Energy & Sustainability Statement

Dominion Way
Worthing
BN14 8NT

7th March 2022 V3

Prepared for:

Glenmore Holdings Limited
38 Wigmore Street
London
W1U 2HA



Holborn Premier, 137-144 High Holborn, London, WC1V 6PL I 020 7148 6290 I info@eb7.co.uk I www.eb7.co.uk

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1.0 Executive Summary

This statement sets out the overall energy and sustainability strategy for the commercial development at the Dominion Way.

The proposed re-development of the site to create 23 new industrial units has been designed to achieve the highest of environmental performance standards set out in Worthing's Local Plan policies.

A 'Lean, Clean, Green' design methodology following the energy hierarchy has been adopted, and the project achieves an overall improvement (DER/TER) in regulated emissions of **>16.93%** over Part L 2013 standard, through the introduction of high elemental performance in the new build elements, a low-energy natural ventilation strategy, high efficiency gas fired heating systems and a roof mounted PV arrays.

To underline the sustainability credentials of the proposed development, the project will achieve a certified BREEAM "Very Good" status in line with local policy requirements.

2.0 The Site & Proposal

The project involves the redevelopment of the site to create 23 new build industrial units across a development of 5 blocks.

Overall the project will deliver circa 2525m^2 of new commercial floor space, including first floor mezzanine areas, as well as associated open storage areas.



2.1 Planning Policy.

The project lies within the Borough of Worthing

The Worthing Local Plan Core strategy was adopted in 2011; key policies include:-

Policy 17 - Sustainable Construction

All new development (including conversions, extensions and changes of use) will contribute to making Worthing a more sustainable place to live and work by reducing its contribution to carbon emissions and ensuring that the town is resilient to the local impacts of climate change. Development will be required to:

- Demonstrate how the development addresses climate change mitigation and adaptation and more specifically how it addresses issues such as pollution, energy, water efficiency, waste minimisation, drainage, sustainable construction and recycling
- All new development should be built to a standard which minimises the consumption of resources during construction and thereafter in its occupation
- All new non-residential development must achieve as a minimum the national/regional/local targets and standards for sustainable construction with a particular emphasis on water efficiency. The BREEAM standards (or any national standards that supersede them) will be used to assess any new non-residential developments. Where viable and achievable, new non-residential development will be expected to go beyond those.
- Developers will be expected to provide certification evidence of the levels achieved in the relevant codes at the planning application stage.

Policy 18 - Sustainable Energy

In order to support the Council's objective to achieve the highest sustainability standards:

New development will be required to include sufficient on-site renewable energy generation to match the requirements of the South East Plan (or any subsequent national/regional targets that supersede these).

Where developers cannot meet this requirement evidence will be required to demonstrate why it is not feasible or viable.

Worthing Planning and Climate Change Interim Checklist (December 2020)

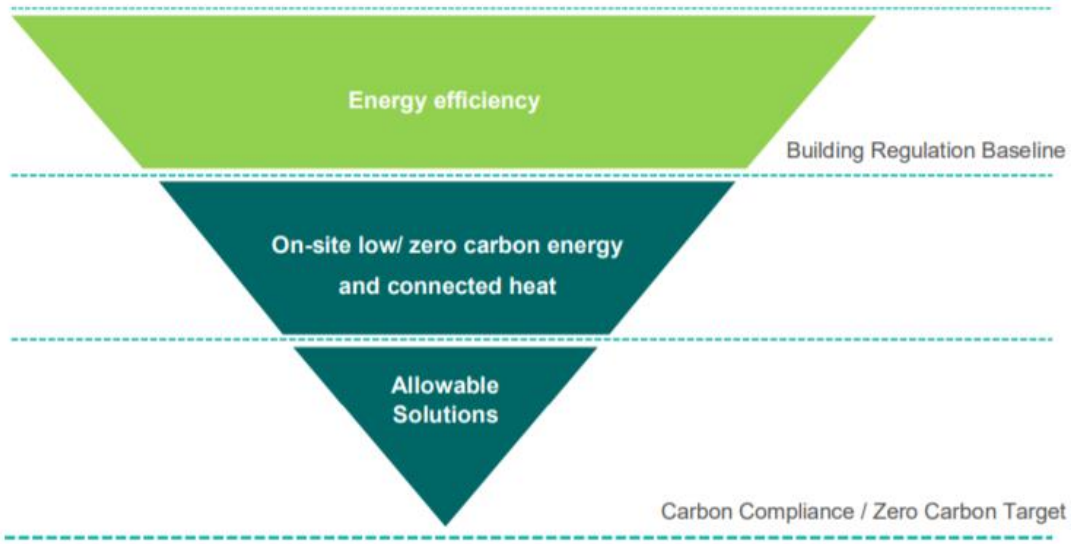
In late 2019, Worthing declared a climate emergency and introduced the interim checklist in 2020, the contents of which include:-

Development (excluding householder applications apart from household extensions above 100 sqm) should be designed in a way that meet the following criteria as far as is feasible and viable:

- Major development should follow the energy hierarchy to contribute to achieving zero carbon emissions, which in order of importance seeks to 1) minimise energy demand, 2) maximise energy efficiency, 3) utilise renewable energy, 4) utilise low carbon energy, 5) and only then use other energy sources. This should be demonstrated in the submitted sustainability statement.
- Major development incorporating non residential floorspace is required to achieve at least BREEAM 'Very Good' standard.
- Major developments are expected to connect to an existing low carbon heat or energy network, or provide capacity to connect to any proposed future networks.
- Where these are not available, consideration should be given to the feasibility of creating a new network. This should be set out within the submitted sustainability statement.
- Major development should follow the waste hierarchy to minimise, reuse, and recycle waste during the construction phase and incorporate facilities that enable and encourage high rates of recycling and re-use of waste and materials. This should be demonstrated in the submitted sustainability statement.
- Major developments should promote walking, cycling and public transport to reduce reliance on the private car and enable car free lifestyles by providing attractive, safe and well connected walkable and cyclable neighbourhoods. All developments should provide cycle parking/storage.

2.2 The Energy Hierarchy

In order to assess the energy performance of the proposed industrial development, this report will adopt the principles of the energy hierarchy as set out in Worthing Planning and Climate Change Interim Checklist – to reduce energy consumption via the promotion of energy efficient design and the use low carbon or renewable technologies, prior to resorting to other energy sources.



3.0 Baseline energy results

When assessing the energy efficiency credentials of a new development against the energy hierarchy, the first stage of the Energy Hierarchy is to consider the baseline energy model.

The following section details how the baseline energy requirements for the overall development are established for each element.

3.1 Commercial Space

The energy requirements for space heating, water heating and ventilation within the proposed new build commercial spaces have been calculated using the National Calculation Method (NCM) in line with AD L2A of the Building Regulations 2013 and the Non-Domestic Heating Compliance Guide.

The Government approved assessment methodology is the Simplified Building Energy Model (SBEM), eb7 Sustainability Ltd use an advanced modelling software - Design Builder - which enables accurate SBEM models to be created, as well as heat loss and cooling load calculations and full M&E design to be undertaken.

To consider the subject building performance against The Building Regulations (Approved Document L2A) SBEM first creates the notional reference building, the characteristics of which are defined in within NCM and the minimum fabric values and fixed services efficiencies set down by AD L2A and the Non-domestic Compliance Guide.

This creates the target Emission Rate (TER) and should be considered as stage 'zero' of the energy hierarchy as described earlier and sets the benchmark for the worst performing, but legally permissible, development against which, SBEM assesses the "actual" design, fabric values, heating lighting and ventilation systems and creates the Building Emissions Rate (BER).

The baseline regulated emission rates (as calculated above) are set out in Table 1 below, before then applying the energy hierarchy.

Table 1 – Baseline energy consumption and CO2 emissions

Unit	Baseline Emission Rate (regulated energy use) Kg/sqm	Total baseline regulated emissions Kg
Dominion Way	12.40	31310.00
Total		**31,310**

The baseline BRUKL TER outputs are attached at **Appendix A**

4.0 Design for Energy Efficiency

The first step in the 'Energy Hierarchy' requests that buildings be designed to use improved energy efficiency measures – Be Lean. This will reduce demand for heating, cooling, and lighting, and therefore reduce operational costs while also minimizing associated carbon dioxide emissions.

This section sets out the measures included within the design of the development, to reduce the demand for energy, both gas and electricity (not including energy from renewable sources). The table at the end of this section details the amount of energy used and CO_2 produced by the building after the energy efficiency measures have been included. From these figures the overall reduction in CO_2 emissions, as a result of passive design measures, can be calculated. To achieve reductions in energy demand the following measures have been included within the design and specification of the buildings:

4.1 Passive Design

The national Planning Policy Framework also emphasises the need to take account of *climate change over the longer term and plan new developments to avoid increased* vulnerability to the range of impacts arising from climate change. The UK Climate Impacts Programme 2009 projections suggest that by the 2080's the UK is likely to experience summer temperatures that are up to 4.2°C higher than they are today."

Accordingly, designers are to ensure buildings are designed and constructed to be comfortable in higher temperatures, without resorting to energy intensive air conditioning.

1. **minimise internal heat generation through energy efficient design**

This will take the form of high levels of insulation – well insulated building keep out the heat in summer, and well as retaining the heat in winter

2. **reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and wall**

The commercial spaces are orientated on an east-west format with only limited glazing to the internal area.

Any glazing or rooflights will have a high performance in terms of solar protection to further reduce the potential for overheating.

3. **manage the heat within the building through exposed internal thermal mass and high ceilings**

Floor to ceiling heights within the industrial units will be in excess of 5m, enabling plenty of opportunity for the stack effect to dissipate warmth within the units.

4. **passive ventilation**

As a matter of general practice is such industrial units, the main vehicle doors are generally left open during warm periods when the buildings is occupied, enabling huge volumes of external air to circulate within the units, negating the need for mechanical ventilation.

5. **mechanical ventilation**

The passive ventilation and cooling strategy as out lined above; it is considered acceptable for occupants to naturally ventilate their units via opening windows and doors.

4.2 Heating & DHW system

To consider the "Energy Efficient" design, this report must recognise that the units will be a shell finish, however, it will assume heating in the main workshop areas.

All units will be provided with a capped off gas supply to enable efficient gas fired heating solutions as part of any tenant fit outs.

Accordingly, it is assumed that the heating system considered for the development will consist of gas LTHW heating to storage and WC areas, with gas radiant heating to the workshop areas.

The heaters will operate at circa 92% combustion efficiency.

Domestic hot water will be supplied via localised point of use water heaters; the most efficient solution for low hot water demand commercial spaces.

4.3 Fabric heat loss

Insulation measures will be utilised to ensure the calculated u values exceed the Building regulations minima, with specific guidance taken from the design team:-

- Wall constructions will be of an insulated cladding achieving a u-value at 0.25W/m^2k.
- New roof structures and will be of similar materials and a u-value of 0.18W/m^2k will be targeted.
- New floor slabs will be insulated to meet u values at circa 0.14W/m^2k subject to individual building P/A ratios.

Glazing

- New glazing for windows and rooflights will have area weighted average U-Values of 1.6W/m^2K or better.
- The twin skinned rooflight glazing will be at 1.6W/m^2K.

Air Tightness

- The new build dwellings will be tested for air tightness with a target value of 5m^3/hr/m^2 in line for best practice for naturally ventilated units.

4.4 Ventilation

The natural ventilation strategy for the commercial units has been detailed under 4.1 Passive Design.

In order to progress this report through the Energy Hierarchy, this report will continue to assume this as the case.

4.5 Lighting and appliances

The commercial development will incorporate high efficiency light fittings utilising LED lamps with an efficacy at minimum 90lm/w and will have PIR controls in toilets.

The LED highbay lighting in the main workshop areas will meet a minimum of 120l/cw, as well as having photocell controls to minimise daytime/unnecessary use.

The use of LED lighting will also minimise the internal gains commonly associated with tungsten and fluorescent lighting systems as noted under 4.1 above.

4.6 Energy efficiency results

The above data has been used to update the SBEM models, the Building Emission Rate outputs of which are attached at **Appendix B.** The following Table 2 shows the overall emissions from the building.

Table 2 – "Efficient" energy consumption and CO2 emissions

Unit	Building Emission Rate (regulated energy use) Kg/sqm	Total regulated emissions Kg
Dominion Way	12.20	30805.00
Total		**30,805**

The results show that the energy efficiency measures introduced have resulted in the reduction in total regulated CO_2 emissions from the development of **1.61%** and in addition, the outputs at **Appendix B,** clearly demonstrate that Building Regulations Part L 2013 compliance has been achieved.

5.0 Supplying Energy Efficiently

The second stage in the 'Energy Hierarchy' is to ensure efficient and low carbon energy supply – Be Clean. In particular, this concerns provision of decentralised energy where practical and appropriate.

5.1 Community Heating/Combined Heat and Power (CHP)

Firstly, this report must consider the availability of heat networks in the project site area.

Worthing's Climate emergency policies confirm that:-

- Major developments are expected to connect to an existing low carbon heat or energy network, or provide capacity to connect to any proposed future networks.
- Where these are not available, consideration should be given to the feasibility of creating a new network. This should be set out within the submitted sustainability statement.

The remote location of the already established Dominion Way estate to the east side of Worthing suggest that a district energy network is unlikely to service the area in the foreseeable future.

In the medium term, the project is also required to consider the use of on-site community heating/CHP.

5.2 On-site CHP/District Heating

A community heating network comprises a series of insulated pipes used to deliver heat, in the form of hot water or steam, to a number of different locations or dwellings. They range from small, providing heat to a house and a couple of holiday cottages for example, to large scale systems supplying housing estates or blocks of flats.

The heat production facility for a DH scheme is generally considered to include heat only boilers (HOB) and/or the production of both electricity and heat i.e. CHP.

CHP systems are essentially biomass or fossil fuel fired electricity generators that use the heat by-product to provide space and water heating. The electricity generated can be used directly within the host buildings or sold to electricity suppliers on the national grid.

CHP is, as a rule of thumb, is only operated as a base load as, depending on the technology, it may be difficult and/or inefficient to operate according to daily variations in demand. In a well-designed district heating network heat from CHP will provide between 60% and 80% of the annual baseline heat (heating and hot water) requirement with heat-only boiler plants providing the peak load and back-up. To maximise efficiency of the engine it needs to run for at least 17 hours a day; therefore, the heat load needs to be present for this period.

Clearly, as a large scale development opportunity, there is the potential to introduce the potential for CHP.

However, we must also consider the net carbon benefits from such a system as the de-carbonisation of national grid dilutes the benefits obtained from the higher efficiency of larger-scale CHP led system.

Reference is made to the latest CIBSE Symposium on the topic; "An operational lifetime assessment of the carbon performance of gas fired CHP led district heating" (2016). This paper sets out a calculation methodology to determine the greenhouse gas emissions associated with district heat networks which use gas fired CHP as a heat source.

