results showed that all of the activities at their designated areas were at least 'Tolerable or better' under the tested wind conditions. This outcome was in spite of the increased windiness cause by the geometry and orientation of the existing buildings with the addition of the Upper Retail zone connecting the two buildings.

The most vulnerable areas for the most sensitive / least tolerable activities of standing, entrance doors and sitting was predicted to be in this area underneath the Upper Retail zone and also to the north side of West Coal Drops and south of West Coal Drops on the bridge over Regents canal and near by the Triplets.

The designed wind mitigation features included hedges to the south of West Coal Drops, planters on West Wharf Road Arches and to the south of East Coal Drops at viaduct level. In addition the open area of the balustrades were examined and included as a design feature.

There is an inherent risk that excessive windiness can lead to a loss of amenity for specific activities at the limited times when higher wind speeds occur from the more 'vulnerable' directions for a particular location. This risk is also a function of local geometry and wind direction and may also change if a change in function and/or geometry occurs at some time in the future. The lessons learnt from these studies could be applied either as temporary or permanent local solutions to reduce levels of windiness and increase amenity if some of these changes were to occur.

2.0 Introduction

This Environmental Wind Statement has been prepared by Hoare Lea on behalf of King's Cross Central General Partner Limited to describe the contribution that the proposed refurbishment of the Coal Drops Yard development will make to the levels of windiness within the pedestrian zones of the development and its immediate surrounds. The development comprises the Eastern Coal Drops (ECD), Western Coal Drops (WCD), newly-built areas connecting these two buildings, along lower Stable Street, the Western Wharf Road Arches (WWRA) and the areas of surrounding public realm.

This statement updates the Pedestrian Level Wind Environment Study carried out by BMT Fluid Mechanics in 2003 reported in the Environmental Statement (Volume 4: Part 19, May 2004) which was qualitative in nature. The output from this study is quantitative, from a computational model, and provided information on windiness from specific wind directions and also, using a wind comfort index (Lawson Criteria) which combines wind from many directions into a single value at each location.

3.0 Risks

Pedestrian wind comfort was the key consideration of this wind assessment. A key part of this assessment was based upon the generation of a pedestrian wind comfort index called the Lawson Criteria. This index was generated throughout the pedestrian zones and related wind comfort as a function of six activities, e.g. 'roads and car parks', 'people around buildings', 'pedestrian walkthrough', 'pedestrian standing', 'entrance doors', and 'sitting'. Lawson Criteria predictions were completed in order to determine the potential impact or risk of excessive windiness on wind comfort. It categorised the risk as follows:

- "Acceptable" - when the wind will not be noticed for the specific activity. Remedial measures are not required.
- "Tolerable" – when the wind will be noticed but not prevent the area being used effectively for its designated purpose. Some remedial measures may be required if viable to do so and not adversely affecting aesthetics.
- "Unacceptable" when wind is of sufficient strength and frequency to deter people from using the area for its designated purpose. Some remedial measures should be considered.

Plots of this index within the pedestrian zones were used to drive the design response (mitigation strategy) to the calculated risk for the specified activity. For example, pedestrians walking are far more tolerant of higher levels of windiness than people sitting and this fact is reflected within the predicted levels of acceptability.

The example shown in Figure 1 is of the predicted Lawson Criteria at Yard Level for 'pedestrians standing'. This shows that most areas are predicted to be 'Acceptable', there are a number of limited areas that 'Tolerable' and that no areas are 'Unacceptable'.

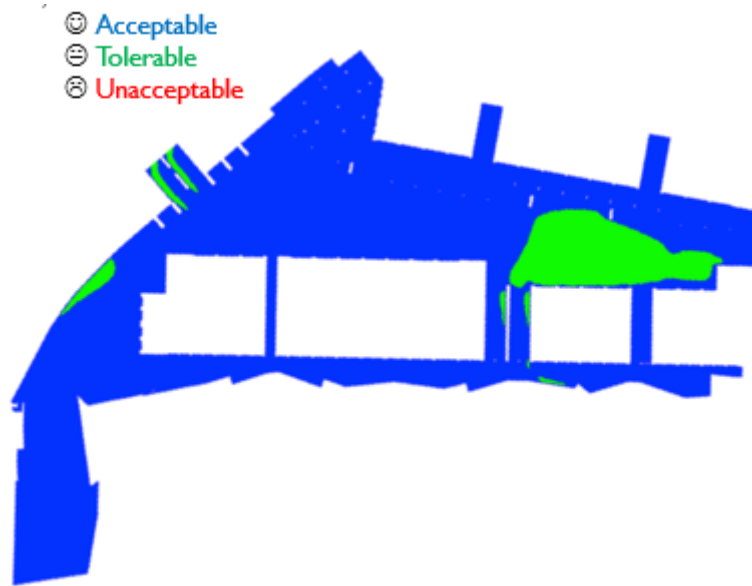


Figure 1: Predicted Lawson Criteria at Yard Level for 'pedestrians standing'

4.0 Wind assessment

This Environmental Wind Statement is based upon the findings of a detailed wind assessment of the Development Zones I and M within Kings Cross Central and surrounding urban zone with the proposed Coal Drops Yard geometry at its centre. A 'numerical wind turntable' was constructed in CAD representing 1.8km in diameter at full scale. This was developed into a computational fluid dynamics (CFD) model which was used to predict the expected wind conditions within the pedestrian zones for twelve wind directions – see Figure 2.

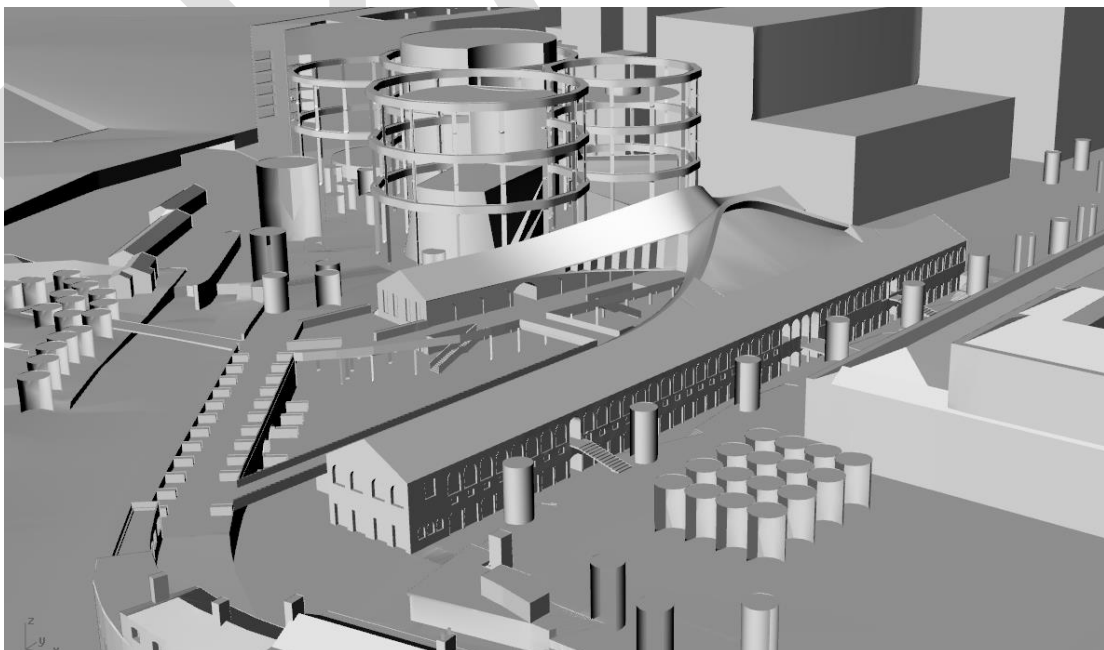


Figure 2: View of Coal Drops Yard CFD model looking from the south-east

Key considerations for the study were:

- The climatic wind environment at the measuring station (Heathrow Airport) which was adjusted to the local site conditions and then into annual and seasonal components.
- The geometry of all the buildings and landscape within Kings Cross Central which modified the wind environment local to Coal Drops Yard.
- Within and around Coal Drops Yard the geometry was represented in fine detail. Under windy conditions, this geometry channelled (squeezed) and deflected the local wind, e.g. through WWRA, resulting in various degrees of windiness within the pedestrian zones in the spaces between and around the buildings.
- Required local scale design features, such as balustrades, were tested for their impact on local windiness and potential to improve conditions. In the computational model, calculations were carried out at full-scale allowing feature properties such as openness (porosity) to be examined and improvements made where required.
- Additional local scale design features, such as using partially screened areas, hedges and planters - local wind mitigation measures – were tested as part of a process designed to examine a wide range of wind mitigation options.

