

**Development at Carriage House, Burton Park
Road, Petworth, West Sussex, GU28 0JS**



**Energy & Sustainability
Statement**

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1.0 Introduction

- 1.1 Blewburton Limited has been commissioned to prepare an Energy & Sustainability Statement to support the application for planning permission for the construction of a one-bedroom, holiday let, single storey dwelling at Carriage House, Burton Park Road, Petworth, West Sussex.
- 1.2 As licensed BREEAM, HQM, Code for Sustainable Homes and energy assessors of several years standing, Blewburton Limited has considerable expertise in all issues of energy assessment and sustainability.
- 1.3 The proposed scheme will see the demolition of stables and a pole barn and the construction of a replacement building to comprise a small, one-bedroom, holiday let and a vehicle store building with associated car parking and gardens.
- 1.4 The site is situated within the South Downs National Park and is shown in the Google Earth aerial photo in Figure 1 below, with the site location shown on the map in Figure 2 and the proposed site layout in Figure 3.

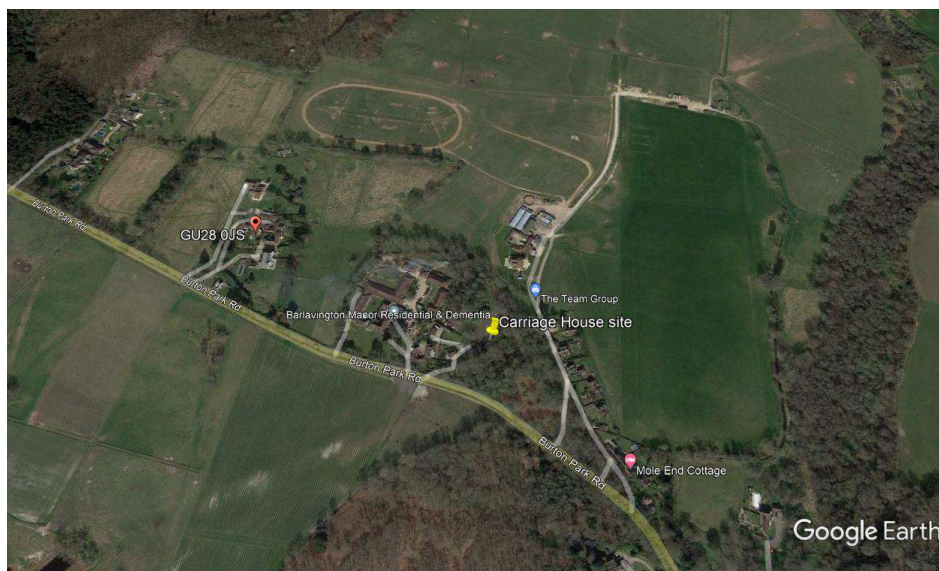


Figure 1: Aerial photo of site location and area

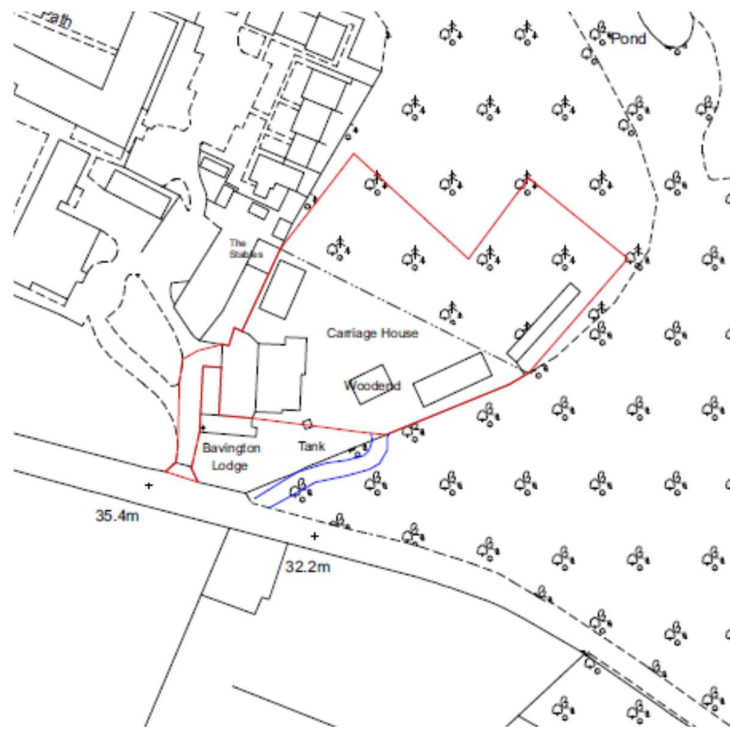


Figure 2: Proposed site location map

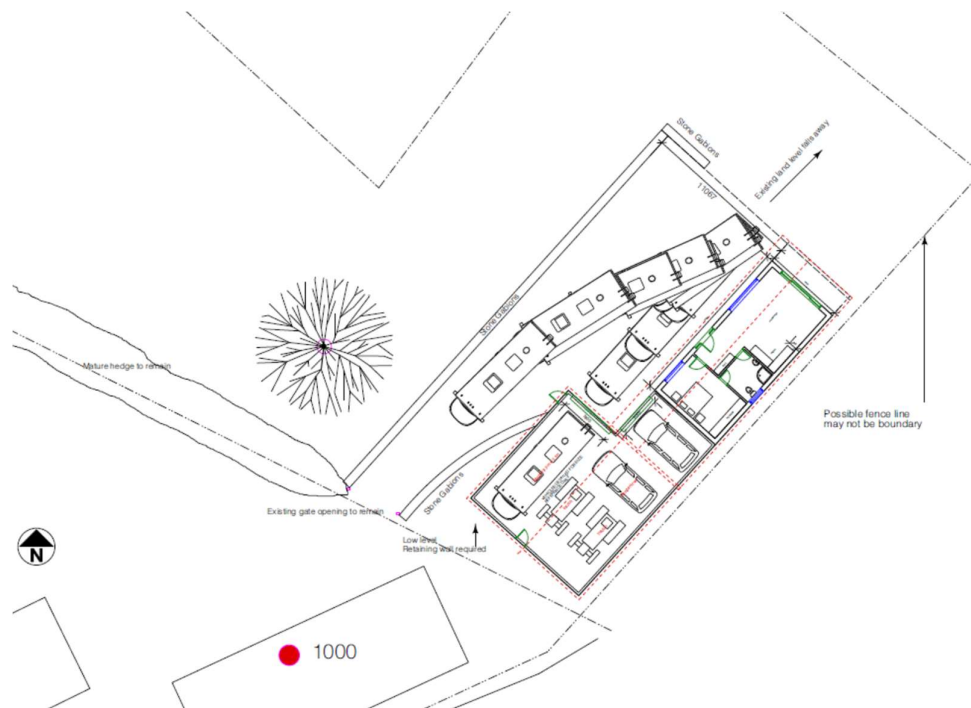


Figure 3: Proposed site layout

1.5 The proposed floor plans and elevations of the building are shown in the figures below.

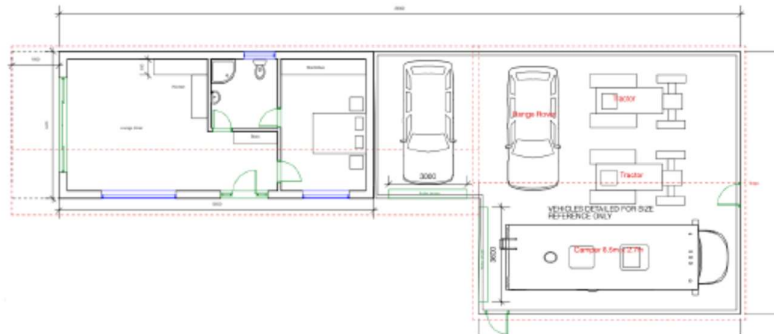


Figure 4: Proposed floor layout

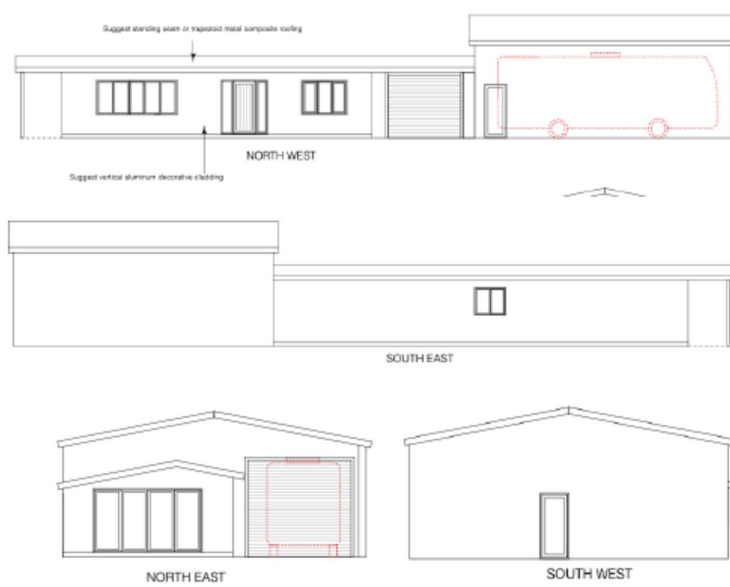


Figure 5: Proposed elevations

2.0 Proposed Approach to Energy & Sustainability

- 2.1 This proposal is within the South Downs National Park (SDNP), so a Sustainability Assessment is required as part of the application.
- 2.2 The SDNP Local Plan Strategic Policy SD48: Climate Change and Sustainable Use of Resources states the following for new residential development:
