Power Park Exeter
211268

February 2022

Sustainability Statement – P03

OXENWOOD
REAL ESTATE

CPW
Where buildings come alive

Contents

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01 - INTRODUCTION

01

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01 Introduction

Above: Illustrative Masterplan

This report has been produced in support of a Local Development Order (LDO) for the proposed industrial development in Exeter. It has been prepared by CPW on behalf of Oxenwood Real Estate.

The site can be developed up to a total of 270,000sqft. of Gross Internal Area (GIA) and currently consists of warehouse developments with associated offices. The intention is to target a BREEAM 'Excellent' rating for the development where practically possible. Where BREEAM 'Excellent' is impractical, such as on the smaller units, 'Very Good' will be achieved as a minimum. This is in line with clause 7.52 of East Devon District Council's Local Plan. The development plan shown is illustrative and may change as the scheme develops.

The following analysis is specific to three units – Unit A (large unit), Unit G (medium unit), and Unit L (small unit).

The general construction design standards to be adopted must exceed the requirements of the current (2013 Edition) Part L Building Regulations which stipulate an improvement on the CO_2 emissions of an aggregated 9% against 2010 standards.

To this end, the proposed design shall promote reduced CO_2 emissions from delivered energy consumption by minimising operational energy demand through passive and best-practice measures. The LZC technology energy options presented herein will potentially provide an energy contribution over and above the measures included as an integral part of the project design. A summary of the findings is presented below.

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02 - ENERGY BENCHMARKING

02

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02 Estimated Energy Demands and CO_2 Emissions

In order to benchmark the proposed new development, estimated energy demands and CO_2 emissions data have been calculated. These estimated energy consumptions are indicative only at this stage. They will, however, be used as a guideline to assess the percentage of the building's total energy consumption and CO2 emissions that could be reduced or offset by applying suitable renewable and/or low carbon technology energy options.

For the purposes of BREEAM, it is prudent for this report to reflect the benchmark data derived from approved Dynamic Simulation Model (DSM) software which uses government and industry agreed National Calculation Methodology (NCM) room templates containing standard operating conditions. This is due to the fact that BRE Global will only accept results from the approved models when verifying the percentage reduction in CO2 emissions from the building for credits Ene 1 and Ene 4 (BREEAM 2018).

The estimated energy consumption and CO_2 emissions for the development, including passive low energy features but no renewable or LZC technologies, derived from approved DSM software (IES), are shown below for the three sample units and the output data is included in the appendices.

Unit A – 3,837m2
The total predicted regulated notional CO_2 emissions are: 27,243kgCO_2 per year

Unit G – 1,598m2
The total predicted regulated notional CO_2 emissions are: 14,702kgCO_2 per year

Unit L – 484m2
The total predicted regulated notional CO_2 emissions are: 7,018kgCO_2 per year

Note 1. CO_2 emission factors of 0.216 for Gas and 0.519 for Electricity have been used to calculate the above and are taken from Building Regulations Approved Documents.

03 - ENERGY EFFICIENCY

03

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03 Building Design – Energy Efficiency

In order to deliver environmentally responsible building stock, an exemplar approach is being proposed based on low energy design principles. In summary, this approach involves energy demand minimisation through effective building form and orientation, good envelope design and proficient use of services; such that the buildings themselves are being used as the primary environmental modifier.

Long term energy benefits are best realised by reducing the inherent energy demand of the buildings in the first instance. These benefits are described and quantified as follows:

The general construction design standards to be adopted must exceed the requirements of the current (2013 Edition) Part L Building Regulations which stipulate an improvement on the CO_2 emissions of an aggregated 9% against 2010 standards for non-domestic elements.

The building envelope will be designed to ensure that the fabric and form of the development encompasses low energy sustainability principles.

The following table describes the proposed minimum building envelope thermal performance criteria. This performance criteria applies to each of the sample units.

Element	Part L 2013 Building Regulations U-Value (W/m2K)	Target U-Value (W/m2K)	Notes
Wall	U = 0.35	U = 0.35	
Ground Floor	U = 0.25	U = 0.25	
Roof	U = 0.25	U = 0.23	
Vehicle access door	U = 1.5	U = 0.5	
Windows, roof windows, and rooflights	U = 2.2	U = 1.5	Glass to achieve a total light transmission of 0.42 (g = 0.38)

In accordance with the requirements of a low energy building, the air tightness characteristics will be addressed. With robust design, the target proposed for the commercial elements 2.5m3/m2.hr @ 50Pa. This compares to the current Part L Building Regulations standard of 10m3/m2.hr @ 50Pa and hence represents improvements of 75%.

