**UCL Estates – Sustainable UCL**

**UCL Sustainable Building Standard**

**A standard for the sustainable design, construction and operation of our built environment**



**Version Control**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** | **Version** | **Change** | **Reason** | **Author** | **Authorised** |
| 16/11/2016 | 1.8 | For publication | Update | B. Stubbs | R. Jackson |
| 31/07/2020 | 2.6 | Updated – for release | Update | B. Stubbs | Project Review Group (PRG) |

**Author**: Ben Stubbs, Senior Sustainability Manager, UCL

**Contributors**

**Technical Contributors:** Mark Dowson, David Kingstone, Jonathan Didsbury, Georgina Chamberlain, Philippa Garnett, Vasiliki Kourgiozou (Buro Happold)

**Peer Review:** Kenichi Hamada (Buro Happold), Eimar Moloney (Hoare Lea), Mary Moran (Kendall Kingscott), Simon Ebbaston (Elementa)

**UCL Consultees:** Chris Shore, Francesca Fryer, Nawed Khan, David Young, Alex Perry, Reshmi Govindankutty, Patrick Julien, David Stevens, Stephen McKinnell, Joanna Marshall-Cook, Ciaran Jebb, Ian Elmer, Chris Marshall, Keiron McGrath, Lucia Liddle, Ivet Dimitrova, Jason Grady, Megan Putt, Rod Pecover, Richard Jackson, Pip Jackson

**UCL Academic Colleagues**: Prof. Ben Croxford, Prof. Paul Ruyssevelt, Prof. Dejan Mumovic, Prof. Jacqui Glass, Dr. Sam Stamp, Prof. Julia Stegemann

|  |  |
| --- | --- |
|  |  |

Contents

[Introduction 5](#_Toc47099695)

[Compliance and Assurance 6](#_Toc47099696)

[Key targets and commitments: advancing net zero 7](#_Toc47099697)

[Part 1: Our Vision for a Sustainable Estate 8](#_Toc47099698)

[Part 2: Managing Sustainable Projects 11](#_Toc47099699)

[Key Requirements by RIBA Stage 11](#_Toc47099700)

[Project Brief/ Business Case 13](#_Toc47099701)

[Environmental Assessment (BREEAM & Ska) 16](#_Toc47099702)

[Soft Landings/ Construction & Handover/ Post Project Review 20](#_Toc47099703)

[Life Cycle Costing (LCC) 21](#_Toc47099704)

[Carbon Appraisal 23](#_Toc47099705)

[Energy Targets & Modelling 24](#_Toc47099706)

[Embodied carbon 29](#_Toc47099707)

[Specifications, Tender and Contract Documents 32](#_Toc47099708)

[Part 3: Sustainable Design Specifications 34](#_Toc47099709)

[1. Life cycle value 35](#_Toc47099710)

[2. Minimising energy use & carbon emissions 41](#_Toc47099711)

[3. Healthy & Productive Environments 52](#_Toc47099712)

[4. Circular Economy 61](#_Toc47099713)

[Further Information 72](#_Toc47099714)

**Relationship with other documents and procedures**

This document is designed to complement UCL Estates procedures, specifications, guidance and templates. The contents and requirements are also reflected and embedded throughout relevant Estates documentation. The following UCL documents, available via the [UCL Estates website](http://www.ucl.ac.uk/estates/), are of particular relevance:

* [UCL Sustainability Policy](https://www.ucl.ac.uk/greenucl/about-us/policy-and-strategy)
* [UCL Sustainability Strategy 2019-2024](https://www.ucl.ac.uk/sustainable/change-possible-strategy-sustainable-ucl-2019-2024)
* [UCL Employer’s Requirements](https://www.ucl.ac.uk/estates/estates-development/employers-requirements?collection=drupal-professional-services-policies&meta_UclOrgUnit=%22Estates+Division%22&meta_UclCommunicationType=%22Employer%27s+requirements%22&meta_SiteName=%22Estates%22&):
	+ [Building user guide template](https://www.ucl.ac.uk/estates/policies/2019/mar/building-user-guide)
	+ [Cost & Carbon Tool](https://www.ucl.ac.uk/estates/policies/2019/feb/carbon-appraisal-tool)
	+ [Design Guidance for Mechanical, Electrical & Public Health Services](https://www.ucl.ac.uk/estates/policies/2019/feb/design-guidance-mechanical-electrical-public-health-services)
	+ Building Management System Standard Specification (in draft at time of writing)
	+ [EHS Rules for Contractors](https://www.ucl.ac.uk/estates/policies/2019/feb/ehs-rules-contractors)
	+ [Estates Metering Strategy](https://www.ucl.ac.uk/estates/policies/2019/feb/estates-metering-strategy)
	+ [Inclusive Design Specification](https://www.ucl.ac.uk/estates/policies/2020/mar/inclusive-design-specification)
	+ [Mini-Ska Template](https://www.ucl.ac.uk/estates/policies/2019/feb/mini-ska-template)
	+ [UCL Heating, Cooling & Ventilation Policy](https://www.ucl.ac.uk/estates/policies/2019/feb/ucl-heating-cooling-ventilation-policy)
	+ [UCL Soft Landings Framework](https://www.ucl.ac.uk/estates/policies/2019/mar/ucl-soft-landings-framework)
	+ [UCL Post Project Review Guidelines](https://www.ucl.ac.uk/estates/policies/2019/jun/post-project-review-guidelines)
	+ [UCL Travel Plan](https://www.ucl.ac.uk/estates/policies/2019/feb/ucl-travel-plan)
	+ [UCL Biodiversity Strategy & Action Plan](https://www.ucl.ac.uk/estates/policies/2019/feb/ucls-biodiversity-strategy-action-plan)

**Non-UCL documents**

The following external documents have also been used to inform specific targets and requirements, notably with regard to net zero carbon buildings:

* [UKGBC – Net Zero Carbon Buildings: A Framework Definition](https://www.ukgbc.org/ukgbc-work/net-zero-carbon-buildings-a-framework-definition/)
* [LETI – Climate Emergency Design Guide](https://www.leti.london/cedg)
* [RIBA 2030 Climate Challenge](https://www.architecture.com/about/policy/climate-action/2030-climate-challenge)
* [RIBA Plan of Work 2020](https://www.architecture.com/-/media/GatherContent/Test-resources-page/Additional-Documents/2020RIBAPlanofWorkoverviewpdf.pdf)
* [RIBA Sustainable Outcomes Guide](https://www.architecture.com/knowledge-and-resources/resources-landing-page/sustainable-outcomes-guide)
* [BREEAM New Construction 2018](https://www.breeam.com/NC2018/)
* [Ska Higher Education](https://www.rics.org/uk/about-rics/responsible-business/ska-rating/)
* [RICS whole life carbon assessment for the built environment](https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf)

# Introduction

UCL recognises the importance of a sustainable estate in support of its academic mission. This is identified as a key enabler in [*UCL 2034*](https://www.ucl.ac.uk/2034/), our 20-year institutional strategy.

The construction, operation and maintenance of our buildings is also central to the delivery of our institutional Sustainability Strategy, not least through our commitment to being a net zero carbon institution by 2030. The Strategy is underpinned by three signature campaigns all of which have clear implications for our built environment:

**Positive Climate:** Reducing our carbon emissions to sustainable levels requires major reductions in the energy demand associated with our buildings and operations, whilst meeting our remaining requirements from clean, renewable sources. We have committed to net zero carbon buildings and a 40% energy reduction by 2024.

**The Loop:** Our buildings are responsible for major consumption of material resources, through both construction and operational phases. Construction projects need to focus on reducing, reusing, repairing and sharing – aiming for 100% diversion from landfill. This will require a circular economy approach - maintaining products and materials at maximum value for as long as possible.

**Wild Bloomsbury:** We are committed to improving biodiverse, green spaces across our campuses – targeting an increase of 10,000m2 by 2024. This is a major challenge in central London, but one which we must deliver against as part of an approach which prioritises nature-based solutions whilst also enhancing the health and wellbeing of our staff and students.

In order to address these ambitious objectives, this Sustainable Building Standard (SBS) sets out minimum requirements and targets for all our projects - new build, refurbishment, fit-out and minor works. We aim to anticipate regulatory obligations and best practice, as well as meeting the rising expectations of our staff and students.

**Our requirements are underpinned by the potential for measurable, value-driven outcomes.**

This document is split into three sections:

* [**Part 1 – Our Vision for a Sustainable Estate:**](#_Part_1:_Our) Sets out our main objectives and core principles for the delivery of a sustainable built environment.
* [**Part 2 - Managing Sustainable Projects:**](#_Part_2:_Managing) This section is principally for those who are involved in the management of our design, construction and maintenance projects. It aims to ensure that relevant sustainability requirements are effectively incorporated from the earliest project stages. This helps to minimise administrative burden; avoid the need for potentially costly design changes later on; and maximise the value that can be achieved.
* [**Part 3 – Sustainable Design Specifications:**](#_Part_3:_Sustainable) Sets out more detailed and specific project requirements, by discipline and RIBA stage, which support the implementation of our Sustainability Strategy, as well as environmental assessments.

## Compliance and Assurance

Deviation from the requirements in this document must be agreed with the University Project Officer (UPO) and Sustainable UCL, and clearly documented. Sustainable UCL undertakes regular project reviews and is required to report on progress against targets.

Failure to comply with the requirements of the Standard may result in the withholding of payments based on:

a) recovery of costs associated with regulatory non-compliance; and/ or

b) increased life cycle cost implications (e.g. energy or maintenance costs).

Project teams are required to report performance against specific environmental KPIs (including BREEAM, Ska etc.) to the Portfolio Services Office as part of monthly reporting.

In addition, UCL Stage Gate reviews need to include a statement and relevant data detailing sustainability performance. This should include risks of non-compliance; life cycle cost and carbon impacts; and justification for any derogations. This will allow project boards to make informed decisions relating to potential variations/ mitigating actions.

|  |
| --- |
| Key targets and commitments: advancing net zero* UCL has committed to achieving net zero carbon buildings by 2024, to be approached with reference to the [UKGBC Framework Definition](https://www.ukgbc.org/wp-content/uploads/2019/04/Net-Zero-Carbon-Buildings-A-framework-definition.pdf).
* All projects must identify opportunities for climate change mitigation and adaptation
* All major projects, new build and refurbishment (>£10m), must present proposals to minimise energy use intensity (EUI) in relation to best practice industry targets[[1]](#footnote-2):
1. Develop a building energy strategy, including energy use intensity (EUI) targets, from RIBA Stage 0/1, prioritising energy demand reduction over low carbon supply
2. Confirm proportionate EUI targets no later than RIBA Stage 3.
3. Undertake and maintain operational energy modelling from RIBA Stage 3 to confirm or refine the EUI target.

In addition, the following is required for all relevant projects:1. The UCL Soft Landings framework (RIBA Stages 1 – 7; projects >£2m) requires a technical reality check no later than RIBA Stage 4 which should be used to de-risk any energy performance gap.
2. The Contractor will work with the design team to deliver against the operational energy performance targets, highlighting any additional risks or opportunities.
* Major refurbishments, including heritage buildings - adopt Part L2B principles for building envelope treatment as far as reasonably practical.
* Major projects - provide a circular economy statement covering embodied carbon and opportunities to retain existing materials for superstructure and substructure.
* Major projects - reduce embodied carbon of superstructure and substructure by 40% and/or to <500 kgCO2/m2 (see RIBA Sustainable Outcomes Guide, modules A, B & C).
* BREEAM Excellent or above must be achieved on all new build and major refurbishment projects, with due regard for life cycle value (defined below).
* Smaller refurbishment or fit out projects – must achieve Ska ‘Gold’ certification; or comply with all relevant Mini-Ska requirements, as agreed with Sustainable UCL.
* All our construction projects will target zero construction waste to landfill and provide clear documentation to demonstrate how this has been approached and achieved.
* For new build projects with standard facilities at least 40% improvement over baseline water consumption must be targeted (calculated in the BREEAM Wat 01 Calculator).
* All projects involving external landscaping are expected to target a net biodiversity gain. Off-site solutions may be agreed where onsite solutions are not feasible.
* All built environment projects will demonstrate a balanced approach to sustainable design that includes staff and student health, well-being, accessibility and inclusion.
* A [Post Project Review](#_Soft_Landings/_Post) will take place on all projects to capture lessons learned. For major and or business critical projects (typically >£10m), Post Occupancy Evaluation will be carried out by an independent third party.
 |