Representations of existing and proposed trees, including those in surrounding squares and on the other side of the Regent's Canal, were included within the calculations as these influenced to some degree the levels of windiness in and around Coal Drops Yard.

An additional consideration to using Lawson Criteria for improving levels of wind comfort was the predicted velocity at a particular point for twelve wind directions starting from a north wind (bearing 0°) in 30° increments. The results from each direction which informed this assessment included surface pressures and flow streamlines (see Figure 3). This led to a better understanding of local wind flow characteristics and the drivers for it.

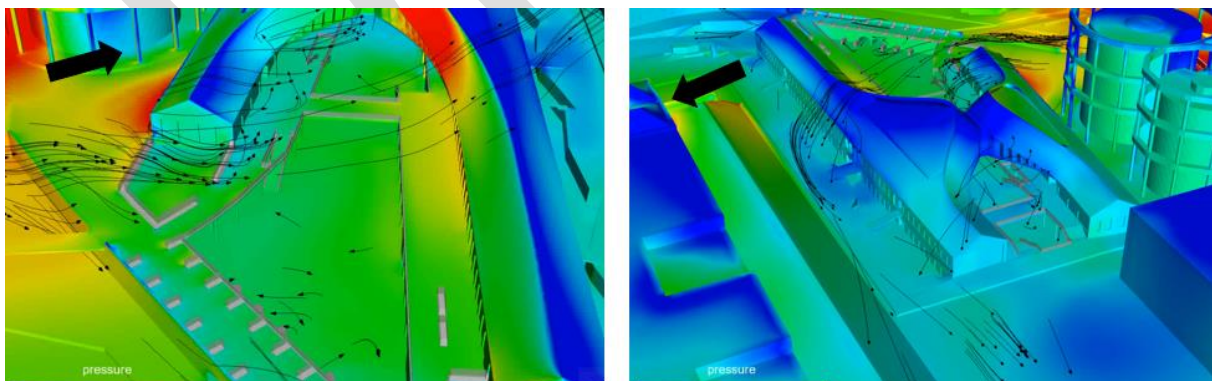


Figure 3: View of wind flow through Coal Drops Yard in a south to north direction for the prevailing south-westerly wind (two views of the same result). Colours relate to relative surface pressures (red positive, blue negative) and the large arrow indicates the direction that the south-west wind is moving *towards*.

5.0 Results

The detailed assessment for pedestrian wind comfort included a series of local wind mitigation design features such as hedges to the south of Western Coal Drops and also planters above WWRA and on the south side of Eastern Coal Drops at Viaduct Level. The process also informed the optimal location of the two routes from the towpath through WWRA. The Lawson Criteria predictions are shown schematically in Figures 4 and 5 with blue activities being 'Acceptable', green 'Tolerable' and red 'Unacceptable'. These results are based upon a mid-season wind.

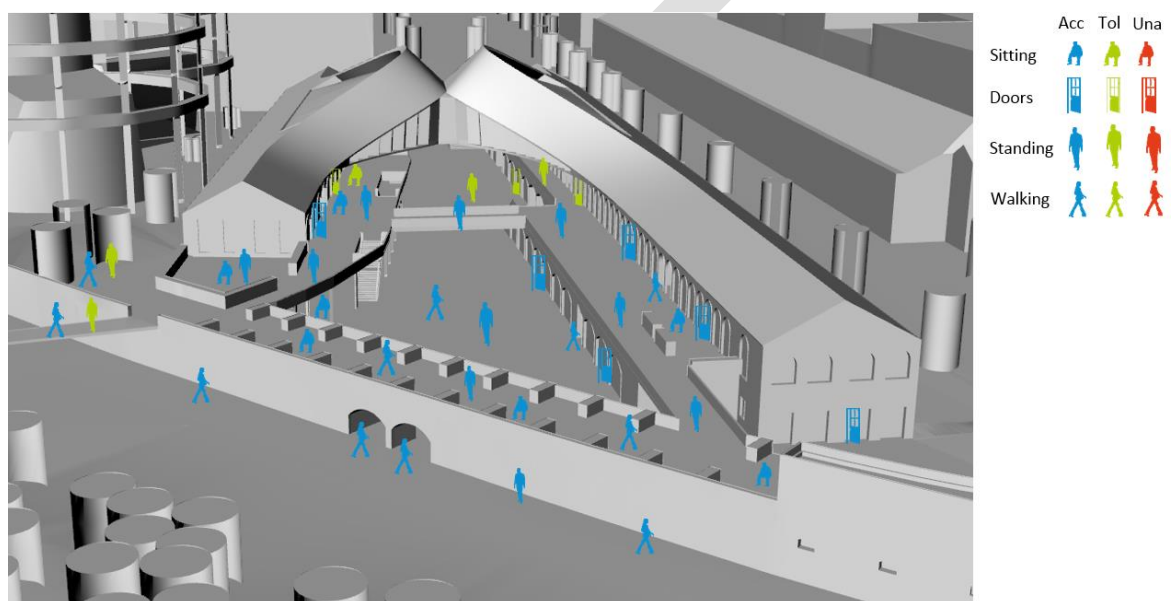


Figure 4: Schematic representation of Lawson Criteria – south side

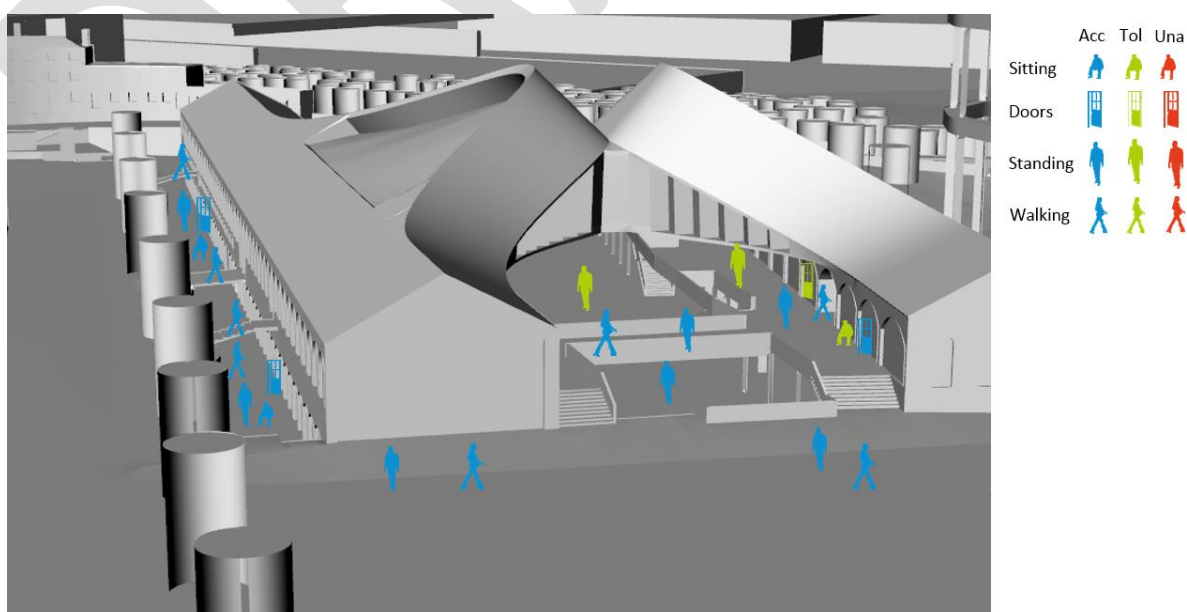


Figure 5: Schematic representation of Lawson Criteria – north side

In all cases the two most tolerant categories of 'roads and car parks' and 'people around buildings' were predicted to be 'Acceptable' and are therefore not included within these schematics. It was predicted that the majority of typical activities from pedestrian walking (most tolerant shown) through to sitting (least tolerant) were 'Acceptable' under the tested wind conditions.