The glazing specifications for the new buildings will be optimised to ensure that the glazed elements provide excellent thermal performance combined with optimum solar reflectance to minimise summer solar heat gains along with high daylight transmittance factors to maximise daylight factors. Encouraging the correct quality and quantity of daylight to penetrate the buildings is key to reducing the amount of light required from artificial sources and hence energy requirements.

03 Building Design – Energy Efficiency

It is imperative that the lighting design philosophy provides the correct quality of lighting with minimum energy input and hence reduce internal heat gains. The latest low energy lighting technology will be employed throughout, including LEDs, where appropriate. External lighting will be designed with consideration to security requirements and minimising nuisance glare and light pollution to the surrounding area.

For the commercial elements, the building services heating and ventilation systems being proposed will also drastically reduce the inherent energy consumption of the site.

The provision of an effective control and metering philosophy is fundamental to the efficient operation of the building's environmental services. The following provides an overview of the plant efficiency and control measures that are proposed:

- Domestic hot water produced via heat pumps.
- Heating and cooling provided via air source heat pumps.
- High efficiency heat recovery ventilation with automatic control strategy.
- Zoning of mechanical ventilation systems.
- High efficiency low energy motors to be used to drive mechanical ventilation systems.

04 - APPRAISAL OF RENEWABLE AND LOW CARBON TECHNOLOGY ENERGY OPTIONS

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04 Appraisal Of Renewable and Low Carbon Technology Energy Options

The technical feasibility of installing each LZC technology at this development has been assessed to discount any unsuitable options at an early stage. A summary of the feasibility process is tabulated below, and an overview of each technology is given subsequently.

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Solar Photovoltaic	Solar photovoltaic panels convert solar radiation into electrical energy through semiconductor cells. They are not to be confused with solar panels which use the sun's energy to heat water (or air) for water and space heating.	Low maintenance/no moving parts Easily integrated into building design	Any overshadowing reduces panel performance Panels ideally inclined at 30° to the horizontal facing a southerly direction	Yes
Solar Thermal	Solar thermal energy can be used to contribute towards space heating and hot water requirements. The two most common forms of collector are panel and evacuated tube.	Low maintenance Little/no ongoing costs	Must be sized for the building hot water requirements Panels ideally inclined at 30° to the horizontal facing a southerly direction	No
Ground Source Heat Pump (GSHP)	GSHP systems tap into the earth's considerable energy store to provide both heating and cooling to buildings. A number of installation methods are possible including horizontal trench, vertical boreholes, piled foundations (energy piles) or plates/pipe work submerged in a large body of water. The design, installation and operation of GSHPs is well established.	Minimal maintenance Unobtrusive technology Flexible installation options to meet available site footprint	Large area required for horizontal pipes Full ground survey required to determine geology More beneficial to the development if cooling is required Integration with piled foundations must be done at an early stage	No
Air Source Heat Pump	Electric or gas driven air source heat pumps extract thermal energy from the surrounding air and transfer it to the working fluid (air or water).	Efficient use of fuel Relatively low capital costs	Specialist maintenance More beneficial to the development if cooling is required Requires defrost cycle in extreme conditions Some additional plant space required	Yes

