

## SUSTAINABILITY STATEMENT

FOR

PREMISES CHANGE OF USE

AT

181 – 183 CARDIFF ROAD

READING

Project N°: 4888  
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Client: Charlie Mills

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LOW CARBON CONSULTANTS



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## DOCUMENT REVISION SHEET

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1.0 INTRODUCTION

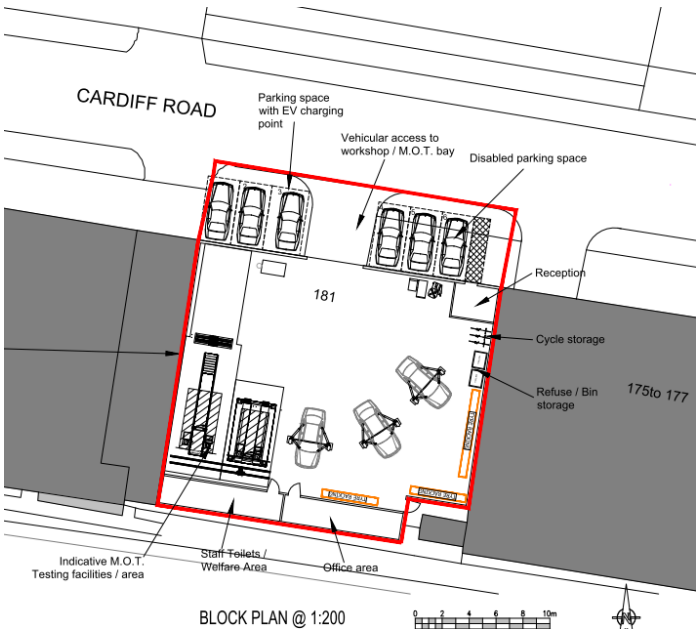
This Sustainability Statement has been prepared on behalf of the MOT Centre Reading to assist with their change of use application at 181 – 183 Cardiff Road Reading for a car leasing / financing / storage operation to an MOT Centre.

The report will consider planning guidance given in national, regional and local policies, in particular the Reading Borough Council Local Plan.

2.0 SITE DESCRIPTION



The site location is shown on the left, with pin denoting the exact location



The drawing to the left shows a detail of the proposed building layout.

### 3.0 PLANNING POLICY

This section explores some of the relevant policies which set out carbon and energy emission reductions for this project to consider and adopt.

#### A. KYOTO PROTOCOL (1997)

The Kyoto Protocol first signed in 1997 was a landmark International agreement for member states to commit to legally binding emission reduction by set dates.

In the United Kingdom, their first commitment was to reduce emission 12.5% against relative levels in 1990. This later led to the Climate Change Act within the UK, that sets a commitment to reduce 34% by 2020 and 80% by 2050 compared to the relative levels in 1990.

As the Kyoto Protocol was due to expire 2020, it was replaced by the Conference of Parties (COP21) held in Paris 2015. Where commitments were made to limit global temperature rises.

#### B. NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The NPPF sets out planning policies for England and Wales and how these are expected to be applied. In determining planning applications, local planning authorities should expect new developments to:

- Comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
- Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

#### C. READING BOROUGH LOCAL PLAN NOVEMBER 2019 (RBLP)

The RBLP does not specifically cover change of use applications, however it does state:

##### CC3: ADAPTATION TO CLIMATE CHANGE

All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change. The following measures shall be incorporated into development:

- Wherever possible, new buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements;
- Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc;
- Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and
- All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change.

The majority of the above items relate specifically to new build developments, and it is technically difficult or financially unviable to include these under a change of use. This statement therefore focuses on upgrades and modifications that can be made for this property.

## SUSTAINABLE DESIGN AND CONSTRUCTION SUPPLEMENTARY PLANNING DOCUMENT – DECEMBER 2019

Reading Borough Council have also adopted a supplementary planning document that sets out how to interpret the existing climate change policy, energy efficiency and renewable energy. The relevant information for this kind of development has been adopted for this Sustainability Statement.