All six activities do not take place in all pedestrian areas. Through coordinating the desired activities within each specific area with the risk of excessive windiness, it was possible to restrict the occurrence of 'Unacceptable' conditions by applying the designed mitigation measures discussed above where needed.

At times, with winds from certain directions, the East Coal Drops and West Coal Drops buildings tend to channel winds increasing levels of windiness in the pedestrian zone at Yard and Viaduct Level. The positioning of the Upper Retail zone connecting the two buildings resulted in a slight increase of windiness in central areas at both Yard and Viaduct Level. This is shown by some activities being 'Tolerable' such as 'standing', 'entrance doors' and 'sitting' whereas these activities were predicted to be 'Acceptable' to the north and south of this zone. The existing buildings are therefore a key constraint as wind mitigation measures could not be undertaken by their reorientation or reshaping.

'Tolerable' conditions were also predicted for 'sitting' on the north side of West Coal Drops at Viaduct level and also, for 'standing', on the bridge over the regent's Canal and the nearby area close to the Triplets.

When examining the relative levels of windiness for different wind directions, the key wind directions that were highlighted were the prevailing WSW wind (bearing 240°) and WNW wind (bearing 300°), both driving air from a south to north direction through the Yard, and also the E wind (bearing 90°) which drove the air from north to south through the Yard. Detailed characteristics of the wind flow, such as a deflection due to a parapet wall, were captured in the analysis and supported the implementation of the wind mitigation design features discussed above. Another example was the open area or porosity of a balustrade which had a range of values examined settling on the current design.

6.0 Discussion of results

Prior to assessing the development wind mitigation measures, the influence of geometry of the buildings in Kings Cross Central on Coal Drops Yard environmental wind was examined for each of twelve wind directions. These assessments included looking at annual, winter and mid-season winds with the final assessment being based upon the latter wind type. Findings included recognition of the impact of the existing East Coal Drops and West Coal Drops buildings and their orientation towards the prevailing south-west quadrant wind where higher wind speeds tend to occur more frequently.

There is an inherent risk that excessive windiness can lead to a loss of amenity at the limited times when higher wind speeds occur from the more 'vulnerable' directions for a particular location – also a function of local geometry and wind direction. Some of the risks associated with this amenity loss were alleviated and some were reduced through the design development of geometry and also local measures including the use of trees, planters and balustrades.

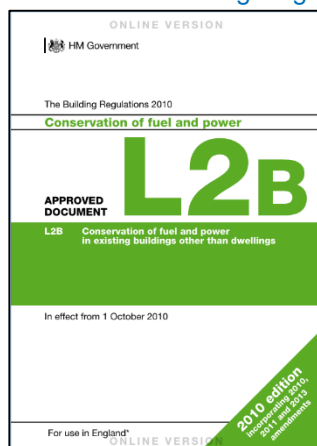
If there was to be a future change in location for a particular activity into an area currently predicted to have 'Unacceptable' conditions for that activity, such as relocating some seating additional wind mitigation features such as those discussed above may need to be considered. There are also other options that may wish to be considered such as using high-backed and/or high-sided seats.

DRAFT

12.0 Appendix F – Overview of planning and regulatory framework

National Planning Guidance

Part L of the Building Regulations (2013)



On a national level, the leading requirement applicable to the project's energy strategy is Part L of the Building Regulations: Part L2A is applicable to new non-domestic buildings, and Part L2B is relevant for refurbished non-domestic buildings.

Under Building Regulations Approved Document Part L2B: Conservation of Fuel and Power (2013), depending on the extent of the refurbishment, requirements vary and include minimum standards for new or replaced elements, requirements for upgrade of retained elements to minimum standards, and potentially the requirement for consequential improvements.

An option exists to achieve compliance by demonstrating that the Building Emission Rate (BER) does not exceed the emissions of an identical building refurbished to minimum requirements as set out in Part L2B 2013 (which, for services, refers to the Non-Domestic Services Compliance Guide for existing buildings). This is the approach that has been taken for the Coal Drops Yard model.

Similarly, for new buildings, compliance with Part L2A is shown by demonstrating that the Building Emission Rate (BER) does not exceed the emissions of an identical building refurbished to minimum requirements as set out in Part L2A 2013. The targets for new buildings have been tightened in successive versions of Part L. See figures 12.1 and 12.2 for an overview of the changes to building regulations since the Outline Planning Permission was granted.

Target aggregate reduction	9%
Distribution warehouse	4%
Deep plan office AC	12%
Retail warehouse	8%
Shallow plan office AC	13%
Hotel	12%
School	9%
Small warehouse unit	3%

Figure 12.1: Target reductions for new, non-domestic notional buildings in Part L 2013 compared to Part L 2010.

Source: DCLG Impact Assessment: Changes to Part L of the Building Regulations 2013.

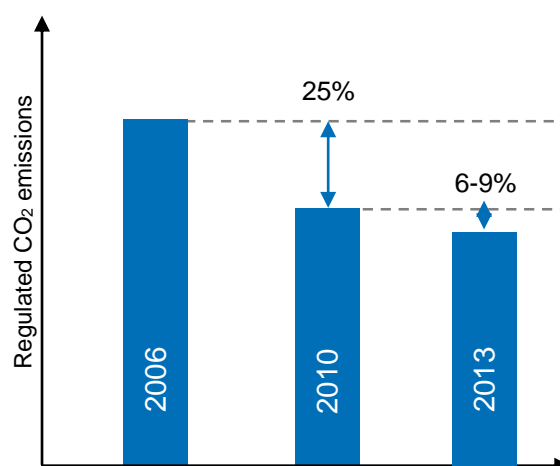


Figure 12.2: Previous changes to Part L of Building Regulations, shown as aggregate reductions.

Scale-back from future zero carbon target

Since 2007 there has been a target set by the UK Government for all new residential development to achieve Zero Carbon status for regulated energy uses from 2016, and all new commercial development to achieve this standard from 2019 onward.

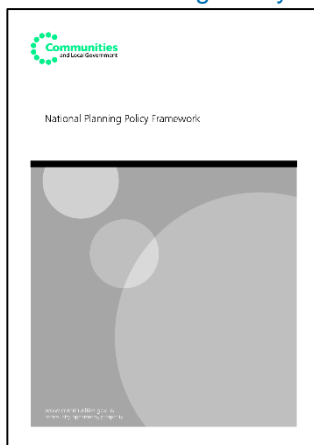
However, in July of 2015 the UK Government issued a statement as part of the HM Treasury's Productivity Report in which it is proposed that, for housebuilders:

The government does not intend to proceed with the zero carbon Allowable Solutions carbon offsetting scheme, or the proposed 2016 increase in on-site energy efficiency standards, but will keep energy efficiency standards under review, recognising that existing measures to increase energy efficiency of new buildings should be allowed time to become established.

It has since been confirmed that the removal of the Zero Carbon target also applies to non-domestic buildings.

This does not change the over-all target for the UK, set within the EU Directive on the Energy performance of buildings, which states that all new buildings must be nearly zero energy buildings by 31 December 2020 (and public buildings by 31 December 2018). This target is subject to a cost-optimum analysis to be carried out by the UK Government in 2017.

National Planning Policy Framework (2012)



The National Planning Policy Framework (NPPF) was published on 27th March 2012 and superseded all Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) documents, with the exception of PPS10 (Waste).

The NPPF sets out the Government's strategy on the delivery of sustainable development through the planning system. The NPPF places responsibility for policy making with the Local Planning Authority, who shall communicate their policies through local core strategy documents and other supplementary planning guidance. The NPPF states that there is a presumption in favour of sustainable development.