# Part 1: Our Vision for a Sustainable Estate

Achieving our objectives means addressing the following core principles on all projects:

|  |  |
| --- | --- |
|  | **LIFE CYCLE VALUE[[2]](#footnote-3)*****Our interest in the buildings we occupy often spans decades, and even centuries. We need to future-proof our built assets, ensuring that they are robust and flexible to stand the test of time within the context of a changing environment.*** |
|  | Life cycle costing | All our projects will explore solutions that prioritise long-term value, not just the initial budget. Specifically, financial costs and benefits need to be considered alongside environmental and social aspects. |
|  | Life cycle carbon | UCL has clear targets to achieve net zero carbon emissions as set out in our [Sustainability Strategy](https://www.ucl.ac.uk/sustainable/sustainability-ucl/change-possible-strategy-sustainable-ucl-2019-2024). All relevant projects need to set out how they will contribute towards this target by minimising carbon emissions and costs throughout the building lifecycle. |
|  | Life cycle design | Future proofing our built assets requires design for durability and adaptability whilst minimising maintenance requirements. This includes allowance for climate change impacts, with particular emphasis on projected temperature and rainfall patterns. |
|  | Soft Landings | Involving the right stakeholders is fundamental to minimising running costs, resource consumption and increasing user satisfaction. UCL operates a [Soft Landings framework](https://www.ucl.ac.uk/estates/policies/2019/jun/ucl-soft-landings-framework) including a clear, documented post-project review process. |

|  |  |
| --- | --- |
|  | **ENERGY USE AND CARBON EMISSIONS*****Deep cuts to energy use and carbon emissions are required to help minimise our environmental impacts, manage operational costs and achieve our targets. We are committed to net zero carbon buildings by 2024 as part of our Sustainability Strategy.*** |
|  | Fabric first | We expect all our project teams to adopt a ‘fabric first’ approach to building design – prioritising passive solutions such as natural ventilation, improved insulation and airtightness, whilst minimising the need for mechanical and electrical services. |
|  | Efficient systems and renewable energy | All of our plant and equipment should be as efficient as possible, and we will specify renewable technologies to provide zero carbon energy wherever feasible. |
|  | Energy modelling and performance | To better understand and minimise operational energy consumption and costs, modelling needs to go beyond basic regulatory requirements, accounting for detailed energy profiles and unregulated energy uses. |
|  | Embodied carbon | We will quantify, disclose and minimise the carbon emissions associated with manufacture, transport and construction of building materials – as well as end of life emissions. |
|  | Ongoing monitoring and management | It is vital that we can measure and understand the energy consumption associated with individual areas, systems and equipment to help identify opportunities for improved management and efficiencies. |

|  |  |
| --- | --- |
|  | **HEALTHY AND PRODUCTIVE ENVIRONMENTS*****Simple design measures can have a major impact on user satisfaction and productivity. The comfort and wellbeing of all building users will be considered alongside functional and technical requirements.***  |
|  | Internal environment | The design of internal spaces should improve health, wellbeing, productivity, access and inclusivity for all building users. This requires a focus in areas such as lighting, air quality, thermal comfort, interior design, acoustics, ventilation, biophilia and layout. |
|  | External environment | External environments must be planned to optimise personal safety and accessibility, as well as enhancing site ecology and opportunities to improve mental health. |
|  | Inclusive Design  | All our buildings will be designed, built and maintained to optimise access and inclusion as far as possible – regardless of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex or sexual orientation. |
|  | Pollution | We require all projects to demonstrate how they have minimised pollution to air, land and water – as well as light and noise pollution. This should encompass design, construction and operational phases. |
|  | Sustainable travel | Facilities should help to minimise the need for motorised transport – particularly where powered by fossil fuels - including the provision of remote working/ conferencing technology and enhancing the environment for pedestrians and cyclists.  |
|  | Construction site management | Contractors are required to implement best practice site management procedures to reduce their impact on staff and students, as well as our neighbours and the wider environment. |

|  |  |
| --- | --- |
|  | **CIRCULAR ECONOMY*****Resource efficient design can result in significant cost savings whilst also minimising environmental impacts. We will follow circular economy[[3]](#footnote-4) principles, using material and water resources as efficiently as possible, whilst also conserving natural capital.***  |
|  | Design for material resource efficiency | We expect design teams and contractors to minimise resource use, avoiding the need for new products and materials as far as possible, and through specification of reused or recycled alternatives. Major projects require life cycle analysis (LCA). |
|  | Minimising construction waste | We require all of our contractors to provide detailed plans to manage and minimise construction and demolition waste to the lowest possible level, whilst also targeting zero waste to landfill.  |
|  | Operational waste | We will provide facilities and adopt management strategies which help to minimise operational waste and maximise our recycling rates with a focus on eliminating single-use, disposable items. |
|  | Materials with low environmental impacts  | The materials used in our buildings should have the lowest possible impact on the environment. In addition to circular economy principles, this requires responsible and sustainable procurement decisions. |
|  | Reducing water consumption | We expect to reduce water consumption associated with our buildings and facilities through the use of efficient fittings and equipment as well as careful management. Where practical, we will use alternatives to potable water such as rainwater harvesting and greywater recycling. |

# Part 2: Managing Sustainable Projects

This section of the UCL Sustainable Building Standard is written principally for those who are involved in the management of our design, construction and maintenance projects.

It is structured to ensure that sustainability requirements are effectively incorporated from the earliest project stages. This helps to minimise administrative burden whilst avoiding the need for corrective action later on. Importantly, it also helps to maximise the value that can be achieved.

Project managers are responsible for ensuring all relevant requirements are covered.

|  |
| --- |
| Key Requirements by RIBA Stage *(follow hyperlinks for detailed guidance)* |
| **Stages** **0 - 1** | [**Project Brief/ Business Case**](#_Project_Brief/_Business_1)Confirm sustainability opportunities and targets are included in the project brief. Identify precedent projects and review lessons learned from past experiences (as per the Soft Landings process). For refurbishment projects, include provision for building fabric upgrades in the budget. |
| **Stage****1 onwards** | [**Environmental Assessment**](#_Environmental_Assessment_(BREEAM)Identify the correct sustainability assessment method (e.g. BREEAM, Ska, UCL Mini-Ska) in conjunction with Sustainable UCL. Complete pre-assessment(s) to embed strategies into the emerging cost plan. Agree principles for passive design, engaging with specialists where applicable (e.g. heritage). |
| **Stage** **1 onwards** | **[Soft Landings](#_Soft_Landings/_Post)**Ensure the UCL Soft Landings framework is fully embedded into the project to manage user consultation and inform project planning and design. This will help ensure that buildings are commissioned and managed to ensure optimum performance.  |
| **Stage** **2 onwards** | [**Life Cycle Costing**](#_Life_Cycle_Costing)All projects must demonstrate how capital expenditure is being balanced with ongoing operational and maintenance costs. Ensure that life cycle costing is not treated as a ‘tick-box’ exercise. Findings must have a visible impact on live design decisions and be presented/ reported as part of the project governance process.  |
| **Stage** **2 onwards** | [**Carbon Appraisal**](#_Carbon_Appraisal)Projects which have an impact on energy consumption must calculate potential carbon and cost savings associated with different design/ specification options as part of business case development. The [UCL Cost and Carbon Tool](https://www.ucl.ac.uk/sustainable/resources/construction) may be used. Options to be tested must be agreed in advance as part of the project governance process and in coordination with Sustainable UCL. |
| **Stage** **2 onwards** | [**Energy Targets & Modelling**](#_Energy_Modelling_1)Commission appropriate building physics modelling (energy, comfort, daylight) to guide the design towards the most sustainable outcomes. During stages 3-4, energy modelling must extend beyond regulatory minimum compliance to predict more accurate and holistic building energy use.  |
| **Stage** **2 onwards** | [**Embodied Carbon**](#_Embodied_carbon)Calculate the embodied carbon impact of the project in KgCO2e per m2 accounting for Life Stages A-C and building parts as defined within the embodied carbon section. Document design decisions undertaken to reduce embodied carbon impact.  |
| **Stages** **4 - 5** | [**Specifications, Tender and Contract Documents**](#_Specifications,_Tender_and_1)Embed specific, measurable sustainability targets and requirements in tender and contract documents. Ensure that the Contractor provides all necessary reassurances and operational plans (e.g. waste, site monitoring, materials sourcing) to confirm that sustainability requirements will be met. |
| **Stages** **5 - 6** | **[Construction and handover (Soft Landings)](#_Soft_Landings/_Post)**Confirm that responsible construction practices are taking place. Ensure that stakeholders remain engaged throughout construction and handover processes to ensure a smooth transition into the building. The initial aftercare package should be planned in accordance with the UCL Soft Landings Framework.  |
| **Stages** **6 - 7** | [**Post Project Review (Soft Landings)**](#_Soft_Landings/_Post)Ensure that lessons learned are documented following the UCL Post Project Review guidance and templates. For major projects, appoint an independent consultant to complete a post occupancy evaluation. Refer to the [UCL Soft Landings Framework](https://www.ucl.ac.uk/estates/policies/2019/jun/ucl-soft-landings-framework) for requirements.  |

|  |  |  |
| --- | --- | --- |
| Project Brief/ Business Case | *Input required:* | *UPO/ External PM* |
|  | *RIBA Stage:*  | *0 onwards* |

Achieving the best possible sustainability outcomes requires consideration of opportunities from inception stage onwards. Indeed, is sustainable project delivery even possible? For some existing buildings or acquisitions, it may not be feasible or cost-effective to bring them up to current standards.

It is also essential to have a clearly defined approach to design management and environmental assessment as early as possible, and no later than Stage 1.

University Project Officers (UPOs) and external project managers will need to ensure that all relevant requirements are accounted for, and that initial responsibilities and actions are assigned to relevant members of the project team. Depending on the project scope, this may require specialist appointments. Sustainable UCL will assist with this process wherever required.

**The business case for a sustainable estate**

The type of environmental assessment should be confirmed in the Project Initiation Document (PID) and relevant sustainability opportunities and requirements, appropriate to the project scope, need to be reflected in business case submissions.

It is essential that life cycle value benefits are accounted for and communicated to key decision makers/budget holders, particularly when that value is accrued over a long period or where it is less tangible. This may include, for example, reduced energy consumption; lower carbon footprint; more efficient use of material and water resources; simplified maintenance; or adaptability.

However, not all value benefits are immediately evident. As well as the more obvious cost savings, the business case must also account non-financial benefits such as health, productivity, accessibility, inclusion and broader community value.

A ‘whole life’ approach to planning design and planning must also include the ability for our buildings to endure and adapt to both changing user requirements and environmental change.

|  |
| --- |
| Actions & Responsibilities1. **Consider whether it is possible to deliver the project sustainably**
2. **Review all relevant requirements in the Sustainable Building Standard**
3. **Justify any likely areas of risk/ non-conformance (where known)**
4. **Highlight opportunities for innovative or best practice sustainability interventions**
5. **Ensure initial budgets account for sustainability measures**
6. **Explore opportunities to improve access and inclusion**
 |

Table 1 – Roles and Responsibilities

| **Role** | **Responsibility** |
| --- | --- |
| Estates Leadership Team | * Approves strategy, reviews progress and agrees derogations/ mitigation
* Overall responsibility for compliance and audit
 |
| Sustainable UCL  | * Sets overarching requirements; provides guidance and assurance
* Oversees assessment and audit process/ monitors progress
* Requires provision of performance data for reporting purposes
* Provides guidance on access and inclusion
 |
| University Project Officer/ External Project Manager | * Implements the requirements of the Sustainable Building Standard
* Manages Soft Landings process/ appoints Soft Landings Champion
* Ensures that requirements are included in project documentation
* Ensures that the correct assessment methodologies are applied
* Arranges sustainability meetings/ workshops
 |
| Sustainability Consultant/ BREEAM or Ska Assessor (where appointed) | * **Must be appointed no later than RIBA Stage 1 on major projects**
* Ensures that the project is delivered in accordance with the UCL SBS
* Facilitates sustainability workshops; assigns responsibilities; sends reminders; and provides regular written updates.
* Provides leadership on sustainability objectives and assessments
* Challenges the project team to optimise sustainable design and construction and identify opportunities for innovation
* Supports design team on feeding forward sustainability requirements into specifications by others
* Manages formal certification process (BREEAM/ Ska), collating and reviewing evidence to confirm compliance
 |
| Design and Delivery Teams  | * Reviews and implements relevant requirements in the SBS, environmental assessment (BREEAM/ Ska) and project sustainability strategy
* Provides compliant evidence documents and highlights compliance risks, including alternative approaches
* Identifies additional opportunities for best practice/ innovation
* Organises/ attends sustainability review meetings
 |
| Energy Consultant | * Provides project-specific advice on sustainable energy solutions, with a view to minimising operational carbon emissions.
* Identifies opportunities for exemplar practice/ innovation
* Undertakes energy modelling as part of the project energy strategy
* Carries out additional modelling (e.g. daylighting, thermal comfort) as required/appropriate
* Provides energy usage data to cost consultant for LCC analysis
* Inputs into MEP specifications to ensure energy efficiency is achieved in practice, highlighting any risks
 |
| Cost Consultant | * Accounts for life cycle benefits budgeting and value engineering
* Accounts for value of existing building materials
* Where required, carry out/ input into life cycle cost and carbon analysis, presenting to Sustainable UCL and the design team
 |
| Specialist disciplines | * Additional specialist inputs may be required to meet the requirements of the SBS and sustainability assessments (e.g. access specialist, ecologist, acoustician, security consultant, transport consultant, civil/ structural engineer, heritage, commissioning manager etc.)
 |

|  |  |  |
| --- | --- | --- |
| Environmental Assessment (BREEAM & Ska) | *Input Required:* | *Sustainability Consultant* |
| *RIBA Stage:* | *1 onwards* |

UCL is committed to the use of robust and auditable environmental assessment procedures for all of our building projects. In general, we use recognised industry standards to provide a framework for implementing environmental and broader sustainability best practice, as outlined below.

The principal standards we use are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **BREEAM**  | **Ska HE** | **Mini-Ska/ Ska Labs**  |
| **Target** | **Excellent[[4]](#footnote-5)** | **Gold** | **Comply with all relevant measures** |
| **RIBA** | New build, including extensions, and major refurbishments | Larger fit-out projects(typically, >£5m) | Smaller projects (e.g. room/ corridor refurbishment), including lab fit-out |
| 0 | Confirm environmental assessment method in PID/ Business Case documents |
| 1 | ***PRE-ASSESSMENT***Appoint BREEAM Assessor and BREEAM AP; hold pre-assessment workshop; identify early actions and responsibilities | ***SCOPING***Initial scoping, and pre-assessment exercise | ***SCOPING***UPO/PM to identify relevant measures using Mini-Ska template |
| 2 | ***DESIGN STAGE ASSESSMENT***Design team reviews; prepare evidence; include BREEAM requirements in tender docs; interim certification | ***DESIGN STAGE ASSESSMENT***Appoint assessor (if required); design team reviews; prepare evidence; include Ska in tender docs | ***SELF-ASSESSMENT***Ensure that ALL relevant measures are translated into design specification and complete Mini-Ska tool to confirm implementation |
| 3 |
| 4 |
| 5 | ***CONSTRUCTION STAGE***Contractor reviews; site audits; prepare and collate project performance data | ***CONSTRUCTION STAGE***Contractor reviews; site audits; prepare and collate project performance data |
| 6 | ***POST-CONSTRUCTION ASSESSMENT***Finalise project performance data and provide 'as built' evidence; final certification | ***HANDOVER STAGE ASSESSMENT***Finalise project performance data and provide 'as built' evidence | ***AUDIT***Confirm final complianceUpdate Mini-Ska toolAudits carried out by Sustainable UCL  |
| 7 |

Where appropriate, proposals to achieve BREEAM ‘Outstanding’ are encouraged, but not at the expense of compromised life cycle value.