Currently, Part L calculations and CHP emissions savings are based on the grid based emission rate taken from the SAP 2012 3-year average - 519g/kWhCO2; SAP 2012 introduced a 15-year average at 381g/kWhCO2 to assist designers considering the longer term impacts.

Such a difference will markedly affect the relative calculated performance of a gas CHP engine versus a gas boiler, particularly if any DH network losses are removed from the equation through the use of localised boilers.

The CIBSE paper further advises that "Using a typical good practice assumption of 40% thermal efficiency of the CHP, the threshold for net benefit is a grid carbon factor of around 338 gCO2/kWh. Below that threshold, CHP is found to be worse than a gas boiler and grid electricity."

DECC provides data for treating energy and emissions in their guidance; this provides projections of grid emissions factors over the next 85 years. With the rapid and recent introduction of renewable technologies to the grid – wind power and PV - DECC's "Green Book" guidance projects that grid carbon intensity will reach 338 gCO2/kWh by 2017/18 and will reach 300gCO_2/kWh by 2018/19.

SAP10 data, to be introduced in 2020 uses a figure of 233 gCO_2/kWh.

So it can be surmised, that by the time an CHP led DH network at Dominion Way project site has reached maturity in 2 or 3 years, the carbon benefits will already have been lost

Finally, we must consider the benefits for a localised heat only network for the new development.

Again we can refer back to the aforementioned CIBSE Symposium which readily predicted up to 15% losses in localised community schemes; so given the highly unpredictable occupation levels, the potential limited demand for heating and hot water and the limited opportunity to connect to a DEN in the future – this option is also dismissed in favour of localised systems.

6.0 Renewable Energy Options

The final element of the 'Energy Hierarchy' requires development proposals should provide a reduction in expected carbon dioxide emissions through the use of on-site renewable energy generation, where feasible – Be Green.

This is further supported by Worthing's local plan

Renewable energy can be defined as energy taken from naturally occurring or renewable sources, such as sunlight, wind, wave's tides, geothermal etc. Harnessing these energy sources can involve a direct use of natural energy, such as solar water heating panels, or it can be a more indirect process, such as the use of Biofuels produced from plants, which have harnessed and embodied the suns energy through photosynthesis.

The energy efficiency measures and the sourcing the energy efficiently outlined above have the most significant impact on the heating and hot water energy requirements for the development, and the associated reduction in energy consumption.

This section then sets out the feasibility of implementing different energy technologies in consideration of: -

- Potential for Carbon savings
- Capital costs
- Running costs
- Payback period as a result of energy saved/Government incentives
- Maturity/availability of technology
- Reliability of the technology and need for back up or alternative systems.

6.1 Government incentives

6.1.1 Smart Export Guarantee (SEG)

Introduced in 2020, the SEG will enable solar photovoltaic (PV), wind, hydro and anaerobic digestion (AD) installations up to 5MW and micro-combined heat and power (micro-CHP) up to 50kW will be able to receive an export tariff under the policy.

The SEG is a market-led initiative, requiring electricity supply licensees to offer export tariffs to eligible generators. Suppliers are free to set their own SEG compliant tariff price (provided it is above zero pence at all times) and decide how their tariffs work.

Installation owners are able to shop around and select the Licensee of their choice based upon an offer of the most appropriate tariff.

Payment are made against metered exports only.

6.1.2 Renewable Heat Incentive

The Renewable Heat Incentive (RHI) was formally withdrawn for non-domestic application in March 2021.

6.2 Wind turbines

Wind turbines come in two main types'- horizontal axis and vertical axis. The more traditional horizontal axis systems rotate around the central pivot to face into the wind, whilst vertical axis systems work with wind from all directions.

The potential application of wind energy technologies at a particular site is dependent upon a variety of factors. But mainly these are: -

- Wind speed
- Wind turbulence
- Visual impact
- Noise impact
- Impact upon ecology

The availability and consistency of wind in urban environments is largely dependent upon the proximity, scale and orientation of surrounding obstructions.

The proposed site is clearly located in relatively built up area surrounded by other industrial units - where any wind turbine would need to be considerably above these construction; such a structure is unlikely to be acceptable in this location.

6.3 Solar Energy

The proposed development has areas of roof that could accommodate solar panels orientated to the south.

In general, the roofs will have an unrestricted aspect, so there is scope therefore to site solar photovoltaic (PV) or water heating equipment at roof level.

6.3.1 Solar water heating

Solar water heating panels come in two main types; flat plate collectors and evacuated tubes. Flat plate collectors feed water, or other types of fluid used specifically to carry heat, through a roof mounted collector and into a hot water storage tank. Evacuated tube collectors are slightly more advanced as they employ sealed vacuum tubes, which capture and harness the heat more effectively.

Both collector types can capture heat whether the sky is overcast or clear. Depending on location, approximately 900–1100 kWh of solar energy falls on each m^2 of unshaded UK roof surface annually. The usable energy output per m^2 of solar panel as a result of this amount of insolation ranges from between 380 – 550 kWh/yr.

Solar hot water systems are of course, displacing gas for DHW provision (as noted above), and due to the low cost of gas as a source of energy, solar thermal systems tend to have a very poor pay back model unless there is a reliable and consultant demand for hot water; a low demand commercial scheme simply does not provide this.

Accordingly, given the roof space available and the strategy to off-set the electrical use, solar PV may be a stronger candidate (see below) and offer a greater return in terms of a return on investment.

Accordingly, solar thermal would not be the optimum solution for the proposed development.

6.3.2 Photovoltaics (PV)

A 1kWp (1 kilowatt peak) system in the UK could be expected to produce between 790-800kWh of electricity per year based upon a south east orientation according to SAP2005 methodology used by the Microgeneration Certification Scheme (MCS). The figure given in the London Renewables Toolkit is 783 kWh per year for a development in London.

PV panels also offer a much more attractive return from the savings in electrical consumption.

Accordingly, the design team are proposing the use of PV as the preferred renewable technology to reduce overall emission for the development; 2 panels per unit.

Accordingly, the PV installation would take the form of 34 x 0.33kWp panels across all of the blocks

The above arrays would generate some 10,500kWh/annum, offsetting over 5.5tonnes of CO_2 emissions.

6.4 Biomass heating

Biomass is a term given to fuel derived directly from biological sources for example rapeseed oil, wood chip/pellets or gas from anaerobic digestion. It can only be considered as a renewable energy source if the carbon dioxide emitted from burning the fuel is later recaptured in reproducing the fuel source (i.e. trees that are grown to become wood fuel, capture carbon as they grow).

Biomass heating systems require space to site a boiler and fuel hopper along with a supply of fuel – which can be very bulky items. There also needs to be a local source of biomass fuel that can be delivered on a regular basis.

Additionally, a boiler of this type would replace the need for a conventional gas boilers and therefore offset all the gas energy typically used for space and water heating. However, biomass releases high levels of NO_x emissions and particulate matters, as well as other pollutants and would therefore have to be considered carefully against the assumed the potential impact, being so close to the Worthing bypass.

6.6 Ground source heat pump

All heat pump technologies utilise electricity as the primary fuel source – in this case displacing gas, as such, the overall reduction in emissions when using this technology can be less effective when opposed to a technology that is actually displacing electricity.

Ground source heating or cooling requires a source of consistent ground temperature, which could be a vertical borehole or a spread of pipework loops and a 'heat pump'. The system uses a loop of fluid to collect the more constant temperature in the ground and transport it to a heat pump. In a cooling system this principle works in reverse and the heat is distributed into the ground.

The heat pump then generates increased temperatures by 'condensing' the heat taken from the ground, producing hot water temperatures in the region of 45°C. This water can then be used as pre-heated water for a conventional boiler or to provide space heating with an under floor heating system.

The use of a ground source heating/cooling system will therefore require:

- Vertical borehole or ground loop
- Use of under floor heating
- Space for heat pump unit

Clearly, there is insufficient land area to install low level collector loops or deep bore collectors; additionally the capital costs associated with GSHP's, along with the technical & risk issues associated with having heat collection devices below ground – it is considered that a more "mainstream" solution would more appropriate.

6.7 Air source heat pump

Air source heating or cooling also employs the principle of a heat pump, but is the more "mainstream" solution with a proven track record heating and cooling offices, restaurants and public buildings for many decades - this time either, upgrading the ambient external air temperature to provide higher temperatures for water and space heating, or taking warmth from within the building and dissipating it to the outdoor air.

It must be remembered that heat pumps utilise grid based electricity and the associated emissions, so that the actual reduction in emissions can be limited, but this is a technology that is progressing rapidly with the development of variable refrigerant flow systems much improving efficiencies.

The accepted reduction in carbon emission from the UK electricity grid also supports the use of heat pump systems.

Assuming a seasonal system efficiency of 320% (Coefficient of Performance of 3.2) and that the air source heat pump will replace 100% of the space heating/hot water demand, then the system would reduce the overall CO_2 emissions by approximately 17%. The table below demonstrates, on the assumption of a demand of 1000kWh/year for heating and hot water.

Table 3 – ASHP Performance

Type of Array	Energy Consumption (kWh/yr.)	Emission factor ($kgCO_2/kWh$)	Total CO_2 emissions (kg/annum)
90% efficient gas boiler	11111	0.216	2400
320% efficient ASHP	2813	0.519	1460
100% efficient immersion (back-up)	1000	0.519	519

A theoretical carbon saving of 17.5%

However, heat pumps deliver low grade heat best suited to underfloor heating to well insulated properties.

The Dominion Way project consists of workshop premises, storage areas and have vehicle access doors often allowing in high volumes of external air - so the gas fired heating solutions currently proposed are better able to overcome these heat losses.

6.8 Final Emissions Calculation

Given the outcome of the feasibility study above, the developer is proposing the use of the aforementioned 0.33kWp (2 panel) PV array per unit thereby utilising available roof space across the all the proposed buildings in the scheme.

The final table – Table 4 – assumes that the PV array is to be installed as noted above and the final outputs from the BRUKL models are attached at **Appendix C.**

Table 4 – "Green" energy consumption and CO2 emissions

Unit	Building Emission Rate (regulated energy use) Kg/sqm	Total baseline regulated emissions Kg
Dominion Way	10.30	26007.50
Total		**26,008**

The data at Table 4 confirms that overall emissions have been reduced by **16.93%** over and above the baseline model, with a **15.57%** reduction in emissions directly from the use of energy generating and renewable technologies, i.e. over and above the energy efficient model.

7.0 Sustainable Design & Construction

The sustainable assessment criteria as developed by BRE are utilised within this report to confirm that the development meets with the requirements of the Worthing's sustainability policies.

Accordingly, the applicants will actively introduce the following elements to the development.

The project will be formally assessed against the BRE's environmental assessment method (BREEAM) and will achieve a Very Good standard in order to comply with Worthing's Climate Emergency Checklist.

A pre-assessment estimator/report is attached at **Appendix D** to demonstrate how this can be achieved.

Materials

Construction techniques will be considered against the BRE Green Guide to ensure that, where practical, the most environmentally friendly construction techniques are deployed.

Construction materials will be sourced from suppliers capable of demonstrating a culture of responsible sourcing via environmental management certification, such as BES6001

Insulation materials will be selected that demonstrate the use of blowing agents with a low global warming potential, specifically, a rating of 5 or less. Additionally, all insulants used will demonstrate responsible sourcing of material and key processes.

The principle contractor with be required to produce a site waste management plan and sustainable procure plan, in line with BREEAM requirements – this will include a pre-demolition audit to identify demolition materials to reuse on-site or salvage appropriate materials to enable their reuse or recycling off-site. The procurement plan will follow the waste hierarchy Reduce; Reuse & Recycle.

A Site Waste Management Plan (SWMP) will be developed prior to commencement of development stage to inform the adoption of good practice waste minimisation in design. This will set targets to minimise the generation of non-hazardous construction waste using the sustainable procurement plan to avoid over-ordering and to use just-in-time delivery policies.

The developer will also maximise the use of recycled and secondary aggregates.

Waste and recycling – the plans show appropriate internal and external storage space will be provided to ensure that residents can sort, store and dispose of waste and recyclable materials in line with Worthing's collection policies.

Pollution

The contractor will also monitor the use of energy and water use during the construction phase and incorporate best site practices to reduce the potential for air (dust) and ground water pollution.

The proposed heating system will use low NOx emission gas appliances.

The main contractor will be required to register the site with the Considerate Constructors Scheme and achieve a best practice score of 25 or more.

Energy

The development will incorporate energy efficiency measures and renewables technologies as noted in the main report above.

This will be further enhanced by the installation of comprehensive sub-metering throughout, enabling occupants to accurately assess their energy usage and thereby, manage it.

Cycle storage spaces are to be provided to reduce reliance of journeys via private cars, forming part of an overriding sustainable transport plan.

Water

The development minimise water use as far as practicable by incorporating appropriate water efficiency and water recycling measures.

The WCs and handwash areas in the new development will employ dual flush toilets and low flow basin taps to reduce wholesome water use.

SuDs – a flood risk assessment will be produced to consider and ensure that the proposed development is resilient to risk of flooding from ALL sources, and to ensure that surface water run-off is no greater than was associated with the site pre-development - using SuDs techniques; permeable surfaces, infiltration and attenuation. (See report under separate cover)

8.0 Conclusions

This report has detailed the baseline energy requirements for the proposed development, the reduction in energy demand as a result of energy efficiency measures and the potential to achieve further CO_2 reductions using renewable energy technologies.

The baseline results have shown that if the development was built to a standard to meet only the minimum requirements of current building regulations, the total amount of CO_2 emissions would be **31,310Kg/year**.

Following the introduction of passive energy efficiency measures into the development, as detailed in section 4, the total amount of CO_2 emissions would be reduced to **30,805Kg/year**, a reduction of **1.61%.**

Under the requirement to reduce CO_2 emissions across the development using renewable or low-carbon energy sources, this report has considered the feasibility of the following technologies:

- Wind turbines
- Solar hot water
- Photovoltaic systems
- Biomass heating
- CHP (Combined heat and power)
- Ground & Air source heating

The results of the assessment of suitable technologies relative to the nature, locations and type of development suggest that the most suitable solutions to meeting reduction in CO_2 emissions would be via the use of roof mounted photovoltaic (PV) panels.