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Wind Turbine *(Stand-alone column mounted)*	Wind generation equipment operates on the basis of wind turning a propeller, which is used to drive an alternator to generate electricity. Small scale (1kW – 15kW) wind turbines can be pole or roof mounted.	Low maintenance/ongoing costs Minimum wind speed available (www.bwea.com) Excess electricity can be exported to the grid	Planning issues Aesthetic impact and background noise Space limitations on site Wind survey to be undertaken to verify 'local' viability	No
Wind Turbine *(Roof Mounted)*	As above	Low maintenance/ongoing costs Minimum wind speed available (www.bwea.com) Excess electricity can be exported to the grid	Planning issues Aesthetic impact and background noise Structural/vibration impact on building to be assessed Proximity of other buildings raises issues with downstream turbulence Wind survey to be undertaken to verify 'local' viability	No
Gas Fired Combined Heat and Power	A Combined Heat and Power (CHP) installation is effectively a mini on-site power plant providing both electrical power and thermal heat. CHP is strictly an energy efficiency measure rather than a renewable energy technology.	Potential high CO2 saving available Efficient use of fuel Excess electricity can be exported to the grid	Maintenance intensive Sufficient base thermal and electrical demand required Some additional plant space required	No
Bio-fuel Fired Combined Heat and Power	As above.	Potential high CO2 saving available Efficient use of fuel Excess electricity can be exported back to the grid Benefits from being part of an energy centre/district heating scheme	Maintenance intensive Sufficient base thermal and electrical demand required Significant plant space required Large area needed for fuel delivery and storage Reliable biomass fuel supply chain required	No

Technology	Brief Description	Benefits	Issues/Limitations	Feasible for site
Bio-Renewable Energy Sources *(Automated feed – wood-fuel boiler plant)*	Modern wood-fuel boilers are highly efficient, clean and almost carbon neutral (the tree growing process effectively absorbs the CO2 that is emitted during combustion). Automated systems require mechanical fuel handling and a large storage silo.	Stable long term running costs Potential good CO2 saving	Large area needed for fuel delivery and storage Reliable fuel supply chain required Regular maintenance required Significant plant space required	No
Fuel Cells and Fuel Cell Combined Heat and Power	Fuel cells convert the energy of a controlled chemical reaction, typically involving hydrogen and oxygen, into electricity, heat and water vapour. Fuel cell stacks operate in the temperature range 65°C – 800°C providing co-generation opportunities in the form of Combined Heat and Power (CHP) solutions.	Zero CO2 emissions if fired on pure hydrogen and low CO2 emissions if fired on other hydrocarbon fuels Virtually silent operation since no moving parts High electrical efficiency Excess electricity can be exported back to the grid Benefits from being part of an energy centre/district heating scheme	Expensive Pure hydrogen fuel supply and distribution infrastructure limited in the UK Sufficient base thermal and electrical demand required Some additional plant space required Reforming process, used to extract hydrogen from alternative fuels, requires energy; lowering overall system efficiency	No

04 Solar Photovoltaic (PV) Panels

Solar photovoltaic panels convert solar radiation into electrical energy through semiconductor cells. They are not to be confused with solar panels which use the sun's energy to heat water (or air) for water and space heating.

Photovoltaic panels are available in a number of forms including mono-crystalline, polycrystalline, amorphous silicon (thin film) or hybrid panels. They are fixed or integrated into a building's un-shaded south facing façade or pitched roof ideally at an incline of 30º to the horizontal for maximum energy yield.

It is essential that the panels remain un-shaded, as even a small shadow can significantly reduce output. The individual modules are connected to an inverter to convert their direct current (DC) into alternating current (AC) which is usable in buildings.

Although sloping rooftops provide an ideal site for fixing PV panels using traditional mounting frames, there are a number of alternative solutions whereby PV panels can be incorporated into the actual building fabric of the development.

04 Solar Photovoltaic (PV) Panels

Solar glazing uses a combination of solar PV and glass, where the PV cells are laminated between two panes of specialised glazing (see below). The resulting glass laminate serves the dual function of creating energy and shade at the same time, reducing the risk of overheating.