In respect of energy policy contained within the NPPF, paragraphs 96, 97 and 99 set out that:

"In determining planning applications, local planning authorities should expect new development to:

- Comply with adopted Local Plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable*
- Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption*

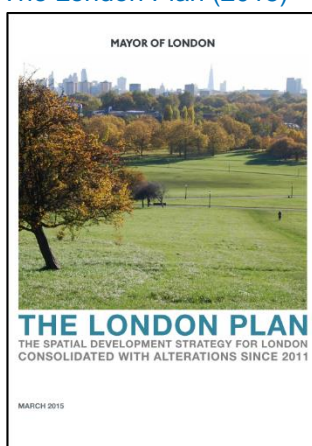
To help increase the use and supply of renewable and low carbon energy, local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources. They should:

- *Have a positive strategy to promote energy from renewable and low carbon sources*
- *Design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts*
- *Consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources*
- *Support community-led initiatives for renewable and low carbon energy, including developments outside such areas being taken forward through neighbourhood planning*
- *Identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers*

Local Plans should take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.”

Regional Planning Guidance

The London Plan (2015)



The London Plan is the overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. It forms part of the development plan for Greater London. The first London Plan was published in 2004 with the latest version published in March 2015.

One of the main objectives of the London Plan is to improve the environment and reduce climate change by:

- Reducing CO₂ emissions and heat loss from new developments
- Managing flood risk, ensuring water supply and quality
- Improving London's recycling performance and waste management.

The London Plan and the Supplementary Planning Guidance sets a target of 35% compared with Part L 2013.

Policy 5.4 on retrofitting states:

“The environmental impact of existing urban areas should be reduced through policies and programmes that bring existing buildings up to the Mayor’s standards on sustainable design and construction. In particular, programmes should reduce carbon dioxide emissions, improve the efficiency of resource use (such as water) and minimise the generation of pollution and waste from existing building stock.”

Major developments within the London Borough of Camden are subject to the policy requirements of the London Plan 2015, although flexibility exists for refurbishments within the SPG on Sustainable Design and Construction (see below).

The London SPG on Sustainable Design and Construction (2014)



In support of Policy 5.3 (Sustainable Design and Construction) of the London Plan, the GLA have published a Supplementary Planning Guidance (SPG) which supersedes the May 2006 version of the guidance document.

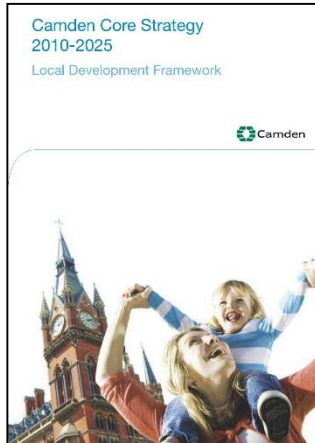
It is acknowledged within this guide that for many schemes involving existing buildings it will be a challenge to meet the London Plan target for carbon emission reductions, and therefore it is implied that flexibility may be available. It is recommended within this guidance that boroughs develop local policies to maximise the reduction in carbon dioxide emissions from these schemes.

The SPG was released in April 2014 and provides guidance on how to achieve the London Plan Objectives through ‘Mayor’s priority’ and ‘Mayor’s best practice’ standards to which proposed developments should aim. It provides guidance on:

- Energy efficient design and meeting the carbon dioxide reduction targets
- Decentralised energy
- How to off-set carbon dioxide where the targets set out in the London Plan are not met
- Retro-fitting measures
- Support for monitoring energy use during occupation
- An introduction to resilience and demand side response
- Air quality
- Resilience to flooding
- Urban greening
- Pollution control
- Local food growing

Local Planning Guidance

LB Camden Core Strategy



Local policies applicable to the Proposed Development are set out in the Camden Core Strategy, which was adopted in November 2010. The Core Strategy defines how Camden will change up to 2025.

Relevant policies include:

- CS11 – Promoting Sustainable and Efficient Travel
- CS13 – Tackling Climate change through promoting higher environmental standards
- CS15 – Protecting and improving our parks and open spaces and encouraging biodiversity
- CS18 – Dealing with our waste and encouraging recycling

The Core Strategy is the key element of the Local Development Plan and sets out the elements of the Council's planning visions and plan for the borough's future. The strategy contributes to Camden's Community Strategy.

Camden Development Policies (2010)

Further local policies applicable to the Proposed Development are stated in the Camden Development Policies, which was adopted in 8th November 2010. Camden Development Policies is an additional part of the Local Development Plan and sets out the elements of the Council's planning visions and plan for the borough's future.

Relevant policies include:

- DP16 - Transport Implications of Development
- DP17 - Walking, Cycling and Public Transport
- DP18 - Parking Standards and Limiting the Availability of Car Parking
- DP22 - Promoting sustainable design and construction
- DP23 - Water
- DP24 - Securing High Quality Design
- DP25 - Conserving Camden's Heritage
- DP31 - Provision of, and improvements to, open space and outdoor sport and recreation facilities

Camden Planning Guidance (CPG) 3 - Sustainability

The CPG provides information on ways to achieve carbon reductions and more sustainable developments. The CPG contains tables and checklists which should be completed and submitted with planning applications alongside relevant supporting evidence. There is guidance to help protect and enhance biodiversity and natural habitats.

This document sets out requirements and guidelines to support the policies: CS13 from the Core Strategy and DP22 and DP23 from the Development Policies. Key targets include:

- Developments of >500m² require an energy statement to be submitted;
- Developments involving a change of use or a conversion of >500m² of any floorspace will be expected to achieve 60% of the un-weighted credits in the Energy category in the BREEAM assessment.
- 20% of CO₂ reduction to be met via on site renewables as per policy CS13
- 10% of the total value of materials used to be derived from recycled and reused sources as per policy CS13, or if major development the target is 15-20%
- 10% of projects costs should be spent on the refurbishment of existing buildings to reduce their carbon emissions
- Assess the feasibility to connect to an existing or upcoming (within 3 years) decentralised energy network within 1km of the development
- Design development to enable its connection to a decentralised energy network in the future
- Where there is no connection and or no agreement to connect your development within 3 years to a decentralised energy network, on site CHP will be expected where heating demand makes it feasible
- If there is more than one occupier, use of building a community heating network will be expected

If no connection or agreement to connect to a decentralised energy network occurs within 3 years and the scheme does not include CHP, a financial contribution will be expected to enable future expansion and connection to energy network.

Planning Conditions and Section 106 Agreement

The Planning Conditions and Section 106 agreement currently in place for the development (King's Cross Central Outline Planning Permission (ref. 2004/2307/P) dated 22 December 2006) will be relevant to the Reserved Matters application areas, however the new application areas will also aim to be in keeping with these targets.

Below are listed the requirements from these two documents pertinent to this ESP, namely:

- Conditions 17 a-f and condition 45 of the Outline Planning Permission
- Sections AA, Y and Z of the Section 106 Agreement.

Condition 17(a) Energy Efficiency Measures

Explain how the proposed building design realises opportunities to include design and technology energy efficiency measures.

Condition 17(b) Reduction in carbon emissions

Explain the reduction in carbon emissions achieved through building design and technology energy efficiency measures, compared with the emissions permitted under the national Building Regulations prevailing at the time the application for approval of reserved matters is submitted.

Condition 17(c) and Condition 46: Green and/or brown roofs

Explain the specification for any green and/or brown roof. At least 15% of the roofs of new buildings constructed pursuant to the planning permission shall be green and/or brown roofs as defined in the Revised Development Specification dated September 2005.

Condition 17(d): Energy supply

Explain how energy shall be supplied to the building, highlighting:

- 1 How the building relates to the site-wide strategy for district heating incorporating tri-generation from distributed combined heat and power.*
- 2 How the building relates to the strategy for using bio-fuel boilers to supplement the energy supplied through the district heating system.*
- 3 The assessment of the cost-effectiveness and reliability of the supply chain and bio-fuels.*
- 4 Any other measures to incorporate renewables.*

Condition 17(e): BREEAM / Code for Sustainable Homes rating

Explain how the proposed building has been designed to achieve a BREEAM and/or Ecohomes rating of 'Very Good' (or an equivalent assessment method and rating) or better.

Condition 17(f): Ecology / Wildlife Features

Explain the incorporation of bird boxes, bat roosts and other wildlife features on the building.