The developer has indicated the installation of a 0.66kWp system per unit consisting of 2 x 330w panels mounted on the pitched roofs for each unit

This has been used in the BRUKL models (reproduced at **Appendix C**) for the development which have also been detailed above in Table 4, which show a final gross emission level of **26,008Kg/year**, representing a total reduction in emission over the baseline model of **16.93%.**

Appendix A

Baseline/Regulated Energy Use:-

BRUKL Target Emission Rate Outputs

Appendix B

Energy Efficient Design:-

BRUKL Building Emission Rate Outputs

Appendix C

Generating energy on-site:-

BRUKL Building Emission Rate Outputs

Appendix D

BREEAM New Construction 2018

Pre-assessment Estimator

Dominion Way

Pre-Assessment Estimator Tracker Document

Prepared for:

Glenmore Holdings Ltd



Dominion Way | **BREEAM New Construction 2018** | **TARGET Very Good (55%)** | **56.40**

Commercial | Industrial | Industrial unit – process, manufacturing or vehicle servicing

BREEAM NEW CONSTRUCTION 2018

Shell only

Category	Assessment Issues	Compliance Requirements	BREEAM User Guide	Definite	Possible	Not Targeting	Max Credits Available	Design Stage (Assessor Notes)	Action/Responsible person	Tracker
-	-	-	-	-	-	-	-	-	-	-
Management **Man 1** - **Project brief and Design**	**Project delivery planning** (1 credit)	1. Prior to completion of the Concept Design, the project delivery stakeholders to identify and define for each key phase of project delivery: 1.a Roles 1.b Responsibilities 1.c Contributions. 2. Consider each one of the following items when defining roles, responsibilities and contributions for each key phase of the project: 2.a End user requirements 2.b Aims of the design and design strategy 2.c Particular installation and construction requirements or limitations 2.d Occupiers' budget and technical expertise in maintaining any proposed systems 2.e Maintainability and adaptability of the proposals 2.f Operational energy 2.g Requirements for the production of project and end user documentation 2.h Requirements for commissioning, training and aftercare support. 3. The project team demonstrates how the project delivery stakeholders' contributions and the consultation process outcomes influence the following: 3.a Initial Project Brief 3.b Project Execution Plan 3.c Communication Strategy 3.d Concept Design.	1 to 3	1			1	Stakeholder consultation has taken place during early design stages, defining roles and responsibilities of the project team and demonstrating how the consultation process has influenced the overall design Supporting evidence to include: 1. Construction Programme 2. Responsibilities Schedule 3. Meeting minutes of stakeholder consultation activities from concept stage to detailed design stage 4. List of stakeholders involved 5. Design & Access Statement	Project Team	NOT Set Up
	Stakeholder Consultation (Interested Parties) (1 credit)	4. Prior to completion of the Concept Design, the design team consult with all interested parties on matters that cover the minimum consultation content. 5. Demonstrate how the stakeholder contributions and consultation exercise outcomes influence the Initial Project Brief and Concept Design. 6. Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), all interested parties give and receive consultation feedback.	4 to 6	1			1	Relevant interested parties (e.g. intended building users, FM staff, representative consultation group from existing community, existing partnerships and networks) have been consulted by the design team and covers a minimum consultation content - See section details for definiton of interested parties Supporting evidence to include: 1. Statement of community involvement 2. Public consultation report 3. Documentation demonstrating consultation activities with existing partnerships and networks having experience on projects with same building type	Project Team	NOT Set Up
	BREEAM AP (Concept Design) (1 credit)	**Prerequisite**: 8. The project team, including the client, formally agree strategic performance targets early in the design process 9. Involve a BREEAM AP in the project at an appropriate time and level to: 9.a Work with the project team, including the client, to consider the links between BREEAM issues and assist them in maximising the project's overall performance against BREEAM, from their appointment and throughout Concept Design. 9.b Monitor progress against the performance targets agreed throughout all stages after their appointment where decisions critically impact BREEAM performance. 9.c Proactively identify risks and opportunities related to the achievement of the targets agreed under criterion 8. 9.d Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets. 9.e Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.	8,9			1	1	Early stage involvement of BREEAM AP to provide appropriate advise for successful delivery of agreed performance targets and monitoring progress from concept design to developed design stages Supporting evidence to include: 1. The AP appointment letter 2. Meeting notes/ recorded correspondence that can demonstrate BREEAM issues are a regular agenda item and AP attendance 3. The AP progress report (for each work stage)	BREEAM AP	NOT Set Up
	BREEAM AP (Developed Design) (1 credit)	10. Criteria 8 and 9 above are achieved. 11. Involve the BREEAM AP in the project at an appropriate time and level to: 11.a Work with the project team, including the client, to consider the links between BREEAM issues and to assist them in maximising the project's overall performance against BREEAM throughout Developed Design. 11.b Monitor progress against the performance targets agreed under throughout all stages where decisions critically impact the specification and tendering process and the BREEAM performance. 11.c Proactively identify risks and opportunities related to the achievement of the targets. 11.d Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets. 11.e Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team.	10,11			1	1	Early stage involvement of BREEAM AP to provide appropriate advise for successful delivery of agreed performance targets and monitoring progress from concept design to developed design stages Supporting evidence to include: 1. The AP appointment letter 2. Meeting notes/ recorded correspondence that can demonstrate BREEAM issues are a regular agenda item and AP attendance 3. The AP progress report (for each work stage)	BREEAM AP	NOT Set Up
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Man 2 - Life cycle cost and service life planning ?	**Elemental Life Cycle Costing** (2 credits)	1. A competent person carries out an outline, entire asset LCC plan at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design options appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865: 2008(6). 2. The elemental LCC plan: 2.a Provides an indication of future replacement costs over a period of analysis as required by the client (e.g. 20, 30, 50 or 60 years); 2.b Includes service life, maintenance and operation cost estimates. 3. Demonstrate, using appropriate examples provided by the design team, how the elemental LCC plan has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.	1 to 3 ?			2	2	The developer is to commission Elemental Life Cycle Costing in accordance with relevant standards and demonstrate how the LCC plan has influenced the building and systems design and specification -See section details for defintion of Elemental LCC Supporting evidence to include: 1. Elemental level LCC Plan	Contractor	NOT Set Up
	Component level LCC plan (1 credit)	4. A competent person develops a component level LCC options appraisal by the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865: 2008. The component level LCC includes : 4.a Envelope, e.g. cladding, windows, or roofing 4.b Services, e.g. heat source, cooling source, or controls 4.c Finishes, e.g. walls, floors or ceilings 4.d External spaces, e.g. alternative hard landscaping, boundary protection. 5. Demonstrate, using appropriate examples provided by the design team, how the component level LCC options appraisal has been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.	4,5 ?			1	1	The developer is to commission Component Life Cycle Costing in accordance with relevant standards and demonstrate how the LCC plan has influenced the building and systems design and specification -See section details for defintion of Component LCC Supporting evidence to include: 1. Component level LCC options appraisal plan	Contractor	NOT Set Up
	Capital cost reporting (1 credit)	6. Report the capital cost for the building in pounds per square metre of gross internal floor area (£k/ m²) as part of the submission to BRE	6	1			1	The developer will publish predicted capital cost at design stage in pounds per square metre of gross internal floor area (£k/ m²) Supporting evidence to include: 1. Letter of commitment by developer - See draft letter	Client	NOT Set Up
										-
Man 3 - Responsible Construction Practices Minimum Standards- One credit	**Prerequisite**	1. All timber and timber-based products used during the construction process of the project are 'legally harvested and traded timber'	1	y			0	Ensure all timber and timber based products will be legally sourced in line with FCS/PEFC including site timber Supporting evidence to include: 1. Letter of commitment by contractor - See draft letter	Contractor	NOT Set Up
	Environmental management - EMS System (1 credit)	3. All parties who at any stage manage the construction site (e.g. the principal contractor, the demolition contractor) operate an EMS covering their main operations. The EMS must: 3.a Be third party certified, to ISO 14001: 2015(10), EMAS (EU Eco Management and Audit Scheme) or equivalent standard; OR 3.b In compliance with BS 8555: 2016(11) have: 3.b.i Appropriate structure 3.b.ii Reached implementation stage phase four 'implementation and operation of the environmental management system' 3.b.iii Completed defined phase audits one to four. 4. All parties who at any point manage the construction site (e.g. the principal contractor, the demolition contractor) implement best practice pollution prevention policies and procedures on site in accordance with Working at construction and demolition sites: PPG6, Pollution Prevention Guidelines(12).	3,4	1			1	Contractor to have ISO 14001 accreditation in place and implement best practice pollution and prevention policies in line with the required standards Supporting evidence to include: 1. Letter of commitment by contractor - See draft letter	Contractor	NOT Set Up
	BREEAM AP (Site) (1 credit)	**Prerequisite**: 5. The client and the contractor formally agree performance targets. 6. Involve a BREEAM AP in the project at an appropriate time and level to: 6.a Work with the project team, including the client, to consider the links between BREEAM issues and assist them in achieving and if possible going beyond the design intent, to maximise the project's performance against the agreed performance targets throughout the Construction, Handover and Close Out stages. 6.b Monitor construction progress against the performance targets agreed throughout all stages where decisions critically impact BREEAM performance. 6.c Proactively identify risks and opportunities related to the procurement and construction process and the achievement of the targets agreed. 6.d Provide feedback to the constructors and the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets. 6.e Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team and the provision to the assessor.	5,6	1			1	BREEAM AP involved throughout Construction, Handover and Close Out stages to monitor construction progress against the agreed performance targets and providing relevant feedback to the project team Supporting evidence to include: 1. The AP appointment letter 2. Meeting notes/ recorded correspondence that can demonstrate BREEAM issues are a regular agenda item and AP attendance 3. The AP progress report (for each work stage)	BREEAM AP	NOT Set Up

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?	**Responsible construction management** (up to 2 credits)	The principal contractor evaluates the risks (on site and off site), plans and implements actions to minimise the identified risks including Vehicle movement, Pollution management, Tidiness, Health & Wellbeing, Security process, Training and awareness feedback, Monitoring & reporting **One credit** 7. Achieve items listed as required for one credit in Table 4.1 Responsible construction management items (Refer to Table 4.1 of the BREEAM manual) **Two credits** 8. Achieve criterion 7 above 9. Achieve six additional items in Table 4.1 Responsible construction management items (Refer to Table 4.1 of the BREEAM manual)	7 to 9	1	1		2	Principal contractor to evaluate risks from construction activities and implement suitable actions to minimise the identified risks as outlined in Table 4.1 Responsible construction management items -See Section details for Table 4.1 Supporting evidence to include: 1. Company's policy and procedure documents (including environmental management, pollution prevention, security) 2. Construction logistics plan 3. Responsibility matrix 4. Training records 5. Photographic evidence 6. Records of communication with the neighbouring community (e.g. letters, newsletters and campaigns) 7. Contracts or formal agreements – Reporting documents and logs 8. Reporting procedures 9. Records of improvements and of no complaints 10. Lessons learned	Contractor	NOT Set Up
	Monitoring of construction-site impacts (up to 2 credits)	10. Assign responsibility to an individual for monitoring, recording and reporting energy use, water consumption and transportation data (where measured) resulting from all on-site construction processes (and dedicated off-site manufacturing) throughout the build programme. To ensure the robust collection of information, this individual must have the appropriate authority and responsibility to request and access the data required. Where appointed, the BREEAM AP could perform this role	10 to 22	2			2	Principal contractor to monitor and report energy use and water consumption from on-site construction activities, as well as transport of materials and waste to and from site Supporting evidence to include: 1. Letter of commitment by contractor - See draft letter	Contractor	NOT Set Up
										-
										-
Man 4 - Commissioning and Handover **Minimum Standards- commissioning-test schedule and responsibilities AND Criterion 11 (Building User Guide)**	**Commissioning testing schedule and Responsibilities** (1 credit)	1. Prepare a schedule of commissioning and testing. The schedule identifies and includes a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services and control systems and for testing and inspecting building fabric. 2. The schedule identifies the appropriate standards for all commissioning activities to be conducted, where applicable, in accordance with Current Building Regulations, BSRIA guidelines(16), CIBSE guidelines(17), Other appropriate standards 3. Where a building management system (BMS) is specified: 3.a Carry out commissioning of air and water systems when all control devices are installed, wired and functional 3.b Include physical measurements of room temperatures, off-coil temperatures and other key parameters, as appropriate, in commissioning results 3.cThe BMS or controls installation should be running in auto with satisfactory internal conditions prior to handover 3.d All BMS schematics and graphics (if BMS is present) are fully installed and functional to user interface prior to handover 3.e Fully train the occupier or facilities team in the operation of the system. 4. Appoint an appropriate project team member to monitor and programme pre-commissioning, commissioning and testing. Where necessary include re-commissioning activities on behalf of the client. 5. The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and the main programme of works.	1 to 5				-	Not Applicable	Contractor	NOT Set Up
	Commissioning - design and preparation (1 credit)	6. Achieve criteria 1 to 5 7. During the design stage, the client or the principal contractor appoints an appropriate project team member , provided they are not involved in the general installation works for the building services systems, with responsibility for: 7.a Undertaking design reviews and giving advice on suitability for ease of commissioning. 7.b Providing commissioning management input to construction programming and during installation stages. 7.c Management of commissioning, performance testing and handover or post-handover stages. For buildings with complex building services and systems, this role needs to be carried out by a specialist commissioning manager.	6,7				-	Not Applicable	Specialist commissioning manager/Contractor	NOT Set Up
	Testing and inspecting building fabric (1 credit)	8. Achieve criteria 1 to 5 9.The commissioning and testing schedule and responsibilities credit is achieved. Complete post-construction testing and inspection to quality-assure the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths (this is through airtightness testing and a thermographic survey). A suitably qualified professional undertakes the survey and testing in accordance with the appropriate standard. 10. Rectify any defects identified during post-construction testing and inspection prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building or element as defined at the design stage.	8 to 10			1	1	Thermographic survey and air-tightness testing to be carried out in line with the appropriate standards and any defects identified to be rectified during post-construction testing and inspection Supporting evidence to include: 1. Programme of works 2. Letter of appointment of Suitably Qualified Professional	Contractor	NOT Set Up