The choice of assessment method is not always clear-cut and should be discussed with Sustainable UCL if there is any doubt. For example, UCL generally supports the use of Ska HE on major fit-out projects, but project teams may also need to consider the likelihood of any planning requirements.

Project category and hence method/rating needs to be stated in the consultants’ invitation to tender.

**Alternative** **Methods**

The use of complementary or alternative methods may be considered where they can be demonstrated to result in an equal or improved level of performance, and subject to planning requirements. For example, major new build projects going forward may also be subject to the Passivhaus standard in order to provide appropriate focus on energy use intensity (EUI targets). With an emphasis on staff and student wellbeing, we have also encouraged adoption of requirements from the WELL Building Standard on individual projects, and may seek formal assessment in the future.

**BREEAM/ Ska Assessors**

The appointed assessor will be expected to facilitate BREEAM/ Ska workshops involving relevant members of the project team, and to attend regular progress update meetings. They will also be required to provide all relevant project stakeholders with guidance on the assessment in an easily accessible format, including the following as a minimum:

* Detailed list of targeted credits, including core requirements
* Different scoring scenarios. i.e.
	+ to achieve targeted rating; and
	+ additional credits to reach a higher score/ rating
* Areas of risk and opportunity
* Early actions required to secure time-critical credits
* Clear break-down of relevant requirements
* Confirmation of responsibilities (i.e. for compliance and evidence provision)
* Written progress updates/ reports

It is particularly important that clear responsibilities for individual requirements are defined by individual and discipline. However, all relevant members of the project team are expected to familiarise themselves with, and support implementation of, all targeted credits/ measures as required.

UPOs/ Project Managers will need to maintain regular contact with the assessor to monitor the progress of the assessment, including risks of non-compliance or opportunities for additional credits. They should also ensure that evidence is being provided to the assessor in a timely manner.

A number of BREEAM/Ska issues require appointments and actions during the earliest stages of the project, including documented workshops/ procedures and reports from RIBA Stage 1. Depending on the project scope, this may include the following:

* Appointment of BREEAM AP (RIBA Stage 1)
* Climate change adaptation strategy (Stage 1 onwards)
* Appointment of ecologist (Stage 1 onwards)
* Materials efficiency/ circular economy workshops (Stage 1 onwards)
* Materials workshops/ life cycle analysis (Stage 2)
* Pre-demolition/ refurbishment audit (Stage 2)
* Life cycle costing (Stages 2 and 4)
* Security consultation (Stage 2)
* Passive design analysis and/or renewables feasibility (Stage 2)
* Operational energy modelling and workshop (Stage 3 onwards)
* Heritage energy study (Stage 2)
* Travel plan (Stage 2)
* Operational energy modelling and workshop (Stage 3 onwards)

It is UCL’s preference that assessments are managed using online tracker software (e.g. Tracker Plus) in order to facilitate guidance and provide updates to the project team; set clear responsibilities and deadlines; and provide effective progress monitoring. For all assessments a live, up-to date tracking sheet must be maintained by the sustainability consultant and be available on request.

**Evidence Requirements**

A variety of evidence will be required to support compliance with BREEAM/ Ska assessments. In many cases, it should be possible to source readily available project documentation for this purpose. However, in some circumstances it will be necessary to amend or mark-up documents, or possibly prepare additional evidence from scratch. All members of the project team are required to contribute to this process as set out in framework scopes of service, and individual disciplines are expected to have allowed for this in their fees.

Evidence must be provided so that an external assessor can be satisfied that it demonstrates unambiguous compliance against all relevant criteria. Documents must be appropriately referenced to identify, as a minimum, the purpose of the document, author, organisation and date of publication/ version.

The following table provides an indication of the types of evidence that may be required:

|  |  |
| --- | --- |
| **Design Stage** | **Implementation/ Post-Construction Stage** |
| * Specifications
* Tender Documentation
* Annotated Design Drawings
* Plans
* Manufacturer’s details
* Formal letters (e.g. client, design team, manufacturer)
* Input into reporting templates
 | * Site photographs
* Purchase orders, invoices, delivery notes, waste transfer notes
* Supplier/ product certification
* Physical inspection of products on site
* Waste transfer notes
* Formal letters
* As-built drawings
 |

Of particular importance is the inclusion of specific sustainability requirements in tender and contract documents, both as evidence of intention to comply, and to ensure any instances of non-compliance can be dealt with effectively. Further information is provided below under ‘Specifications and Tender Documents’.

|  |
| --- |
| Actions & Responsibilities1. **Identify correct assessment method (e.g. BREEAM, Ska)**
2. **Appoint/ identify relevant Assessor and AP (as applicable), to guide the process**
3. **Carry out pre-assessment exercise to identify relevant measures/ credits**
4. **Commission early inputs required for compliance (e.g. reports, surveys)**
5. **Ensure that clear responsibilities have been defined by individual/ discipline**
6. **Include requirements in tender and contract documents**
7. **Identify areas of risk or opportunity**
8. **Set clear deadlines for the provision of evidence documents**
 |

|  |  |  |
| --- | --- | --- |
| Soft Landings/ Construction & Handover/ Post Project Review | *Input Required:* | *UPO/ External PM* |
| *RIBA Stage:* | *1 onwards* |

A common criticism of sustainable design initiatives is that buildings fail to perform at the levels intended during the briefing, design and construction phases. Many buildings are handed over in a state of poor operational readiness and do not achieve environmental targets or end user requirements.

The UCL approach to Soft Landings aims to bridge this “performance gap” by focussing on the following areas:

1. Effective consultation with existing/ future building users to understand how the building is likely to be used
2. Prepare realistic visualisations, mock-ups and simulation models during design stages to manage stakeholder expectations
3. Undertake walkthroughs with key personnel during construction, and plan for effective commissioning and seasonal commissioning
4. Provide appropriate training of building users and managers on how to operate the building based on design intent
5. Form an aftercare team to monitor the building in-use, and to ensure that user behaviour doesn’t conflict with intended performance

It is intended that the UPO/ External project manager confirms the Soft Landings Champion at RIBA Stage 1 of the project in conjunction with the UCL Mobilisation and Transition team, which has oversight of the process.

As part of the [Soft Landings process](https://www.ucl.ac.uk/estates/policies/2019/jun/ucl-soft-landings-framework), UCL is also committed to undertaking [Post Project Reviews](https://www.ucl.ac.uk/estates/policies/2019/jun/post-project-review-guidelines) (PPR) on all registered projects to ensure that buildings are performing as intended and to capture lessons learnt. The scope of the review will depend on project value, scope, scale and criticality. Larger/ business critical projects will require a third-party post-occupancy evaluation. This requires a functional evaluation of the building, including user surveys and technical evaluation of in-use performance data.

Most buildings will not reach their steady mode of operation during the defects liability period. For large and complex projects, aftercare will need to extend to at least two years post occupancy to ensure energy and environmental performance objectives are met. The University Project Officer (UPO) will be responsible for organising necessary remedial work.

|  |
| --- |
| Actions & Responsibilities1. **Commence Soft Landings from RIBA Stage 1 and ensure the process is effectively managed throughout the project lifecycle**
2. **Use the UCL Soft Landings process to ensure close, early collaboration between members of the project team, building occupants and building managers**
3. **Pin down an effective handover process including best practice commissioning, seasonal commissioning and post-occupancy evaluation**
 |

|  |  |  |
| --- | --- | --- |
| Life Cycle Costing (LCC) | *Input Required:* | *Cost Consultant* |
|  | *RIBA Stages:* | *2 and 4* |

UCL recognises that investing in efficiency measures, including robust and durable building fabric and services, can result in lower operating costs and life cycle savings. We therefore require all our projects to look beyond the initial capital costs, through to operation, maintenance, refurbishment and decommissioning.

**Methodology**

* For major projects (typically >£10m), a formal life cycle costing (LCC) analysis must be carried out. This must be in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:2008, and carried out at elemental level (Stage 2) and component level (Stage 4).

Project teams must be able to demonstrate, with evidence, how the LCC analysis has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value.

* Smaller projects (<£10m) are not required to carry out full LCC analysis. However, calculations must be carried out to determine potential life cycle savings and to justify investment in more efficient solutions. The [UCL Cost & Carbon Tool](https://www.ucl.ac.uk/sustainable/resources/construction) can be used for this purpose.
* For maintenance, minor works and smaller refurbishment projects the calculation of simple financial payback and net present value associated with different options, is likely to be sufficient. This can also be done using the [UCL Cost & Carbon Tool](https://www.ucl.ac.uk/sustainable/resources/construction).

In addition to purely financial considerations, the life cycle costing process should also account for the value associated with social and environmental impacts/ benefits as far as possible (e.g. carbon emissions; biodiversity net gain; health and wellbeing).

At all stages, the cost consultant and design team must work collaboratively to demonstrate how the LCC cycle appraisal has been used to influence building and systems design/ specification to minimise life cycle costs and maximise critical value. Any value engineering decisions impacting on building/ energy performance must be discussed collaboratively and undergo a formal sign-off process as part of the project governance process, and in conjunction with Sustainable UCL.

LCC results must be included in the relevant stage gate review documentation to aid informed decision-making about the balance between capital and operational costs. This should include consideration of best practice or innovative solutions that can provide long-term value.

|  |
| --- |
| Actions & Responsibilities1. **All projects must demonstrate sound financial sense throughout their projected lifecycle – capex and opex must always be considered together (i.e. ‘totex’)**
2. **Major projects require formal lifecycle costing starting at RIBA Stage 2**
3. **Facilitate the provision of energy and cost information to support the process**
4. **Account for non-financial benefits, particularly relating to health & wellbeing**
5. **Findings from lifecycle cost studies must be presented to Sustainable UCL with a visible impact on live design decisions**
6. **Value engineering decisions impacting negatively on building/ energy performance or life cycle costs, must be clearly documented and agreed with Sustainable UCL**
 |

|  |  |  |
| --- | --- | --- |
| Carbon Appraisal  | *Input Required:* | *Energy Consultant*  |
|  | *RIBA Stages:* | *2-3* |

UCL has an obligation to measure, monitor, report and reduce carbon emissions associated with its estate and operations. Our institutional [Sustainability Strategy](https://www.ucl.ac.uk/sustainable/sustainability-ucl/change-possible-strategy-sustainable-ucl-2019-2024) targets net zero carbon buildings by 2024. As such, all projects which have an impact on building energy consumption (i.e. including provision or changes to building fabric or fixed services) should account for any increase or decrease in operational carbon emissions, as well as operational cost implications.

The principal aims of the carbon appraisal are as follows:

* Part of feasibility assessment - to inform business case decision making
* To evaluate different building servicing/ fabric options during early design stages
* To identify the option with lowest life cycle carbon and associated costs
* Provide accurate and auditable carbon data to assist with UCL reporting

The level of detail required will be dependent on project scope and determined in conjunction with Sustainable UCL.

For simple projects, or where a specialist energy consultant has not yet been appointed, an initial carbon appraisal should be undertaken using the [UCL Cost & Carbon Tool](https://www.ucl.ac.uk/sustainable/resources/construction). For larger, more complex projects, the appraisal will be informed by more detailed operational energy modelling – the results should also be inputted into the Cost & Carbon Tool.

Current, standard carbon factor values for the current District Heating network in UCL District Heating Network; Bloomsbury Heat and Power Network; and Queen Elizabeth Olympic Park District Heating Network should be used, as relevant.

In all cases, the difference between the baseline option and chosen option(s) must be calculated so that carbon savings and financial payback of energy saving measures can be reported.

|  |
| --- |
| Actions & Responsibilities1. **During RIBA Stage 1, agree with Sustainable UCL the expectations for using the Carbon Appraisal tool across the project**
2. **Carry out a carbon appraisal on all projects at RIBA Stage 2 which have an impact on building energy consumption, appropriate to the project scope and likely emissions**
3. **Facilitate the provision of relevant performance data for different scenarios**
4. **Identify the option with lowest life cycle carbon and associated costs**
5. **Provide accurate and auditable carbon data to assist with UCL reporting**
6. **Where appropriate, input operational energy predictions at RIBA Stages 3-4 into the carbon appraisal tool (can be calculated separately) to enable the total energy use, carbon and cost to be forecasted**
 |

|  |  |  |
| --- | --- | --- |
| Energy Targets & Modelling | *Input Required:* | *Energy Consultant* |
|  | *RIBA Stages:* | *2 onwards* |

UCL is committed to ensuring our buildings achieve net zero carbon in construction and operation, as defined by the UKGBC Framework Definition. This requires a greater emphasis on operational energy modelling, embodied carbon calculations and energy demand reduction as the primary approach. Carbon offsetting and/ or green tariffs should be avoided in building energy strategies as far as possible.

|  |
| --- |
| All major projects, new build and refurbishment (>£10m), must present proposals to minimise energy use intensity (EUI) in relation to best practice industry targets[[5]](#footnote-6):1. Develop a building energy strategy, including energy use intensity (EUI) targets, from RIBA Stage 1 onwards, prioritising energy demand reduction over low carbon supply

*This should follow a ‘passive first’ approach and reflect building type; function; users and usage patterns; equipment requirements etc. (Passivhaus principles should be followed where appropriate).*1. Confirm proportionate[[6]](#footnote-7) EUI targets no later than RIBA Stage 3.
2. Undertake and maintain operational energy modelling from RIBA Stage 3 to confirm or refine the EUI target.

*Use CIBSE TM54, advanced HVAC simulation, and/or the Passive House Planning Package, as appropriate. The model will need to be maintained throughout RIBA Stage 5 & 6 to represent the ‘as-constructed’ building, accounting for any value engineering that may impact performance.*In addition, the following is required on all relevant projects:1. The UCL Soft Landings framework (RIBA Stages 1 – 7; projects >£2m) requires a technical reality check no later than RIBA Stage 4 which should be used to de-risk any energy performance gap.

*Independent design review may also be appropriate for major projects.*1. The Contractor will work with the design team to deliver against the operational energy performance targets, highlighting any additional risks or opportunities.

*This includes commissioning, seasonal commissioning and fine-tuning the operation of the building during the first 12 months after practical completion.* |

**Relationship with statutory requirements**

Energy calculations for regulatory compliance (Building Regulations Part L) are often misinterpreted as predictions of in-use energy consumption. However, they do not account for all energy uses in buildings, nor do they consider realistic occupancy profiles or realistic plant operating parameters.