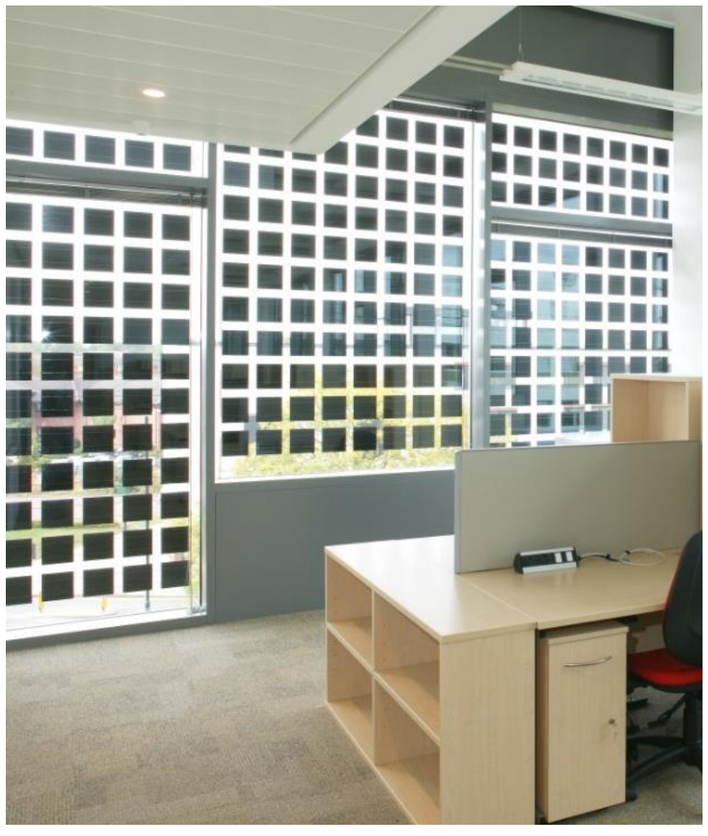
Solar glazing can be used wherever conventional glass would be specified, especially in atria. Bespoke designs allow for varying light penetration by changing the spacing between individual cells. Typically, a combination of 50% PV and 50% translucent glazing is used.

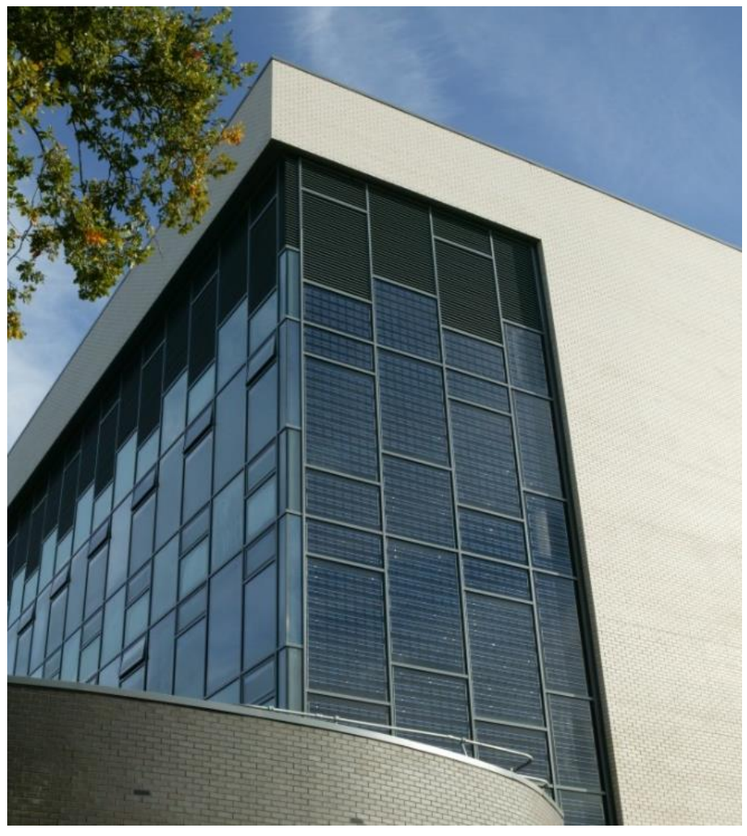
Photovoltaic technology may be feasibly incorporated into the building design with little/no maintenance or on-going costs. Installations are scaleable in terms of active area; size being restricted only by available façade and/or roof space.

A particular advantage of solar PV is that running costs are very low (requires no fossil fuel for operation) and, since there are no moving parts, very little maintenance is required.

It should be noted that the installation and connection of embedded generation equipment to the mains electrical utility grid (National Grid), including solar PV panels rated at more than 16A per phase, is subject to technical approval by the District Network Operator (DNO). This takes the form of a G99 agreement. The G99 is the regulation surrounding the connection of any form of generator device to run 'in parallel' or 'synchronised' with the grid.

The DNO are required (under the Connection and Use of System Code) to make a request for a Statement of Works (SoW) to National Grid Electricity Transmission plc (NGET) in relation to the potential impact of connection of embedded generation on the National Electricity Transmission System (NETS). As such, there is no guarantee that approval for the connection of embedded generation equipment will be granted.