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?	**Handover** (1 credit)	11. Prior to handover, develop two building user guides 11.a A non-technical user guide for distribution to the building occupiers. 11.b A technical user guide for the premises facilities managers. A draft copy is developed and discussed with users first (where the building occupants are known) to ensure the guide is most appropriate and useful to potential users. 12. Prepare two training schedules timed appropriately around handover and proposed occupation plans for the following users: 12.a A non-technical training schedule for the building occupiers. 12.b A technical training schedule for the premises facilities managers.	11,12				-	Not Applicable	Contractor	NOT Set Up
										-
Man 5 - Aftercare **Minimum Standards-** **One credit** **(commissioning-implementation)**	**Aftercare support** (1 credit)	1. Provide aftercare support to the building occupiers through having in place operational infrastructure and resources. 1.a A meeting between the aftercare support team or individual, and the building occupier or management team (prior to initial occupation, or as soon as possible thereafter) to: 1.a.i Introduce the aftercare support available, including the content of the building user guide (where it exists) and training schedule. 1.a.ii Present key information on the building including the design intent and how to use the building to ensure it operates as efficiently and effectively as possible. 1.b On-site facilities management training including: 1.b.i a walkabout of the building AND 1.b.ii introduction to and familiarisation with the building systems, their controls and how to operate them in accordance with the design intent and operational demands. 1.c Provide initial aftercare support for at least the first month of building occupation, e.g. weekly attendance on-site, to support building users and management (the level of frequency will depend on the complexity of the building and building operations). 1.d Provide longer term aftercare support for occupiers for at least the first 12 months from occupation, e.g. a helpline, nominated individual or other appropriate system to support building users and management. 2. Establish operational infrastructure and resources to coordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is substantially occupied. This facilitates analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and user behaviours accordingly.	1,2				-	Not Applicable	Client	NOT Set Up
	Commissioning implementation (1 credit)	3. Complete the following commissioning activities over a minimum 12-month period, once the building becomes substantially occupied: 3.a Complex systems: The specialist commissioning manager will: 3.a.i Identify changes made by the owner or operator that might have caused impaired or improved performance. 3.a.ii Test all building services under full load conditions, i.e. heating equipment in mid-winter, cooling and ventilation equipment in mid-summer and under part load conditions (spring and autumn). 3.a.iii Where applicable, carry out testing during periods of extreme (high or low) occupancy. 3.a.iv Interview building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of the systems. 3.a.v Produce monthly reports comparing sub-metered energy performance to the predicted one. 3.a.vi Identify inefficiencies and areas in need of improvement. 3.a.vii Re-commission systems (following any work needed to serve revised loads), and incorporate any revisions in operating procedures into the operations and maintenance (O&M) manuals. 3.b Simple systems (naturally ventilated): The external consultant, aftercare team or facilities manager will: 3.i Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback. 3.ii Identify deficiencies and areas in need of improvement. 3.iii Re-commission systems and incorporate any relevant revisions in operating procedures into the O&M manuals.	3				-	Not Applicable	Specialist Commissioning Manager	NOT Set Up
?	**Post occupancy evaluation** (1 credit)	4. The client or building occupier makes a commitment to carry out a post-occupancy evaluation (POE) exercise one year after initial building occupation. 5.a A review of the design intent and construction process (review of design, procurement, construction and handover processes). 5.b Feedback from a wide range of building users including facilities management on the design and environmental conditions of the building covering: 5.b.i Internal environmental conditions (light, noise, temperature, air quality) 5.b.ii Control, operation and maintenance 5.b.iii Facilities and amenities 5.b.iv Access and layout 5.b.v Energy and water consumption 5.b.vi Other relevant issues, where appropriate 6. The independent party provides a report with lessons learned to the client and building occupiers. 7. The client or building occupier commits funds to pay for the POE in advance. This requires an independent party to be appointed to carry out the POE as described in criterion 5. Evidence of the appointment of the independent party and schedule of responsibilities which fulfils the BREEAM criteria are acceptable to demonstrate compliance.	4 to 7				-	**Not Applicable**	Client	NOT Set Up
										-
SECTION CREDIT SCORE				**6.400**	**0.800**	**4.800**	**15**			

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Health & Wellbeing **Hea 01 - Visual Comfort** ?	**Control of glare from sunlight** (1 credit)	1. Identify areas at risk of glare using a glare control assessment. The glare control assessment also justifies any areas deemed not at risk of glare. 2.A glare control strategy designs out potential glare in all relevant building areas where risk has been identified. This should be achieved through building form and layout or building design measures. 3.The glare control strategy does not increase energy consumption used for lighting. This is achieved by: 3.a Maximising daylight levels in all weather, cloudy or sunny AND 3.b Ensuring the use or location of shading does not conflict with the operation of lighting control systems.	1 to 3				-	Not Applicable	Specification	NOT Set Up
	Daylighting (up to 2 credits - building type dependent)	4. Daylighting criteria have been met using either of the following options: 4a The relevant building areas meet good practice daylight factors and other criteria as outlined in Table 5.1 and Table 5.2 (Refer to Table 5.1 and Table 5.2 of the BREEAM manual) 4.b The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table 5.3 (Refer to Table 5.3 of the BREEAM manual) Additional alternative route for healthcare building types only: 4.cThe relevant building areas meet the median daylight factors and minimum daylight factors in Table 5.4 (Refer to Table 5.4 of the BREEAM manual)	Multi-Residential building		2		2	Relevant building areas to meet good practice daylight factors OR meet good practice average and minimum point daylight illuminance as outlined in Table 5.1: Minimum values of average daylight factor required, Table 5.2: Daylighting uniformity criteria and Table 5.3: Space type and illuminance requirements - See section details for Table 5.1, 5.2 & 5.3 & Defintion of relevant areas Supporting evidence to include: 1. Design drawings 2. Daylight Calculations by appropriate consultant		NOT Set Up
	View out (1 credit)	5. 95% of the floor area in 95% of spaces for each relevant building area is within 8 m of an external wall which has a window or permanent opening that provides adequate view out 6. The window/opening must be ≥ 20% of the surrounding wall area. Where the room depth is greater than 7m, compliance is only possible where the percentage of window/opening is the same as, or greater than, the values in table 1.0 of BS 82061 7. In addition, the building type criteria in Table 5.6 are applicable to view out criteria.(Refer to Table 5.6 of the BREEAM manual)	5 to 7	1			1	95% of the floor area in 95% of spaces for each relevant building area to be within 8 m of an external wall which has a window or permanent opening. Window/opening must be ≥ 20% of the surrounding wall area Supporting evidence to include: 1. Design drawings demonstrating appropriate view-out in relevant areas 2. Window Schedule		NOT Set Up
	Internal and external lighting, zoning & control (1 credit)	**Internal Lighting** 8. Internal lighting in all relevant areas of the building is designed to provide illuminance (lux) levels and colouring rendering index in accordance with the SLL Code for Lighting 2012 (33) and any other relevant industry standard. Internal lighting should be appropriate to the tasks undertaken, accounting for building user concentration and comfort levels. 9. For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7(34) sections 2.4, 2.13 to 2.15, 2.20, and 6.10 to 6.20. 9.a Limits to the luminance of the luminaires to avoid screen reflections. 9.b Any area where a surface is used to reflect light in to a space, such as uplighting, the recommendations refer to the luminance of the lit ceiling rather than the luminaire; a design team calculation is usually required to demonstrate this. 9.c Recommendations for direct lighting, ceiling illuminance, and average wall illuminance. **External Lighting** 10. All external lighting located within the construction zone is specified in accordance with BS 5489-1:2013 Code for the practice for the design of road lighting. Lighting of roads and public amenity areas (35) and BS EN 12464-2:2014 (36) Light and lighting - Lighting of work places - Part 2: Outdoor work places. External lighting should provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. 11. Where no external light fittings are specified (either separate from or mounted on the external building façade or roof), the criteria relating to external lighting do not apply and the credit can be awarded on the basis of compliance with Internal lighting criteria	8 to 12	1			1	Internal/ external lighting to be designed in accordance with the relevant standards Supporting evidence to include: 1. Internal lighting layouts and schedules 2. External lighting layouts 3. Letter of formal confirmation of compliance by M&E consultant see draft letter of commitment sent under separate cover	M&E Specification	NOT Set Up
		Zoning & Occupant Control 12. Internal lighting is zoned to allow for occupant control. Zoning is in accordance with the criteria below for relevant areas present within the building: 12.a In office areas, zones of no more than four workplaces 12.b Workstations adjacent to windows or atria and other building areas separately zoned and controlled 12.c Seminar and lecture rooms: zoned for presentation and audience areas 12.d Library spaces: separate zoning of stacks, reading and counter areas 12.e Teaching space or demonstration area 12.f Whiteboard or display screen 12.g Auditoria: zoning of seating areas, circulation space and lectern area 12.h Dining, restaurant, café areas: separate zoning of servery and seating or dining areas 12.i Retail: separate zoning of display and counter areas 12j Bar areas: separate zoning of bar and seating areas 12.k Wards or bedded areas: zoned lighting control for individual bed spaces and control for staff over groups of bed spaces 12.l Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff. Areas used for teaching, seminar or lecture purposes have lighting controls provided in accordance with CIBSE Lighting Guide 5 (37) In addition, the building type criteria in Table 5.7 (Refer to Table 5.7 of the BREEAM manual)	8 to 12					Not Applicable		-
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Hea 02 - Indoor Air Quality	**Prerequisite**	1. A site-specific indoor air quality plan has been produced and implemented. The plan must be produced no later than the end of Concept Design. The objective of the plan is to facilitate a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during occupation of the building. An indoor air quality plan has been produced considering the following: 1.a Removal of contaminant sources 1.b Dilution and control of contaminant sources 1.c Procedures for pre-occupancy flush out 1.d Third party testing and analysis 1.e Maintaining indoor air quality in-us	1				-	Not Applicable	Contractor	NOT Set Up
	Ventilation (1 credit)	2. The building has been designed to minimise the indoor concentration and recirculation of pollutants in the building as follows: 2.a Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation 2.b Ventilation pathways are designed to minimise the ingress and build-up of air pollutants inside the building 2.c Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 13779:2007 Annex A3(46). The specified filters should achieve a minimum Indoor Air Quality of IDA2 2.d Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO_2) or air quality sensors specified and: 2.d.i In mechanically ventilated buildings or spaces: sensors are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space 2.d.ii In naturally ventilated buildings or spaces: sensors either have the ability to alert the building owner or manager when CO_2 levels exceed the recommended set point, or are linked to controls with the ability to adjust the quantity of fresh air, i.e. automatic opening windows or roof vents 2.e For naturally ventilated or mixed mode buildings, the design demonstrates that the ventilation strategy provides adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates in accordance with CIBSE AM10(47).	2 to 5				-	Not Applicable	M&E Specification	NOT Set Up
	Emissions from construction products (up to 2 credits)	**One credit** 3. Three out of the five product types meet the emission limits, testing requirements and any additional requirements listed in Table 5.11 (Refer to Table 5.11 of the BREEAM manual) Where wood-based products are not one of three selected product types, all wood-based products used for internal fixtures and fittings must be tested and classified as formaldehyde E1 class as a minimum. **Two Credits** 4. All of the product types listed meet the emission limits, testing requirements and any additional requirements listed in Table 5.11 (Refer to Table 5.11 of the BREEAM manual)	6,7				-	Not Applicable	Contractor	NOT Set Up
	Post-construction indoor air quality measurement (1 credit)	5. The formaldehyde concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 100 µg/ m³ averaged over 30 minutes (World Health Organization guidelines for indoor air quality: Selected pollutants, 2010 (58) 6. The formaldehyde sampling and analysis is performed in accordance with ISO 16000-2 (59) and ISO 16000-3 (60). 7. The total volatile organic compound (TVOC) concentration in indoor air is measured post construction (but pre-occupancy) and does not exceed 500 µg/ m³over 8 hours. 8. The TVOC sampling and analysis is performed in accordance with ISO 16000-5 (61) and ISO 16000 6 (62) or ISO 16017-1 (63). 9. Where levels are found to exceed these limits, the project team confirms the measures that have, or will be, undertaken in accordance with the IAQ plan, to reduce the TVOC and formaldehyde levels to within the above limits. 10. The measured concentration levels of formaldehyde (µg/ m³) and TVOC (µg/ m³) are reported, via the BREEAM Scoring and Reporting Tool.	5 to 10				-	Not Applicable		NOT Set Up
										-
	Thermal Modelling (1 credit)	1. Thermal modelling has been carried out using software in accordance with CIBSE AM111 Building Energy and Environmental Modelling 2. The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis 3. The modelling demonstrates that: 3.a For air-conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design(79), Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement or level for the building type) 3.b For naturally ventilated buildings: 3.b.i Winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5. Or other appropriate industry standard (where this sets a higher or more appropriate requirement or level for the building type) 3.b.ii The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in either of the following standards as appropriate; CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings(80) or CIBSE TM59: Design methodology for the assessment of overheating risk in homes(81) 4. For air-conditioned buildings, the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	1 to 4				-	Not Applicable	M&E/Energy Consultant	NOT Set Up

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Hea 04 - Thermal Comfort ?	**Design for future thermal comfort** (1 credit)	5. Criteria 1 to 4 are achieved. 6. The thermal modelling demonstrates that the relevant requirements set out in criterion 3 above are achieved for a projected climate change environment. 7. Where criterion 6 above is not met, the project team demonstrates how the building has been adapted, or designed to be easily adapted in future using passive design solutions in order to subsequently meet the requirements under criterion 6 above 8. For air-conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.	5 to 8				-	Not Applicable		NOT Set Up
	Thermal zoning and controls (1 credit)	9. Criteria 1 above to 4 above are achieved. 10 The thermal modelling analysis has informed the temperature control strategy for the building and its users. 11 The strategy for proposed heating or cooling systems demonstrates that it has addressed the following: 11.a Zones within the building, and how the building services could efficiently and appropriately heat or cool these areas. For example consider the different requirements for the central core of a building compared with the external perimeter adjacent to the windows. 11.b The degree of occupant control required for these zones. This is based on discussions with the end user (or alternatively building type or use specific design guidance, case studies, feedback) and considers: 11.b.i User knowledge of building services 11.b.ii Occupancy type, patterns and room functions (and therefore appropriate level of control required) 11.b.iii How the user is likely to operate or interact with the systems, e.g. are they likely to open windows, access thermostatic radiator valves (TRV) on radiators, change air-conditioning settings etc. 11.b.iv The user expectations (this may differ in the summer and winter) and degree of individual control (i.e. obtaining the balance between occupant preferences, for example some occupants like fresh air and others dislike draughts) 11.c How the proposed systems will interact with each other (where there is more than one system) and how this may affect the thermal comfort of the building occupants 11.d The need or otherwise for an accessible building user actuated manual override for any automatic systems.	9 to 11				-	Not Applicable		NOT Set Up
										-
Hea 05 - Acoustic Performance ?	**Acoustic performance** (up to 4 credits)	**Up to three credits - Acoustic performance** For all building types, except Residential institutions (short term and long term stay), which have four credits available below. 1 .The building meets the appropriate acoustic performance standards and testing requirements defined in the relevant table below. (Refer to Table 5.14 to 5.17 of the BREEAM manual) These tables define criteria for the acoustic principles of: 1.a Sound insulation 1.b Indoor ambient noise level 1.c Room acoustics. OR 2. A suitably qualified acoustician (SQA) is appointed to define a bespoke set of performance requirements for all function areas in the building. The bespoke performance requirements use the three acoustic principles defined in criterion Hea 05 Acoustic performance - Criterion 1 above, setting out the performance requirements for each and the testing regime required. **Up to four credits - Acoustic performance for Residential institutions (short term and long term stay)** 3.The building meets the appropriate acoustic performance standards and testing requirements defined in the relevant table(Refer to Table 5.19 of the BREEAM manual) These tables define criteria for the acoustic principles of: 3.a Sound insulation 3.b Indoor ambient noise level 3.c Room acoustics.	Residential Building ?			3	3	The building meets the appropriate acoustic performance standards and testing requirements defined within the Tables 5.14 to 5.17. A suitably qualified acoustician is to be appointed to define a bespoke set of performance requirements for all function areas in the building - See Section details for Table 5.14 to 5.17 Supporting evidence to include: 1. Professional report/ study and calculations from the acoustician 2. Letter of appointment 3. Formal letter from the project team regarding commitments	Suitably Qualified Acoustician	NOT Set Up
										-
Hea 06 - Security ?	**Security of site and building** (1 credit)	1. A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent). The purpose of the SNA will be to identify attributes of the proposal, site and surroundings which may influence the approach to security for the development . 2. The SQSS develops a set of security controls and recommendations for incorporation into the proposals. Those controls and recommendations shall directly relate to the threats and assets identified in the preceding SNA. 3. The controls and recommendations shall be incorporated into proposals and implemented in the as-built development. Any deviation from those controls and recommendations shall be justified and agreed with the SQSS.	1 to 3	1			1	A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security Needs Assessment for the project and recommendations to be incorporated within the proposal Supporting evidence to include: 1. Correspondence from or a copy of the report/ feedback from the ALO/CPDA/Security Consultant confirming: - Scope of their advice/ involvement - The stage of design in which their advice was sought - Summary of their recommendations	Contractor	NOT Set Up
										-