Condition 45: Drainage

The new drainage infrastructure within the site shall be designed to achieve a combined (storm and foul) peak discharge to the existing combined sewer of 2,292 l/s or less.

S106 - Section AA: Water

Section AA of the Section 106 agreement places an obligation to use reasonable endeavours:

- To incorporate within the detailed design water efficiency measures such that the design secures at least 40% of the potable water consumption credits available under the BREEAM methodology which represents a reduction of approximately 20-30% against typical water consumption,*
- To incorporate one or more of groundwater abstraction, grey-water and black-water recycling and rainwater harvesting as alternative water supplies to meet 5% or more of the non-potable water needs and*
- To ensure that the design for the treatment of storm water run-off incorporates, where practicable, filtration, attenuation and other techniques that is consistent with current best practice on SUDS, to control the timing and volume of flows.*

S106 - Section Y: Construction materials and waste

Section Y of the Section 106 Agreement imposes obligations to:

- Implement the Construction Materials and Purchasing Strategy.*
- Apply the Construction Materials and Purchasing Strategy to agreeing specifications and targets in contracts with contractors, designers and suppliers of services in relation to construction.*
- Use reasonable endeavours:*
 - 1 To minimise packaging waste associated with the delivery of construction materials.*

- 2 *To produce topsoil and subsoil that uses subsoil and crushed rubble from the site combined with organic material for use in areas of landscaping.*
- 3 *To achieve the Construction Targets.*

S106 - Section Z: Waste

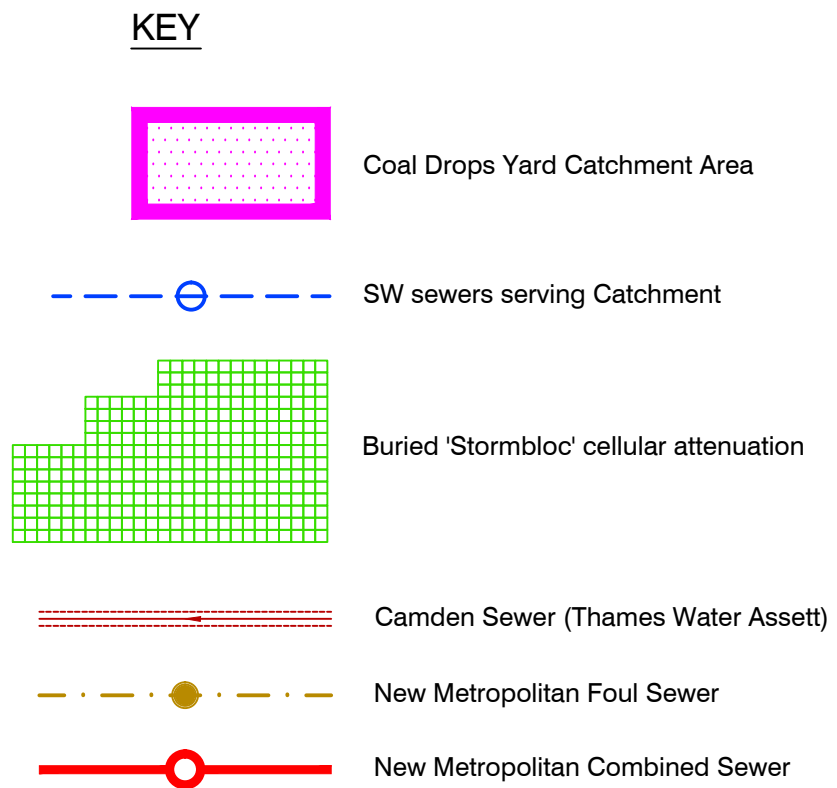
Section Z of the Section 106 Agreement imposes obligations to:

- *Provide occupiers with Waste Information Packs and use reasonable endeavours to obtain feedback on the success or popularity of the initiatives contained within the Packs.*
- *Use reasonable endeavours to incorporate within the detailed design best practice design solutions that provide for waste segregation and storage areas and to maintain the solutions that are implemented.*

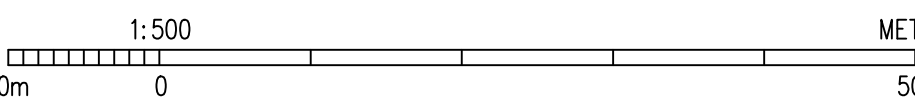
Provide and maintain segregated waste containers within the Public Realm areas at suitable locations and in appropriate numbers.

13.0 Appendix G – Surface water and foul drainage layout

- KEY
- Maximum peak (storm & foul) discharge permissible for the Kings Cross Central site as a whole must not exceed 2292 l/s in accordance with planning consent Ref. 2004/2307/P, condition 45.
 - Drawing 2022/007/500/16 and associated S106 connection summary shows each catchment connection to the existing sewer infrastructure and associated peak storm & foul flows demonstrating compliance with condition 45.
 - Each new storm water system comprise online and offline attenuation in the form of oversized pipes and modular underground storage system as well as flow control devices to buffer peak flows generated down to the discharge rates to that mentioned in note 2 above.



- Residual Risks
- Normal construction risks which a competent contractor would be expected to identify have not been listed.
- 400kV underground cable along tow path.
 - Unengaged drainage
 - Tow path existing retaining wall stability
 - Hot spots of underground contamination
 - Transit Street existing retaining wall stability
 - Subterranean tunnels - private and Network Rail
 - Interface with public highway
 - Existing and proposed utilities
 - Work on live sewer
 - Confined spaces
 - Deep connections
 - Runaround from existing flows
 - Regents canal




A	Lower Stable Street added to Catchment area.	MG	01.10.15	CA
Mark	Revision	Drawn	Date	Chkd