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04 Air Source Heat Pumps

Electric driven air source heat pumps extract thermal energy from the surrounding air and transfer it to the working fluid (air or water). Like GSHPs they can provide both heating and cooling to buildings and have an associated Coefficient of Performance (COP). This is typically around 3 to 4 for heat pumps driven by compressors powered by electric motors and incorporating Variable Refrigerant Flow (VRF) technology. With VRF technology, there is an opportunity to heat and cool separate spaces and recover the heat between them.

Care should be taken when mounting the units to avoid any acoustic problems associated with operating the fans. The outdoor units normally operate with sound levels typically in the range 55 - 60dB(A).

A downside of electric driven air source heat pumps is that they require a defrost cycle in extreme conditions which impacts on the system efficiency. Heating capacity also falls off as the ambient temperature drops below 5ºC but still maintains 80% capacity at -5ºC.

Units are either roof or ground mounted and coupled to a thermal buffer store with additional back-up electric immersion heaters in the cylinder, to make up any shortfall. Alternative heat pump solutions can be supplied for internal installation within a plant room.

Air source heat pumps as VRF air conditioning arrangements are being incorporated into the appropriate office areas.

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05 - BREEAM ASSESSMENT

05

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05 Unit A BREEAM Pre-Assessment: 70.1%

A BREEAM 2018 pre-assessment has been undertaken by a qualified BREEAM Accredited Professional (AP) against the New Construction criteria at Design and Procurement stage. The three sample units currently target a BREEAM 'Excellent' rating. Where BREEAM 'Excellent' is impractical, such as on the smaller units, 'Very Good' will be achieved as a minimum. The individual scores are detailed below.

Unit A BREEAM Pre-Assessment: 70.1%

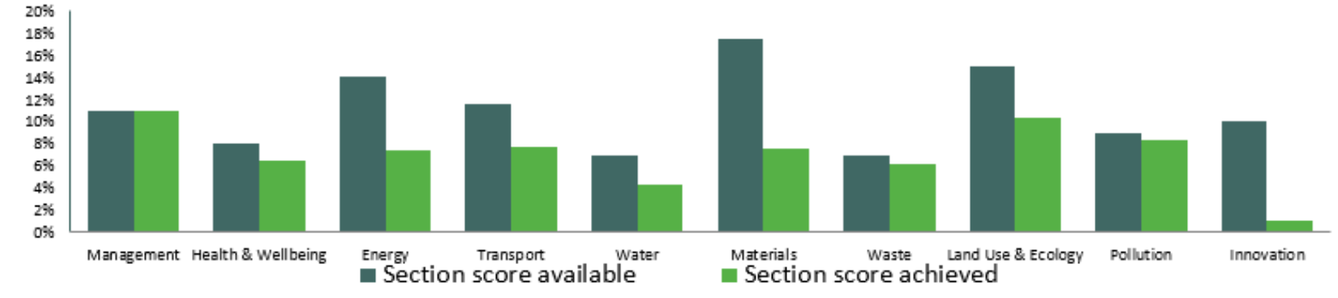
BREEAM UK New Construction 2018 Assessment Report: Rating & Key Performance Indicators

BREEAM® UK delivered by bre

Overall Building Performance

Building name	Power Park Exeter, Unit A (Large)
BREEAM rating	Excellent
Total Score	70.10%
Min. standards level achieved	Excellent level

Building Performance by Environment Section



Environmental Section	No. credits available	No. credits Achieved	% credits achieved	Section Weighting	Section Score
Management	18	18	100.00%	11.00%	11.00%
Health & Wellbeing	10	8	80.00%	8.00%	6.40%
Energy	21	11	52.38%	14.00%	7.33%
Transport	12	8	66.67%	11.50%	7.66%
Water	8	5	62.50%	7.00%	4.37%
Materials	14	6	42.86%	17.50%	7.50%
Waste	9	8	88.89%	7.00%	6.22%
Land Use & Ecology	13	9	69.23%	15.00%	10.38%
Pollution	12	11	91.67%	9.00%	8.25%
Innovation	10	1	10.00%	10.00%	1.00%