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	Hea 07 - Safe and healthy surroundings ?	**Safe access** (1 credit)	Where external site areas form part of the assessed development the following apply: 1 . Dedicated and safe cycle paths are provided from the site entrance to any cycle storage, and connect to offsite cycle paths where applicable. 2. Dedicated and safe footpaths are provided on and around the site providing suitable links for the following: 2.a The site entrance to the building entrance, 2.b Car parks (where present) to the building entrance 2.c The building to outdoor space 2.d Connecting to off-site paths where applicable. 3 Pedestrian drop-off areas are designed off, or adjoining to, the access road and should provide direct access to other footpaths. Where vehicle delivery access and drop-off areas form part of the assessed development, the following apply: 4. Delivery areas are not accessed through general parking areas and do not cross or share the following: 4.a pedestrian and cyclist paths 4.b outside amenity areas accessible to building users and general public. 5. There is a dedicated parking or waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking. 6. Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting.	1 to 6	1			1	The project offers dedicated and safe access for pedestrians and cyclists within the project development and separate access for delivery goods with dedicated parking and waiting areas Supporting evidence to include: 1. Design drawings (including scaled site plan) highlighting all necessary compliant features and dimensions	Architects	NOT Set Up
		Outside space (1 credit)	7. There is an outside space providing building users with an external amenity area.	7	1			1	There is an outside space providing building users with an external amenity area. Supporting evidence to include: 1. Design drawings indicating appropriate outdoor space	Architects	NOT Set Up
											-
	SECTION CREDIT SCORE				**3.500**	**1.400**	**2.100**	**10**			
											-
Energy	**Ene 01 - Reduction of CO2 Emissions** Minimum Standards-Four credits ?	**Energy Performance** (up to 9 credits)	1. Calculate an Energy Performance Ratio for New Construction (EPR NC). Compare the EPR NC achieved with the benchmarks in Table 6.1 and award the corresponding number of BREEAM credits. (Refer to Table 6.1 of the BREEAM manual)	1	5	3	1	9	SBEM modelling to be undertaken and relevant outputs generated to inform the Energy Performance Ratio for New Construction (EPR NC) for the project Supporting evidence to include: 1. A copy of Building Regulations Output Document from the approved software. The output documents must be based on the 'As designed' stage of analysis	Energy Consultant	NOT Set Up
		Prediction of operational energy consumption	**Prerequisite** 2. Prior to completion of the Concept Design, relevant members of the design team hold a preliminary design workshop focusing on operational energy performance. Energy modelling and reporting 3. Undertake additional energy modelling during the design and post-construction stage to generate predicted operational energy consumption figures 4. Report predicted energy consumption targets by end use, design assumptions and input data. 5. Carry out a risk assessment to highlight any significant design, technical, and process risks that should be monitored and managed throughout the construction and commissioning process.	2 to 5				-	Not Applicable		NOT Set Up
											-
	Ene 02 - Energy Monitoring Minimum Standards-First Sub-metering credit	**Sub-metering of end-use categories** (1 credit)	1. Install energy metering systems so that at least 90% of the estimated annual energy consumption of each fuel is assigned to the end-use categories. 2. Meter the energy consumption in buildings according to the total useful floor area: 2.a If the area is greater than 1,000 m², by end-use category with an appropriate energy monitoring and management system. 2.b If the area is less than 1,000 m², use either: 2.b.i an energy monitoring and management system or 2.b.ii separate accessible energy sub-meters with pulsed or other open protocol communication outputs, for future connection to an energy monitoring and management system 3. Building users can identify the energy consuming end uses, for example through labelling or data outputs.	1 to 3				-	Not Applicable	M&E Consultant/Contractor	NOT Set Up

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?	**Sub-metering of high energy load and tenancy areas** (1 credit)	4. Monitor a significant majority of the energy supply with: 4.a An accessible energy monitoring and management system for: 4.a.i tenanted areas or 4.a.ii relevant function areas or departments in single occupancy buildings. OR 4.b Separate accessible energy sub-meters with pulsed or other open protocol communication outputs for future connection to an energy monitoring and management system for: 4.b.i tenanted areas or 4.b.ii relevant function areas or departments in single occupancy buildings. 5. Sub-meter per floor plate in large single occupancy or single-tenancy buildings with one homogeneous function, for example hotel bedrooms, offices.	4,5				-	Not Applicable		NOT Set Up
										-
Ene 03 - **External lighting** ?	**External Lighting** (1 credit)	1. No external lighting (which includes lighting on the building, at entrances and signs). OR 2 External light fittings within the construction zone with: 2.a Average initial luminous efficacy of not less than 70 luminaire lumens per circuit Watt 2.b Automatic control to prevent operation during daylight hours 2.c Presence detection in areas of intermittent pedestrian traffic.	1,2	1			1	External lighting to be low energy and controlled by time switch or daylight control and presence detection in areas of intermittent pedestrian traffic Supporting evidence to include: 1. Relevant sections/ clauses of the building specification or contract 2. Design drawings showing appropriate controls 3. Letter of commitment by M&E consultant	M&E Consultant	NOT Set Up
										-
Ene 04 - **Low Carbon Design** ?	**Passive design analysis** (1 credit)	1. Achieve the first credit Assessment scope - One credit - Thermal modelling to demonstrate that the building design delivers appropriate thermal comfort levels in occupied spaces. 2. The project team analyses the proposed building design and development during Concept Design to identify opportunities for the implementation of passive design measures. 3 Implement passive design measures to reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumption in line with the passive design analysis findings. 4. Quantify the reduced total energy demand and carbon dioxide (CO_2) emissions resulting from the passive design measures.	1 to 4	1			1	The first credit under Hea 04-Thermal modelling is achieved Thereafter, the design team have considered appropriate passive design strategies that will be incorporated into the final design and report on reduction in CO_2 emissions Supporting evidence to include: 1. The feasibilty study report 2. Results from a dynamic simulation model demonstrating the reduced energy demand and CO_2 emissions from the specified passive design measures.	Energy Consultant	NOT Set Up
	Free Cooling (1 credit)	5. Achieve the passive design analysis credit. 6. Include a free cooling analysis in the passive design analysis carried out under criterion2. 7. Identify opportunities for the implementation of free cooling solutions. 8. The building is naturally ventilated or uses any combination of the free cooling strategies listed in Free cooling analysis	5 to 8	1			1	Include a free cooling analysis in the passive design analysis carried out for the project and incorporate relevant free cooling strategies wiithin the design Supporting evidence to include: 1. The feasibilty study report 2. Results from a dynamic simulation model and other used methods demonstrating that the free cooling strategy can meet the building's cooling demand.		
	Low or zero carbon technologies (1 credit)	9. An energy specialist completes a feasibility study by the end of Concept Design. 10. Establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy sources for the building or development, based on the feasibility study. 11. Specify local LZC technologies for the building or development in line with the feasibility study recommendations. 12. Quantify the reduced regulated carbon dioxide (CO_2) emissions resulting from the feasibility study.	9 to 12	1			1	An LZC feasibility study has also been commissioned and the appropriate technology will be utilised to further reduce carbon emissions Supporting evidence to include: 1. The feasibilty study report 2. Results from a dynamic simulation model demonstrating reductions in CO_2 emissions from the specified low zero carbon technology.	Energy Consultant	NOT Set Up
										-

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Ene 05 - Energy Efficient Cold Storage ?	**Refrigeration Energy Consumption** (1 credit)	1. Design, install and commission the refrigeration system: 1.a In accordance with the Code of Conduct for carbon reduction in the refrigeration retail sector(124) and BS EN 378-2:2016(125). 1.b Using robust and tested refrigeration systems or components included on the Enhanced Capital Allowance (ECA) Energy Technology Product List (ETPL)(126) or an equivalent list 2. Commission the refrigeration plant in compliance with the commissioning criteria in BREEAM issue Man 04 Commissioning and handover	-				-	**Not Applicable**		NOT Set Up
	Indirect Greenhouse gas emissions (1 credit)	3. Achieve criteria 1 and 2. 4. Demonstrate a saving in indirect greenhouse gas emissions (CO_2-eq) from the installed refrigeration system over the course of its operational life.	-				-	**Not Applicable**		NOT Set Up
										- -
Ene 06- Energy Efficient Transportation Systems ?	**Energy consumption** (1 credit)	1. For specified lifts, escalators or moving walks (transportation types): 1.a Analyse the transportation demand and usage patterns for the building to determine the optimum number and size of lifts, escalators or moving walks 1.b Calculate the energy consumption in accordance with BS EN ISO 25745 Part 2(131) or Part 3(132) for one of the following: 1.b.i At least two types of system for each transportation type required OR 1.b.ii An arrangement of systems, for example for lift systems, hydraulic, traction, machine room-less lift (MRL) OR 1.b.iii A system strategy that is 'fit for purpose' 1.c Consider the use of regenerative drives, subject to the requirements in Regenerative drives below 1.d Specify the transportation system with the lowest energy consumption.	1 ?				-	Not Applicable	Lift Supplier	NOT Set Up
	Energy efficient feature - (2 credits)	2. Achieve criterion 1 above 3. Specify the following three energy efficient features for each lift: 3.a A standby condition for off-peak periods 3.b The lift car lighting and display lighting provides an average luminous efficacy across all fittings in the car of > 70 luminaire lumens per circuit Watt 3.c Use of a drive controller capable of variable speed, variable-voltage, and variable-frequency (VVVF) control of the drive motor. 4. Specify regenerative drives where their use is demonstrated to save energy.	2 to 4 ?				-	Not Applicable		NOT Set Up
										- -
Ene 07 - Energy Efficient Laboratory Systems	**Design Specification** (1 credit)	Engage with the client during the preparation of the initial project brief to determine occupant requirements and define laboratory performance criteria. Performance criteria will include, but not be limited to: 1.a Description of purpose 1.b Occupant or process activities 1.c Containment requirements and standards 1.d Interaction between systems 1.e Flexibility and adaptability of laboratory facilities. 1.f Any other specific requirements (for example, requirements relevant to ventilation, heating or cooling). 2. Size the services system equipment (including ventilation supply and extract) correctly 3. Demonstrate the minimised energy demand of the laboratory facilities resulting from the achievement of the defined design performance criteria. Laboratory containment devices and containment areas (criteria only applicable to buildings containing these facilities) 4 For ducted fume cupboards specified: 4.a Demonstrate that the average design air flow rate is no greater than 0.16 m^3/s per linear metre (internal width) of fume cupboard workspace 4.b Measure the volume flow rate in the exhaust duct (at the boundary of the laboratory) to take account of reductions in (inward) volume flow rate from fume cupboard leakage 4.c Demonstrate that a reduction in air flow does not compromise the defined performance criteria and does not increase the health and safety risk to future building occupants.	-				-	**Not Applicable**		NOT Set Up

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?	**Best practice energy efficient measures** (up to 4 credits)	If the laboratory area accounts for at least 10% of the total building floor area 5. Achieve criteria 1 to 4 above (or criteria 1 to 3 above where there are no ducted fume cupboards). 6. Design, specify and install laboratory plant and systems to promote energy efficiency. Demonstrate compliance with items in Table 6.4 below (Refer to Table 6.4 of the BREEAM manual) 6.a Up to 2 credits: laboratory areas) account for at least 10% (but less than 25%) of the total building floor area OR 6.b Up to 4 credits: laboratory areas account for 25% or more of the total building floor area. 7. Demonstrate by calculations or modelling that the chosen measures have a reasonably significant effect on the total energy consumption of the laboratory, i.e. 2% reduction or greater. 8. Demonstrate that the energy efficient measures specified do not compromise the defined performance criteria, and do not increase the health and safety risk to future building occupants.	-				-	**Not Applicable**		NOT Set Up
										-
										-
Ene 08 - Energy Efficient Equipment ?	**Energy Efficient Equipment** (2 credits)	1. Identify the building's unregulated energy consuming loads. Estimate their contribution to the total annual unregulated energy consumption of the building, assuming a typical or standard specification. 2. Identify the systems or processes that use a significant proportion of the total annual unregulated energy consumption of the building. 3. Demonstrate a meaningful reduction in the total annual unregulated energy consumption of the building. Table 6.5 lists some examples of significant contributors to unregulated energy consumption, and the associated criteria. If additional significant contributors, not listed in the table, will be specified, the design team should justify how a meaningful reduction will be achieved for these contributors. (Refer to Table 6.5 of the BREEAM manual)	1 to 3				-	Not Applicable	Specification	NOT Set Up
										-
										-
SECTION CREDIT SCORE				**6.577**	**2.192**	**0.731**	**13**			
										-
										-

