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MOTO HOSPITALITY SWINDON SERVICES

SUSTAINABLE CONSTRUCTION AND ENERGY STATEMENT

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Suitability Code Legend

S0	Work in Progress
S1	Suitable for Co-ordination
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AT	Tender Issue
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SUSTAINABLE CONSTRUCTION AND ENERGY STATEMENT

SWINDON SERVICES

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1. INTRODUCTION

This sustainability and energy statement relates to the proposed development of Swindon Services, a new Motorway Rest Area (MRA) within the county of Wiltshire which will include a private fuel filling station, an amenity building, a fuel filling shop, HGV fuel filling station, and parking areas for cars, heavy goods vehicle (HGV), coaches, caravans, and motorcycles, as well as provision for EV charging.

This statement illustrates the measures that will be incorporated within the scheme to ensure it is sustainable and energy efficient in the context of current local and national policies, and the Building Regulation. The proposed development is subject to the planning requirements of Wiltshire Core Strategy, the National Planning Policy Framework (2021), and guidance of Approved Document L2A of the 2021 Building Regulations.

It also demonstrates how the proposed development will deliver sustainable development objectives for Wiltshire and addresses policies relevant to sustainable construction and energy strategies as set out in the national and local policies.

2. SITE CONTEXT

The proposed development will be located on the land area bounded by the M4 motorway and B4005 road, close to Spittleborough roundabout. The site is an agricultural field, that is currently unused. The site area extends to 7.27ha in area, with residential buildings and commercial developments within its vicinity on the opposite end of the M4.

The site of the proposed development is highlighted with a red line in the image below.