05 Unit G BREEAM Pre-Assessment: 70.1%

Unit G BREEAM Pre-Assessment: 70.1%

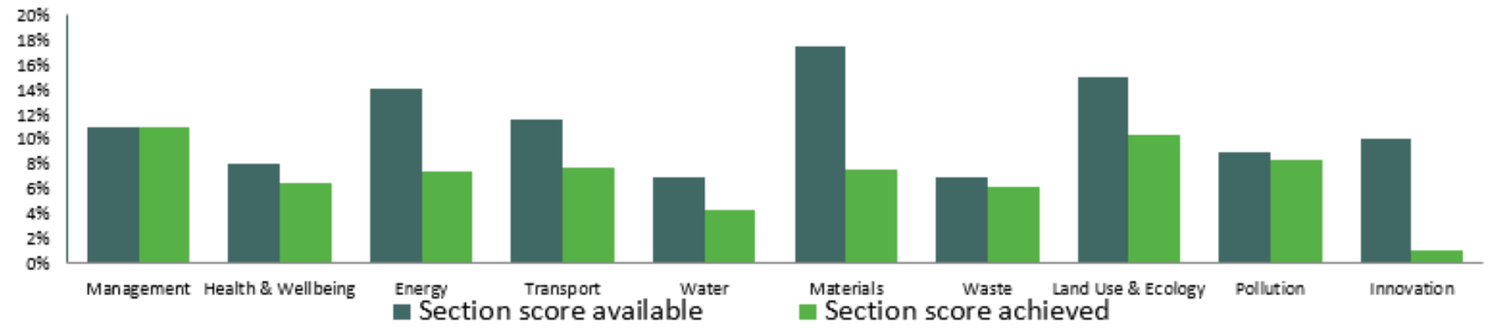
BREEAM UK New Construction 2018 Assessment Report: Rating & Key Performance Indicators

BREEAM® UK delivered by bre

Overall Building Performance

Building name	Power Park Exeter, Unit G (Medium)
BREEAM rating	Excellent
Total Score	70.10%
Min. standards level achieved	Excellent level

Building Performance by Environment Section



Environmental Section	No. credits available	No. credits Achieved	% credits achieved	Section Weighting	Section Score
Management	18	18	100.00%	11.00%	11.00%
Health & Wellbeing	10	8	80.00%	8.00%	6.40%
Energy	21	11	52.38%	14.00%	7.33%
Transport	12	8	66.67%	11.50%	7.66%
Water	8	5	62.50%	7.00%	4.37%
Materials	14	6	42.86%	17.50%	7.50%
Waste	9	8	88.89%	7.00%	6.22%
Land Use & Ecology	13	9	69.23%	15.00%	10.38%
Pollution	12	11	91.67%	9.00%	8.25%
Innovation	10	1	10.00%	10.00%	1.00%

05 Unit L BREEAM Pre-Assessment: 70.1%

Unit L BREEAM Pre-Assessment: 70.1%

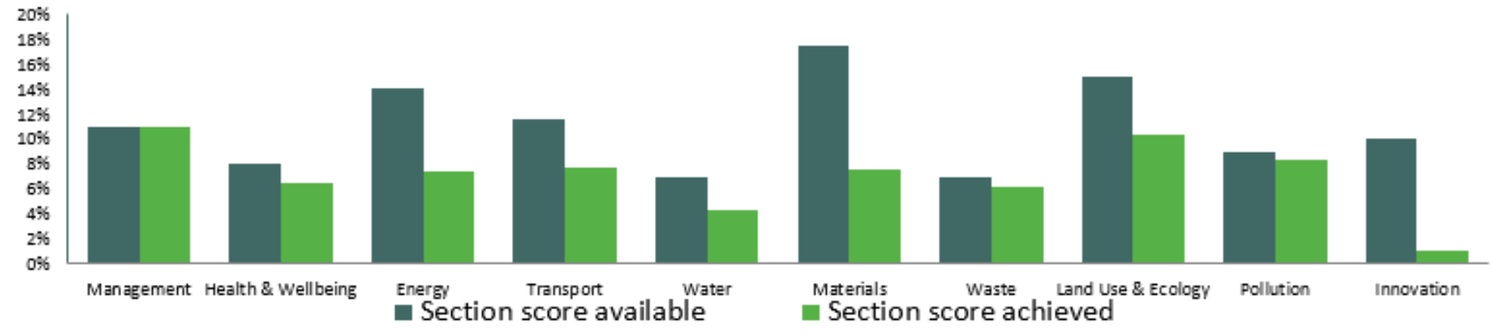
BREEAM UK New Construction 2018 Assessment Report: Rating & Key Performance Indicators