### 4.0 ENERGY EFFICIENCY

To meet planning conditions as well as Building Regulations, it is important to minimise energy requirements for the planned development. Conventionally this can be achieved through energy efficiency measures such as improving the building's fabric performance as well as utilising sustainable building services.

As this application is for a planning change of use, the refurbishment of the existing building will be minor. Therefore, the following considerations will be made for the refurbishment.

- Any new fixed building services to be in line with non-domestic Building Services Compliance Guide.
- Use new low energy LED fittings will be used with automatic and/or manual switching facilities. The use of photocells (daylight sensors) to control the external lighting will be provided.
- Non-regulated energy demand will be minimised by using A/A+ rated white goods and appliances.

### 5.0 DECENTRALISED ENERGY SUPPLY

As the size of the non-residential scheme is below 1000m<sup>2</sup>, the site is not expected to connect to a district heating scheme or be ready for a future connection.

Of the four identified clusters for district heating schemes, this development falls outside of the closest one ("North of the station").

## 6.0 LOW/ZERO CARBON TECHNOLOGIES

This section of the report will review the potential viability of the on-site installation and implementation of decentralised and renewable or low-carbon energy sources.

### A. SOLAR PHOTOVOLTAICS PV

Solar PV systems use cells to convert daylight into electricity. PV cells consist of layers of a semi-conducting material, usually silicon. When light shines on the cell it creates an electric field across the layers causing electricity to flow. The greater the intensity of the light, the greater the flow of electricity. The PV Modules gather solar energy in the form of daylight and convert it into direct current (DC) electricity. The inverter converts DC power into alternating current (AC) power, which is the type of electricity used in your premises.



As Solar PV systems do not require direct sunlight to generate power, these systems can work well in UK installations with year-round generation. Although largely dependent on available roof space and orientation of building. Given that Solar PV is becoming a more mature technology in the UK, installation costs are coming down. However, that also means there is less export tariffs and support schemes available to offset costs.

Although the building does have a west facing roof, it is partially shaded by the front elevation upstand and the adjoining building's roof, also the roof structure is unlikely to accommodate the additional weight of solar panels, therefore PV is not considered suitable for this building.

### B. SOLAR WATER HEATING

Solar water heating systems use solar panels, called collectors. These collect heat from the sun and use it to heat up water which is stored in a hot water cylinder. A boiler or immersion heater can be used as a back-up to heat the water further to reach the required safe water storage temperature.

There are two types of solar water heating panels, either Evacuated tubes, or Flat plate collectors. Evacuated tube collectors are the most efficient but can cost twice as much per square metre as flat plate collectors. Each evacuated tube is a glass or metal tube containing the water or heat transfer fluid is surrounded by a larger glass tube. The space between them is a vacuum, so very little heat is lost from the fluid.



Similarly, to Solar PV, Solar Water collectors are largely reliant on available roof space and orientation of the building to operate effectively. Commonly these are used as supplementary hot water generation systems and thus would still likely require some form of back up water heater or boiler to meet peak hot water loads. Also, given its expected usage, the domestic hot water demand profile throughout the week would vary rather than a constant load.

The building does have an area of west facing roof that is large enough to accommodate the solar collectors without being overshadowed, however, building as a very low hot water usage and therefore solar hot water will have very minimal impact to the total energy use and are not seen as suitable for this building.

### C. WIND TURBINES

Wind is a form of solar energy and is a result of the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface, and the rotation of the earth. Turbines utilise wind to make electricity. The wind turns the blades, which spin a drive shaft, the movement of this shaft spins an electricity generator via a gearbox. As the shaft turns, it helps to power the generator consisting of magnets and a conductor, such as coiled copper wire. When the magnets rotate around the copper wire, it creates voltage and a DC electric current. An inverter converts DC power into AC power.



An initial assessment of the Wind Speed Profile in the area of the site, shows that it just about merits consideration for wind generation. However integrating a wind turbine into such a well developed urban area would be impractical.