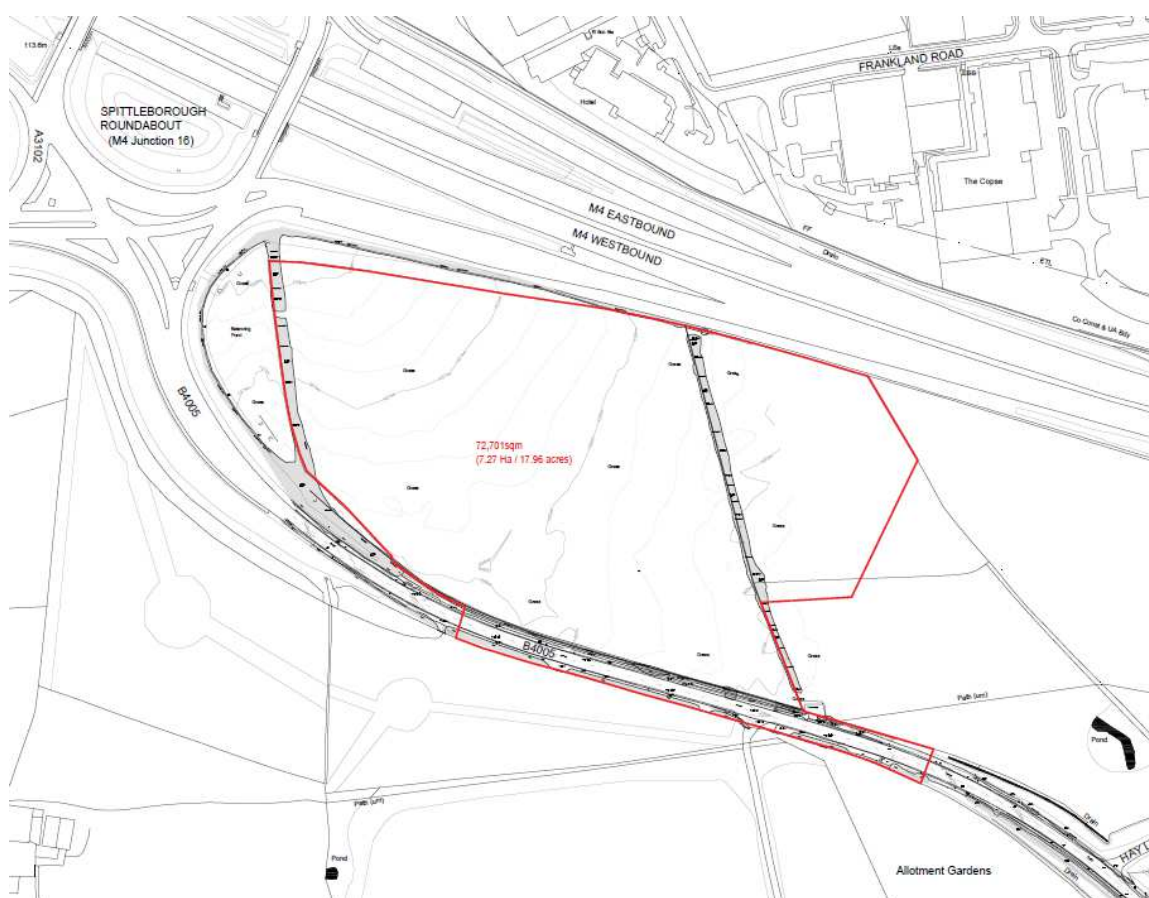


Fig. 1: Proposed site of development

The below image indicates the site plan for the proposed development.