BREEAM® UK delivered by bre

Overall Building Performance

Building name	Power Park Exeter, Unit L (Small)
BREEAM rating	Excellent
Total Score	70.10%
Min. standards level achieved	Excellent level

Building Performance by Environment Section



Environmental Section	No. credits available	No. credits Achieved	% credits achieved	Section Weighting	Section Score
Management	18	18	100.00%	11.00%	11.00%
Health & Wellbeing	10	8	80.00%	8.00%	6.40%
Energy	21	11	52.38%	14.00%	7.33%
Transport	12	8	66.67%	11.50%	7.66%
Water	8	5	62.50%	7.00%	4.37%
Materials	14	6	42.86%	17.50%	7.50%
Waste	9	8	88.89%	7.00%	6.22%
Land Use & Ecology	13	9	69.23%	15.00%	10.38%
Pollution	12	11	91.67%	9.00%	8.25%
Innovation	10	1	10.00%	10.00%	1.00%

06 - SUMMARY AND CONCLUSIONS

06

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06 Summary and Conclusions

A Sustainability Statement has been produced for the proposed industrial development in Exeter.

In order to deliver environmentally responsible building stock, an exemplar approach is being proposed based on low energy design principles. In summary, this approach involves energy demand minimisation through good envelope design, heating and cooling via efficient ASHPs, domestic hot water from heat pumps, and intelligent lighting controls throughout.

It is worthy of note, that long term energy benefits are best realised by reducing the inherent energy demand of the building in the first instance. This is the approach adopted by the Design Team and results in an Energy Performance Certificate (EPC) A-rating, as demonstrated through the modelling. The EPCs are shown in the Appendix.

To further quantify the positive impact of the proposed sustainability measures, a BREEAM 2018 Design and Procurement pre-assessment has been undertaken by a qualified BREEAM Accredited Professional (AP) against the New Construction criteria. As an example, the three units that have been assessed achieve a targeted BREEAM 'Excellent' rating. Where BREEAM 'Excellent' is impractical, such as on the smaller units, 'Very Good' will be achieved as a minimum.

In addition, having reviewed the feasibility of installing each LZC technology solution, the following is proposed for inclusion on the scheme, at this stage, in order to provide a contribution to the regulated energy of 10.0% compared to the notional building:

- 140m^2 Solar Photovoltaic Panel installation (30% contribution to the regulated energy) on Unit A.
- 120m^2 Solar Photovoltaic Panel installation (37% contribution to the regulated energy) on Unit G.
- 110m^2 Solar Photovoltaic Panel installation (54% contribution to the regulated energy) on Unit L.

This provision of solar PV panels is an estimate and could change as the scheme develops.

Other LZC technology solutions have been discounted on the grounds that they are not technically feasible or economically viable for the development, as described earlier in this report.

07

07 - APPENDIX A: UNIT A ENERGY PERFORMANCE CERTIFICATE

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07 Appendix A: Unit A Energy Performance Certificate

Energy Performance Certificate

Non-Domestic Building

HM Government

Certificate Reference Number:
2290-5197-8081-7500-4541

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO_2 emissions

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

19 This is how energy efficient the building is.

Less energy efficient

Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Air Conditioning
Total useful floor area (m^2):	4190.268
Building complexity:	Level 5
Building emission rate ($kgCO_2/m^2$ per year):	11.18
Primary energy use (kWh/m^2 per year):	84.36

Benchmarks

Buildings similar to this one could have ratings as follows:

20 If newly built

53 If typical of the existing stock

08 - APPENDIX B: UNIT G ENERGY PERFORMANCE CERTIFICATE

08

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Appendix B: Unit G Energy Performance Certificate