Transport

Tra 01 - Transport assessment and travel plan ?	**Travel plan** (2 credits)	1. During the feasibility and design stages, develop a travel plan based on a site-specific travel assessment or statement. 2. The site-specific travel assessment or statement covers as a minimum: 2.a Existing travel patterns and opinions of existing building or site users towards cycling and walking, identifying constraints and opportunities, if relevant 2.b Travel patterns and transport impact of future building users 2.c Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children) 2.d Reporting of the number and type of existing accessible amenities, see Table 7.1, within 500m of the site (Refer to Table 7.1 of the BREEAM manual) 2.e Disabled access (accounting for varying levels of disability and visual impairment) 2.f Calculation of the existing public transport Accessibility Index (AI), 2.g Current facilities for cyclists 3. The travel plan includes proposals to increase or improve sustainable modes of transport and movement of people and goods during the building's operation and use, see Methodology on the next page. 4. If the occupier is known, involve them in the development of the travel plan. 5. Demonstrate that the travel plan will be implemented post construction and be supported by the building's management in operation.	1 to 5 ?	2			2	Please provide commitment to develop and publish a travel plan or statement specific to the assessed building and its users.- see draft letter. Please provide a specific travel plan, see section detail for Travel plan measures examples and table 7.1 for amenities examples to be included. Please provide design drawings demonstrating examples of design measures implemented in support of the travel plan findings.	Project Team	NOT Set Up
										-
										-
Tra 02 - Sustainable transport measures ?	**Transport options implementation** (10 credits)	**Prerequisite** 1. Achieve the Tra 01 Transport assessment and travel plan credits. 2. Identify the sustainable transport measures, listed in Table 7.4 (Refer to Table 7.1 of the BREEAM manual) 3. Award credits according to the Accessible Index (AI) of the project, and the total number of points achieved for the options implemented, listed in Table 7.3 (Refer to Table 7.3 of the BREEAM manual)	1 to 3 ?	6	2	2	10	Pre-requisite: Achieve the Tra 01 Transport assessment and travel plan credits. Cr 2-3: Team to identify sustainable transport measures proposed as outlined within Table 7.4:Sustainable public, private and active transport measures Please see section details for relevant options.	Project Team	NOT Set Up
										-
										-
SECTION CREDIT SCORE				**9.667**	**2.417**	**2.417**	**12**			

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										- -
Water **Wat 01 - Water Consumption** Minimum Standards- 1 credit	**Water Consumption** (upto 5 credits)	1. Use the BREEAM Wat 01 calculator to assess the efficiency of the domestic water-consuming components. 2. Use the standard Wat 01 method to compare the water consumption (litres/person/day) for the assessed building against a baseline performance. Award BREEAM credits based upon Table 8.1 . Where it is not possible to use the standard method, complete the assessment using the alternative Wat 01 method (Refer to Table 8.1 of the BREEAM manual) 3. If a greywater or rainwater system is specified, use its yield in L/person/day to offset potable water demand from components. 4. If a greywater or rainwater system is specified and installed: 4.a Greywater systems in compliance with BS 8525-1:2010 Greywater systems - Part 1 Code of Practice (157). 4.b Rainwater systems in compliance with BS 8515:2009+A1:2013 Rainwater harvesting systems - Code of practice(158).	1 to 4				-	Not Applicable	Specification	NOT Set Up
										- -
Wat 02 - Water Monitoring Minimum Standards-criterion 1 only ?	**Water Monitoring** (1 credit)	1. Specify a water meter on the mains water supply to each building. This includes instances where water is supplied via a borehole or other private source. 2. For water-consuming plant or building areas consuming 10% or more of the building's total water demand: 2.a Fit easily accessible sub-meters OR 2.b Install water monitoring equipment integral to the plant or area. 3 For each meter (main and sub): 3.a Install a pulsed or other open protocol communication output AND 3.b Connect it to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption. If there is no BMS system in operation at Post-Construction stage, award credits provided that the system used enables connection when the BMS becomes operational. 4. In buildings with swimming pools, or large water tanks and aquariums, fit separate sub-meters on the water supply of the above and any associated changing facilities (toilets, showers etc.) irrespective of their water consumption levels. 5. In buildings containing laboratories, fit a separate water meter on the water supply to any process or cooling loop for 'plumbed-in' laboratory process equipment, irrespective of their water consumption levels.	1 to 5 ?	1			1	Please provide Relevant section/clauses of the building specification or contract along with design drawings to confirm pulsed water meter to be installed on main supply to each building or appropriate utility monitoring and management systems with sub-meters installed for water-consuming plant or building areas consuming 10% or more of the building's total water demand. Please provide M&E consultant signed letter of commitment- see draft letter. See section detail for Sites with multiple units or buildings, No water supply to the building or unit - Extensions to existing buildings.	M&E Specification	NOT Set Up
										- -
Wat 03 - Water Leak Detection & Prevention ?	**Leak Detection Systems** (1 credit)	1. Install a leak detection system capable of detecting a major water leak: 1.a On the utilities water supply within the buildings, to detect any major leaks within the buildings AND 1.b Between the buildings and the utilities water supply, to detect any major leaks between the utilities supply and the buildings under assessment. 2. The leak detection system is: 2.a A permanent automated water leak detection system that alerts the building occupants to the leak OR an inbuilt automated diagnostic procedure for detecting leaks 2.b Activated when the flow of water passing through the water meter or data logger is at a flow rate above a pre-set maximum for a pre-set period of time. This usually involves installing a system which detects higher than normal flow rates at meters or sub-meters. It does not necessarily require a system that directly detects water leakage along part or the whole length of the water supply system 2.c Able to identify different flow and therefore leakage rates, e.g. continuous, high or low level, over set time periods. Although high and low level leakage rates are not specified, the leak detection equipment installed must have the flexibility to distinguish between different flow rates to enable it to be programmed to suit the building type and owner's or occupier's usage patterns. 2.d Programmable to suit the owner's or occupier's water consumption criteria 2.e Where applicable, designed to avoid false alarms caused by normal operation of large water consuming plant such as chillers	1 ?	1			1	Please provide confirmation to confirm a leak detection system capable of detecting major leaks is in place. Supporting evidence to include: 1. Relevant section/clauses of the building specification or contract 2. Design drawings 3. Manufacturer product details 4. Letter of commitment by M&E consultant- see draft See section details for No water supply to the building or unit, Extensions to existing buildings, Utilities water meter scenarios.	M&E Specification	NOT Set Up
	Flow Control devices (1 credit)	3. Install flow control devices that regulate the water supply to each WC area or sanitary facility according to demand, in order to minimise undetected wastage and leaks from sanitary fittings and supply pipework.	2 ?				-	Not Applicable		NOT Set Up
										- -

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Wat 04 - **Water Efficient Equipment** ?	**Water Efficient Equipment** (1 credit)	1. Identify all water demands from uses other than those listed under Assessment scope - Table 8.1 that could be realistically mitigated or reduced. (Refer to Table 8.1 of the BREEAM manual) Where there is no water demand from uses other than domestic-scale, sanitary use components in the building, this issue is not applicable. 2. Identify systems or processes to reduce the relevant water demand, and establish, through either good practice design or specification, a demonstrable reduction in the total water demand of the building.	1,2 ?	1			1	Please provide Relevant section/clauses of the building specification or contract-design drawings identifying all non-domestic scale, non-sanitary water uses proposed within the development. See section detail for the Non-domestic scale, non-sanitary water uses examples. Where installed, please provide manufacturer product details to identify systems or processes to reduce the relevant water demand eg drip-feed irrigation systems, reclaimed/ recovered water from a rainwater collection or waste water recovery systems.	Landscape Architect	NOT Set Up
										-
SECTION CREDIT SCORE				**2.000**	**0.000**	**0.000**	**3**			
										-
Mat 01 - **Environmental impacts from construction products - Building life cycle assessment**	**Superstructure** (upto 6 credits)	**Comparison with the BREEAM benchmark during Concept Design (offices, industrial and retail buildings only)** Superstructure (offices, industrial and retail buildings 1 During the Concept Design, demonstrate the environmental performance of the building as follows: 1.a Carry out a building LCA on of the superstructure design using either the BREEAM Simplified Building LCA tool or an IMPACT Compliant LCA tool according to the methodology 1.b Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications).	Building type dependant ?			6	Carry out building LCA options appraisal of 2 to 4 significantly different superstructure design options during Concept Design and Technical Design stages . Superstructure	Principal Contractor/Tender/ Specification	NOT Set Up
	Superstructure (upto 6 credits)	**Comparison with the BREEAM benchmark during Technical Design (offices, industrial and retail buildings only)** 2 During Technical Design, demonstrate the environmental performance of the building as follows: 2.a As criterion 1.a 2.b Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design. Where a project has not achieved criterion 1, criterion 2 may still be achieved.	Building type dependant ?			6	See section details for guidance on the methodology along with the table 9.1. Supporting evidence to include: 1. The Mat 01/02 Results Submission Tool (Criteria 1-2) 2. As criteria 1 to 2 (Criteria 3-4) – The options appraisal summary document – Evidence that the LCA options appraisal summary document has been received by the design team and client (meeting minutes, letter of acknowledgement) – Evidence of how the LCA design options have informed the design decision-making process (e.g. meeting minutes, documented design development showing how the LCA options have affected the design) 3. As criteria 3 to 4 (updated)		NOT Set Up
	Superstructure (upto 6 credits)	**Option appraisal during Concept Design (all building types)** 4. During Concept Design, identify opportunities for reducing environmental impacts as follows: 4.a Carry out building LCA options appraisal of 2 to 4 significantly different superstructure design options 4.b Use a building LCA tool that is recognised by BREEAM (as suitable for assessing superstructure during Concept Design) according to the methodology 4.c For each design option, fulfil the same functional requirements specified by the client and all statutory requirements (to ensure functional equivalency).	Building type dependant ?				0		NOT Set Up
	Superstructure (upto 6 credits)	**Options appraisal during Technical Design (all building types)** 5. During Technical Design identify opportunities for reducing environmental impacts as follows: 5.a Carry out building LCA options appraisal of 2 to 3 significantly different superstructure design options (based on the selected Concept Design option and as applicable to the Technical Design stage, 5.b Use a building LCA tool that is recognised by BREEAM (as suitable for assessing superstructure during Technical Design) according to the methodology 5.c As criteria 4.c to 4.e above. Where an options appraisal summary document was produced during Concept Design, update it to include the Technical Design options. 5.d Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design	Building type dependant- Multi-Residential ?				0		NOT Set Up

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Category	Assessment Issues	Compliance Requirements	BREEAM User Guide	Definite	Possible	Not Targeting	Max Credits Available	Design Stage (Assessor Notes)	Action/Responsible person	Tracker
?	**Substructure and hard landscaping options appraisal during Concept Design (all building types)** (1 credit)	6. Criteria 3 and 4 are achieved. 7. During Concept Design identify opportunities for reducing environmental impacts as follows: 7.a Carry out building LCA options appraisal of a combined total of at least six significantly different substructure or hard landscaping design options (at least two shall be substructure and at least two shall be hard landscaping). 7.b Using a building LCA tool that is recognised by BREEAM (as suitable for assessing substructure and hard landscaping during Concept Design) according to the methodology 7.c As criteria 4.c to 4.f above	Building type dependant ?			1	1	Carry out building LCA options appraisal of a combined total of at least six significantly different substructure or hard landscaping design options Supporting evidence to include: 1. As criteria 3 to 4 (Criteria 6-7) – The LCA options appraisal summary document includes substructure and hard landscaping according to the criteria 2. As criteria 3 to 4 (Criteria 8-9) – The LCA options appraisal summary document includes core building services according to the criteria 3. As criteria 5 (Criteria 10-14) – The 'elemental LCC plan' and 'Component level LCC option appraisal; in issue Man 02 Life cycle cost and service life planning'. 4. The third party's report: (Criteria 15-18) – Verifying that building LCAs accurately represent the designs under consideration. – Itemising the findings of their verification checks. – Evidence that the requirements of a Suitably qualified third party are fulfilled. See table 9.2 in the section detail.		NOT Set Up
										-
										-
Mat 02 - **Environmental impacts from construction products - Environmental Product Declarations (EPD)** ?	**Specification of products with a recognised environmental product declaration (EPD)** (1 credit)	1. Specify construction products with EPD that achieve a total EPD points score of at least 20 (Refer to the Methodology section of the BREEAM manual) 2. Enter the details of each EPD into the Mat 01/02 Results Submission Tool, including the material category classification. The Mat 01/02 Results Submission Tool will verify the EPD points score and credit award.	1,2 ?	1			1	Please specify construction products with EPD that achieve a total EPD points score of at least 20, according to the BREEAM Methodology Supporting evidence to include: 1. The Mat 01/02 Results Submission tool 2. Copies of EPD certificates See table 9.8 for EPD points for different type of EPD and table 9.9 for material classification within the section detail.	Principal Contractor/Tender/ Specification	NOT Set Up
										-
										-
Mat 03 - **Responsible Sourcing of Materials** Minimum Standards-criterion 1 only	**Prerequisite**	1. All timber and timber-based products used on the project are legally harvested and traded timber as per the UK Government's Timber Procurement Policy (TPP)	1 ?	y			Y	MANDATORY- Please provide letter of commitment to confirm all timber will be legally sourced in line with FCS/PEFC- see draft	Contractor	NOT Set Up
	Enabling sustainable procurement (1 credit)	2. A sustainable procurement plan must be used by the design team to guide specification towards sustainable construction products. The plan must: 2.a Be in place before Concept Design. 2.b Include sustainability aims, objectives and strategic targets to guide procurement activities. Note: targets do not need to be achieved for the credit to be awarded but justification must be provided for targets that are not achieved. 2.c Include a requirement for assessing the potential to procure construction products locally. There must be a policy to procure construction products locally where possible. 2.d Include details of procedures in place to check and verify the effective implementation of the sustainable procurement plan. In addition, if the plan is applied to several sites or adopted at an organisational level it must: 2.e Identify the risks and opportunities of procurement against a broad range of social, environmental and economic issues following the process set out in BS ISO 20400:2017(170).	2 ?	1			1	Please provide a sustainable procurement plan in line with the criteria requirements. See section details for relevant definition.	Contractor	NOT Set Up