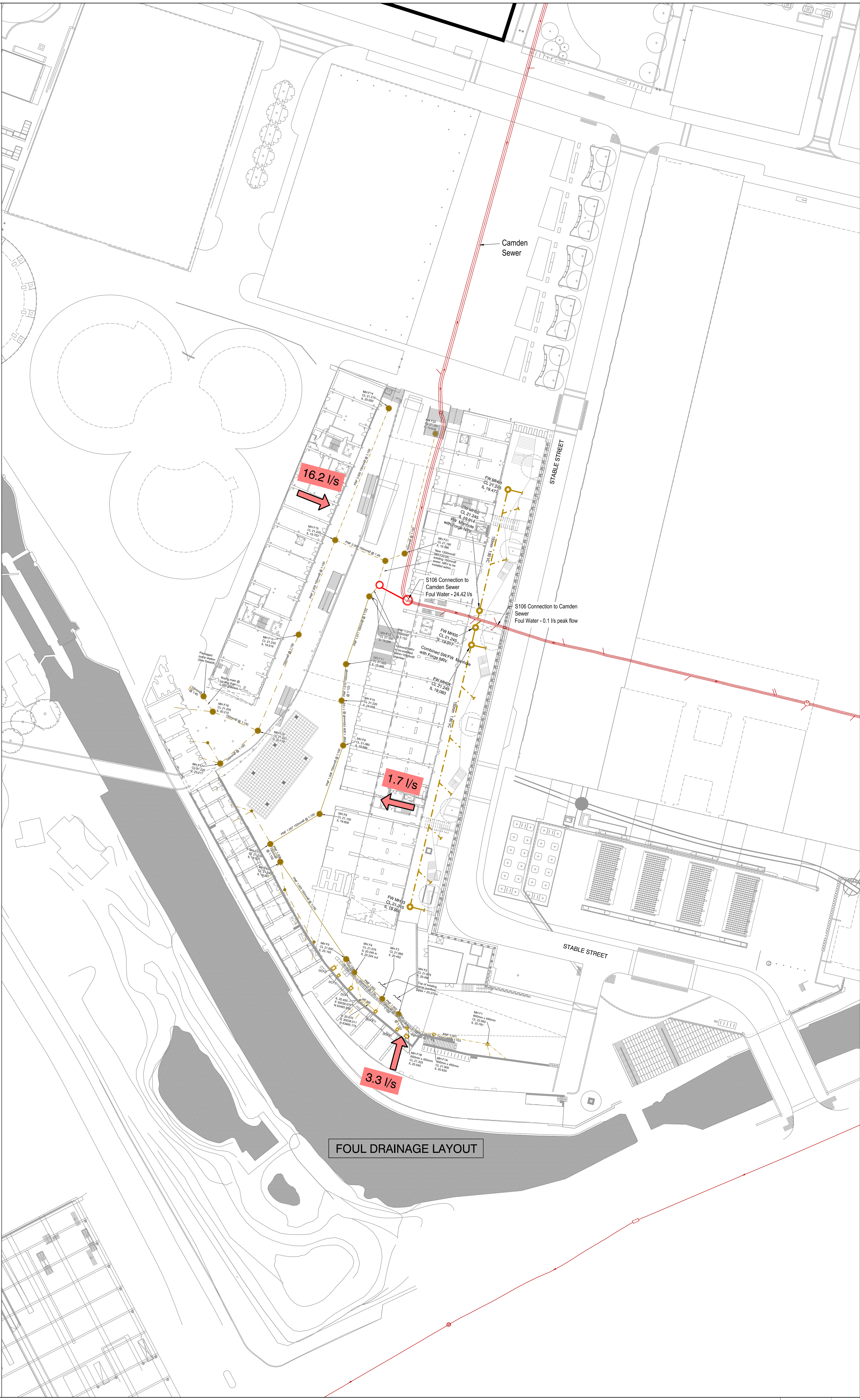
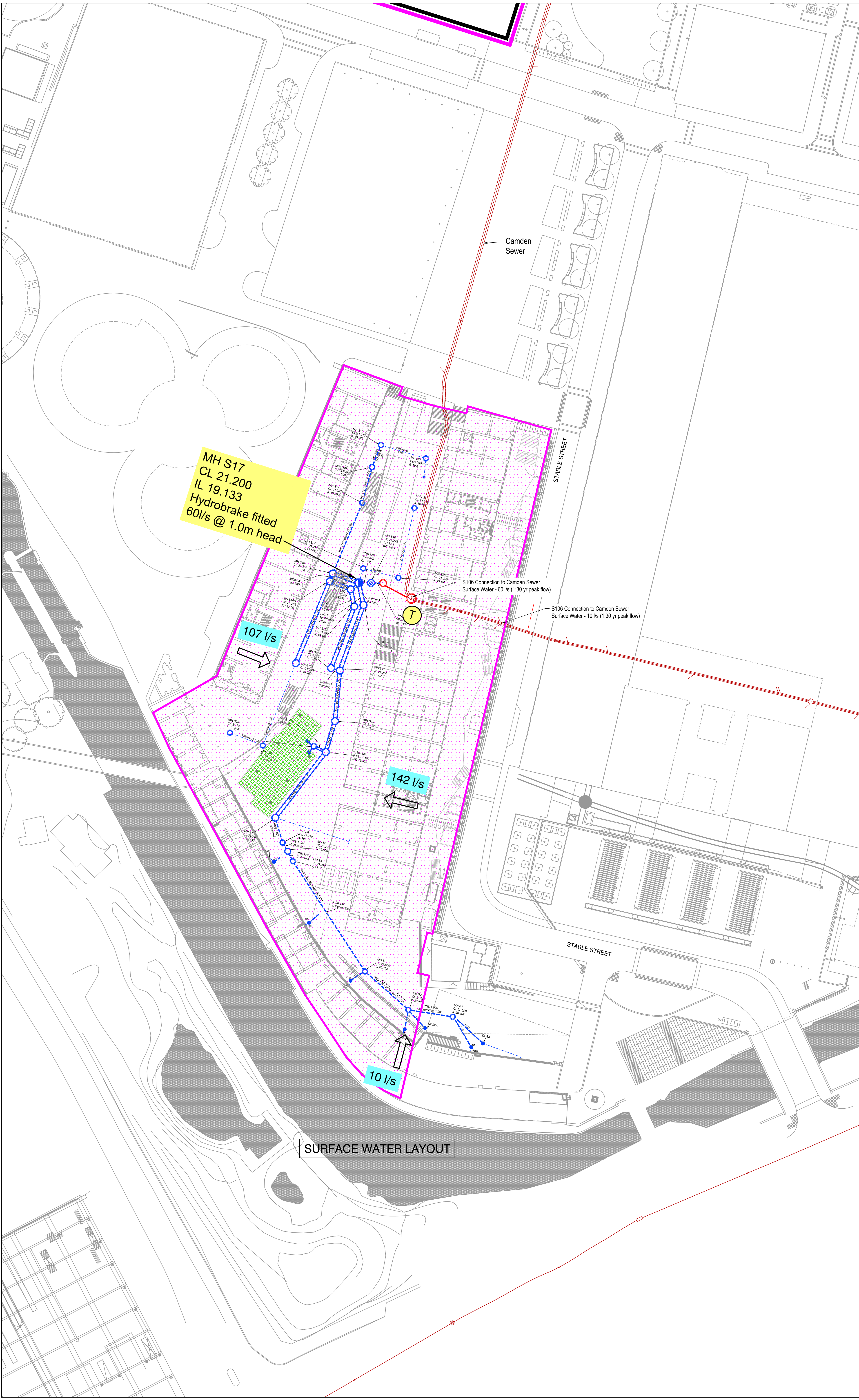
SCALING NOTE: Do not scale from this drawing. If in doubt, ask.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake his own investigation where the presence of any existing sewers, services, plant or apparatus may affect his operations.

Drawing Issue Status	FOR INFORMATION
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KINGS CROSS CENTRAL
COAL DROPS YARD AREA
SURFACE WATER &
FOUL DRAINAGE LAYOUT

Client		 <p>Offices throughout the UK and Europe</p> <p>www.peterbrett.com</p> <p>© Peter Brett Associates LLP</p> <p>ASHFORD</p> <p>Tel: 01233 651740</p>	
KINGS CROSS CENTRAL LIMITED PARTNERSHIP			
Date of 1st Issue	Drawn by		
24.09.15	MG		
As Scale	1:500	Checked by	IM
Drawing Number	Revision		
20227/007/500/16	A		



Appendices

- a. Environmental Wind Statement
- b. Ecology Support Statement



Coal Drops Yard
King's Cross Central General Partner Ltd.

Environmental Wind Statement
Rev. C
October 9th 2015

Western Transit Shed
12-13 Stable Street
London
N1C 4AB

Tel: +44 (0) 20 3668 7100

Audit Sheet

Rev.	Description	Prepared and checked by	Reviewed by	Date
A	Draft plan for comments	D. Woolf	R. Macpherson	25.08.2015
B	Draft plan for comments	D. Woolf	R. Macpherson	18.09.2015
C	Issue copy following Argent feedback	D. Woolf	R. Macpherson	09.10.2015

This report is provided for the stated purposes and for the sole use of the named Client. It will be confidential to the Client and the client's professional advisers. Hoare Lea accepts responsibility to the Client alone that the report has been prepared with the skill, care and diligence of a competent engineer, but accepts no responsibility whatsoever to any parties other than the Client. Any such parties rely upon the report at their own risk. Neither the whole nor any part of the report nor reference to it may be included in any published document, circular or statement nor published in any way without Hoare Lea's written approval of the form and content in which it may appear.

Contents

1.0	Executive summary	4
2.0	Introduction	5
3.0	Risks	5
4.0	Wind assessment	6
5.0	Results	7
6.0	Discussion of results	9

1.0 Executive summary

Pedestrian wind comfort was assessed for the proposed Coal Drops Yard development and landscaping scheme. This assessment included generation of a pedestrian wind comfort index (Lawson Criteria) applied to different activities, focussed on walking, standing, entrance doors and sitting. Also predictions of velocities in all of the pedestrian areas within and around the Development were completed to increase understanding of windiness and its causes.

A computational fluid dynamics (CFD) model was constructed including buildings surrounding Kings Cross Central measuring approximately 1.8km in diameter with Coal Drops Yard at the centre. The geometry of Coal Drops Yard was included in fine detail, such as having representations for hedges, planters and balustrades with different open areas (porosities).

The impact of wind from twelve directions was assessed with risks for the different activities assigned as 'Acceptable', 'Tolerable' and 'Unacceptable'. It should be noted that increased risk due to increased windiness was likely to lead to reduction in amenity for the particular activity at the assigned locations for it.