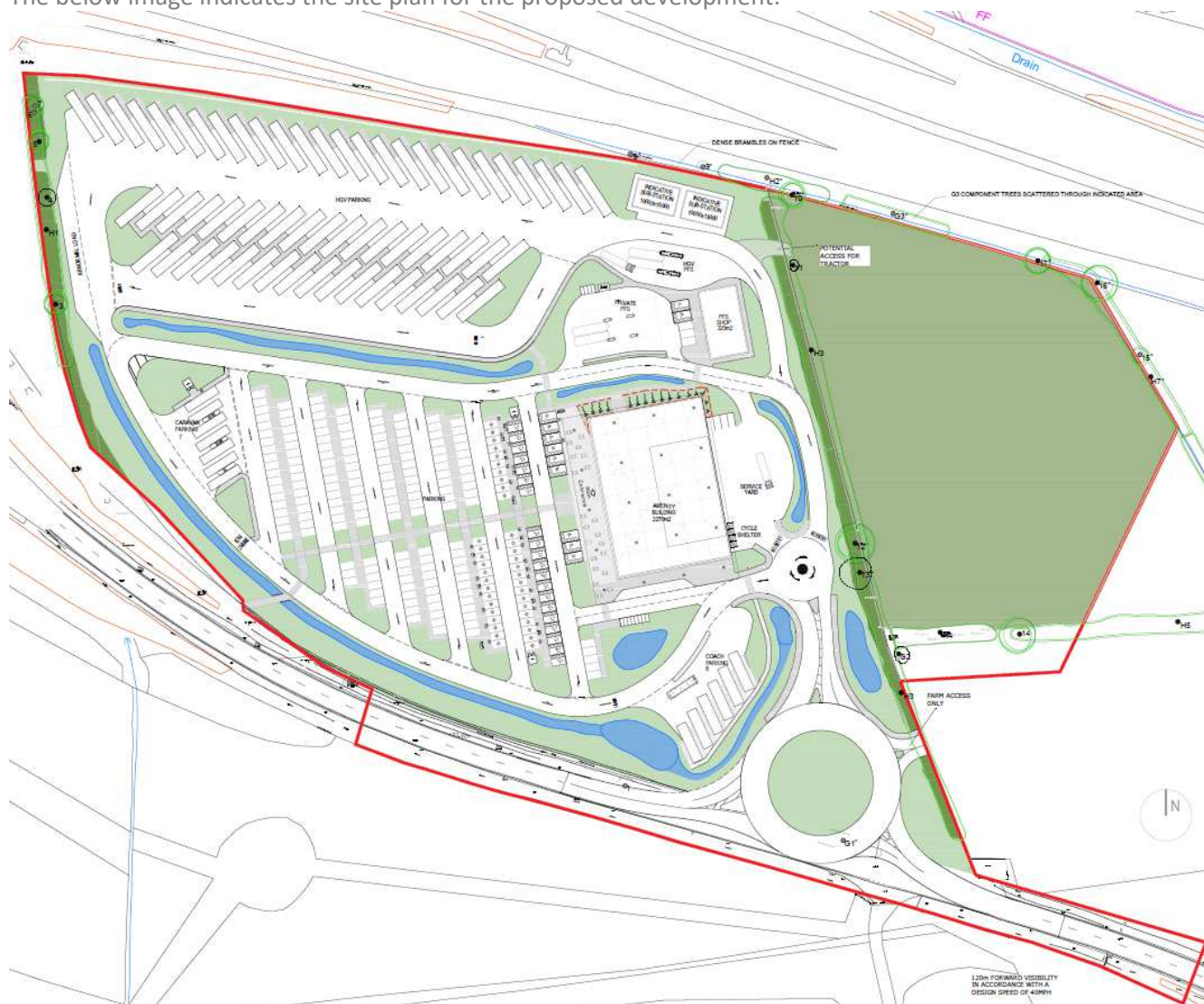


Fig. 2: Site plan

The following sections sets out the local and national sustainability objectives and policies, followed by an outline of the social, economic and environmental benefits of the proposed development, as well as a review of the sustainable and energy efficient design measures which will be incorporated into the design of the proposed development.

3. PLANNING POLICY

This section of the report provides an overview of the relevant planning policy and guidance in relation to carbon dioxide emissions, climate change and sustainability for the proposed development from a national and local perspective.

3.1 National Policy

The National Planning Policy Framework (2021) provides a framework for the development of local plans and sets out the Government's planning policies for England and expectation of how they are to be applied.

It serves to guide the preparation of local plans and policies with emphasis on the transition to a low carbon future and sustainable development as the core planning principle.

Paragraph 7 of the National Planning Policy Framework (NPPF) states that: “the purpose of the planning system is to contribute to the achievement of sustainable development.”

In achieving sustainable development, the NPPF states three overarching, interdependent objectives, which needs to be pursued in mutually supportive ways.

- An economic objective - to build a strong, responsive and competitive economy while ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity.
- A social objective – to support strong, healthy and vibrant communities by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities’ health, social and cultural wellbeing.
- An environmental objective – to protect and enhance our natural, built and historic environment; including improving biodiversity, minimising waste and pollution, mitigating and adapting to climate change, making effective use of land, using natural resources prudently, and moving to a low carbon economy.

These policies are meant to play an active role in guiding sustainable solutions considering local circumstances to reflect the character, needs and opportunities of each area.

3.2 Local Policy

Alongside the NPPF, the current Wiltshire Core Strategy adopted in January 2015 and covers the period up to 2026 will be used to guide decisions on planning and development of the land area at the site of the proposed development.

The vision of Wiltshire as encapsulated in the Local Plan is to have stronger, more resilient communities based on a sustainable pattern of development. This vision is all about people and places, fostering a sense of community belonging and self-sufficiency where communities can solve problems locally with the support of the public sector, partner bodies and organisations.

To realise this vision, six strategic objectives have been outlined for Wiltshire in the Local plan as set out below.

Strategic objective 1: Delivering a thriving economy – The Core Strategy enables development to take place and encourages economic vitality, providing local jobs for Wiltshire’s population, whilst ensuring that sustainable development objectives have been met. Residents within Wiltshire should have access to facilities and retail choice in convenient locations throughout Wiltshire. The potential of tourism should be realised as a major growth sector through capitalising on the quality of the environment and location Wiltshire benefits from.

Strategic objective 2: Addressing climate change – Delivering the most sustainable development and shaping communities that are resilient to the unavoidable consequences of a changing climate.

Strategic objective 3: Providing everyone with access to a decent, affordable home – The Core Strategy makes provision for at least 42,000 new homes in Wiltshire in the plan period from 2006 to 2026. It sets out a plan for an appropriate mix of types, sizes and tenures, particularly to address affordable housing needs, and will ensure a continuous supply of housing over the plan period that is aligned to job growth and the delivery of infrastructure.

Strategic objective 4: Helping to build resilient communities – The Core Strategy will provide support for Wiltshire's communities, enabling them to help themselves and improve their quality of life, and foster a sense of community belonging, safety, social inclusion and self-sufficiency.

Strategic objective 5: Protecting and enhancing the natural, historic and built environment – Wiltshire's rich and diverse natural, historic and built environment are a significant asset and the Core Strategy will be based on taking steps to use these as a catalyst to attract inward investment in a manner which, at the same time, protects and enhances them.

Strategic objective 6: To ensure that infrastructure is in place to support communities – The Core Strategy will ensure that infrastructure requirements are appropriately planned, secured and implemented to ensure the timely delivery of development proposals. It will also ensure that strategic and local transport needs are managed in a sustainable manner. Developments will also need to appropriately address the risk of flooding and, where necessary, provide attenuation measures designed to adapt to the challenge of climate change.