Because of this, Part L calculations cannot be used as a basis for estimating in-use utilities costs. Similarly, Part L cannot be used as the approach for ensuring operational energy performance is as low as it can be.

UCL requires that all major new build/ part new build projects meet or improve on regulated carbon targets as set out in the London Plan. In addition to the standard building regulations requirements for major refurbishments, heritage buildings should also target or improve on Part L2B standards as far as reasonably practical.

**Choice of modelling approach**

The selected modelling approach, or combination of approaches, shall be agreed with the UPO/ External project manager on commencement of the project, in consultation with Sustainable UCL. The table below provides guidance on applicable routes.

|  |  |
| --- | --- |
| **Modelling approach** | **Project scope** |
| CIBSE TM54 | Naturally ventilated buildings (i.e. lower complexity) |
| HVAC simulation (extension of TM54) | Mechanically ventilated buildings (i.e. greater complexity) |
| PHPP | Deep building fabric and/or air tightness works |

Calculations must account for **all main building loads**, over and above basic regulatory compliance. As a minimum, this must include those in CIBSE Guide A (2015) Table 5.22:

|  |
| --- |
| *CIBSE Guide A (2015) Table 5.22* – Main sources of building energy demand |
| Current ‘regulated’ energy total demands in England & Wales | Additional demands contributing to building loads |
| HeatingCoolingFans, pumps and controlsFixed lightingDomestic hot water | Small powerCateringBusiness/ process loadsExternal lightingLifts/ escalators |

Unregulated sources of energy consumption, including specialist functions, must also be considered at the design stage (these typically account for more than 30% of the energy consumption in standard office-type buildings). This includes specialist/lab equipment and servers, whereby the design strategy must also consider how to reduce these loads.

Under no circumstances is it acceptable for ‘operational energy modelling’ to be Part L modelling plus NCM unregulated loads.

Uncertainty should be reflected by providing a ‘results envelope’. For example, alternative realistic occupancy levels/patterns may be included, as appropriate. Results should then be presented as a range (i.e. ‘absolute energy demand between x and y kWh/year’). This should include the annual heating and cooling generation efficiency to demonstrate that the proposed heating and cooling systems operate efficiently for all scenarios.

In addition to energy modelling (operational and Part L compliance) UCL require that thermal comfort assessments are undertaken, in line with the appropriate BREEAM standard for the project. This shall include ‘future climate’ thermal comfort modelling, using weather files as defined in BREEAM for naturally ventilated and mechanically ventilated buildings, as appropriate.

All buildings should balance energy, daylight and overheating (i.e. energy performance should not create an adverse overheating risk).

**Target design parameters**

Where appropriate, the following design parameters shall form the basis of design:

|  |  |
| --- | --- |
| **Building Fabric** | **Performance requirement (U-value)** |
| Walls | 0.12 – 0.15 W/m2.K |
| Floor | 0.10 – 0.12 W/m2.K |
| Roof | 0.10 – 0.12 W/m2.K |
| Windows | 1.0 W/m2.K (triple glazing)1.2 W/m2.K (double glazing) |
| Doors | 1.2 W/m2.K |

|  |  |
| --- | --- |
| Air tightness | ≤1 m3/h.m2 @ 50 Pa (projects above £10m)≤3 m3/h.m2 @ 50 Pa (all other new build projects)≤5 m3/h.m2 @ 50 Pa (all other refurbishment projects)≤10 m3/h.m2 @ 50 Pa (where appropriate for heritage projects\*, or projects with limited alterations to the façade)\*Heritage projects should employ best practice measures to reasonably limit air leakage pathways whilst avoiding any adverse impact on building fabric (e.g. condensation issues) |
| Thermal bridging | 0.04 (y-value) |
| G-value of glass | Typically, 0.4 – 0.3, but requires consideration of glass area, orientation and room use to balance daylight and solar gain. |

|  |  |
| --- | --- |
| **MEP item** | **Performance requirement** |
| MVHR | 90% (efficiency) |
| Heat pumps and chillers | Best practice SCoPs and SEERs dependant on system type. Include calculation of delivered heat and cooling efficiency including all ancillary devices (e.g. supplementary heating), based on BS EN 14825:2016.  |
| Central AHU SFP | 1.5 – 1.2 W/l.s |
| A/C set points | 20-26°C |

In addition, the following principles shall be applied where appropriate:

* Heat emitters shall be designed to operate with very low temperature hot water, e.g. 45°C and below:
	+ Sizing of heat emitters/ space limitations will need to be taken into account. Consider underfloor/radiant systems where feasible.
	+ Provide domestic hot water generation solutions which are complimentary and do not cause increase in flow temperature of all systems.
* Connect to a low temperature heat network, or provide heating and hot water solutions that are fossil fuel free:
	+ For example, generation of heat should be from electric heat pump systems, or via connection to a district heat network that is or will be decarbonised.
	+ Where a building is connected to existing UCL District Heating network, ensure that the design enables a future reduction in temperature of pre-existing network.
* Demonstrate how on-site renewable energy is being maximised. For example, target an annual energy requirement for at least two floors of the development being met through renewable energy, confirmed through the energy model. Feasibility studies are expected to incorporate target efficiency values with comparison/ reference to other recent UCL schemes.
* Demonstrate how demand response is being maximised, i.e. measures to reduce peak heating and hot water peak demand. For example, appropriately sizing heating/hot water buffer vessels for peak demand; lighting load shedding flexibility; provide active demand control and battery storage.
* Demonstrate how secondary waste heat is being maximised, i.e. incorporate systems to reuse waste heat for building heating and domestic hot water generation, where feasible (for example IT cooling systems, ventilation exhaust, heat recovery chillers, catering refrigeration).
* Passive design measures such as external shading[[7]](#footnote-8), exposed thermal mass, low glazing ratios (i.e. 25-40%), openable windows and cross ventilation, should be included before the adoption of renewable energy solutions.

**Heritage Considerations**

UCL is committed to energy efficient, sustainable solutions that are also sympathetic to the heritage status of many of our buildings, as well as the broader Bloomsbury Conservation Area.

We recognise that the Planning (Listed Buildings and Conservation Areas) Act 1990 will need to be taken into account in relation to some improvements to building fabric/ thermal performance in particular. Work should not prejudice the character or cultural significance of the building, or increase the risk of long-term deterioration to the fabric or fittings.

However, we are also clear that all feasible efficiency improvements must be properly explored in order to contribute to our institutional carbon reduction targets; and in accordance with the net zero carbon framework set out by the UKGBC.

Relevant projects must involve early engagement between the design team; experts in sustainable heritage; and the local planning authority. Opportunities to improve the building fabric in agreement with heritage are strongly supported by Sustainable UCL.

**The UPO/External project manager and cost consultant shall consult with Sustainable UCL and/or independent MEP consultant (and heritage consultant where applicable) to highlight opportunities for holistic building envelope and services upgrades on major refurbishment projects. This is expected from the early feasibility stage onwards, with options for reasonable improvements included within the business case, and Stage Gate documentation**.

Example measures which may be applicable include roof insulation; floor insulation; internal wall insulation; new/ upgraded controlled fittings (windows/doors/secondary glazing) in line with the existing character of the building; and draught proofing to all air leakage paths.

Further guidance on how to optimise sustainability for heritage projects is available from the following sources:

* Historic England (2018) [*Energy Efficiency and Historic Buildings*](https://historicengland.org.uk/images-books/publications/eehb-how-to-improve-energy-efficiency/)English Heritage
* Balson, K., Summerson, G., and Thorne, A. (2014) [*Sustainable Refurbishment of Heritage Buildings*](http://www.breeam.com/filelibrary/Brochures/Heritage-Sustainable-Refurbishment-v2.pdf)BREEAM
* Miles, N (2013) [*Retrofitting Historic Buildings for Sustainability*](http://transact.westminster.gov.uk/docstores/publications_store/Retrofitting_Historic_Buildings_for_Sustainability_January_2013.pdf)Westminster City Council
* Grosvenor (2013) [*Sustainable Refurbishment: a Toolkit for Going Green*](http://grosvenorlondon.com/GrosvenorLondon/media/GrosvenorLondon/SustainableRefurbishmentAToolkitForGoingGreen.pdf) Grosvenor Estates

|  |
| --- |
| Actions & Responsibilities1. **Undertake operational energy modelling on all major new build / part new-build and refurbishment projects**
2. **Feasibility studies to assess viable targets shall be undertaken at RIBA Stage 2, with whole building operational modelling at RIBA Stages 3&4**
3. **Any deviations to operational energy targets are to be agreed with Sustainable UCL no later than RIBA Stage 3**
4. **The operational building simulation model (e.g. IES) shall be maintained throughout RIBA Stage 5 & 6 to represent the ‘as-constructed’ building, accounting for the impacts of value engineering exercises**
5. **The Contractor will work with the design team to deliver against the operational energy performance targets, highlighting any additional risks or opportunities**
6. **For heritage buildings, engage early on appropriate/ sympathetic improvements, including expert advice from the early feasibility stage**
 |

|  |  |  |
| --- | --- | --- |
| Embodied carbon  | *Input Required:* | *LCA Consultant* |
|  | *RIBA Stages:* | *2 onwards* |

UCL is committed to the measurement, disclosure and reduction of embodied carbon throughout the life cycle of projects. This includes emissions associated with materials extraction; processing; manufacture; distribution and assembly. It also includes the implications of maintenance, repair, replacement, demolition and disposal.

**New Build Projects**

UCL expects that major new build/ part new build projects target embodied carbon reductions 40% and/or to <500 kgCO2/m2 for superstructure and substructure.

RICS provides a standard approach to life cycle assessment (LCA) of materials in their [Whole Life Carbon Assessment methodology](https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf). Major new build/ part new build projects (>£10m) are expected to cover the following:

* Building parts:
* Substructure 1.1 & External works 8.2
* Superstructure 2.1-2.7
* Life stages:
	+ Product stage [A1 – A3]
	+ Construction stage [A4 – A5]
	+ Replacement & refurbishment stage [B4-B5]
	+ End of Life [C1-C4]

BREEAM 2018 Mat 01 Life Cycle assessment of materials also requires this exercise to be undertaken for compliance.

**Refurbishment Projects**

For major refurbishment projects, the building parts within the scope of works to be assessed may be limited. Where the scope of works includes elements of the building parts above, they should be assessed however on top of this the following building elements should be assessed:

* Building parts:
* Finishes 3.1-3.3
* Building Services 5.1-5.4 Building-related
* Life stages:
	+ Product stage [A1 – A3]
	+ Construction stage [A4 – A5]
	+ Replacement & refurbishment stage [B4-B5]
	+ End of Life [C1-C4]

For major refurbishment finishes and MEP services embodied carbon must be assessed and reductions made where possible as the RIBA stages progress.

Data sources used in the LCA shall be stated. The following industry databases are acceptable sources of carbon data for materials and products:

* The Inventory of Carbon and Energy (ICE) database;
* Environmental Product Declarations (EPDs) and datasets in accordance with ISO 14025, ISO 14040 and 14044; and
* IMPACT compliant software packages such as One Click LCA, eTool etc.

The LCA consultant (typically covered under the UCL MEP Framework appointment) should undertake embodied carbon analysis at RIBA Stages 2 and 4, as a minimum to align with BREEAM reporting. During RIBA Stage 3 the LCA consultant should document what recommendations are (or are not) being implemented by the design team to reduce embodied carbon. All assumptions must be clearly stated.

The LCA assessment should be presented in the following way:

* Total kgCO2e, or any clearly stated metric multiples thereof as appropriate, e.g. tCO2e;
* Total kgCO2e per building element i.e. substructure, superstructure etc and each expressed as a percentage of the total footprint;
* Total kgCO2e per major building component i.e. walls, floors etc and each expressed as a percentage of the total footprint; and
* Total kgCO2e per m2 [based on Gross Internal floor Area (GIA)]

**Smaller Projects**

For smaller projects that include new superstructure and substructure, a 40% reduction in embodied carbon should be targeted in order to drive higher recycled content, cement replacements and material efficient design. Calculations should be based on material volumes from the cost plan and ‘business as usual’ carbon factors for standard materials (e.g. cement mix with no cement replacement) vs. the proposed improvement approach.

**Circular Economy Statement**

Major projects must provide a circular economy statement considering whole life embodied carbon of materials, including end of life re-use opportunities. Standard contents for the circular economy statement, together with relevant BREEAM/ Ska issues, are set out below.

| **Circular economy principles** | **BREEAM** | **SKA** |
| --- | --- | --- |
| Re-use (including refurbish and repurpose)1. Re-use the existing asset
2. Recover materials and products
3. Share materials and products for reuse
 | Mat 06Wst 01  | SKA Waste & Materials categories |
| Design buildings for optimisation1. Design for longevity
2. Design for flexibility
3. Design for adaptability
4. Design for assembly, disassembly and recoverability
 | Mat 05Mat 06Wst 05Wst 06 |
| Standardisation or modularisation | Mat 06 |
| Servitisation and leasing  | Man 02 |
| Design and construct responsibly1. Use low impact new materials
2. Use recycled content or secondary material
3. Design out waste
4. Reduce construction impacts
 | Mat 01Mat 02Mat 06Wst 02Wst 01 |

Further guidance on embodied carbon is available from the following sources:

* RICS (Nov 2017) [*Whole Life Carbon Assessment for the Built Environment*](https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf)
* RIBA Architecture (December 2019) [*2030 Climate Challenge*](https://www.architecture.com/about/policy/climate-action/2030-climate-challenge)*,* [*RIBA Sustainable outcomes Guide*](https://www.architecture.com/knowledge-and-resources/resources-landing-page/sustainable-outcomes-guide)
* London Energy Transformation Initiative (2020) [*LETI Embodied Carbon Primer*](https://www.leti.london/ecp) LETI

|  |
| --- |
| Actions & Responsibilities1. **Undertake LCA on all major new build / part new-build and refurbishment projects**
2. **LCA analysis should be undertaken at Stage 2 to estimate the embodied carbon of the project and identify the impact of potential savings.**
3. **Document decisions taken to reduce embodied impact at Stage 3, and update the LCA calculation at Stage 4 to calculate the embodied carbon of the project.**
4. **Tender documentation to include the LCA requirements for materials sourcing and monitoring carbon reductions during construction.**
5. **Suppliers to be assessed for their ability to provide relevant information.**
 |

|  |  |  |
| --- | --- | --- |
| Specifications, Tender and Contract Documents | *Input Required:* |  *UPO/ External PM* |
| *RIBA Stages:* | *3-4* |

The UCL Sustainable Building Standard forms contract documentation for all projects. In addition, it is considered important that project teams embed relevant requirements from this standard and BREEAM/ Ska assessments within project documentation to ensure that all targeted measures are incorporated and not overlooked.