The CFD modelling has informed the design process in coordinating desired activity areas with levels of acceptable windiness and also in designing local mitigation where needed.

The results of the final CFD modelling show that all of the activities at their designated areas are at least 'Tolerable' or better, and in the majority of cases, 'Acceptable' under the tested wind conditions.

The designed local wind mitigation features include hedges/planters to the south of Western Coal Drops and to the north of the Western Wharf Road Arches at Viaduct Level and the area immediately in front of the WWRA at Yard Level

There is an inherent risk that excessive windiness can lead to a loss of amenity for specific activities at the limited times when higher wind speeds occur from the more 'vulnerable' directions for a particular location. This risk is also a function of local geometry and wind direction and may also change if a change in function and/or geometry occurs at some time in the future. The lessons learnt from these studies could be applied to any future proposed changes to these, either as temporary or permanent local solutions to reduce levels of windiness and increase amenity.

2.0 Introduction

This Environmental Wind Statement has been prepared by Hoare Lea on behalf of King's Cross Central General Partner Limited to describe the contribution that the proposed refurbishment of the Coal Drops Yard development will make to the levels of windiness within the pedestrian zones of the development and its immediate surrounds. The development comprises the Eastern Coal Drops (ECD), Western Coal Drops (WCD), newly-built areas connecting these two buildings, along Lower Stable Street (LSS), the Western Wharf Road Arches (WWRA) and the areas of surrounding public realm.

This statement updates the Pedestrian Level Wind Environment Study carried out by BMT Fluid Mechanics in 2003 reported in the Environmental Statement (Volume 4: Part 19, May 2004) which was qualitative in nature. The output from this study is quantitative, from a computational model, and provided information on windiness from specific wind directions and also, using a wind comfort index (Lawson Criteria) which combines wind from many directions into a single value at each location.

3.0 Risks

Pedestrian wind comfort was the key consideration of this wind assessment. A key part of this assessment was based upon the generation of a pedestrian wind comfort index called the Lawson Criteria. This index was generated throughout the pedestrian zones and related wind comfort as a function of six activities, e.g. 'roads and car parks', 'people around buildings', 'pedestrian walkthrough', 'pedestrian standing', 'entrance doors', and 'sitting'. Lawson Criteria predictions were completed in order to determine the potential impact or risk of excessive windiness on wind comfort. It categorised the risk as follows:

- "Acceptable" - when the wind will not be noticed for the specific activity. Remedial measures are not required.
- "Tolerable" – when the wind will be noticed but not prevent the area being used effectively for its designated purpose. Some remedial measures may be required if viable to do so and not adversely affecting aesthetics.
- "Unacceptable" when wind is of sufficient strength and frequency to deter people from using the area for its designated purpose. Some remedial measures should be considered.

Plots of this index within the pedestrian zones were used to drive the design response (mitigation strategy) to the calculated risk for the specified activity. For example, pedestrians walking are far more tolerant of higher levels of windiness than people sitting and this fact is reflected within the predicted levels of acceptability.

4.0 Wind assessment

This Environmental Wind Statement is based upon the findings of a detailed wind assessment of the Development Zones I and M within Kings Cross Central and surrounding urban zone with the proposed Coal Drops Yard geometry at its centre. A 'numerical wind turntable' was constructed in CAD representing 1.8km in diameter at full scale. This was developed into a computational fluid dynamics (CFD) model which was used to predict the expected wind conditions within the pedestrian zones for twelve wind directions – see Figure 1.



Figure 1: View of final Coal Drops Yard CFD model looking from the south-east

An additional consideration to using Lawson Criteria for improving levels of wind comfort was the predicted velocity at a particular point for twelve wind directions starting from a north wind (bearing 0°) in 30° increments. The results from each direction which informed this assessment included surface pressures and flow streamlines (see Figure 2). This led to a better understanding of local wind flow characteristics and the drivers for it.

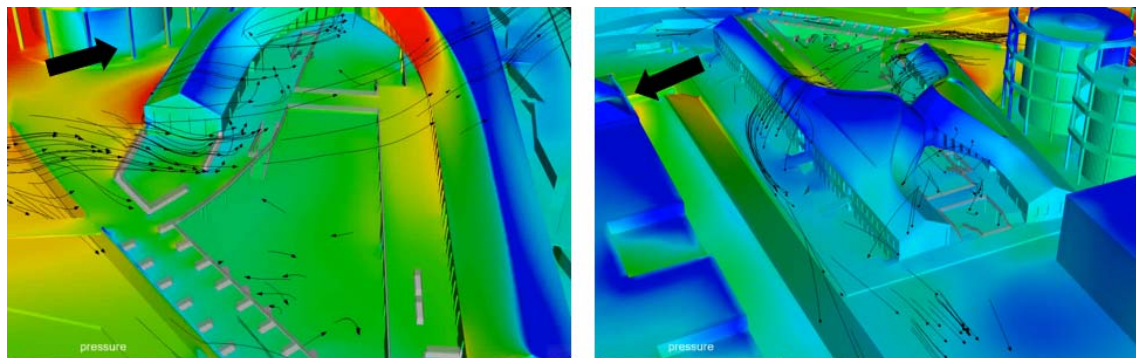


Figure 2: View of wind flow through Coal Drops Yard in a south to north direction for the prevailing south-westerly wind (two views of the same result). Colours relate to relative

surface pressures (red positive, blue negative) and the large arrow indicates the direction that the south-west wind is moving towards.

The wind assessment to date has consisted of a series of tests, based on iterations of the CFD model.

The first iteration of the CFD model formed the baseline test and included the following:

- The climatic wind environment at the measuring station (Heathrow Airport) which was adjusted to the local site conditions and then into annual and seasonal components.
- The geometry of all the buildings and landscape within Kings Cross Central which modified the wind environment local to Coal Drops Yard.
- The geometry within and around Coal Drops Yard represented in fine detail. Under windy conditions, this geometry channelled (squeezed) and deflected the local wind, e.g. through WWRA, resulting in various degrees of windiness within the pedestrian zones in the spaces between and around the buildings.
- Representations of existing and proposed trees, including those in surrounding squares and on the other side of the Regent's Canal.

Further iterations of the model refined local scale design features, such as balustrades and additional local scale design features such as the use of partially screened areas, hedges and planters. These were tested for their impact on local windiness and potential to improve conditions. This has provided a detailed understanding of the local wind environment.

5.0 Results

The baseline test predicted the levels of wind comfort across the proposed scheme, without any specific local design measures in place.

At times, with winds from certain directions, the Eastern Coal Drops and Western Coal Drops buildings tend to channel winds increasing levels of windiness in the pedestrian zone at Yard and Viaduct Level. The positioning of the Upper Level connecting the two buildings resulted in a slight increase of windiness in central areas at both Yard and Viaduct Level. The existing buildings are therefore a key constraint as wind mitigation measures could not be undertaken by their reorientation or reshaping.

When examining the relative levels of windiness for different wind directions, the key wind directions that were highlighted were the prevailing WSW wind (bearing 240°) and WNW wind (bearing 300°), both driving air from a south to north direction through the Yard, and also the E wind (bearing 90°) which drove the air from north to south through the Yard. Detailed characteristics of the wind flow, such as a deflection due to a parapet wall, were captured in the analysis.

The predictions of wind condition provided by the baseline test results were reviewed against the activities proposed. This identified those areas requiring local mitigation measures, in particular external seating areas.

These measures were incorporated into subsequent iterations of the CFD model. The final assessment model predicts all areas are 'Tolerable' or better for their intended purpose. The following design features have been included for wind mitigation:

- Optimal location of the two routes from the towpath through WWRA
- Planters to the Viaduct Level, to the south of WCD.
- Planters outside a number of retail units immediately to the north of the WRA
- Balustrades with vertical bars in areas without a parapet wall

The need for local measures for wind mitigation in these areas is noted on planning drawings PL-1073 and PL-1074. The detailed form and position of these will be developed through the next stages of design.