Energy Performance Certificate

HM Government

Non-Domestic Building

Address 3
Address 4
City

Certificate Reference Number:
0233-1303-7524-0713-7603

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO_2 emissions

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

19 This is how energy efficient the building is.

Less energy efficient

Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Air Conditioning
Total useful floor area (m^2):	1968.798
Building complexity:	Level 5
Building emission rate ($kgCO_2/m^2$per year):	12.64
Primary energy use (kWh/m^2per year):	107.95

Benchmarks

Buildings similar to this one could have ratings as follows:

24 If newly built

63 If typical of the existing stock

09 - APPENDIX C: UNIT L ENERGY PERFORMANCE CERTIFICATE

09

Where buildings come alive

Appendix C: Unit L Energy Performance Certificate

Energy Performance Certificate

HM Government

Non-Domestic Building

Certificate Reference Number:
6343-3744-5491-9248-3301

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO_2 emissions

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

17 This is how energy efficient the building is.

Less energy efficient

Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Air Conditioning
Total useful floor area (m^2):	563.121
Building complexity:	Level 5
Building emission rate ($kgCO_2/m^2$per year):	18.15
Primary energy use (kWh/m^2per year):	209.17

Benchmarks

Buildings similar to this one could have ratings as follows:

26 If newly built

68 If typical of the existing stock

Waldeck

emery planning

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paragon

CPW
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pHp architects

Where buildings come alive

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Power Park - Exeter – BREEAM 2018

The BREEAM currently targets an Excellent rating for the units at Power Park, Exeter. In reality, moving forward, there will be a number of challenges which are likely to result in the units acheiving a Very Good rating, especially the smaller elements across the site.

This note highlights some of the identified challlenges at this stage and should be read in conjuction with the pre-assessment trackers and reports.

Hea 07 Safe and Healthy Surroundings

One credit is available for providing safe access, this credit is not achievable for an industrial site of this size as it would require seperate access for HGVs and general parking. A further credit is available for the provision of an oustide seating area, this has been targetted for the example units but may not be possible for all units given due to space limitations.

Ene 01 Reduction of Energy Use and Carbon Emissions

Nine credits are available based on the building's energy performance. Four credits have been targeted at this stage for the example assessments based on the output thus far from the BRUKL modelling exercise with good low energy design and the inclusion of solar PV panels. This means that the units are already significantly better than Part L requirements – just meeting Part L doesn't get any credits under BREEAM.

The minimum requirements for 'Excellent' under BREEAM Ene 01 is 4 credits. However, there is no gurantee that these 4 credits will be achieved across all the units. In theory, it would be feasible to increase the amount of solar PV on the roofs of each unit to try to increase the BREEAM score. However, the baseload energy requirements of these small units is predicted to be low. Increasing the solar PV array size could mean that in summer months, where energy from solar PV is at a maximum and the base load of the units is negligible, the likelyhood is that energy would be dumped. There is no guarantee that energy can be exported back to the grid at the time where excess is being produced, as the grid may not accept it.

Practically, solar PV energy should be used at the time of production, locally, for maximum benefit. Otherwise, the embodied carbon associated with the raw materials and production of solar PV panels outweighs the benefits.

Tra 02 Sustainable Transport Measures

Ten credits are available for implementing a range of sustainable transport measures. The location of the site is restricting as there is limited public transport access, meaning the site will have a low

accessibiliy index (AI). Furthermore, due to space restrictions there is limited scope to install further measures, such as cyclist facilities within the office area across all the units.

Wat 01 Water Consumption

Five credits and one innovation credit are available based on the improvement of the building's estimated water consumption against a notional building. Two credits have been targetted based on the installation of low flow rate taps and WCs etc. Realistically, further credits can only be secured through the introduction of rainwater harvesting systems. On large warehouse developments these make perfect sense and can save large amounts of water relative to the embodied carbon associated with the raw materials, installation of tanks and the associated pipework etc. On much smaller units, multiple rainwater harvesting solutions serving each of them is simply not practical, adds unncessary complexity and maintenance requirements and through the use of new raw materials adds to the embodied carbon. In short – sledgehammer to crack a nut.

LE 04 Change and Enhancement of Ecology

Three credits and one innovation credit are available based on the change in ecological value on the site, pre and post development. Due to space limitations there is limited scope for additional planting and therefore for ecological gain. 'Significant' net gain is considered very unlikely.