This requires the review and/ or provision of appropriate input to specification, tender and contract documents. Where appointed, this should be supported by the sustainability consultant. Alternatively, Sustainable UCL can provide guidance.

Sustainability experience and expertise must also be included as part of design team and contractor evaluation. Ensuring that we have specialists with relevant experience – and commitment – to achieving sustainable project outcomes means that we are also more likely to manage costs and optimise value.

The following key documentation should reflect project sustainability requirements:

* Business case/ PSO Stage Gates/ monthly reports
* End of stage reports
* Specification documents (particularly architectural and MEP)
* Tender documents: PQQ/ ITT, prelims, employer’s information requirements
* Access tracker
* Pre-construction information
* Additional contract documents

For BREEAM or Ska assessments, the required rating, and input into the formal assessment process must be a contractual requirement. Specifications and tender documents may need to be supplemented with additional evidence materials prepared by individual disciplines. This includes letters, reports, design plans, drawings, manufacturers’ details, technical calculations and models etc.

|  |
| --- |
| **Value Engineering (VE)**It is particularly important to account for implications of any value engineering exercises which may impact on sustainability performance, including BREEAM/ Ska compliance; energy strategy or life cycle value. UCL’s priority is to differentiate between value engineering and cost-cutting – avoiding the latter – ensuring that long-term operation and maintenance costs are fully understood and accounted for.Relevant reports may need to be revised as part of the VE process (e.g. energy model, life cycle costing, carbon appraisal).A VE template is available from the UCL Portfolio Services Office (PSO) and should be used for all VE exercises, including indication of any life cycle cost impacts.The sustainability consultant and/ or Sustainable UCL must be included as part of this process to agree any VE-related changes which may impact on sustainability performance, including unintended consequences and life cycle costs. |

|  |
| --- |
| Actions & Responsibilities1. **Account for sustainability expertise in design team and contractor evaluation**
2. **Ensure all members of the team are aware of the requirement to comply with the UCL Sustainable Building Standard**
3. **Ensure consultants account for specific, detailed requirements in design documentation**
4. **Include sustainability targets and requirements in contract documents**
5. **Ensure that value-engineering accounts for life cycle value, and is not simply a cost cutting exercise**
 |

# Part 3: Sustainable Design Specifications

This section of the Sustainable Building Standard sets out minimum requirements for all our construction projects in support of the overarching vision and targets for sustainable development set out in [*Change Possible: The Strategy for a Sustainable UCL 2019 - 2024*](https://www.ucl.ac.uk/sustainable/change-possible-strategy-sustainable-ucl-2019-2024). It is categorised in line with the core principles set out in Part 1 of this document:

It is the duty of the project team led by the UPO/ Project Manager to identify which requirements are relevant to the project scope/ context, and to ensure that responsibility for delivery is clearly assigned to individual specialists.

|  |
| --- |
| Life cycle value |

| **Issue** | **Standard to be achieved/ UCL minimum requirement** | **Lead** | **RIBA** | **BREEAM** | **Ska** |
| --- | --- | --- | --- | --- | --- |

|  |
| --- |
| **Assessing life cycle value** |
| Life cycle costing | Projects of all types and sizes must be able to demonstrate value throughout their projected lifecycle. Capital expenditure (capex) must be considered alongside operational and maintenance cost implications (opex) through to end of life.Methodology and approach are dependent on project size, as set out in [Part 2](#_Life_Cycle_Costing_1) of this document. | **UPO/ PM/ Cost Consultant** | **2 & 4** | **Man 02** | **N/A** |
| Whole building solutions | As part of the business case and/ or feasibility work for all projects, opportunities for complementary work in adjacent areas/ buildings must be identified and explored with a view to highlighting potential whole building solutions. This will typically focus on the following key areas:* Building fabric performance and consistency/ effectiveness of thermal envelope (e.g. through window upgrades/ replacement, additional insulation etc)
* Building services – opportunities for upgrade or replacement of wider building services where this would demonstrate clear efficiencies and value (e.g. lighting, HVAC etc)
* Appropriate opportunities for the addition of on-site renewable energy technologies.
 | **PM UPO** | **0/1** | **N/A** | **N/A** |
| Recognising non-financial value | Project managers must be able to demonstrate how non-financial benefits have been considered in business cases/ feasibility studies, with reference to the environmental targets set out in the Sustainable UCL [Policy](https://www.ucl.ac.uk/sustainable/ucls-sustainability-policy) and [Strategy](https://www.ucl.ac.uk/sustainable/change-possible-strategy-sustainable-ucl-2019-2024), as well as the potential impacts or benefits relating to health and wellbeing. | **PM/ UPO** | **1+** | **N/A** | **N/A** |
| Maintainability | As far as practically possible, and without prejudicing broader UCL/ statutory requirements, buildings should be designed to be simple and easy to maintain throughout their lifecycle in close consultation with UCL Estates EM&I team, and through the development of a maintenance strategy appropriate to the scope of works. This strategy should include the following considerations as a minimum:1. Preventive maintenance requirements
2. Procurement - availability and cost of parts and materials
3. Coordination with existing UCL procedures and systems
4. Technical requirements and capabilities
5. Ability to measure ongoing performance
6. End of life considerations (i.e. following 'cradle-to-cradle' principles)

This process should seek to minimise lifecycle costs in terms of both financial expenditure and carbon emissions through intelligent design and efficient operation. | **PM/ UPO** | **2 - 6** | **Man 01** | **N/A** |
| **Carbon appraisal** |
| Carbon appraisal | The carbon impact of all projects – including both regulated and unregulated loads - must be taken into account as part of the early decision-making process for different design options and as part of business case preparation. Project managers are advised to use the UCL Cost & Carbon Tool although alternative methods may be used depending on project size and scope. Results are to be provided at Stages 2 and 3 and included in the relevant stage gate review documentation where options are being discussed, to aid informed decision making and to ensure best value. Results must be provided to the PSO via monthly reports. | **PM/ UPO** | **2 & 3** | **N/A** | **N/A** |

|  |
| --- |
| **Consultation, handover and aftercare** |
| Consultation process | Early consultation must involve relevant university; project delivery; and third-party stakeholders, including specialist building users (e.g. lab managers). This must account for the potential to influence positive behaviour change, helping to facilitate the ongoing sustainable operation of our buildings.Consultation content will vary according to project scope but will typically include the following:1. Soft Landings
2. Sustainability
3. Functionality, build quality and impact (including aesthetics)
4. Management and operational implications
5. Community impacts
6. Opportunities for shared use of facilities
7. Compliance with statutory (national/local) consultation requirements
8. Inclusive and accessible design
9. Impacts or opportunities relating to adjoining/ adjacent buildings/ facilities or district level services (e.g. district heating network)
10. Sizing, optimisation and integration of equipment and systems
11. Opportunities for building/grounds to facilitate learning
12. How the design can best provide a range of social spaces appropriate to the needs of students and other users

The project team must be able to demonstrate how the outcomes of the consultation process have influenced or changed the Initial Project Brief, including if appropriate, the project execution plan, communication strategy, and the concept design.In addition to the above, independent 3rd party consultation is a requirement for BREEAM. (i.e. needs to be undertaken by a consultant outside the client/ project team).  | **PM/ UPO** | **1** | **Man 01** | **N/A** |
| Soft Landings and Post-Project Review | Follow the [UCL Soft Landings process](https://www.ucl.ac.uk/estates/policies/2019/mar/ucl-soft-landings-framework), to allow for the continual assessment of the emerging design and completed building, with a particular emphasis on actual performance and user expectations. As part of Soft Landings, all registered projects are required to carry out a Post Project Review (PPR) to ensure that buildings are performing as intended and to ensure that the lessons learnt throughout the project lifecycle are documented. The scope of the PPR is set out in a separate [guidance document](https://www.ucl.ac.uk/estates/policies/2019/feb/post-project-review-guidelines) and will vary based on project value, scope, scale and criticality.Projects >£10m (or as agreed with the UCL Mobilisation & Transition Team) are required to carry out post-occupancy evaluation (POE) normally starting 11 months following building occupation/ re-occupation. The process and must include the following:1. In-use performance feedback from building users to inform operational processes
2. Recommendations for maintaining or improving productivity, health, safety and comfort
3. Subsequent re-commissioning activities

**The individual/ organisation carrying out the POE must be able to demonstrate independence from the design process.**Full requirements are set out in the UCL PPR guidance document.  | **PM/ UPO** | **1 - 7** | **Man 01, Man 04, Man 05** | **D56** |
| Commissioning | UCL requires comprehensive, impartial commissioning and seasonal commissioning of building services, accounting for specialist building uses where changes to/ installation of any of the following form part of the scope of works:1. Building services (including both complex and non-complex systems)
2. Building services control systems (including Building Management Systems)
3. Changes to the building fabric that will affect thermal performance

Responsibility for monitoring and programming pre-commissioning, commissioning, testing and, where necessary, re-commissioning activities must be clearly defined during the project design stages.A schedule of commissioning and testing must be provided to identify appropriate commissioning standards required for the scope of works (e.g. Building Regulations; CIBSE; BSRIA, BS8300). This must include a suitable timescale for commissioning and re-commissioning of all relevant works carried out.Seasonal commissioning to be carried out over a 12-month period, once the building becomes substantially occupied. All complex systems to be tested under full load conditions and high/low occupancy. Inefficiencies and areas in need of improvement to be identified and re-commissioned.**Full details of UCL Commissioning requirements are set out in UCL MEP Design Guidance.** | **MEP** | **2 - 7** | **Man 04, Man 05** | **D56** |
| Building User Guide | For larger and more complex projects, a building user guide must be provided prior to handover and made available to UCL Estates for distribution to the building users. A template is available at <https://www.ucl.ac.uk/estates/policies/2019/mar/building-user-guide>.Smaller projects should also develop guidance appropriate to the project scope and the nature of operational requirements (e.g. information on heating controls, lighting, AV equipment including induction loops).These guides must be written for the non-technical building user (an O&M manual/ Log Book will not suffice) with the purpose of facilitating access and efficient operation of the building in line with the original design intent.Whilst the content of the guide will be specific to building type and user, minimum requirements must be covered as set out in the relevant version of BREEAM/ Ska. | **Contractor** | **5 - 6** | **Man 04** | **D45** |
| Training | For new build projects, and where works result in changes to building mechanical or electrical systems, appropriate training must be provided for the UCL Engineering, Maintenance and Infrastructure Team, UCL Facilities Managers, and external FM providers as relevant. This should be designed to provide appropriate knowledge of any controls, monitoring, and maintenance requirements; and to therefore help to achieve optimum operational efficiency.A training schedule must be provided and timed appropriately around handover and proposed occupation plans.**Full details of UCL handover training requirements are set out in UCL MEP Design Guidance.** | **Contractor** | **5** | **Man 04** | **D56** |

|  |
| --- |
| Minimising energy use & carbon emissions |

| **Issue** | **Standard to be achieved/ UCL Requirement** | **Lead** | **RIBA** | **BREEAM** | **Ska** |
| --- | --- | --- | --- | --- | --- |

|  |
| --- |
| **Targeting Net Zero Carbon** |
| 1.