The Lawson Criteria predictions are shown schematically in Figures 3 and 4 below with blue activities being 'Acceptable' and green 'Tolerable'. Activities are shown only in areas where they are realistically expected to take place therefore no 'Unacceptable' predictions are displayed. These results are based upon a mid-season wind.

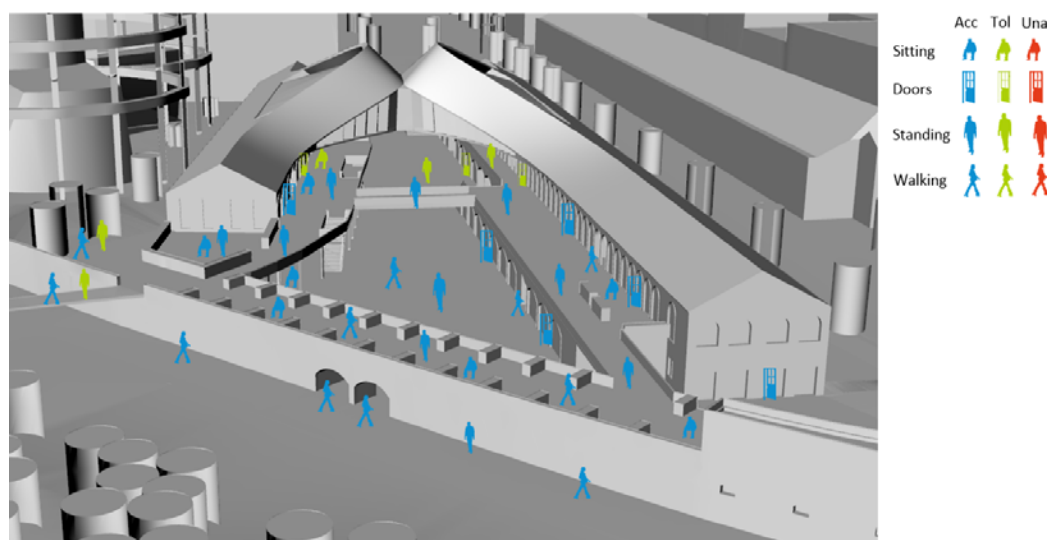


Figure 3: Schematic representation of Lawson Criteria – south side

In all cases the two most tolerant categories of 'roads and car parks' and 'people around buildings' were predicted to be 'Acceptable' and are therefore not included within these schematics. It was predicted that the majority of typical activities from pedestrian walking (most tolerant shown) through to sitting (least tolerant) are 'Acceptable' under the tested wind conditions.

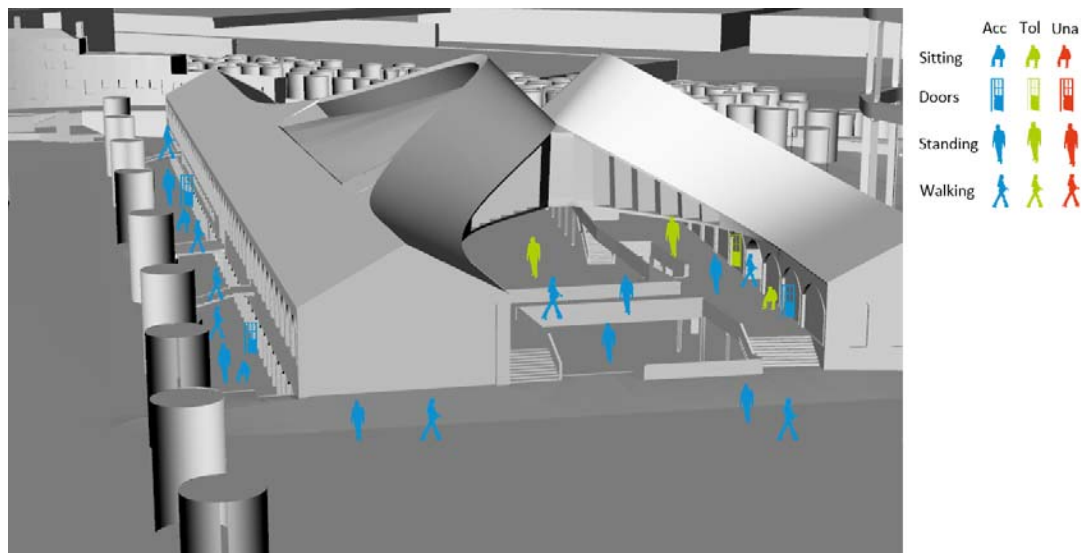


Figure 4: Schematic representation of Lawson Criteria – north side

6.0 Discussion of results

Prior to assessing the development wind mitigation measures, the influence of geometry of the buildings in Kings Cross Central on Coal Drops Yard environmental wind was examined for each of twelve wind directions. These assessments included looking at annual, winter and mid-season winds with the final assessment being based upon the latter wind type. Findings included recognition of the impact of the existing Eastern Coal Drops and Western Coal Drops buildings and their orientation towards the prevailing south-west quadrant wind where higher wind speeds tend to occur more frequently.

There is an inherent risk that excessive windiness can lead to a loss of amenity at the limited times when higher wind speeds occur from the more 'vulnerable' directions for a particular location – also a function of local geometry and wind direction. The risks of amenity loss, to the point where 'Unacceptable' conditions are predicted, have been mitigated by local measures including the use of trees, planters and balustrades. All areas are predicted as having a 'Tolerable' or better condition, for the activity expected to take place in that area.

If there was to be a future change in location for a particular activity into an area currently predicted to have 'Unacceptable' conditions for that activity, such as relocating some seating, additional wind mitigation features such as those discussed above may need to be considered. There are also other options that may wish to be considered such as using high-backed and/or high-sided seats.

Appendices

- a. Environmental Wind Statement
- b. Ecology Support Statement



Coal Drops Yard – Ecology Support Statement

Existing Baseline

The Coal Drops Yard site located within the Urban Regeneration project at Kings Cross is of low ecological value, this was verified during an ecological walkover in January 2015. The planning boundary is dominated by hardstanding, with large areas now under construction (refer to Figure 1).

No protected species have been recorded within the Coal Drops Yard site. None of the buildings present on the site provide roosting opportunities for bats. Bats have been foraging and commuting recorded immediately adjacent to the site along Regent's canal, the Gas Governor site and the Western Transit Shed.

No birds have been recorded on the land at the Coal Drops Yard. The site does provide nesting opportunities for breeding birds but no nests were observed at the time of the 2015 verification walkover. The lack of nesting birds at present is probably attributed to the highly disturbed nature of the site.

No invasive weeds have been recorded within the Coal Drops Yard planning boundary to date.

Mitigation Measures

Protection measures will be implemented prior to the site construction commencing at the actual Eastern and Western Coal Drop buildings on the site, these will include:

Black restarts are known to use the wider Kings Cross site for breeding and foraging so care will be taken on site to ensure piles of aggregate, spoil piles etc. are covered with netting or a plastic covering to deter nesting;

The Western Wharf Road Arches will remain netted over to deter nesting birds; and

The plastic roof covering and exposed areas on the Western and Eastern Coal Drops will be covered and continue to be monitored to deter nesting birds during the construction period.

Enhancement Measures

The Coal Drops Yard site is set within a highly urbanised environment. In order to enhance the site for local wildlife a number of measures will be incorporated into the final design. A number of protected bird and bat species are known to use the wider Kings Cross regeneration site, house sparrow, black redstart and common pipistrelle, so these species will be focused on during the design process. Built in bat tubes and bricks, plus external wall boxes will be considered for bats and a variety of built-in or external bird boxes.

Site specific locations for these measures will be provided as the scheme progresses and in consultation with the projects ecologist. Wildlife boxes are a very effective but a simple enhancement measure within this type of environment and will work well within this redevelopment.

Ecology Overview

In summary the Coal Drops Yard site is of low ecological value. The future landscape proposals for the site will be produced in consultation with the projects ecologist to benefit local wildlife. The new landscape proposals for the redevelopment will promote nature conservation by attracting local wildlife. Any planting will also tie in with the existing vegetation on the site. Planting will attract seed eating birds and foraging bats. The Coal Drops Yard site will be further enhanced for wildlife through the incorporation of ecological enhancement measures such as bird and bat boxes.

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