- i. Energy efficiency: 19% carbon dioxide reduction improvement against Part L (2013) through the energy efficiency of the building and;*
 - ii. Water: Total mains consumption of no more than 110 litres per person per day.*
- 2.3 The same policy goes on to state:
- All development proposals, including retrofitting, will be required to demonstrate, proportionately, how the development addresses climate change mitigation and adaptation through the on-site use of zero and/or low carbon technologies, sustainable design and construction, and low carbon materials.*
- 2.4 The purpose of this policy is to encourage high standards of sustainable building design and construction in new and existing buildings, as an essential part of the National Park's response to the challenges of climate change. Further guidance is offered and been followed from within the SDNP "Sustainable Construction SPD" (August 2020).
- 2.5 Accordingly, this statement sets out the approach that the applicant is proposing to adopt to ensure that the proposal meets the high standards of energy use and sustainability set out in local planning policy as detailed above.

3.0 Energy Conservation and Carbon Emissions

- 3.1 It is recognised that the generation of energy to heat, light and cool buildings is responsible for approximately half of the total CO₂ emissions of the UK. Part L of the Building Regulations requires a minimum standard of energy efficiency in new development, however, it is the intention with this development to go significantly beyond this.
- 3.2 As a first step in dealing with carbon emissions arising from energy use within buildings it is important to consider designing in energy efficiency measures as part of the construction of the building as these will be difficult to retrofit in the future and this will also reduce the amount of energy required by a building.