As a result of these strategic objectives, several Core Policies have been put together to help aid the realization of Wiltshire's spatial vision. The following are the local policy requirements with respect to energy and sustainability:

- Core Policy 41 – Sustainable construction and low-carbon energy – This policy expects new developments, building conversions, refurbishments and extensions to incorporate design measures to reduce energy demand. Developments are expected to be well insulated and designed to take advantage of natural light, heat from the sun and use natural air movement for ventilation, whilst maximising cooling in the summer. All proposals for major development are required to submit a sustainable energy strategy alongside the planning application outlining the low-carbon strategy for the proposal. All non-residential developments are required to achieve the relevant BREEAM 'excellent' standards.
- Core Policy 50 – Biodiversity and geodiversity – Development proposals are expected to demonstrate how they protect features of nature conservation and geological value as part of the design rationale. Where it has been demonstrated that such features cannot be retained, removal or damage shall only be acceptable in circumstances where the anticipated ecological impacts have been mitigated as far as possible and appropriate compensatory measures can be secured to ensure no net loss of the local biodiversity resource, and secure the integrity of local ecological networks and provision of ecosystem services. All developments are also encouraged to seek opportunities to enhance biodiversity. Major developments must include measures to deliver biodiversity gains through opportunities to restore, enhance and create valuable habitats, ecological networks and ecosystem services.
- Core Policy 51 – Landscape – Developments are expected to protect, conserve and where possible enhance landscape character, and must not have a harmful impact upon landscape character, while any negative impacts must be mitigated as far as possible through sensitive design and landscape measures.
- Core Policy 57 – Ensuring high quality design and place shaping – A high standard of design is required of all new developments. Developments are expected to create a strong sense of place through drawing on the local context and being complementary to the locality.

- Core Policy 68 – Water resources – Non-residential developments are required to incorporate water efficiency measures. Developers are expected to submit details of how water efficiency has been considered during the design of proposals.

In line with the strategic objectives and policies to realizing the vision for Wiltshire as contained in the Local Plan, the proposed development will:

- I. Minimise greenhouse gas emissions in line with Government targets, deploy the use of renewable energy and ensure the building is well adapted to the effects of climate change.
- II. Ensure high design standards that promotes architectural quality and energy efficiency while protecting and enhancing the Wiltshire's historic environment as well as reflecting local distinctiveness.
- III. Support the growth, vitality and viability of Wiltshire.
- IV. Boost the local economy and create jobs, improve social interaction and ecological value of Wiltshire as well as improve the quality of life of residents of the community.
- V. Encourage and enhance biodiversity.

3.3 Building Regulation

The proposed development is also expected to comply with the 2021 Part L2A Building Regulation and meet the minimum performance requirements for target primary energy rate and target CO₂ emission rate. The proposed development will consider and apply at the very least the minimum requirements for energy efficiency stipulated in the building regulation to demonstrate compliance.

3.4 Summary

The central theme of the national and local policies is the provision of sustainable development. The local plan sets out policies that support sustainable development, responding to the Government's ambition for developments which reflect local environmental, social and economic values. Both national and local policies aim to ensure any new development is sustainable and incorporates measures to tackle climate change.

In this context, the proposed development proposes a robust, commercial, and technically viable sustainability strategy to create a sustainable development with the provision of a roadside service, that would allow members of the public increased accessibility to HGV parking and EV charging, in an area of identified need. The proposed development will also target to meet the technical requirements of the 2021 Part L2A Building Regulation for energy efficiency.

4. SUSTAINABLE DEVELOPMENT AT WILTSHIRE

This section outlines the social, economic and environmental benefits of the proposed development to Wiltshire.

4.1 Economic benefit

The proposed development which has a project cost of circa £150m will offer significant economic benefit to Wiltshire through the construction and operational phases. The construction and operational phases of the proposed development will generate approximately 300 local employment opportunities for the residents of the local community and contribute to the economic development of Wiltshire, as well as increased revenue for materials, services, and goods produced locally.

Furthermore, the proposed development will generate revenue for the local authority through taxes, which can be used to fund public services, infrastructure projects, and community development initiatives. It will also provide trade and supply chain opportunities as partnerships are established with local vendors, stimulating economic growth further in Wiltshire. Additionally, the presence of the proposed development will impact positively on the value of properties within the area.