Net Zero Carbon Strategy | UCL has adopted the [UKGBC framework definition](https://www.ukgbc.org/ukgbc-work/net-zero-carbon-buildings-a-framework-definition/) for net zero carbon buildings, which has been developed to provide the industry with clarity on how to achieve net zero carbon in construction and operation.In line with UCL’s strategic commitment to achieving net zero carbon buildings by 2024, all projects must be able to demonstrate how they have approached the minimisation of life cycle carbon emissions, prioritising energy demand reduction in line with the energy hierarchy (Be Lean; Be Clean; Be Green). This must be reflected from project inception onwards and in business cases/ feasibility studies, and must form an integral part of both project reporting and formal end of stage reports.For acquisitions and lease renewals/ negotiations, the following must be documented and presented to the relevant UCL committee(s) for consideration:1. Opportunities for further improvements to energy performance and carbon emissions with due regard for life cycle cost and wider value (e.g. wellbeing). For example, this may include building fabric improvements and/or rationalisation/ improvements relating to the building services strategy.
2. Limitations on bringing the building up to current best practice standards – for example, relating to building type, function or heritage limitations. Where relevant, the local conservation officer and/ or conservation planning specialists should be consulted as early as possible to help understand what building envelope and wider carbon reduction measures may be achievable.
 | **UPO/ PM** | **0** | **N/A** | **N/A** |
| Building energy performance targets | All major projects, new build and refurbishment (>£10m), must present proposals to minimise energy use intensity (EUI) in relation to best practice industry targets, as set out in [Part 2](#_Energy_Targets_&) of this document. It is essential that this is considered at the earliest stages (from RIBA Stage 1 onwards) before major design decisions are locked in, and refined throughout the design process.Proportionate targets must be confirmed by the end of RIBA Stage 3 at the latest. | **Energy Consultant** | **1 - 6** | **Ene 01** | **D66** |
| Whole-building energy modelling | New build projects, and those involving major changes to building fabric or services must carry out comprehensive 'whole building' energy modelling as set out in [Part 2](#_Energy_Modelling_1) of this document.  | **Energy Consultant** | **3 - 4** | **Ene 01, Ene 08** | **N/A** |
| Embodied Carbon (materials) | UCL requires that all projects account for, and minimise, the embodied carbon emissions associated with building design and delivery, including specific products and materials, as set out in [Part 2](#_Embodied_carbon) of this document.  | **Architect** | **2+** | **Mat 01, Mat 02, Mat 04** | **See Ska Materials category** |
| Scope 3 Carbon Emissions | Principal contractors will be required to measure, monitor and report energy consumption and carbon emissions associated with all on-site construction processes throughout the build programme. This information must be made available to the Sustainable UCL and as BREEAM/ Ska evidence on request.In addition, data on transport movements and impacts resulting from delivery of construction materials to site and construction waste from site must be recorded. As a minimum this must cover:1. Transport associated with materials used for major building elements, groundworks and landscaping - from the factory gate to the building site, including any transport, intermediate storage and distribution.
2. Transport of construction waste from the construction gate to waste disposal processing/recovery centre gate. Scope of this monitoring must cover the construction waste groups outlined in the project's waste management plan.
 | **Contractor** | **5 - 6** | **Man 03** | **P01** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Passive design** |  |  |  |  |
| Passive design analysis | Where relevant to the project scope (e.g. projects involving new build elements or changes/ upgrade to the building envelope), project teams must carry out an analysis of the proposed building design/ development to identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services (i.e. lighting, heating, cooling, mechanical ventilation, lighting loads and other energy consumption). This will help to inform design decisions in support the project [EUI target](#_Energy_Modelling_1) and [Carbon Appraisal](#_Carbon_Appraisal_1). Results/ recommendations must be documented accordingly. This must include clearly assigned responsibilities for taking forward the chosen solutions to detailed design and implementation stages.Overheating and daylight studies should also be carried out in tandem to ensure an optimum balance between: size of glazing; natural daylight; natural ventilation; and active cooling needs. | **Energy Consultant** | **2** | **Ene 04** | **D66** |
| Building orientation and massing | In order to optimise the passive performance of new buildings, orientation and massing must be considered from the project inception stage. This should include consideration of daylight availability/ provision; sun path analysis; opportunities for natural ventilation; wind analysis; acoustics and impact on microclimate.Consideration of the position/ orientation of buildings in relation to the wider site, as well as potential interaction of MEP systems with existing and future buildings should also be considered at this stage. | **Architect** | **1** | **Ene 04** | **N/A** |
| Building and Thermal Mass | Design teams must explore the potential to exploit the thermal mass of building structures to help moderate internal environmental conditions and minimise/ level out heating and cooling requirements, reducing reliance on mechanical systems (including plant and system size) and optimising energy performance.This analysis must be linked to thermal comfort/ overheating studies being carried out for the project. | **Architect** | **2** | **Ene 04** | **N/A** |
| Insulation/ U-values | Opportunities for improved building fabric performance must be considered on all projects which impact on the building envelope (i.e. walls, windows, roofs, floors, doors etc.).Target design parameters for new buildings and major refurbishments are set out in the Energy Modelling section in [Part 2](#_Energy_Modelling_1) of this document. UCL recognises the challenges of meeting some of these performance requirements on existing buildings due to the range of building types and functions across our estate. However, design teams must be able to demonstrate how heat loss through the building envelope has been reduced *below* the requirements for regulatory compliance for all relevant aspects of the building envelope.  | **Architect** | **2** | **Ene 04** | **N/A** |
| Air leakage/ integrity of building fabric (design) | The amount of air leakage shall be minimised through design detailing to minimise air leakage paths and thermal bridging, with a view to reducing the building heating/ cooling loads. Target design parameters for new buildings and major refurbishments are set out in the Energy Modelling section in [Part 2](#_Energy_Modelling_1) of this document.  | **Architect** | **3+** | **Ene 04, Man 04** | **N/A** |
| Air leakage/ integrity of building fabric (construction) | The construction process must be planned to optimise building air tightness through:1. Strict adherence to design detail with particular attention to sealing of joints, avoidance of penetrations, use of infiltration barriers, continuity of insulation etc.
2. Identification of additional opportunities to improve air leakage paths and thermal bridging.

In addition to basic airtightness testing required for statutory compliance, principal contractors on new build and major refurbishment projects involving extensive changes to building envelope will be required to carry out a full thermographic survey. **Any defects identified must be rectified prior to handover and close out.**This must be carried out as per best practice in CIBSE TM23 - Testing Buildings for Air Leakage. | **Contractor** | **5** | **Ene 04, Man 04** | **N/A** |
| Natural Day Lighting | See also: Health & Productivity: Visual ComfortIn addition to the health & productivity benefits, optimising natural daylight will also help to reduce reliance on artificial lighting and lower energy consumption/ carbon emissions. Ensure that analysis is linked to thermal comfort and energy studies. | **Architect** | **2** | **Hea 01** | **D04, P10** |
| **Efficient systems** |  |  |  |  |
| Plant Sizing and Energy Usage | Regulated loads need to accurately respond to intended operation of the building, for example: hours of operation; occupancy, cooling/ heating set points; etc. Modular plant and equipment such as boilers, pumps etc. shall be sized to operate at maximum efficiency and installed to enable plant to be turned down to match building loads in and out of season – specifically, oversizing should be avoided. For refurbishment projects, the priority should be to connect to existing building services wherever feasible. Check historic metered head consumption to inform plant sizing.Plant equipment and engineering systems must be specified and designed to operate efficiently under part loads - i.e. modulating systems that retain efficient operation at maximum turndown.Where appropriate, zoning of the environmental building systems is to be maximised such that small areas of the building can operate efficiently. Ensure that ongoing maintenance requirements are fully accounted for (e.g. access to filters, replacement of parts etc). | **MEP** | **3** | **Ene 01** | **D03, D05, E11, E22** |
| On-site CHP/ District Heating Networks | Buildings on the UCL Bloomsbury Campus are served by district CHP systems including our own on-site system, as well as the Bloomsbury Heat and Power Network which also covers a number of other institutions. Projects involving provision or upgrades to heating plant must connect to this system over additional/ new plant installation (where a local connection exists), also enabling future reductions in network temperatures.Buildings forming part of the UCLE development on the Queen Elizabeth Olympic Park are currently required to connect to the district heating network served by the Stratford Energy Centre (i.e. by the LLDC).On other sites, the potential for district heating should be considered as part of an energy/ low carbon feasibility study taking into account carbon reduction, cost/benefit and lifecycle improvements. Consideration must be given to ambient loops for the recovery of waste heat. Where relevant, the feasibility test should align with local authority requirements and systems are expected to comply with the comply with our [District Heating Network Design Requirements](https://www.ucl.ac.uk/estates/sites/estates/files/17_07_06_ucl_district_energy_design_guidance.pdf). | **MEP/ Energy Consultant** | **2** | **Ene 04** | **N/A** |
| Low or zero carbon technologies(i.e. including renewables) | Design teams are expected to actively investigate the feasibility of incorporating or extending low or zero carbon (LZC) energy technologies as part of the building/ site energy strategy.For new build and major refurbishment projects this should include a technical analysis of potential solutions focussing on life cycle benefits, and including the following elements:1. Energy generated from LZC energy source per year
2. Carbon dioxide savings from LZC energy source per year
3. Life cycle cost assessment of the potential specification, accounting for NPV
4. Life cycle assessment to also account for embodied carbon emissions.
5. Potential for immediate or future energy storage

NOTE: Additional elements will be required where a BREEAM assessment is being carried out.Where opportunities for LZC technologies exist, but fall outside the scope of the project, these should be notified to the Sustainable UCL for consideration and kept under review by the design team to account for new technologies.  | **MEP/ Energy Consultant** | **2** | **Ene 04** | **N/A** |
| Ventilation Efficiency  | The most efficient ventilation solution should be determined as appropriate to the building type/ space function. This must be considered as part of a combined strategy also addressing air-quality, noise and overheating needs, accounting for future climate change scenarios (see also 3.3 below). The type of ventilation used will ultimately be based on the results of thermal modelling and any specialist/ lab uses, and aim to achieve the best balance between comfort and low energy consumption. CIBSE TM52 will be applied for new build and major refurbishments projects to ensure appropriate ventilation of the space/ minimise risk of overheating.It is recognised that mechanical ventilation with heat recovery may be preferable during winter seasons to optimise efficiency and achieve EUI targets. Where this is the case, supply and extract air ventilation systems shall incorporate high efficiency air to air heat recovery methods through both passive and mechanical means (≥90% efficiency).HVAC systems are expected to fully integrate with building management systems on existing buildings. | **MEP** | **2** | **Hea 02, Ene 01** | **D03** |
| Refrigerants | Building energy strategies should seek to avoid specifying new/ additional cooling wherever possible, and only in accordance with the [UCL Heating & Cooling Policy](https://www.ucl.ac.uk/estates/policies/2019/feb/ucl-heating-cooling-ventilation-policy).Where specified, refrigerants should be zero ozone depleting with minimal global warming potential (GWP). Where this is not possible due to technical/ functional considerations, leak detection connected to the BMS system should be provided with consideration given to automatic pump down where feasible. Consideration of the consequences of equipment failure is essential.At design Stages 2 and 3 consideration should be given to the appropriate refrigeration specification, including differentiation between process loads and environmental requirements. Advantages and disadvantages of each refrigerant must be documented as part of options appraisal.Note: Improving and connecting to existing systems takes priority over additional standalone plant. | **MEP** | **3** | **Pol 01** | **D23** |
| Artificial Lighting | The need for artificial lighting should be reduced as far as possible through design, and through use of lighting controls, for both internal and external areas (subject to safety and accessibility requirements (BS8300)). Natural daylighting must be optimised for internal areas, including separate consideration of core and perimeter areas, complemented by daylight dimming technology (i.e. to automatically dim lights according to ambient light level). Due consideration must also be given to the potential for glare.Internal lighting designs must seek to minimise energy usage and use dedicated; easily maintainable energy-efficient fittings selected using criteria on the ECA Energy Technology List. LED options are the UCL default standard unless operational requirements dictate otherwise. Automatic lighting controls, suitable for building function, must be used in all areas (timed, daylight and/ or presence) with manual override switches for staff/ students where appropriate - manual-on: auto-off (i.e. absence detection). Where appropriate, task lighting should be specified to minimise background lighting requirements. (see also Heath & Productivity: Zoning & User Control). External space lighting shall only use energy efficient fittings selected from the ECA Energy Technology List, and with average initial luminous efficacy not less than 70 luminaire lumens per circuit Watt. Subject to security considerations, light fittings must be automatically controlled for prevention of operation during daylight hours and with presence detection in areas of intermittent pedestrian traffic. Lighting design should seek to minimise, or ideally eliminate, light pollution without adversely affecting the safety and security of the site and its users. | **MEP** | **4** | **Hea 01, Ene 01, Ene 03** | **P10** |
| External funding | The design and choice of equipment shall be selected with due regard for the availability of any external funding/ discounts. Grant funding may be available during the course of development, design and construction from such sources as Enhanced Capital Allowances, BEIS, Innovate UK, Mayor’s Energy Efficiency Fund (MEEF) etc. Where relevant, the project team shall provide information and submissions to support the application process.Registration for the Feed in Tariff or Renewable Heat Incentive should be actioned where relevant. | **PM/ UPO** | **1** | **N/A** | **N/A** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Monitoring & Management** |  |  |  |  |
| Building Management System | Where appropriate to the scope of works being undertaken, a fully tested and commissioned Building Management System (BMS) shall be provided to ensure that building systems can be closely controlled and monitored. All plant and equipment should be controlled by the BMS where available – separate interfaces must be avoided wherever possible\*. Alternatives which provide remote monitoring and control capability without a full BMS may be acceptable for simple buildings – however, this is to be agreed on a project-by-project basis.Systems will be commissioned in both the heating and cooling seasons and on an annual basis to further improve performance. Zones shall be generally based on a floor-by-floor basis (or by department as appropriate). AHUs with packaged controls are generally not acceptable.Further details of BMS requirements are set out in UCL MEP Design Guidance and BMS Specification.\* Particular attention needs to be paid to AC controls on standalone split systems to avoid inefficient operation, including conflicts between heating and cooling. | **MEP** | **4** | **Ene 02** | **N/A** |
| Energy Metering | Energy metering provision must be planned in accordance with [UCL MEP Design Guidance](https://www.ucl.ac.uk/estates/projects-and-requests/contractors-and-consultants/employers-requirements) and relevant environmental assessments (e.g. BREEAM, Ska) to support detailed and transparent measurement and monitoring of energy use, and highlight ongoing opportunities to reduce consumption in conjunction with effective management procedures.All meters shall have a volt free pulse or other open protocol communications output compatible with the UCL BMS system digital inputs. Outputs must be linked to the BMS energy dashboard, and the *Fabriq* platform used by UCL to track live energy performance, unless otherwise agreed with the UCL Energy Manager.Metering provision must be specified with reference to CIBSE TM39: Building energy metering, and capable of monitoring energy use by building system AND functional area/ department, as relevant (the following list is not exhaustive):Building Systems: space heating, domestic hot water, humidification, cooling, ventilation, pumps, lighting, small power, renewable or low carbon systems, controls. Other major energy consuming systems/ plant must also be covered (e.g. kitchen plant, cold storage, laboratory plant, sterile services, lifts, dedicated computer rooms, ovens/ furnaces etc)Functional area/ department: the following area types are provided as a guide but this list is not exhaustive: kitchens, computer suites, workshops, lecture halls, conference rooms, drama studios, sports halls, process areas, labs (high containment suites should be separate), BSU areas, data centres.Where there is zone control each zone will have a meter including heat meters. Note that Heat Network Metering and Billing Regulations may also need to be complied with depending on project scope. | **MEP** | **4** | **Ene 02** | **E08, E09** |

|  |
| --- |
| Healthy & Productive Environments |

| **Issue** | **Standard to be achieved/ UCL Requirement** | **Lead** | **RIBA** | **BREEAM** | **Ska** |
| --- | --- | --- | --- | --- | --- |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Internal Environment** |  |  |  |  |
| Visual comfort | New build and major refurbishment projects (where windows or rooflights are replaced/ upgraded) must consider the optimisation of natural daylight as part of the design process including, as appropriate, a daylight design study/ modelling to help maximise useful daylight levels.The window and glazing design are to deliver optimum daylighting to the occupied areas, whilst reducing solar gain through the use of appropriate solar shading - with due consideration for planning/ heritage issues. Glare control and reflections from other buildings must also be taken into account. Consideration should be given to the introduction of biophilic design elements on glass partitions/ doors where appropriate, with due regard for visually impaired and neurodiverse users.New build projects should aim to achieve the following:1. Minimum daylight factors of 2% (target 3%) over 80% of occupied space, with a uniformity ratio of at least 0.3. OR
2. Minimum average daylight illuminance, averaged over the entire space, of at least 300 lux for 2000 (target 2650) hours per year or more with at least 90 lux for 2000 (target 2650) hours at the worst lit point.