- 3.3 Reduction of heat loss is a key element of this and it is proposed that insulation within floors, roofs and walls will exceed the minimum standards required under Part L1A (Conservation of Fuel and Power) of the Building Regulations, as will the U-values for glazing and doors.
- 3.4 The initial specification has the following U-values and these will be confirmed once detailed design commences, post planning permission being granted –
- Ground floors – 0.12 (Part L1A compliance is 0.25)
 - External walls – 0.18 (Part L1A compliance is 0.30)
 - Pitched roofs – 0.16 (Part L1A compliance is 0.20)
 - Windows/doors – 1.4 (Part L1A compliance is 2.0)
- 3.5 An air tight building will also play a major part in the reduction of heat loss via the external envelope and coupled with adequate ventilation to ensure internal air quality, is an important element in energy efficient building design. Accordingly, an improvement on the minimum Building Regulations requirement for building air permeability rate within the house will be sought, with an initial target of 5.0m³/hm² (@50Pa) or lower being the intention (Part L1A sets a target of 10.0m³/hm² (@50Pa)).
- 3.6 Attention will also be paid to the designing out of non-repeat thermal bridges and this will involve the use of a standard such as Accredited Construction Details and/or Enhanced Construction Details, and the use of Hi-therm lintels. It is increasingly recognised that as standards of insulation improve, this issue, in conjunction with air leakage, plays a vital role in the energy efficiency of a building and getting both right at design stage and ensuring they are then implemented during construction is considered to be important for this development.
- 3.7 The proposed heating and hot water system for the dwelling has yet to be confirmed, however, the preference is for an Air Source Heat Pump (ASHP) based system to underfloor heating. The system will feature full time and temperature zone controls for both heating and hot water delivery, meaning energy is only used as and where required.