4.2 Social benefit

The proposed development will serve to enhance road safety as fatigued drivers find a safe place to rest, refresh and refuel, reducing the risk of accidents caused by drowsiness and improving the overall travel experience. This will benefit both travellers passing through Wiltshire and the residents. Likewise, the amenity building of the proposed development which will provide seating areas and a range of services, including retail units, food and beverage offerings and a games shop, will serve as a focal point for social interaction and community cohesion among residents and visitors.

4.3 Environmental benefit

The proposed development will be designed and operated with sustainability in mind. The external walls will feature hemclad wall panels which will significantly reduce the embodied carbon of the building and save tonnes of CO₂. The proposed development will also feature green space and green infrastructure such as a tree planting and landscaped gardens, green roof, use of timber from Forest Stewardship Council (FSC) certified sources, permeable pavements, swales, ponds, and rainwater harvesting. This sustainable drainage systems (SUDs) and green space will help manage stormwater runoff, reduce water pollution, improve ground water recharge, mitigate the urban island heat effect, improve air quality, support biodiversity conservation, help sequester carbon dioxide, and improve the overall aesthetics of the proposed development. In addition, the amenity building of the proposed development will be designed with energy efficient materials, technologies, and systems that will ensure energy consumption and greenhouse gas emissions associated with the operation of the facility is significantly minimised. Furthermore, there will be renewable energy generation on site which will lower the carbon footprint of the proposed development even further. Water-saving measures will also be implemented in the proposed development such as low-flow fixtures with sensor-based controls in the wet areas of the amenity building and possible installation of a greywater treatment system. The greywater system will collect and treat water from hand basins and showers to be used for vehicle washing, watering the green roof and reuse in the lavatories. This measure will reduce water consumption and promote water conservation, lending credence to the sustainability credentials of the proposed development. These environmental benefits align with the broader goal of sustainable development and responsible stewardship of natural resources.

5. SUSTAINABLE CONSTRUCTION AND ENERGY STRATEGY

Developing energy-efficient, low carbon buildings is a key objective of national and local policies, and the building regulation supports the reduction of energy demand through efficient building design. The proposed scheme will follow the latest guidance to reduce CO₂ emissions and cut down building energy demand by following a fabric first approach. The proposed development has also been designed to meet BREEAM 'Excellent' standards, which recognises the proposals highly sustainable qualities and initiatives.

5.1 Passive design

The design of the proposed building has been chiefly centred on passive design principles and sustainability features. The adoption of this approach as the first consideration aims to significantly abate the amenity building's heating, ventilation and air-conditioning (HVAC) loads. As a result, the passive design measures to be incorporated into the design of the proposed amenity building to reduce energy demand will include: optimum orientation to minimise heat gain/loss in summer and winter, double glazed windows with low emissivity to reduce unwanted solar gains in summer, provision of shading to lessen the potential for uncomfortable temperatures within the building during summer, adequate insulation and airtightness levels within the ambit of the Part L2A Building Regulations with super insulated roof to minimise solar gain, maximisation of daylight opportunities through glazing and rooflights to decrease artificial lighting energy consumption, and exploration of natural ventilation opportunities through openable windows and rooflights.

These passive design strategies will lower the HVAC load of the building and ensure a comfortable internal space for the occupants with limited tendencies to overheat. Thermal mass is also an important consideration for the proposed building as it's facade will feature hemclad wall panel with timber glulam structure for the roof and mezzanine floor. The use of these thermal mass materials will massively reduce the embodied carbon of the building, while also delivering stable internal temperatures within the building and greatly reducing the energy usage. It is envisaged that with the implementation of these design features, the proposed building will be relatively cool as opposed to its external environment during heat periods.

5.2 Efficient building services systems

The proposed building will be largely naturally ventilated and where mechanical ventilated, energy-efficient systems will be used to meet demand. Heating and possible cooling demand, especially in the gaming room, will be met by highly efficient air source heat pump (ASHP) of the variable refrigerant type. This system can serve multiple zones with different heating and cooling requirements, and they can modulate their output according to the zone's energy requirements, increasing system efficiencies and reducing the energy demand of the system. Variable speed drive motors will also be fitted to all fans and pumps servicing all HVAC systems to ensure the efficient use of energy. In contrast, standard fans and pumps operate at a constant speed to meet maximum demand though only half of the building may be occupied. Variable speed drive motors, however, can ramp up and down depending on the load requirements, making it worthwhile to install on the auxiliary system. Additionally, the proposed development will incorporate a Building Energy Management System (BEMS) to monitor the energy use of all major systems in the building. The BEMS system allows the facilities/building manager to monitor and control all systems throughout the building, optimising the building's operations and identifying opportunities for further energy savings.