### D. MICRO-COMBINED HEAT AND POWER (CHP)

Micro-CHP technologies generate both usable heat and electricity. It was developed to increase the amount of energy harnessed when burning fuel, increasing the efficiency of the combustion process. A micro-CHP boiler typically uses mains gas or LPG, so they are not

considered a renewable energy source, however due to their efficiency and productivity they can significantly lower carbon dioxide emissions. A micro-CHP boiler will typically operate in a similar fashion to a normal gas boiler - although they usually feature an internal motor which generates electricity using the heat produced.



As this technology burns Gas and produces electricity and hot water as a by-product, micro-CHP tends to perform favorably in CO<sub>2</sub> reduction calculations. However, as grid electricity increasingly becomes more decarbonised, the benefits from micro-CHP are expected to be lessened. Electrical production is only a small proportion of the heat output from the micro-CHP. Therefore, the installation performs best when there is a high hot water demand. Allowing the micro-CHP to run with a constant base load as opposed to inefficient short cycles of operation.

Similarly to other technologies considered, the hot water demand and the small size of the extension are big factors against the selection of micro CHP.

### **E. AIR SOURCE HEAT PUMPS (ASHPS)**

An air source heat pump (ASHP) can provide efficient heating and cooling solutions in any climate by converting solar energy stored in the air into energy, providing useful heat. ASHP's absorb heat from the outside air using the refrigerant cycle. Heat from the air is absorbed at low temperature into a refrigerant. This passes through a compressor where its temperature is increased and transfers its higher temperature heat to the building.

There are two main types of ASHP:

- Air-to-air - absorbs heat from the outside air and then transfers it directly into your building via a fan system to heat a room or an indoor space.
- Air-to-water - absorbs heat from the outside air and then transfers it via your central heating system to provide both hot water and space heating.

ASHPs are increasingly being used across the UK and so the market is competitive across different sizes of schemes. As an electrically driven piece of technology, the ASHP's carbon reduction performance will increase as the UK electricity grid decarbonises in future years.



Whilst in heating only mode, ASHPs are recognised as renewable technology. But can also operate to provide cooling where required.

As the building in to be a workshop, very little heating is required and when used typically local point of use heating is preferred. ASHP's are not suitable for this type of heating and are therefore not suitable for general heating. Within the small reception area, a small 'split' type ASHP heating and cooling unit could be considered.

#### **F. GROUND SOURCE HEAT PUMPS (GSHPs)**

Heat from the ground is absorbed at low temperatures into a fluid inside a loop of pipe (a ground loop) buried underground. The fluid then passes through a compressor that raises it to a higher temperature, which can then heat water for the heating and hot water circuits of the building. The cooled ground-loop fluid passes back into the ground where it absorbs further energy from the ground in a continuous process as long as heating is required. Normally the loop is laid flat or coiled in trenches about 2m deep, but if there is not enough space in your development you can install a vertical loop down into the ground to a depth of up to 100m. Like ASHPs, Ground Source Heat pumps have some impact on the environment as they need electricity to run, but the heat they extract from the ground, the air, or water is constantly being renewed naturally.



As detailed previously the building has very little heat demand, additionally there is not external area, therefore GSHP's are not viable for this property.

#### **G. BIOMASS BOILER**

Biomass boilers are very similar to conventional gas boilers however instead of using gas (or oil) to produce the heat, they combust sustainably sourced wood.

Using wood in place of fossil fuels helps to prevent long-term climate change, since the carbon dioxide released during the combustion was actually absorbed while the tree was growing, so they are essentially carbon neutral.



However, they are relatively large scale and therefore really only suitable for large developments or district heating schemes. This development is very small with little heating requirement, therefore GSHP's are not suitable for this property.

## 7.0 CONCLUSION

This sustainability statement has reviewed the possible opportunities for the proposed change of use in building class to improve the sustainability of the site, even those the proposed works are minor. As the proposed usage of a vehicle workshop, the building heating and hot water demands will be low whereas energy usage for lighting will be more. Therefore, improvements made to lighting will have a disproportionately higher effect on the building's overall energy and CO<sub>2</sub> emissions.

Therefore, the majority of carbon saving will be in the usage of LED lighting throughout the site, also the consideration of ASHP for the small reception area will offer renewable energy whilst operating in heating mode.