- 3.8 The option to utilise solar energy technologies has been considered but is rejected as appropriate for this site due to shading issues which will dramatically reduce the ability of a PV array to generate a meaningful supply of electricity or a thermal system to supply hot water.
- 3.9 The use of passive solar design has been considered and where possible good levels of glazing have been designed in to the proposals to allow for natural light penetration. Where artificial light is required, the focus will be on the provision of energy efficient lighting systems as appropriate to locational requirements.
- 3.10 When modelled with Elmhurst SAP software, the specification outlined above, using a Mitsubishi Ecodan 5kW ASHP sees the dwelling have a Target Emission Rate (TER) of 35.75kgCO₂/yr/m² and a Dwelling Emission Rate (DER) of 17.36kgCO₂/yr/m². Therefore, the proposed approach sees an uplift over minimum Building Regulations compliance of 51.44%, which more than meets the SDNP policy with regards energy and carbon offset.
- 3.11 With regards non-fixed energy using items, all 'White Goods' installed – fridge-freezer, washing machine and dishwasher – will be rated as minimum 'A' under the EU Energy Labelling Scheme and attention will be paid to the energy specification of all electrical equipment to be installed within the dwelling.
- 3.12 Also, as per SDNP policy, a charging point will be supplied for an electric vehicle.

3.13 Finally, an OWL "Standalone" Electricity Monitor will be installed to allow the occupants to monitor and understand their electricity consumption – see image, right. The monitor shows consumption or cost per hour (or kwh if preferred), and has a CO₂ equivalent reading too. Because the monitor is wireless and portable, the householder can easily walk around the house and observe, by switching on and off, how much energy particular devices are using. They can also see the overall consumption by day / week / month and compare periods to see if savings have been made.



Figure 6: Image of OWL monitor

3.14 The use of energy conscious design principles, an appropriate LZC in the form of an ASHP and a fabric first approach means that the building should remain energy efficient for its entire lifetime and the overall requirement for energy input is reduced for heating and hot water. The approach outlined above meets the various requirements in the SDNP Local Plan.

4.0 Water Resource Management

- 4.1 The UK has a poor record in being profligate with its abundant water resource and the South-East of England is recognised as suffering from water stress, therefore, on this site only water efficient products will be specified.
- 4.2 The issue has been further amplified by Natural England stating that developments within Sussex North must not add to this impact and that they should demonstrate water neutrality, which they further advise is a usage figure of 85.0 litres per person, per day (l/p/d) for small developments such as this proposed scheme. Accordingly, a Water Neutrality Report has been prepared for the proposed development by CGS Civils.
- 4.3 The actual specifications of the water using products are yet to be established, however, the following specification is considered realistic for this type of development and an assessment of the efficiency of the building's domestic water-consuming components has been undertaken using the Building Research Establishment's water calculator.
- 4.4 The water consumption (L/person/day) for the proposed dwelling shows a figure of 77.2l/p/d with the following potential specification (which is below the 110.00l/p/d required in the SDNP Local Plan and below the 85.0l/p/d threshold discussed above with regards Natural England requirements):
- Dual 4.0/2.6 litre flush WCs;
 - Shower average flow rates of 7.0L/min;
 - Basin average tap flow rates of 3.0L/min;
 - Kitchen tap average flow rates of 5.0L/min;
 - Water efficient washing machine (5.5L per kg dry load) and dishwasher (0.67L per place setting).
- 4.5 Should a more generous specification for internal water using products be decided upon, then thought will be given to the installation of grey-water harvesting systems, such as the EcoPlay unit, pictured below, or through rainwater harvesting, although we would question the utility of this for such a small development, particularly given the increase in carbon footprint this would engender arising from the pumps involved with a rainwater harvesting system. We would argue it is more efficient to specify the low flush WCs detailed above in 4.3.



