SDS Plymouth

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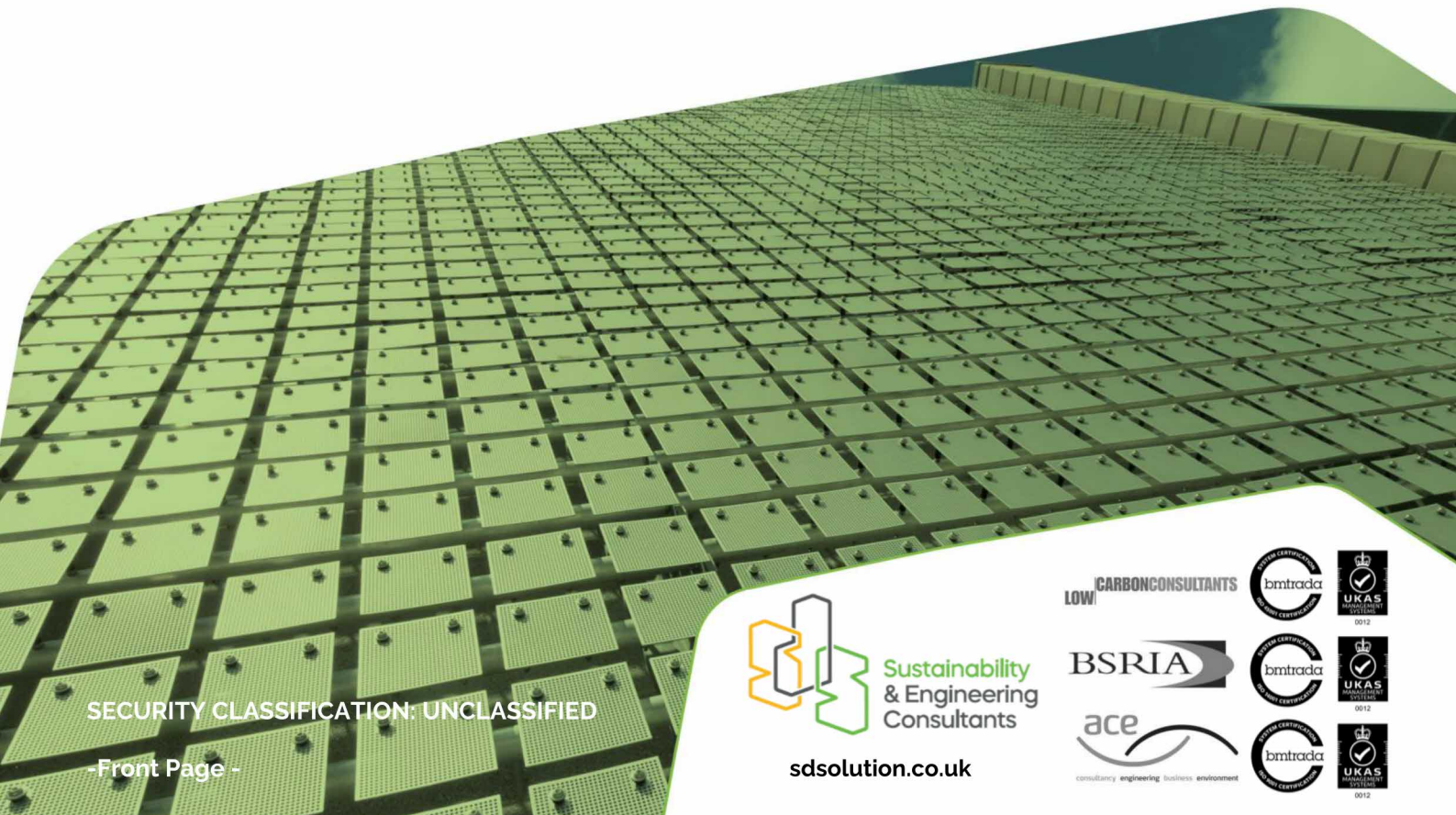
COMMUNITY DIAGNOSTIC CENTRE

Mechanical, Electrical, and Public Health

Sustainability Strategy



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Mechanical, Electrical, and Public Health

Sustainability Strategy

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CONTENTS

1 SUSTAINABILITY STRATEGY

1.1 BREEAM

A target BREEAM rating of Excellent is to be achieved for this development using BREEAM New Construction 2018 V6.0 criteria.
An initial pre-assessment has been undertaken and route to achieve this rating has been outlined that results in a potential assessment score of 72.25%. This score requires early actions to be undertaken to ensure credit requirements are available at a later design stage and are identified in the BREEAM Pre-assessment Report.