Whilst opportunities to improve natural daylight levels may be more limited for refurbishment and smaller/ fit-out projects, design teams must be able to demonstrate how this has been approached and optimised. Simple measures may include changes to room layout or window upgrades. | **Architect** | **2** | **Hea 01** | **D04, D30, D31** |
| Air quality | Projects of all sizes and scopes are required to implement design measures to optimise indoor air quality by minimising pollutant levels, and through the provision of clean/ filtered outdoor air. New build and major refurbishment projects (generally >£5m) should provide an indoor air quality plan to influence design, specification and installation decisions that minimise indoor air pollution through the building lifecycle. Typically, fresh air rates of 12l/s/person and CO2 of 800ppm are expected to be targeted for office type spaces.1. With due regard for the functional and technical constraints of the building/ project, design teams must prioritise the provision of fresh air using a natural ventilation strategy as far as reasonably practicable. Mechanical ventilation with heat recovery may be preferable during the winter season as it is more energy efficient.
2. For buildings with clear mechanical ventilation requirements, zoning should be considered to allow for natural ventilation in areas with lower requirements for environmental control (e.g. offices; recreation areas etc).
3. Extracts from fume/safety cabinets or boiler flues must be designed to respond to the recommendations in the air quality plan with a view to minimising air quality impacts.
4. The balance between comfort, air quality and low carbon design is to be taken into account.
5. Low or zero formaldehyde and low VOC products shall be specified with reference to relevant standards (e.g. as set out by BREEAM/ Ska); PVC products shall be avoided where suitable alternatives exist.
6. Additional consideration may also be required when designing ventilation systems to prevent/ minimise the risk of internal spread of infections during normal building use (i.e. COVID-19 and beyond).
 | **Architect** | **2** | **Hea 02** | **D40, D63, D64, P12** |
| Thermal comfort | New build projects, or any major refurbishments involving significant changes to thermal elements or HVAC, must carry out thermal modelling appropriate to the complexity of the building. Smaller projects, including works to parts of a building, are expected to consider adjacent spaces and the potential for whole building solutions/ upgrades.Operative temperature ranges for both mechanically and naturally ventilated buildings, must be in accordance with the criteria set out in CIBSE Guide A: Environmental Design.For buildings which provide some degree of occupant control, risk of overheating must be limited in accordance with the adaptive comfort methodology outlined in CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings. Consideration should also be given to disabled people who may have specific temperature requirements.The following probabilistic DSY weather data files should be used to establish the projected climate change environment against which the design is evaluated:Naturally ventilated buildings* Time period: 2050s
* Emissions scenario: Medium (A1B)
* 50th percentile DSY 2 and DSY 3

Mechanically ventilated or mixed mode buildings* Time period: 2020s
* Emissions scenario: High (A1F1)

Any risk of future non-compliance must be mitigated through design changes, or potential for future adaptation using passive design solutions. | **MEP** | **2** | **Hea 04** | **D28** |
| Zoning and user control | The design should allow for non-transient building users to have some control over their internal environment, subject to functional and planning requirements. This may be via opening windows in summer, or user controls for heating, mechanical ventilation and/ or lighting. Due regard must be given to the consequences of any user controls, particularly in relation to energy conservation and out of hours operation. As a general guide, non-transient users should be able to control their internal environment as set out below.1. Thermal zoning: Temperature control strategy should be informed by the thermal model with zoning planned to maximise efficiency of heating and cooling, including consideration of systems interaction, including natural ventilation. Where relevant, interlocking must be provided to prevent simultaneous heating and cooling. Degree of occupant control will need to account for building/ area function; occupancy type and patterns; and user expectations. As a guide, this should typically be: Temperature: +/- 2oC either side of the BMS set point
2. Lighting zoning: Internal lighting should be zoned to allow an appropriate level of occupant control for the type of area/ function, and generally in accordance with the requirements of the relevant version of BREEAM/ Ska. Lights should be dimmable to meet the need of specific building users. Specify 'manual on - automatic off' (i.e. absence detection) as standard/ where daylight is available.

Areas that are likely to have different use patterns must be zoned separately, e.g. lab and write up areas. | **MEP** | **2** | **Hea 01, Hea 04** | **D02, E06** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **External environment** |  |  |  |  |
| External lighting levels | All external lighting associated with the development must be designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, including during hours of darkness, as well as optimising personal safety. The following standards should be complied with, as relevant:* BS 5489-1:2013 Lighting of roads and public amenity areas
* BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places.
* BS8300-1: 2018 Design of an accessible and inclusive built environment. Buildings – code of practice

Due regard must be given to impacts on light pollution, including any relevant planning requirements. | **MEP** | **3** | **Hea 01** | **N/A** |
| Light pollution | The external lighting strategy must be designed to minimise, or ideally eliminate, external light pollution as follows:1. Minimise the need for external lighting through good design of site layout, and without compromising requirements for safety and security of the site and its users.
2. Ensure lighting strategy complies with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 2011.
3. Install automatic controls to switch off/ reduce lighting at night/ outside operational hours (not including safety and security lighting)
 | **MEP** | **3** | **Pol 04** | **N/A** |
| Minimising flood risk | All developments must seek to minimise, and preferably reduce, any impacts associated with surface water runoff to minimise local flood risk/ surface water pollution. Where relevant, this should include the use of sustainable drainage principles (SUDS) in the design of all surface water storage and discharges.Risk assessments must identify any sources of surface or ground water pollution, including potential future changes in use, and provide appropriate mitigation measures.The feasibility and benefits of incorporating green, brown or blue roofs as part of a broader drainage strategy should be considered and documented, where relevant. | **Structures/ Civils** | **2+** | **Pol 03** | **N/A** |
| Security | Buildings and associated external spaces (e.g. car parks, amenity spaces) must be planned, designed and specified to minimise security risks associated with property and personal safety. UCL Security must be engaged on all projects that involve provision, replacement or upgrade of buildings and relevant services/ infrastructure. A UCL Design Security Form is available to aid with the assessment of security risks and facilitate the process for recommending appropriate design solutions.Projects which require a BREEAM assessment may also need to engage an external Security Specialist to develop recommendations in accordance with the principles of 'Secured by Design'. | **Architect** | **2** | **Hea 06** | **N/A** |
| **Access & Inclusion** |  |  |  |  |
| Accessibility | The inclusive design guidance set out in the RIBA Plan of Work should be used to inform all relevant projects. UCL’s own Inclusive Design Standard requires the following as a minimum:* 1. All works should meet the requirements set out in BS8300 as the minimum level of accessibility to be achieved.
	2. Consult with UCL’s Access and Inclusion Manager. Access audits must be carried out for all projects with the scope for improvements in accessibility and inclusion and potential measures allowed for in the Business Case and PID. This includes both new build and, in particular, refurbishment projects where existing provision is less likely to comply with current standards.
	3. Major projects should have a registered access consultant on the design team.
 | **Architect** | **1** | **N/A** | **N/A** |
| **Sustainable Travel Arrangements** |  |  |  |  |
| Reduce the need for travel | The design of internal spaces and facilities should include measures to reduce or eliminate the need for staff/ student travel through the provision of adequate networking, audio and video conferencing provision, allowing for both current and likely future requirements.Consultation with UCL Information Services Division will be required. | **PM/ UPO** | **1+** | **Tra 01** | **N/A** |
| Travel Plan | New build, refurbishment and major fit out projects must account for the targets and requirements set out in the UCL Green Travel Plan.Separate Travel Plans or additional content may be required on a project-by-project basis and depending on location, or where additional guidance is required (e.g. due to local planning requirements or where BREEAM/ Ska assessments are being carried out).  | **PM/ UPO** | **2** | **Tra 01** | **N/A** |
| Optimise environment for pedestrians | The design of external areas and building/ site entrances and exits should promote low risk, safe and secure access. Potential microclimate impacts should also be accounted for; this may include the use of planting to provide shade and cool in the summer or minimising wind tunnel effects.Lighting to be in accordance with 'External Lighting Levels', above.In addition, design teams should be able to demonstrate how the external environment has been planned and designed to encourage walking to and from the site, including good wayfinding and signage. This should include aesthetic considerations, use of materials for hard and soft landscaping, segregation of footpaths from other forms of transport, safe pedestrian crossings, disabled access (accounting for different types of disability and visual impairment) etc. | **Architect** | **2+** | **Hea 07** | **N/A** |
| Cyclist facilities | Adequate cyclist facilities must be provided accounting for both current and anticipated future demand, and planned with a view to encouraging more building users to take up cycling. Provision will depend on building location and function; however, the following is expected as standard:1. Secure short stay and covered long stay cycle racks. Include pumps and tool kits where appropriate
2. Clear signage for cycle parking facilities
3. Showers with changing areas and lockers (accessible to all relevant building users)
4. Drying facilities (where possible)

This requirement may be addressed at the individual building level, or based on shared, centralised facilities depending on the nature of the site and adjacent buildings/ projects.Buildings on the Bloomsbury Campus must take into account the UCL 'Core Campus Cycle Strategy' (Revision A, 2018, Hawkins Brown). | **Architect** | **2+** | **Tra 02** | **D41, D42, D43** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Construction Site Management** |  |  |  |  |
| Considerate Constructor Scheme | Construction projects over 6 weeks in duration are required to register with the Considerate Constructors Scheme (CCS). The contractor will be required to take all reasonably practicable steps to achieve a minimum overall score of 40 and meet or exceed the “excellent” standard of 8 in each of the 5 sections.  | **Contractor** | **5** | **Man 03** | **D44** |
| **Ecology & Biodiversity** |  |  |  |  |
| Biodiversity net gain | All projects including work to external areas should be approached in accordance with the UCL Biodiversity Strategy & Action Plan and the targets with in the UCL Sustainability Strategy, ‘Wild Bloomsbury’ signature programme. This includes projects with areas of hard or soft landscaping, as well as opportunities within or on the buildings themselves (e.g. green roofs or walls if appropriate).All projects involving external landscaping are expected to implement measures to achieve a net biodiversity gain (not just providing ‘green’ space for purely aesthetic purposes). Initiatives may involve a net increase in planting area, plant species and/ or provision of additional features to increase biodiversity of flora and fauna. When not feasible on-site, off-site solutions should be agreed with Sustainable UCL.The feasibility of green or brown roofs and/or green walls should be considered on a project-by-project basis, including potential additional advantages for micro-climate and building thermal performance. The potential for enhancing wildlife connectivity or corridors should also be assessed.A net negative ecological impact will only be allowable in exceptional cases and once all technically and economically viable solutions have been considered. This must be agreed with Sustainable UCL and, where appointed, the project ecologist. | **Ecologist** | **2** | **LE 02, LE 03, LE 04** | **N/A** |
| Ecological management and maintenance | For major projects involving external works (generally >£5m), principal contractors are required to nominate a Biodiversity Champion with the authority to influence site activities to manage and maintain ecology throughout the project.The contractor's site induction must promote awareness of any ecological features relevant to the site, and measures required to protect them. Where available, this should take into account the findings of a formal ecology survey/ report.Records must be kept, and made available on request, detailing actions taken to protect biodiversity and monitor their effectiveness throughout key stages of the construction process.Where flora and/or fauna habitats exist on-site, the contractor must work with UCL, the ecologist and the wider project team to programme site works with a view to minimising disturbance to wildlife. This includes site preparation, ground works, and soft landscape works which should be scheduled at an appropriate time of year. A section on ecology and biodiversity is to be included as part of the building user guide. | **Contractor** | **5** | **LE 05** | **N/A** |

|  |
| --- |
| Circular Economy |

| **Issue** | **Standard to be achieved/ UCL Requirement** | **Lead** | **RIBA** | **BREEAM** | **Ska** |
| --- | --- | --- | --- | --- | --- |

|  |
| --- |
| **Minimising resource use** |
| Circular economy principles | In order to maximise opportunities for using materials as efficiently as possible, circular economy principles must be specified in the project brief (i.e. RIBA Stage 1) and approached by the design team on the following basis:1. Prioritise reuse (including refurbishment and repurposing)
2. Design for optimisation (i.e. longevity, flexibility, adaptability and disassembly)
3. Standardisation or modularisation
4. Servitisation and leasing (where available)
5. Responsible sourcing of products and materials

Overall quantities of materials required and waste generated should be optimised through an iterative process which considers building design, procurement, construction, maintenance and end of life. For new build and major refurbishment projects, this should take the form of a documented plan covering each design stage separately (RIBA 1-5), and as required under the London Plan guidelines. The plan must set out relevant targets, as well as reporting on opportunities and methods to optimise the use of materials.To facilitate this process, UCL recommends the UKGBC ‘Circular Economy Guidance for Construction Clients’. <https://www.ukgbc.org/ukgbc-work/circular-economy/> | **Architect** | **1+** | **Mat 06, Wst 01** | **D60** |
| Robust and durable building fabric | To maximise the life expectancy of building fabric, project teams must demonstrate how design solutions and materials specification optimise durability in relation to the building lifecycle. This is to be documented in design team meeting minutes and drawings and include the following elements, as applicable:1. Foundation/substructure/lowest floor/retaining walls
2. External walls
3. Roof/balconies
4. Glazing: windows, skylight
5. External doors
6. Railings/balusters (where exposed to external environment)
7. Cladding (where exposed to external environment)
8. Staircase/ramps (where exposed to external environment)
9. Hard landscaping

Key exposed building elements must meet appropriate quality / durability standards or BS 7543:2015 as the default appropriate standardAll new builds are expected to include convenient access to the roof and façade for cost-effective cleaning, replacement and repair, as well as roof and façade design to prevent water damage, ingress and detrimental ponding. | **Architect** | **2+** | **Mat 05** | **N/A** |
| Single-use plastics | All projects are expected to adopt measures to eliminate single-use plastics as far as possible, and subject to procurement and logistics considerations. This should form part of design development; construction management; and operational planning and include the following areas:* Procurement, including packaging and protection (acknowledging that it may not currently be feasible to source some materials/ products without single-use plastic)
* Equipment purchasing
* Provision of building facilities (e.g. catering)