Figures 7 & 8: External rainwater harvesting butt & EcoPlay unit above WC

- 4.6 Externally, a rainwater harvesting butt will be provided with an external tap for use in the gardens and for car washin.
- 4.7 The provision of water meters is also recognised as an important tool in reducing water usage and in a domestic context they can encourage people to monitor and reduce their water consumption by an average of 10% to 15%. Therefore, the dwelling will have an individual, easily accessible water meter installed as part of the specification.

5.0 Flood Risk, Surface & Waste Water Management

- 5.1 The Environment Agency's Flood Mapping for the area shows the site is not located within an area considered to be at risk from flooding – see <https://check-long-term-flood-risk.service.gov.uk/map?eastings=497536&northings=118294&map=SurfaceWater>.
- 5.2 A Drainage Statement dealing with a proposed surface water-runoff strategy has been supplied by Archibald Shaw, Consulting Civil & Structural Engineers. This states that consideration will be given to managing surface waters by infiltration using sustainable drainage techniques. Infiltration testing to the requirements of BRE 365 will be undertaken at the site to confirm this is viable.
- 5.3 If the testing informs that infiltration techniques are viable then consideration will be given to discharging surface waters from the roof into a soakaway located within or under the driveway. The driveway will be of permeable construction (such as that shown in the image below) and all infiltration systems will be designed to accommodate a 1 in 100 year storm event with an additional 40% allowance for predicted climate change. There will be no material increase in surface water runoff relative to equivalent greenfield levels.
- 5.4 All new drainage systems will be managed and maintained to provide a level of performance that will not compromise any future flood risk.



Figure 9: Typical permeable paving solution

6.0 Ecology & Biodiversity

- 6.1 Other than the barn to be removed, the majority of the site is improved grassland, maintained at a low cut, with scattered trees. Hedgerows feature on the southern boundary and woodland to the rear, on the eastern side of the site. A selection of site images are shown below.



Figure 10: View looking south-east across the site

- 6.2 A Preliminary Ecological Appraisal and Preliminary Roost Assessment has been undertaken by Arbtech Consulting Ltd in April, 2022 and this deems the site to be of low ecological value, with no evidence of roosting bats present.
- 6.3 A Construction Environmental Management Plan (CEMP) will be developed and implemented in full to cover tree protection issues and pollution control. It will also cover details such as pre-commencement checks and tool box talks regarding ecology protection for all site operatives.



Figure 11: North-west elevation of existing barn

- 6.4 Landscaping for the site will incorporate native species and consider an area of wildflower grassland. Peat will not be used in the process.
- 6.5 In addition, two bird and two bat boxes will be installed on mature trees located on the site boundaries and no external lighting will be installed, to further encourage bat activity.



Figure 12: View to South-west of entrance to site

7.0 Waste & Pollution

- 7.1 Waste arising from the construction process has been an area of focus for some years now, with the industry making good strides in re-use and reduction of materials, which not only helps the environment, it also engenders significant cost savings to developers.
- 7.2 With this in mind, the appointed contractor for the scheme will be encouraged to develop a comprehensive site waste management plan (SWMP) prior to the start of construction reflecting the recognition that reduction of waste begins in the design and ordering stage of a project and carries on through to the sign-off of the building. This SWMP will set targets and procedures for the sorting, reusing and recycling of construction waste into defined waste groups, either on site or through a licensed contractor.
- 7.3 The demolition of existing buildings is also an element of this project, so a thorough audit of materials arising from this process will be undertaken, with as much of these materials being re-used in situ for the new project as is reasonable, with the rest designated for re-use elsewhere or recycling.
- 7.4 The generation of waste does not stop at the end of the construction process and adequate provision will be supplied to the proposed dwelling, both internally and externally, to allow for the sorting of general waste from recyclable materials.
- 7.5 Provision for composting of food waste arising from the kitchen will also be supplied in the form of a compost cone to the garden along with information on how to successfully compost, to further reduce waste streams arising from the new development.
- 7.6 Pollution can occur in various guises and attempts will be made to design out or mitigate against a number of issues identified below.
- 7.7 At the construction stage there can potentially be noise nuisance for neighbouring properties and all contractors will be made aware of and expected to comply with policies to prevent this issue. They will also be expected to have and operate policies to facilitate against air and water pollution from their activities and to have procedures in place should an accident occur.
- 7.8 Light pollution will not be an issue as there are no plans to install external lighting and black out blinds will be installed to all glazed areas within the dwelling.