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Category	Assessment Issues	Compliance Requirements	BREEAM User Guide	Definite	Possible	Not Targeting	Max Credits Available	Design Stage (Assessor Notes)	Action/Responsible person	Tracker
?	**Measuring responsible sourcing** (up to 3 credits)	3. Use the Mat 03 calculator tool and methodology to determine the number of credits achieved for the construction products specified or procured. Credits are awarded in proportion to the scope of the assessment and the number of points achieved, as set out in Table 9.10. (Refer to Table 9.10 of the BREEAM manual)	3 ?	1	1	1	3	TPlease provide evidence to confirm the materials used belong to BREEAM recognised responsible sourcing certifications scheme (RSCS) certification or environmental management system (EMS) certification. See section detail for relevant tables and methodology details. Supporting evidence to include: 1. Evidence of level of responsible sourcing achieved for each construction product. For example, certificates 2. Completed copy of the Mat 03 Calculator tool 3. Evidence to show how the Mat 03 calculator tool has been completed	Contractor	NOT Set Up
										-
Mat 05 - **Designing for durability & resilience** ?	**Protecting vulnerable parts of the building from damage**	1. Protection measures are incorporated into the building's design and construction to reduce damage to the building's fabric or materials in case of accidental or malicious damage occurring. These measures must provide protection against: 1.a Negative impacts of high user numbers in relevant areas of the building (e.g. corridors, lifts, stairs, doors etc.). 1.b Damage from any vehicle or trolley movements within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas. 1.c External building fabric damage by a vehicle. Protection where parking or manoeuvring areas are within 1 metre of the building façade and where delivery areas or routes are within 2. metres of the façade, i.e. specifying bollards or protection rails. 1.d Potential malicious damage to building materials and finishes, in public and common areas where appropriate.	1 to 4 ?	1			1	Please provide drawings to show areas of vulnerability from damage and material degradation (to high pedrstrian use, material degradation due to environmental factors, ect.). Please provide relevant sections/ clauses of the building specification or contract confirming the durability and protection measures specified - written statement for protecting exposed parts of the building from material degredation for all the relevant areas.	Architects	NOT Set Up
	Protecting exposed parts of the building from material degradation (1 credit)	2. Key exposed building elements have been designed and specified to limit long and short term degradation due to environmental factors. This can be demonstrated through one of the following: 2.a The element or product achieving an appropriate quality or durability standard or design guide, see Table 9.14 (Refer to Table 9.14 of the BREEAM manual). If none are available, use BS 7543:2015(172) as the default appropriate standard OR 2.b A detailed assessment of the element's resilience when exposed to the applicable material degradation and environmental factors. 3. Include convenient access to the roof and façade for cost-effective cleaning, replacement and repair in the building's design. 4. Design the roof and façade to prevent water damage, ingress and detrimental ponding.	1 to 4 ?					See section details for examples on suitable durability measures. See section details for the list of relevant industry durability and quality standards than can be used on table 9.14 for option 2a. See section details for the list of relevant industry durability and quality standards than can be used on table 9.14.	Architects	
										-
Mat 06 - **Material Efficiency** ?	**Material Efficiency** (1 credit)	1. At the Preparation and Brief and Concept Design stages, set targets and report on opportunities and methods to optimise the use of materials. These must be done for each of the following stages. (Refer to Table 9.15 of the BREEAM manual) 1.a Preparation and Brief 1.b Concept Design 1.c Developed Design 1.d Technical Design 1.e Construction 2. Develop and record the implementation of material efficiency, see Table 9.15, during: 2.a Developed Design 2.b Technical Design 2.c Construction 3. Report the targets and actual material efficiencies achieved.	1 to 3 ?		1		1	Please provide 1. Strategic brief/ written statement to include section on material efficiency which identifies client aspirations and objectives 2. Resource management plan to inculde accurate waste forecasts, oppurtunities to design out waste and increase reclaimed content See section details for material efficiency opportunities examples along with table 9.15 for material efficiency strategy.		NOT Set Up
										-
SECTION CREDIT SCORE				**6.286**	**3.143**	**12.571**	**14**			
										-

Commercial Industrial Industrial unit – process, manufacturing or vehicle servicing

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Waste

Category	Assessment Issues	Compliance Requirements	BREEAM User Guide	Definite	Possible	Not Targeting	Max Credits Available	Design Stage (Assessor Notes)	Action/Responsible person	Tracker
Wst 01 - **Construction Waste Management** ?	**Pre-demolition audit** (1 credit)	1. Complete a pre-demolition audit of any existing buildings, structures or hard surfaces being considered for demolition. This must be used to determine whether refurbishment or reuse is feasible and, in the case of demolition, to maximise the recovery of material for subsequent high grade or value applications. The audit must cover the content of Pre-demolition audit scope and: 1.a Be carried out at Concept Design stage (RIBA Stage 2) by a competent person prior to strip-out or demolition works 1.b Guide the design, consider materials for reuse and set targets for waste management 1.c Engage all contractors in the process of maximising high grade reuse and recycling opportunities 1.d Compare actual waste arisings and waste management routes used with those forecast and investigate significant deviations from planned targets. 2. Make reference to the audit in the resource management plan (RMP)	1,2 ?		1		1	Supporting evidence to include: Please provide copy of pre-demolition audit - see Section Details for requirements	Contractor	NOT Set Up
	Construction waste resource efficiency (up to 3 credits)	3. Prepare a compliant Resource Management Plan (RMP) covering: 3.a Non-hazardous waste materials (from on-site construction and dedicated off-site manufacture or fabrication, including demolition and excavation waste 3.b Accurate data records on waste arisings and waste management routes. 4. Meet or improve upon the benchmarks in Table 10.1 for non-hazardous construction waste, excluding demolition and excavation waste. (Refer to Table 10.1 of the BREEAM manual)	3,4 ?	3			3	Supporting evidence to include: Prepare a compliant Resource Management Plan (RMP) covering non-hazardous waste materials, including demolition and excavation waste - see sections details for content. Include commitment to improve upon the benchmarks in Table 10.1 for non-hazardous construction waste, excluding demolition and excavation waste. (see Section Details)	Contractor	NOT Set Up
	Diversion of resources from landfill (1 credit)	5. Meet, where applicable, the diversion from landfill benchmarks in Table 10.2 for non-hazardous construction waste and demolition and excavation waste generated.(Refer to Table 10.2 of the BREEAM manual) 6. Sort waste materials into separate key waste groups as per Table 10.3 on page 249, either on-site or through a licensed contractor for recovery.(Refer to Table 10.3of the BREEAM manual)	5,6 ?	1			1	Supporting evidence to include: Please include commitment to divert waste from landfill within the submitted RMP - see tables in Section Details	Contractor	NOT Set Up
										-
	Pre-requisite	1. If demolition occurs on site, to encourage the reuse of site-won material on site, complete a pre-demolition audit of any existing buildings, structures or hard surfaces in accordance with Assessment scope - Wst 01 Pre-demolition audit	1 to 6 ?	y				Prerequisite - See Section Details (Wst 01) for details of pre-demolition audit	Structural engineer	NOT Set Up
Wst 02 - **Use of recycled and sustainably sourced aggregates Fully** ?	**Project Sustainable Aggregate Points** (1 credit)	2. Identify all aggregate uses and types on the project Table 10.5 and Table 10.6 (Refer to Table 10.5 and Table 10.6 of the BREEAM manual) 3. Determine the quantity in tonnes for each identified use and aggregate type. 4. Identify the region in which the aggregate source is located. 5. Calculate the distance in kilometres travelled by all aggregates by transport type. 6. Enter the information into the BREEAM Wst 02 calculator to calculate the Project Sustainable Aggregate points.	1 to 6 ?			1	1	See Compliance Requirments for guidance See Section Details for methodology and Tables 10.5 and 10.6	Contractor	NOT Set Up
										-
Wst 03 - **Operational Waste** ?	**Operational Waste** (1 credit)	1. Provide a dedicated space for the segregation and storage of operational recyclable waste generated. The space is: 1.a Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams 1.b Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors 1.c Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily or weekly operational activities and occupancy rates. 2. For consistent and large amounts of operational waste generated, provide: 2.a Static waste compactors or balers; situated in a service area or dedicated waste management space 2.b Vessels for composting suitable organic waste OR adequate spaces for storing segregated food waste and compostable organic material for collection and delivery to an alternative composting facility 2.c A water outlet provided adjacent to or within the facility for cleaning and hygiene purposes where organic waste is to be stored or composted on site.	1,2 ?	1			1	Supporting evidence to include: 1.Complete and return draft letter wording 2.Please provide GA drawings with bin storage marked For building with high volumes of waste, health care and building with residential uses - see Section details	Architects	NOT Set Up
										-
Wst 04 - **Speculative finishes (Offices only)** ?	**Speculative Floor and Ceiling finishes** (1 credit)	1. For tenanted areas, where the future occupant is not known and carpets or other floor or ceiling finishes are installed, these must be limited to a show area only. 2. Only install floor and ceiling finishes selected by the known occupant of a development. Alternatively, where only ceiling finishes and no carpets are installed, the building owner confirms that the first tenants will not be permitted to make substantial alterations to the ceiling finishes	1,2	1			1	Supporting evidence to include: Complete and return draft letter	Architects	NOT Set Up

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Category	Assessment Issues	Compliance Requirements	BREEAM User Guide	Definite	Possible	Not Targeting	Max Credits Available	Design Stage (Assessor Notes)	Action/Responsible person	Tracker
										-
										-
Wst 05 - **Adaptation to Climate Change** ?	**Resilience of structure, fabric, building services and renewables installation** (1 credit)	1. Conduct a climate change adaptation strategy appraisal using: 1.a A systematic risk assessment to identify the impact of expected extreme weather conditions arising from climate change on the building over its projected life cycle. The assessment covers the installation of building services and renewable systems, as well as structural and fabric resilience aspects and includes: 1.a.i Hazard identification 1.a.ii Hazard assessment 1.a.iii Risk estimation 1.a.iv Risk evaluation 1.a.v Risk management. 2. Develop recommendations or solutions based on the climate change adaptation strategy appraisal, before or during Concept Design, that aim to mitigate the identified impact. 3. Provide an update during Technical Design demonstrating how the recommendations or solutions proposed at Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing by the assessor.	1 to 3 ?			1	1	Supporting evedence to Incude: Please provide a copy of the "Adaptation to climate change" strategy - see Sections Details for content		NOT Set Up
										-
										-
Wst 06 - **Design for disassembly and adaptability** ?	**Design for disassembly and functional adaptability - recommendations** (1 credit)	1. Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios by the end of Concept Design. 2. Develop recommendations or solutions based on the study (criterion 1 above), during or prior to Concept Design, that aim to enable and facilitate disassembly and functional adaptation.	1,2 ?	1			1	Supporting Evidence to include: Please provide a copy of the "disassembly and adaptability" strategy - see Sections Details for content	Architects	NOT Set Up
	Disassembly and functional adaptability – implementation (1 credit)	3. Achieve criteria 1 and 2 4. Provide an update, during Technical Design, on: 4.a How the recommendations or solutions proposed by Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing to the assessor. 4.b Changes to the recommendations and solutions during the development of the Technical Design. 5. Produce a building adaptability and disassembly guide to communicate the characteristics allowing functional adaptability and disassembly to prospective tenants.	3 to 5 ?	1			1	As Above	Architects	NOT Set Up
										-
										-
	SECTION CREDIT SCORE			**5.818**	**0.727**	**1.455**	**11**			
										-
										-
Land Use & Ecology										
LE 01 - **Site Selection** ?	**Previously Occupied Land** (1 credit)	1 At least 75% of the proposed development's footprint is on an area of land which has previously been occupied	1		1		1	Supporting evidence to include: Please provide drawings of site as existing and as proposed, with marked up areas of developed and undeveloped land	Project Team	NOT Set Up
	Contaminated Land (1 credit)	2. A contaminated land professional's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified: 2.a The degree of contamination 2.b The contaminant sources or types 2.c The options for remediating sources of contamination which present an unacceptable risk. 3. The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan as recommended by the contaminated land professional	2,3		1		1	Supporting evidence to include: 1.Please provide copy of site investigation report, which should include the recommendation for remediation. 2. Please return draft letter	Land Specialist/ Client	NOT Set Up
										-
										-
	Prerequisite - Assessment route selection	1. An assessment route for the project has been determined using BREEAM Guidance Note GN34 BREEAM Ecological Risk Evaluation Checklist. 2. The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site	1,2	y			0	It is STRONGLY recommended that a suitably qualified ecologist is appointed to undertake a formal BREEAM 2018 compliant site appraisal and report.	Client/Contractor	NOT Set Up

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Category	Assessment Issues	Compliance Requirements	BREEAM User Guide	Definite	Possible	Not Targeting	Max Credits Available	Design Stage (Assessor Notes)	Action/Responsible person	Tracker
LE 02 - Identifying and understanding the risks and opportunities for the project	**Survey and evaluation** (1 credit)	**Route 1** 3. Completion of the BREEAM Ecological Risk Evaluation Checklist indicates Assessment route 1 can be used as the assessment **Route 2** 4. An appropriate individual is appointed at a project stage that ensures early involvement in site configuration and, where necessary, can influence strategic planning decisions. 5. Prior to the completion of the preparation and brief, an appropriate level of survey and evaluation (see Assessment route 2: For sites where complex ecological systems are likely to be present) has been carried out to determine the ecological baseline of the site, taking account of the zone of influence to establish: 5.a Current and potential ecological value and condition of the site, and related areas within the zone of influence. 5.b Direct and indirect risks to current ecological value 5.c Capacity and feasibility for enhancement of the ecological value of the site and, where relevant, areas within the zone of influence. 6. Data are collated and shared with project team to inform the site preparation, design or construction works.	3 to 6	1			1	Please provide a copy of the Ecological Survey and Evaluation document. Note: A phase 1 habitat assessment or other equivalent type of assessment can act as acceptable evidence as long as it can be shown that they cover the content of the assessment criteria. Please complete and return draft letter	Suitably Qualified Ecologist/Contractor	NOT Set Up
	Determining the ecological outcomes for the site (Routes 1 and 2) (1 credit)	**(Routes 1 and 2)** 7. Survey and evaluation criteria (criteria 3–6 above) relevant to the chosen route have been achieved. 8. During Concept Design, the project team liaise and collaborate with representative stakeholders to identify and consider ecological outcome for the sites (appropriate to the scale and type of development) for the project. 9. When determining the ecological outcome for the site, this must involve the identification, appraisal and selection of specific solutions and measures sufficiently early to influence key project planning decisions. This must be done in accordance with the following hierarchy of action: 9.a avoidance 9.b protection 9.c reduction or limitation of negative impacts 9.d on site compensation and, 9.e enhancement, considering the capacity and feasibility within the site, or where viable, off-site. 10. Following this the optimal ecological outcome for the site is selected after liaising with representative stakeholders and the project team.	7 to 10	1			1	As Above	Suitably Qualified Ecologist/Contractor	NOT Set Up
										-
LE 03 - Managing negative impacts on ecology	**Prerequisite – Identification and understanding the risks and opportunities for the site**	1. LE 02 has been achieved. 2. The client or contractor has confirmed that compliance is monitored against all relevant UK, and EU or International legislation relating to the ecology of the site	1,2	y			0	It is STRONGLY recommended that a suitably qualified ecologist is appointed to undertake a formal BREEAM 2018 compliant site appraisal and report.	Client/Contractor	NOT Set Up
	Planning, liaison, implementation and data (1 credit)	3. Roles and responsibilities have been clearly defined, allocated and implemented to support successful delivery of project outcomes at an early enough stage to influence the concept design or design brief. 4. Site preparation and construction works have been planned for and are implemented at an early project stage to optimise benefits and outputs. 5. The project team liaising and collaborating with representative stakeholders, taking into consideration data collated and shared, have implemented solutions, and measures have been selected during site preparation and construction works.	3 to 5	1			1	Please ensure ecologist completes Guidance Note 40 (available on request) and to complete the BREEAM Change in Ecological Value Calculator	Client/Contractor	NOT Set Up
	Managing negative impacts of the project (up to 2 credits)	**Route 1** 6. Negative impacts from site preparation and construction works have been managed according to the hierarchy (see Methodology) and no net impact has resulted. **Route 2** 7 Negative impacts from site preparation and construction works have been managed according to the hierarchy (see Assessment route 2: For sites where complex ecological systems are likely to be present) and either: 7.a No overall loss of ecological value has occurred (2 credits) OR 7.b The loss of ecological value has been limited as far as possible (1 credit)	6,7	1	1		2	Please ensure ecologist completes Guidance Note 40 (available on request) and to complete the BREEAM Change in Ecological Value Calculator and reports accordingly	Suitably Qualified Ecologist/Contractor	NOT Set Up
										-
	Prerequisite - Identifying and understanding the risks and opportunities for the project	1. LE 03 has been achieved. Including the following, specific to the aims of this issue: 1.a Roles and responsibilities have been clearly defined, allocated and implemented to support successful delivery of project outcomes. 1.b Site preparation and construction works have been planned for and implemented at a stage that is sufficiently early in the project to optimise benefits and outputs. 2. The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site	1,2	y			0	It is STRONGLY recommended that a suitably qualified ecologist is appointed to undertake a formal BREEAM 2018 compliant site appraisal and report.	Client/Contractor	NOT Set Up