All major new build and refurbishment projects must seek to provide permanent water fountains to help minimise the need for bottled water. Smaller projects should also investigate the feasibility of providing such facilities. Further guidance is available from Sustainable UCL. | **UPO/ PM** | **3+** | **N/A** | **N/A** |
| Furniture & Fittings | Where furniture and fittings are to be provided or replaced:1. All reasonable options for reuse/ repair in situ have been exhausted
2. Raise a request with the UCL Relocation, Moves and Decants team (at least 2 weeks in advance of any planned moves) to ensure:
3. Adequate arrangements are made for the storage or reuse of any redundant, but reusable, items
4. Existing UCL inventory must be checked with a view to reusing items from storage/ other projects

3. Any new items meet at least one of the following criteria:* the company manufacturing the products is certified under the Furniture Industry Sustainability Programme (FISP) scheme;
* items are manufactured with at least 80% recycled content (measured by mass) and 100% recyclable content, designed for deconstruction with components that can be recycled.
* have been awarded the EU Ecolabel

4. In addition, ALL timber, must meet the requirements for responsible sourcing, as set out in section 4.12, below (i.e. FSC/ PEFC certified). | **Architect/ PM** | **4+** | **N/A** | **Multiple measures in Materials and Waste sections** |

|  |
| --- |
| **Adaptable design** |
| Environmental adaptability  | New build and major refurbishment projects are expected to be planned to ensure efficient and comfortable conditions in a changing climate, with particular emphasis on projected temperature and rainfall patterns. This likely to include building fabric & insulation; design for natural ventilation; risk of overheating; HVAC provision/ upgrades; impact on energy consumption; water management; soft landscaping and biodiversity.A balance between comfort and low carbon design solutions must be determined on a project-by-project basis, taking into account building type, function and design life. As such, an early, documented risk assessment must be used to identify and evaluate potential impacts on the building over its projected life cycle and, where feasible, appropriate mitigation measures. The following aspects are to be included, as relevant:1. Structural stability
2. Structural robustness
3. Weather proofing and detailing
4. Material durability
5. Health and safety of building occupants and others
6. Impacts on building contents and business continuity.
 | **Architect** | **1+** | **Wst 05** | **N/A** |
| Disassembly and adaptability | Design teams are expected to explore the potential and ease of disassembly and the functional adaptation for different design scenarios by the end of stage. Recommendations to are to be provided to facilitate future adaptation/ disassembly allowing for changes in functional requirements, working practices or user profiles - either by UCL or other potential occupiers. This should aim to minimise future material changes (particularly wastage) and/ or reconfiguration costs. This should cover to following as a minimum: * Feasibility
* Accessibility
* Versatility
* Adaptability
* Convertibility
* Expandability
* Refurbishment potential

Solutions and recommendations to be implemented where practical and cost effective.A high-level approach must be developed from the concept stage and, for new build and major refurbishments, documented (including in Stage 2 reports). The following aspects are to be included, as relevant:1. Internal layouts/ partitions, including modular solutions
2. Furniture, fittings and internal decoration
3. Facilitating the replacement or upgrade of major plant
4. Accessibility of local services including power, data infrastructure, specialist services, distribution routes etc.
5. Potential for future extension - either horizontally or vertically
 | **Architect** | **2+** | **Wst 06** | **N/A** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Minimising construction waste** |  |  |  |  |
| Construction waste management | All projects should have a documented plan for the management of material resources on the site and tailored according to the project scope (i.e. Site Waste Management Plan/ Resource Management Plan or equivalent). This must be produced during the design stages and shall include reduce/reuse/recycling targets that meet/ exceed best practice benchmarks.The plan must include the following, as relevant:1. Target benchmark for resource efficiency (tonnes/ 100m²)
2. Procedures and commitments for minimising non-hazardous waste in line with the target benchmark
3. Procedures for minimising hazardous waste, where present
4. A waste minimisation target and details of waste minimisation actions to be undertaken
5. Procedures for estimating, monitoring, measuring and reporting hazardous and non-hazardous site waste.
6. Procedures for sorting, reusing and recycling construction waste into defined waste groups, either on-site or through a licensed external contractor
7. The name/ job title of the individual responsible for implementing the above

The plan must be updated at relevant stages of project planning and construction process to account for changes likely to affect waste quantities and management (e.g. changes to design, construction methods, suppliers, waste management contractors etc).Contractors are required to review opportunities for the reuse/ recycling of demolition, excavation and construction materials throughout the project works, including on other current UCL projects where possible.Accurate and verifiable waste data is to be made available to UCL/ the project sustainability consultant on request (e.g. using data from approved EA Waste Return Forms). | **Contractor** | **4/ 5** | **Wst 01** | **See Ska Waste category** |
| Demolition/ Refurbishment Audit | For all projects involving demolition works, including internal strip out, the design team and contractor must be able demonstrate how materials have been actively and directly used in construction (on or off site) or provide evidence of closed loop recycling. For existing buildings, structures or hard surfaces, a documented pre-demolition audit should be completed to maximise the recovery of material for subsequent high grade/value applications, if possible, on other UCL projects. Basic requirements are as follows:1. Identification of the key refurbishment/demolition materials.
2. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials in accordance with the waste hierarchy.
 | **Contractor** | **2** | **Wst 01** | **See Ska Waste category** |
| Diverting Waste from Landfill | UCL requires that all construction projects can demonstrate how they have approached a target of **ZERO WASTE TO LANDFILL**.Where adequate justification can be provided for not reaching this target, the following diversion from landfill figures are expected to be achieved as a minimum:* Non demolition: 85% (volume) OR 90% (tonnage)
* Demolition 85% (volume) OR 95% (tonnage)
* Excavation 95% (volume) OR 95% (tonnage)

Waste materials will be sorted into separate key waste groups (according to the waste streams generated by the scope of the works) either on-site or through a licensed contractor for recovery. | **Contractor** | **4/ 5** | **Wst 01** | **See Ska waste category** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Operational waste planning** |  |  |  |  |
| Recycling infrastructure | The UCL Sustainability Strategy aims to achieve an 85% operational recycling rate with 100% diverted from landfill. Project teams are expected to provide internal and external recycling facilities in support of this target. This should include, as relevant:* Provision of space for waste storage and dedicated recycling areas
* Locating waste facilities to maximise accessibility for relevant building users (staff, students, FM and waste management contractors).
* Liaising with UCL Facilities Services to determine the appropriate approach.
* No individual office bins shall be supplied
* All bins must be clearly labelled, to assist with segregation of the recyclable waste streams
* All outside bin storage facilities shall enable waste segregation as determined by the current UCL Waste Strategy, be secure and provide adequate access for waste collection vehicles
* No paper towel systems shall be supplied to washroom and toilet areas. Options for paper towel alternatives should be explored for kitchen areas.

For campus-located buildings, centralised recycling infrastructure may be provided as long as it provides adequate capacity (or adaptability) for current and potential future operational waste streams. | **Architect** | **3** | **Wst 03** | **D08** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Materials with low environmental impact** |  |  |  |  |
| Environmental Impact of Materials | All project teams must account for and minimise environmental impacts associated with materials selection. This should include:* The reuse of existing materials should be prioritised where practical
* Use of materials with higher levels of recycled content (e.g. with reference to WRAP best practice recycled content benchmarks)
* Use of materials certified to schemes recognising their lower environmental impact (e.g. FSC timber)

Materials used for all main building elements are expected to achieve a minimum A rating from the BRE Green Guide to Specification. This includes: roofs, external walls, internal walls and partitions, floors, windows, external surfacing, boundary protection and insulation.Where products can be procured, those with an EPD (Environmental Product Declaration) should be prioritised.All contractors/ suppliers shall aim to minimise emissions associated with the transport of construction materials. Contractors shall keep a comprehensive record of where all materials are sourced to enable the calculation of scope 3 emissions associated with construction (water, waste, procurement, and transport).  | **Architect** | **3+** | **Mat 01** | **See Ska Materials category** |
| Responsible sourcing of building materials | Construction materials must be responsibly sourced, with due regard for practices that are environmentally responsible, ethical and fair. Consideration should be given to local sourcing as part of selection criteria.Wherever available, suppliers with at least one of the following recognised, certified environmental management systems must be used\*:* FSC/ PEFC (all timber must be certified to one of these standards)
* BES 6001
* ISO 14001 (this should ideally cover both manufacturing/ production and supply chain processes such as raw material extraction/ cement production etc)

Please consult Sustainable UCL to confirm acceptability of alternative standards/ schemes.\*This requirement may be relaxed in exceptional cases where it can be demonstrated that supply chain options are severely restricted and/ or no suitable products with such certification exist. | **Contractor** | **3+** | **Mat 03** | **See Ska Materials category** |
| **Reducing water consumption** |
| Improving water efficiency | All projects involving the provision, upgrade or replacement of domestic water consuming components are expected to carry out an analysis of the potential for water efficiency improvements.Potential water savings will be dependent on the scope of works; type and location of facilities involved; and local drainage infrastructure. However, typical measures will include low/ dual flush WCs; push-button/ water-efficient urinals; push-button, low flow taps and showers; automatic flow regulators. Products from the ECA Water Technology List shall be used wherever appropriate.Use solenoid valves linked to occupancy PIR sensors to isolate the local cold-water supply to washrooms with a view to minimising localised flooding and water waste.For new build projects with standard facilities a minimum 40% improvement over baseline water consumption is expected, as calculated using the BREEAM Wat 01 Calculator.For labs and other specialist applications, project teams should demonstrate how the design of water-consuming systems has incorporated waterless and low water-consuming technologies and equipment and/ or how operational management procedures can reduce water consumption. | **MEP** | **3** | **Wat 01, Wat 03, Wat 04** | **E12, E14, E16, E19, E20, E23, P08** |
| Rainwater harvesting/ Greywater recycling | Where appropriate to the project scope, the feasibility of incorporating a rainwater harvesting or greywater recycling system is to be explored to further reduce potable water consumption. | **MEP** | **2** | **Wat 01** | **N/A** |
| Water monitoring | In addition to mains supply water meters, sub-meters are to be installed to monitor individual water consuming plant or building areas responsible for a significant proportion of overall consumption (typically >10%).Where available, all meters must be connected to the building management system to facilitate ongoing monitoring and to inform the campus water management strategy. | **MEP** | **3** | **Wat 02** | **E17, E18** |

# Further Information

The following list sets out the various non-UCL standards and guidance referred to in this document:

|  |  |
| --- | --- |
| BRE Green Guide to Specification | <http://www.bre.co.uk/greenguide/> |
| BRE Green Book Live | <http://www.greenbooklive.com/> |
| BREEAM 2014 (New Construction) | <http://www.breeam.com/BREEAMUK2014SchemeDocument/> |
| BREEAM 2014 (Refurbishment & Fit Out) | <http://www.breeam.com/ndrefurb2014manual/> |
| BREEAM 2018 (New Construction) | <https://www.breeam.com/NC2018/>  |
| BSRIA Soft Landings | <https://www.bsria.co.uk/services/design/soft-landings/> |
| CIBSE Guide A: Environmental Design (subscription required) | <https://www.cibse.org/Knowledge> |
| CIBSE AM 11 Building Performance Modelling (2015) (subscription required) | <https://www.cibse.org/Knowledge> |
| CIBSE TM23 Air Leakage Tests (subscription required) | <https://www.cibse.org/Knowledge> |
| CIBSE TM39 Building Energy Metering (subscription required) | <https://www.cibse.org/Knowledge> |
| CIBSE TM52 The Limits of Thermal Comfort (subscription required) | <https://www.cibse.org/Knowledge> |
| CIBSE TM54 Evaluating Operational Energy Performance of Buildings at the Design Stage (subscription required) | <https://www.cibse.org/Knowledge> |
| ECA Energy Technology List | <https://www.gov.uk/guidance/energy-technology-list> |
| ECA Water Technology List | <http://www.watertechnologylist.co.uk/search.asp> |
| Mayor’s Office for Policing & Crime (MOPAC) - Secured by Design | <http://www.securedbydesign.com/> |
| RICS Ska HE Good Practice Measures | <https://ska-tool.rics.org/>  |
| RICS Standardised Method for Life Cycle Costing | <https://www.rics.org/globalassets/rics-website/media/upholding-professional-standards/sector-standards/construction/black-book/life-cycle-costing-1st-edition-rics.pdf> |
| WRAP Designing out Waste: A Design Team Guide for Buildings | <http://www.wrap.org.uk/content/designing-out-waste-design-team-guide-buildings-0> |

1. i.e. kWh/m2/yr. UCL supports the targets set out by the London Energy Transformation Initiative and RIBA 2030 Climate Challenges, but recognises that the EUI benchmarks provided will need to be adjusted for many of our buildings. [↑](#footnote-ref-2)
2. Our definition of lifecycle value goes beyond financial savings and payback. We are committed to accounting for the wider environmental, social and community impacts of our buildings. [↑](#footnote-ref-3)
3. A **circular economy** is an alternative to a traditional **linear** **economy** (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life. [↑](#footnote-ref-4)
4. Project teams for all major new build projects must demonstrate an approach to maximising the BREEAM score above the Excellent threshold, with due regard for life cycle value. A buffer of at least 5% above BREEAM Excellent must be targeted at Design Stage. [↑](#footnote-ref-5)
5. UCL supports the targets set out by the London Energy Transformation Initiative and RIBA 2030 Climate Challenges, but recognises that the EUI benchmarks provided will need to be adjusted for many of our buildings. [↑](#footnote-ref-6)
6. With reference to the following benchmarks:

a) New buildings: Total Energy Use Intensity (EUI) of ≤ 65 kWh/m2/yr GIA (teaching) or ≤ 55 kWh/m2/yr (GIA (offices); Space heating demand should be ≤ 15 kWh/m2/yr (GIA)

b) New buildings (specialist functions) & major refurbishment of existing buildings: 75% reduction in operational energy use per m2 as compared to CIBSE TM46 benchmarks (‘Typical’ benchmarks, area weighted by function) [↑](#footnote-ref-7)
7. Internal blinds are often installed to help reduce solar gain although benefits are limited. External shading & higher performance g-value glazing should be encouraged where feasible. [↑](#footnote-ref-8)