8.0 Materials Selection and Sustainable Construction Methods

8.1 The final material specification has not yet been confirmed for this project and will be subject to planning considerations, however, there is a commitment to ensuring that all materials score as highly as possible in the Building Research Establishment’s Green Guide to specification – see Figure 13 below. In particular, the construction of the walls, roof and windows are expected to achieve an A or A+ rating.

8.2 In addition, wherever possible all building and finishing materials will be sought from local suppliers and manufacturers registered to an environmental management scheme such as FSC, BES6001, ISO14001 or EMAS. This will ensure that the materials have been sourced from suppliers certified as ethical and responsible as far in to the supply chain as possible.

8.3 The re-use of materials from the demolition process, particularly for sub-base material will be explored and will see a reduction of waste, as well as allowing for reduced embodied and transport energy/carbon impacts.

8.4 All insulation materials selected for this building will have a Global Warming Potential of below 5 and where possible be made from natural products.

8.5 Finally, attention will also be paid to materials specified for the internal environment with a focus on materials/finishes containing low/no volatile organic compounds (VoCs) in an effort to improve the internal environment for occupants as internal air pollution is increasingly recognised as having negative impacts on health.

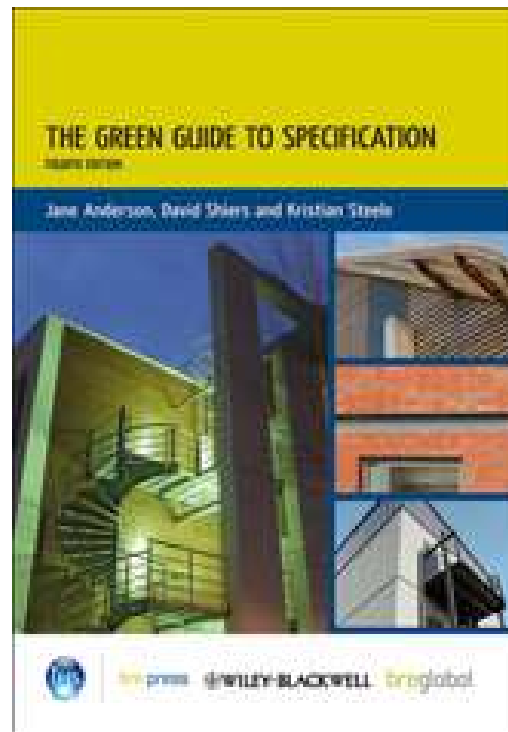


Figure 13: BRE Green Guide to Specification

9.0 Summary

- 9.1 In summary, this development demonstrates a strong commitment to sustainability. It incorporates many features that are consistent with achieving a high level of overall sustainability and which meet the requirements of the SDNP Local Plan.
- 9.2 Areas of strong approach involve the plans for energy and water efficiency, waste arising and the approach to ecological protection/mitigation and where issues have standards to be met under the Building Regulations, the proposed approach is to exceed them.
- 9.3 Particular attention is drawn to the currently modelled figure for carbon emissions, which sees an exceedance of 51.44% beyond minimum Part L of the Building Regulations compliance.
- 9.4 In short, given the nature of the scheme, along with the intentions outlined within this report, the proposed development is deemed to meet high levels of sustainability.