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Category	Assessment Issues	Compliance Requirements	BREEAM User Guide	Definite	Possible	Not Targeting	Max Credits Available	Design Stage (Assessor Notes)	Action/Responsible person	Tracker
LE 04 - Change and enhancement of ecological value	**Liaison, implementation and data collation** (1 credit)	**Route 2** 5 The project team liaising and collaborating with representative stakeholders, taking into consideration data collated and shared, have implemented the solutions and measures selected in a way that enhances ecological value in the following order: 5.a On site, and where this is not feasible 5.b Off site within the zone of influence	5	1			1	Please ensure ecologist completes Guidance Note 40 (available on request) and to complete the BREEAM Change in Ecological Value Calculator	Client/Contractor	NOT Set Up
	Enhancement of ecology (up to 3 credits)	**Route 1** 3. The project team liaising and collaborating with representative stakeholders, taking into consideration data collated and shared, have implemented solutions and measures based on recommendations from recognised 'local' ecological expertise, specialist input and guidance to inform the adoption of locally relevant ecological solutions and measures which enhance the site. 4. Data collated is provided to the local environmental records centres nearest to, or relevant for, the site. **Route 2** 6. Credits are awarded on a scale of 1 to 3, based on the calculation of the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in either GN 35 - BREEAM, CEEQUAL, HQM Ecology Assessment Issues – Route 1 or GN 36 - BREEAM, CEEQUAL, HQM Ecology Assessment	3 to 6	2	1		3	Please ensure ecologist completes Guidance Note 40 (available on request) and to complete the BREEAM Change in Ecological Value Calculator	Suitably Qualified Ecologist/Contractor	NOT Set Up
										-
LE 05 - Long term ecology management and maintenance	**Prerequisite - Roles and responsibilities, implementation, statutory obligations**	1. The client or contractor has confirmed that compliance is being monitored against all relevant UK, EU and international standards relating to the ecology of the site. 2. Where pursued, LE 04 has been achieved, including the following specific aims of this issue: 2.a Roles and responsibilities have been clearly defined, allocated and implemented to support successful delivery of project outcomes. 2.b Site preparation and construction works have been planned for and implemented at a stage that is sufficiently early in the project to optimise benefits and outputs.	1,2	y			0	It is STRONGLY recommended that a suitably qualified ecologist is appointed to undertake a formal BREEAM 2018 compliant site appraisal and report.	Client/Contractor	NOT Set Up
	Planning, liaison, data, monitoring and review management and maintenance (1 credit)	3. The project team liaise and collaborate with representative stakeholders, taking into consideration data collated and shared, on solutions and measures implemented to: 3.a monitor and review implementation and the effectiveness 3.b develop and review management and maintenance solutions, actions or measures. 4. In support of the above and to help ensure their continued relevance over the period of the project the following should be considered: 4.a Monitoring and reporting of on the ecological outcomes for site implemented at the design and construction stage 4.b Monitoring and reporting of outcomes and successes from the project 4.c Arrangements for the ongoing management of landscape and habitat connected to the project (on and, where relevant, off site) 4.d Maintaining the ecological value of the site and its relationship or connection to its zone of influence 4.e Maintaining the site in line with the any sustainability linked activities, e.g. ecosystems benefits (LE 02). 4.f Remedial or other management actions are carried out which relate to those identified in LE 02, LE 03 and LE 04. 5. As part of the tenant or building owner information supplied, include a section on Ecology and Biodiversity to inform the owner or occupant of local ecological features, value and biodiversity on or near the site.	3 to 5	1			1	Please ensure ecologist completes Guidance Note 40 (available on request)	Suitably Qualified Ecologist/Contractor	NOT Set Up
	Landscape and ecology management plan (or similar) development (1 credit)	6. Landscape and ecology management plan, or similar, is developed in accordance with BS 42020:2013(210) covering as a minimum the first five years after project completion and includes: 6.a Actions and responsibilities, prior to handover, to give to relevant individuals 6.b The ecological value and condition of the site over the development life. 6.c Identification of opportunities for ongoing alignment with activities external to the development project and which supports the aims of BREEAM's Strategic Ecology Framework 6.d Identification and guidance s to trigger appropriate remedial actions to address previously unforeseen impacts 6.e Clearly defined and allocated roles and responsibilities. 7. The landscape and management plan or similar is updated as appropriate to support maintenance of the ecological value of the site.	6,7	1			1	Please ensure ecologist completes Guidance Note 40 (available on request)	Suitably Qualified Ecologist/Contractor	NOT Set Up
										-
SECTION CREDIT SCORE				**13.154**	**5.846**	**0.000**	**13**			
										-
										-

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Pollution

Category	Assessment Issues	Compliance Requirements	BREEAM User Guide	Definite	Possible	Not Targeting	Max Credits Available	Design Stage (Assessor Notes)	Action/Responsible person	Tracker
Pol 01 - **Impact of Refrigerants** ?	**Pre-requisite**	2. All systems (with electric compressors) must comply with the requirements of BS EN 378:2008 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice	2 ?				-	Not Applicable	M&E Specification	NOT Set Up
	Impact of refrigerant (1 to2 credits)	**Two credits** 3. The direct effect life cycle CO_2 equivalent emissions (DELC) of ≤ 100 CO_2-eq/kW. For systems which provide cooling and heating, the worst performing output based on the lower of kW cooling output and kW heating output is used to complete the calculation. OR 4. All refrigerants used have a global warming potential (GWP) ≤ 10. OR **One credit** 5. Systems using refrigerants have a DELC of ≤ 1000 kgCO_2-eq/kW cooling and heating capacity	3 to 5 ?				-	Not Applicable		NOT Set Up
	Leak detection (1 credit)	6. All systems are hermetically sealed or only use environmentally benign refrigerants OR 7. Where the systems are not hermetically sealed: 7.a Systems have: 7.a.i A permanent automated refrigerant leak detection system, that is robust and tested, and capable of continuously monitoring for leaks. OR 7.a.ii An inbuilt automated diagnostic procedure for detecting leakage is enabled. 7.b In the event of a leak, the system must be capable of automatically responding and managing the remaining refrigerant charge to limit loss of refrigerant	6,7 ?				-	Not Applicable		NOT Set Up
										-
										-
Pol 02 - **Local air quality** ?	**NOx Emissions** (upto 2 credits)	1. All heating and hot water is supplied by non-combustion systems. For example, only powered by electricity. OR alternatively; 2. Emissions from all installed combustion plant that provide space heating and domestic hot water do not exceed the levels set in Table 12.4 and Table 12.5 of the manual. The measurements must be provided by manufacturers, following the labelling requirements of the European directive 2009/125/EC. No credits can be awarded for Pol 02 if any of the combustion appliances are not covered in Table 12.4 below and Table 12.5 (Refer to Table 12.4 and 12.5 of the BREEAM manual) 3. Emissions from all installed combustion plant that provide space heating and domestic hot water do not exceed the levels set in Table 1.21 and Table 1.22	1 to 3 ?				-	Not Applicable	M&E Specification	NOT Set Up
										-
										-
	Prerequisite	1. An appropriate consultant is appointed to carry out and demonstrate the development's compliance with all criteria.	1	y			0	Client to appoint appropriate consultant	Client	NOT Set Up
	Flood risk (1 to 2 credits)	**Two credits - Low flood risk** 2. A site-specific flood risk assessment (FRA) confirms the development is in a flood zone that is defined as having a low annual probability of flooding. The FRA takes all current and future sources of flooding into consideration **One credit - Medium or high flood risk** 3. A site-specific FRA confirms the development is in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain. To increase the resilience and resistance of the development to flooding, one of the following must be achieved: 4.a The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600 mm above the design flood level of the site's flood zone 4.b The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2017 (218)	2 to 4		2		2	Supporting evidence to include: 1. Please provide site specific FRA to confirm flood risk zone and any resilience measures in line with BS 8533:2017 2. Require confirmation of qualifications of suitably qualified consultant	Project Team	NOT Set Up

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Category	Assessment Issues	Compliance Requirements	BREEAM User Guide	Definite	Possible	Not Targeting	Max Credits Available	Design Stage (Assessor Notes)	Action/Responsible person	Tracker
Pol 03 - Flood and surface water management	**Surface water run-off** (2 credits)	**Pre-requisite** 5. Surface water run-off design solutions must be bespoke, i.e. they must take account of the specific site requirements and natural or man-made environment of and surrounding the site. The priority levels detailed in the Methodology must be followed, with justification given by the appropriate consultant where water is allowed to leave the site. **One credit - Surface Water Run-Off - Rate** 6. Drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) shows a 30% improvement for the developed site compared with the pre-developed site. This should comply at the 1-year and 100-year return period events. 7. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified Sustainable Drainage Systems (SuDS) are in place. 8. Calculations include an allowance for climate change. This should be made in accordance with current best practice planning guidance	5 to 15	1			1	Supporting evidence to include: 1. Please provide site specific Surface water run-off report and drainage strategy in line with Compliance Requirements, to include calculations and a summary of the pre-site and post development run-off volumes. 2. Require confirmation of qualifications of suitably qualified consultant	Project Team	NOT Set Up
	Surface water run-off (2 credits)	**One credit - Surface Water Run-Off - Volume** 9. Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); AND EITHER 10. Drainage design measures are specified so that the post-development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development. This must be for the 100-year 6-hour event, including an allowance for climate change 11. Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other SuDS techniques. OR (only where criteria 10 and 11 cannot be achieved): 12. Justification from the appropriate consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options. 13. Drainage design measures are specified so that the post-development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options: 13.a The pre-development one-year peak flow rate 13.b The mean annual flow rate (Qbar) 13.c 2L/s/ha. For the one-year peak flow rate, the one-year return period event criterion applies. 14. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. 15. For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.	5 to 15	1			1	Supporting evidence to include: 1. Please provide site specific Surface water run-off report and drainage strategy in line with Compliance Requirements, to include calculations and a summary of the pre-site and post development run-off volumes. 2. Require confirmation of qualifications of suitably qualified consultant		NOT Set Up
?	**Minimising water course pollution** (1 credit)	16. There is no discharge from the developed site for rainfall up to 5 mm (confirmed by the appropriate consultant). 17. Areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques. 18. Areas with a high risk of contamination or spillage of substances, such as petrol and oil, have separators (or an equivalent system) are installed in surface water drainage systems. 19. Chemical or liquid gas storage areas have a means of containment fitted to the site drainage system (i.e. shutoff valves). This is to prevent the escape of chemicals to natural watercourses in the event of a spillage or bunding failure. 20. All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as the SuDS manual(219) and other relevant industry best practice. They must be bespoke solutions taking account of the specific site requirements and natural or man-made environment of and surrounding the site. 21. A comprehensive and up to date drainage plan of the site will be made available for the building or site occupiers. 22. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place. 23. All external storage and delivery areas are designed and detailed in accordance with the current best practice planning guidance.	16 to 23			1	1	Please provide details of SuDS technique considered Supporting evidence to include: 1. SUDs report as part of FRA and Run-off report	Appropriate Consultant/Hydrologist	NOT Set Up
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Pol 04 - Reduction of Night Time Light Pollution ?	**Reduction in Night Time Light Pollution** (1 credit)	1. External lighting pollution has been eliminated through effective design that removes the need for external lighting. This does not adversely affect the safety and security of the site and its users. OR alternatively, where the building does have external lighting, one credit can be awarded as follows: 2. The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011(225). 3. All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00. 4. If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILPguidance notes. 5 Illuminated advertisements are designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements.(226).	1 to 5	1			1	Supporting evidence to include: Please provide written confirmation that all external lighting designed in line with the appropriate ILE guidance - See Draft Letter	M&E Specification	NOT Set Up
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Pol 05 - **Reduction of Noise Pollution** ?	**Reduction in Noise Pollution** (1 credit)	1. There are no noise-sensitive areas within the assessed building or within 800 m radius of the assessed site. OR 2. Where there are noise-sensitive areas within the assessed building or noise-sensitive areas within 800 m radius of the assessed site, a noise impact assessment compliant with BS 4142:2014(227) is commissioned. Noise levels must be measured or determined for: 2.a Existing background noise levels: 2.a.i at the nearest or most exposed noise-sensitive development to the proposed assessed site 2.a.ii including existing plant on a building, where the assessed development is an extension to the building 2.b Noise rating level from the assessed building. 3. The noise impact assessment must be carried out by a suitably qualified acoustic consultant. 4. The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise sensitive development, must be at least 5dB lower than the background noise throughout the day and night. 5. If the noise sources from the assessed building are greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with the criterion.	1 to 4 ?				-	Not Applicable	Contractor	NOT Set Up
SECTION CREDIT SCORE				**3.000**	**2.000**	**1.000**	**6**			
Man 01				0	0	1	1			
Man 03				0	0	1	1			
Hea 01				0	0	1	1			
Hea 02				0	0	1	1			
AS				0	0	1	1			
Ene 01				0	0	1	1			
Wat 01				0	0	1	1			
Mat 01				0	0	1	1			
Mat 03				0	0	1	1			
Wst 01				0	0	1	1			
Wst 02				0	0	1	1			
Wst 05				0	0	1	1			

Innovation

Commercial Industrial Industrial unit – process, manufacturing or vehicle servicing

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AS				0	0	1	1			
Pol 03	Simple Buildings Only			0	0	1	1			
SECTION CREDIT SCORE (MAX 10)				**0.000**	**0.000**	**14.000**	**10**			