The lighting system will incorporate LED lights with high lighting efficacy and lighting controls such as absence/presence detection and daylight linked dimming to reduce lighting energy consumption.

Hot water will be provided either by an air-to-water ASHP or direct electricity. ASHP offers the advantage of lower energy consumption, leading to reduced operating cost, as well as lower carbon emissions which reduces further as the national electricity grid decarbonises. If direct electricity is proposed for the supply of hot water, energy losses through the pipework distribution system will be minimised through optimum layout of the pipework to shorten length of route and adequate insulation of the system. To further save energy with a direct electric system for hot water provision, a proper assessment will be carried out to ascertain the daily hot water demand and feasibility of alternatively using point of use (POU) water heater. POU water heaters are highly energy efficient as they heat water directly at the point of use, avoiding the energy losses associated with transporting hot water through long pipelines, which results in higher energy efficiency compared to centralised water heating systems. They also do not have standby heat losses as associated with centralised water heaters with storage tanks. They also have the advantage of limited space requirements, instant hot water delivery and potential for individual temperature control and customisation of hot water delivery based on usage pattern. Depending on the assessment, a hybrid approach may also be considered, where a centralised hot water system supplies high-demand areas and POU water heaters supplies the toilets and other low-demand areas to optimise energy efficiency.

It is important to note that the proposed scheme does not consider the use of natural gas or fossil fuel for any of its building services as a way to ensure energy efficiency and maintain a low carbon impact on the environment.

5.3 Renewable energy generation

The final step to ensuring a low energy building with minimal impact to the environment will include the adoption of renewable electrical energy source for the proposed development which will feed into the amenity building. A feasibility study of the various LZC technologies established photovoltaics to be the most appropriate LZC technology for electrical energy generation. Photovoltaic (PV) panels offer the advantage of low maintenance, zero-carbon electricity that offsets grid electricity, and hence considerable carbon savings. There is provision for installation of PV panels on the canopy of the HGV and private vehicle fuel filling stations. Opting to install the PV panels on the canopy of the HGV and private vehicle fuel filling stations rather than on the green roof of the amenity building guarantees the preservation of the amenity building's aesthetic charm and its harmonious integration with the natural surroundings, while efficiently minimising runoff. Furthermore, this decision eradicates the potential occurrence of plants casting shadows on the PV panels, which could otherwise lead to a reduction in the energy generation capacity of the PV panels.

The table below showcases other technologies considered and deemed unsuitable for the proposed development.

Technology	Reasons not to explore
Wind turbine	Proposed site constraints in terms of land space has been fully occupied by parking areas, fuel filling station, amenity building and other SUD features. Moreover, turbines generate noise which may be unsuitable for setting.
Solar Thermal	For the same area as a PV panel, PV panels offer more benefit in terms of reduction in carbon emissions and energy production.
Fuel cells using hydrogen	Emerging technology and expensive.
Biomass boiler	Large plant room required to house boiler and fuel store. Potentially more maintenance requirements. Negative impact on local air quality.

Hydroelectricity	Proposed site is not in a suitable location for this technology.
District heating network	There is currently no district heating network close to the site of proposed development.

Table 1: unsuitable technologies for the proposed development

5.4 Water efficiency

The proposed development will incorporate measures to reduce water usage in the amenity building through the appropriate selection and installation of low flow, water-saving fixtures and fittings with sensor-based controls in the showers, toilets and kitchen areas. Water meters and leak detection devices to monitor the water consumption and identify any leaks or wastages in the water system will also be installed in the amenity building. Furthermore, the proposed development will incorporate a rainwater harvesting system in the amenity building, which will collect and store rainwater from the roof. This system will conserve groundwater resources and reduce water consumption on the facility by providing an alternative source of water for non-potable uses such as toilet flushing, washing of vehicles and watering of plants on the site of the proposed development. Likewise, a greywater treatment system may be used in the amenity building to collect and treat wastewater from the hand basins and showers to be reused for non-potable purposes. These systems and measures will reduce the amount of water used per operation, reduce the demand for freshwater and the cost of water supply, minimise the volume of wastewater discharged to the environment, enhance the sustainability and resilience of the water system in the MRA, and provide an alternative water source in case of water shortages or an emergency.