1.2 Local planning policy DEV32

Local planning policy DEV32 states:
“All major development proposals should incorporate low or renewable energy generation to achieve regulated carbon emissions levels of 20% less than that required to comply with Building Regulations Part L.”

1.3 Strategy

The building has been initially modelled using Integrated Environment Solutions (IES) Virtual Environment (VE), which is an industry recognised software for simulating building performance. A simplified building energy model (SBEM) has been undertaken to predict the energy performance score and associated rating. The SBEM takes into consideration regulated energy use only (not unregulated).
The energy modelling predicts regulated energy use only and intended as a benchmark to measure a buildings performance for indicative purposes. Actual energy usage will vary depending on human and environmental factors and can be modelled at a later design stage using CIBSE TM54, an industry standard, to model operational energy.
Regulated energy is building energy consumption resulting from the specification of controlled, fixed building services and fittings, including space heating and cooling, hot water, ventilation, fans, pumps, and lighting. Such energy uses are inherent in the design of a building.
Unregulated energy is building energy consumption resulting from a system or process that is not ‘controlled’, i.e. energy consumption from systems in the building on which the Building Regulations do not impose a requirement. E.g. IT equipment, lifts, escalators, refrigeration systems,

external lighting, ducted-fume cupboards, servers, printers, photocopiers, laptops, cooking, audio-visual equipment, and other appliances.
A fabric first approach is proposed to reduce the heating demand for the building, and to limit solar gains which will benefit the end users operating costs.
A heat network is proposed that uses air source heat pumps (ASHP) to service space heating directly and hot water generation using local packaged heat interface units (HIUs).
The building services will be designed to achieve environmental comfort conditions noted in the design report and to maximise energy efficiency in operation.
Current SBEM calculation shows the building design achieves improvement on the Part L 2021 building regulation, using an efficient thermal envelope, building services, and onsite energy generation.

1.3.1 Hot water

It is proposed that hot water is generated locally using HIUs. HIUs are fully packaged, and purpose built with associated controls to generate hot water instantaneously on demand from a heat network.
Domestic hot water (DHW) in will ideally be generated at 50°C. This will complement a heat network operating at 55°C, supporting the use of low carbon heat sources such as heat pumps.
Traditionally, DHW circulating returns are provided to control legionella in water systems by always maintaining the water above 50°C. To achieve this the DHW generator temperature must also increase to greater than 60°C. This can have a detrimental impact on the heat network, as it raises the heat network flow and return temperatures. This increases the losses in the network, as well as the associated operating costs, but importantly it increases the temperature above a heat pumps normal operating range, requiring either alternative or supplementary heat sources to raise the heat network temperature. The solution is to provide local water heaters as close to the draw-off as possible heated instantaneously and on demand from the heating system.

1.3.2 Heating and Cooling

A combination of 4-pipe simultaneous and 2-pipe reversible air source heat pumps are proposed to generate heating and cooling. The building systems will be compatible with Plymouth City Council's ambient loop network.
Cooling is required to control thermal comfort, dehumidify, remove process gains, and maintain environmental conditions. A 4-pipe simultaneous air

source heat pump system can recover this waste heat for beneficial use in the heating and hot water system.

1.3.3 Ventilation

Air handling units with high efficiency heat recovery devices are proposed to provide mechanical ventilation and minimise energy losses. Heat recovery devices will be plate heat exchanger type with summer bypasses. The units will incorporate high efficiency EC fans with low SFPs and be demand controls.

Where natural ventilation systems are permissible, low energy hybrid ventilation systems with heat recovery will be provided to reduce energy consumption.

1.3.4 Lighting

The lighting design will be co-ordinated with opportunities for daylighting, proposed window blinds and internal finishes to avoid glare and minimise energy use.