5.5 Sustainable construction and materials

In addition to the efficient design of the building envelope, efforts will be made to use eco-friendly, sustainably sourced materials for the construction of the building elements. Sustainably sourced materials have low environmental impact and are energy efficient to produce.

Where possible the project will consider the use of sustainably sourced materials that can be made locally or within neighbouring towns, thereby cutting down carbon dioxide emission from transportation and embodied energy / carbon of the building.

Examples of locally sourced or low embodied carbon materials are as follows:

- Bricks made from British clay: consideration should be given to companies that have a good mix of renewables in the production process of bricks.
- Timber glulam structure from FSC certified sources: this will be used for the roof and mezzanine floor.
- Recycled steel: This could be considered for the structure.
- Precast concrete: Has reduced waste and quality assurance, hence ensuring pollution is limited at the proposed site.
- Plant-based polyurethane foam could be considered for the building envelope. Plant-based polyurethane foam is highly resistant to moisture and heat and offers protection against mould and pests. It is known to improve insulation and thermal resistance.

- Sustainable concrete or post-tensioned concrete for the construction of the floor slab: This provides advanced strength, fire and sound protection, and reduced self-weight of the floors transferred to the columns.
- Hemclad wall panel: The external wall will comprise of hemclad wall panels. Hemcretes are made from a mixture of lime, water, and the woody core of the hemp plant known as 'shiv'. They provide insulation, regulation of humidity as well as internal temperature, and are carbon-neutral building products.

All insulation specified for the project including insulation to building services equipment will ensure to have an Ozone Depletion Potential (ODP) of zero, and a low Global Warming Potential (GWP), which will help to minimise the proposed development's impact on climate change.

It is also expected that a construction site waste management plan will be initially prepared and implemented to minimise waste and pollution at the proposed site. Surveys will be conducted to ensure the correct quantity of materials are specified and supplied to mitigate excess waste and pollution caused by oversupply. Waste generated on site will be assessed for re-use where possible to minimise the use of landfills.

5.6 Biodiversity

The proposed development will encourage biodiversity through the provision of green roof for the amenity building, planting of trees, landscaped gardens, ponds, and swales. These come with attendant ecological benefits such as flood water management, enhancement of groundwater recharge, and provision of habitat and foraging opportunities for local wildlife and semi-aquatic species. It also helps to improve the climate resilience of the proposed development, enhance the aesthetical value and improve user experience. In addition, the proposed development includes an area of land, to the east, that is dedicated to providing net gains in biodiversity: The proposed development is set to achieve a biodiversity net gain of circa 12.5%.

6. CONCLUSION

This report has addressed national and local policies relevant to the sustainable construction and energy strategy of the proposed development. A holistic sustainable approach has been adopted by the design team for the proposed development. The proposed development will incorporate several sustainability measures such as permeable paving, green roofs, use of timber for the roof and mezzanine floor, creation of ponds and swales, specification of local and responsibly sourced materials, incorporation of water-saving measures, potential reuse of waste generated onsite, minimisation of waste and pollution at site of construction, rainwater harvesting and reuse of greywater, to mention a few. The energy strategy follows the energy hierarchy of importantly reducing energy demand through passive means, then using energy efficient systems to service the building, and lastly, generation of clean energy from photovoltaic panels.

This report considers that with the successful implementation of the energy and sustainability strategy detailed in this report, the proposed development will satisfy the requirements of the local and national policies, and the Building Regulation as well. The proposed development will also bring numerous economic, social and environmental benefits for Wiltshire as detailed in section 4 of this report.

The proposal, through the application of the techniques and initiatives outlined above, will deliver a highly sustainable and environmentally conscious roadside facility, located in an area of identified need. Swindon Services will be able to provide parking for all transport modes, including dedicated areas for EV cars and HGVs. The scheme will achieve the highest possible quality standards, meeting the BREEAM 'Excellent' criteria and respecting the character and relationship of the site with the surrounding Wiltshire landscape. The development will therefore make a positive impact on the strategic road network and deliver social, environmental, and economic benefits for Wiltshire.