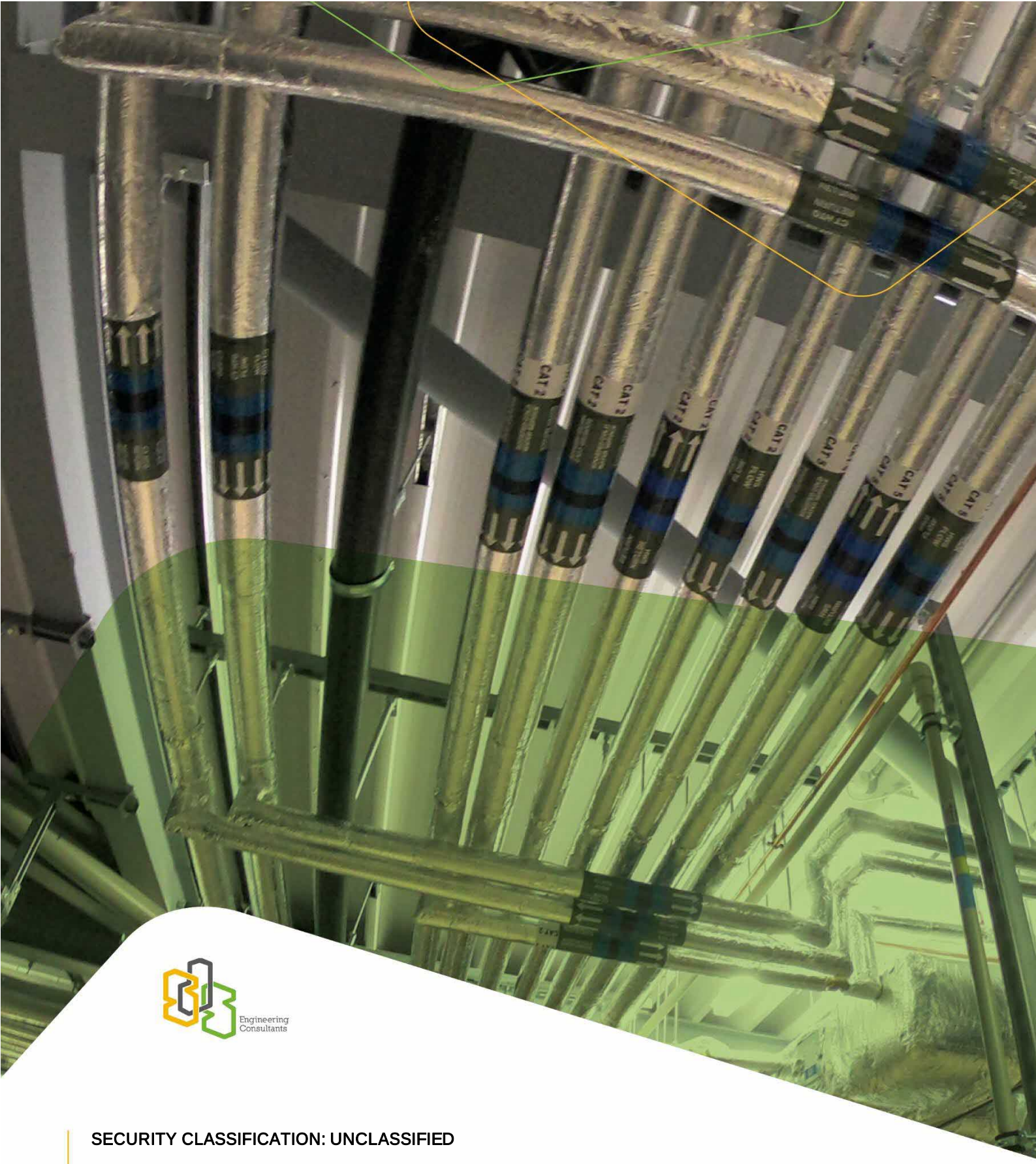
LED lighting technology is proposed to minimise the energy demand of the lighting installation and reduce the impact of casual heat gain when considering the summertime overheating criteria.

Opportunities for daylight dimming will be explored. Transient spaces will be controlled via presence sensor technology.

1.3.5 Photovoltaics

To achieve a BREEAM Excellent rating, onsite photovoltaic systems of 335m2 are required. This achieves a calculated EPRnc of 0.407. This size system also achieves local planning policy DEV32, which requires a 20%. A 5% margin is included in these estimates for design development.

Using the available roof space above the internal plant room a photovoltaic system of 212m2 with rating of 42kWp is possible. This helps achieve a 11.3% improvement on Part L 2021 building regulation, however not the BREAM excellent rating or 20% improvement required by DEV32. To achieve BREEAM excellent and DEV32 compliance an additional area of 123m2 is required to make up the total target area of 335m2. The remaining flat roof is shaded by parapets, roof mounted plant, and the roof plant room, therefore canopy type photovoltaic systems are proposed, that can be elevated above the flat roof and in line with the plant room roof to avoid the issue of shading from adjacencies.



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Services Design Solution Ltd.
19-23 Mary Seacole Road | The Millfields
Plymouth | Devon PL1 3JY | United Kingdom
+44(0)1752 255900
contactus@sdsolution.co.uk
www.sdsolution.co.uk
Building Services Consulting Engineers

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