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Jarvale Construction | Jacquet UK, Tankersley

Energy/Sustainability Statement

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EXECUTIVE SUMMARY

This report has been compiled to meet the requirements of the Energy Sustainability Statement as required by Barnsley Metropolitan Borough Council for the planning application for the erection of storage and manufacturing warehouse at Rockingham House, Wentworth Way, Tankersley, Barnsley, S75 3DH.

A summary of the National and Local planning policies that the development is expected to adhere is provided along with details of the Part L requirements, which is the section of the Building Regulations that covers energy efficiency. A review of the fabric elements of the development has been undertaken to show these meet requirements and justification provided where they do not, as well as a review of applicable LZC technologies.

The proposed development is a storage and manufacturing warehouse which will have no fixed heating or cooling system, the only regulated energy load will be lighting and a small amount of hot water. As a result, it is deemed that the development will be exempt from Part L compliance due to its low energy demand and therefore it is not possible to calculate carbon emissions savings. However, it will still be constructed on a fabric first approach in line with the energy hierarchy, u-values of applicable elements will at least match Part L requirements, all building services will be efficient and feasibility for installation of PV panels to the roof will be undertaken.



Image 1.0: Development Site

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Introduction



1.0 INTRODUCTION

Mainer Associates were approached to undertake an Energy Sustainability Statement for the proposed erection of a new storage and manufacturing warehouse building for Jacquet UK, Rockingham House, Wentworth Way, Tankersley, S75 3DH.

As per the requirements of Local Validation Requirements for Barnsley, this statement seeks to establish how carbon dioxide emissions will be minimised in line with the energy hierarchy of; using less energy, supplying energy efficiently and maximising the use of renewable energy and low carbon systems.

The proposed development seeks to extend the current operations at the Jacquet facility to erect a 2000m^2 Storage and Manufacturing Warehouse (Class B1/B2/B8) on land immediately to the south-east of the existing factory building. The proposed site plan and other images of the development can be seen in the images below.

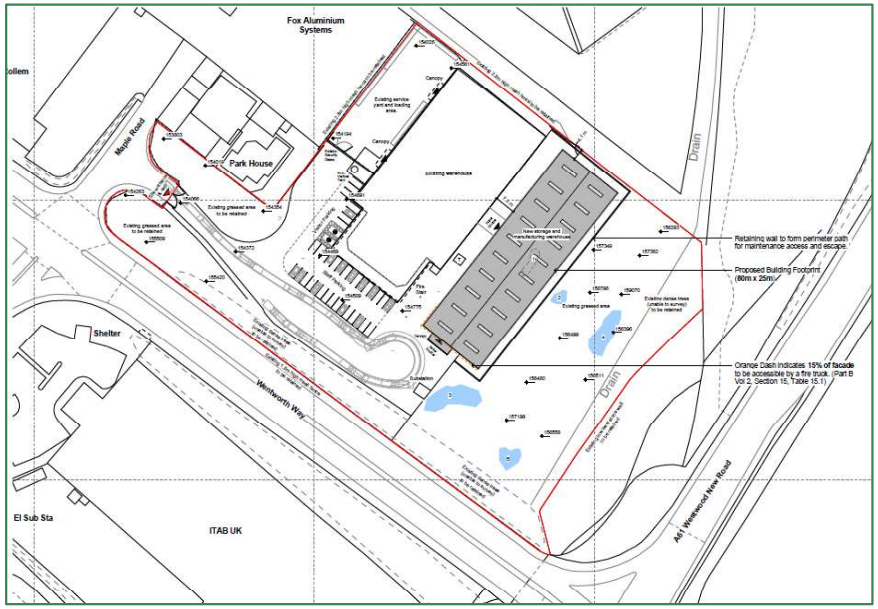


Image 2.0: Proposed Site Plan

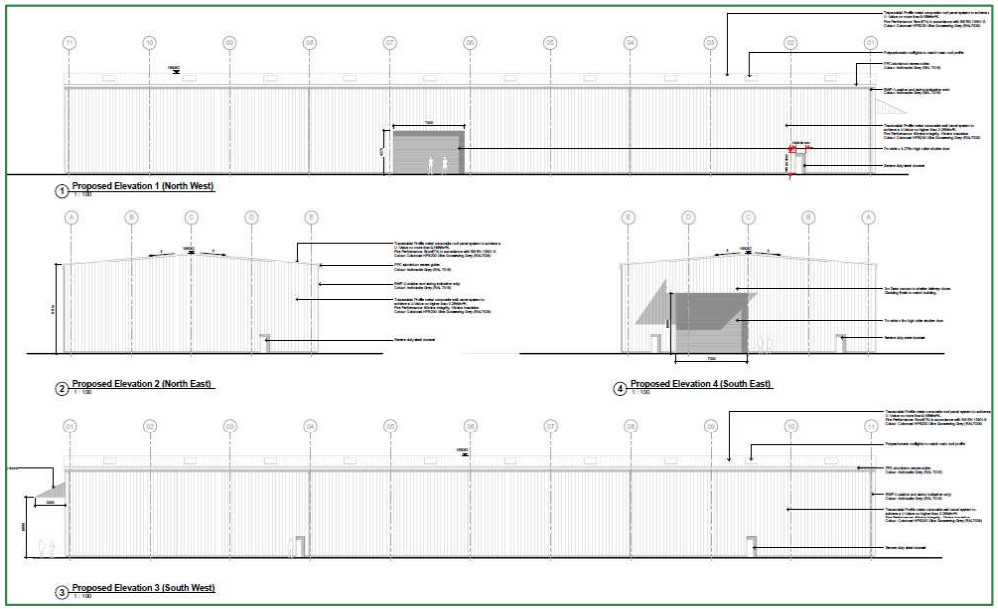


Image 3.0: Proposed Elevations

Regulatory Framework



2.0 REGULATORY FRAMEWORK

2.1 National Policy

National Planning Policy Framework (NPPF) 2023 sets out the Government's planning policies for England and guides the developers on how these are expected to be applied.

The policy argues that the purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development ca be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs. Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways:

1. An economic objective – to help build a strong, responsive, and competitive economy, by ensuring that sufficient land of the right types is available in the right places An economic and at the right time to support growth, innovation, and improved productivity; and by identifying and coordinating the provision of infrastructure;
2. A social objective – to support strong, vibrant, and healthy 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 well-being; and
3. An environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

2.2 Local Regulations: Barnsley Local Plan

The Local Plan sets out key elements of the planning framework for Barnsley, and the approach to its long term physical development to achieve the Council's vision of what sort of place Barnsley wants to become. Promoting sustainable development and reducing the borough's impact on climate change are overarching principles of this Local Plan, in accordance with the NPPF. The use and development of land will be assessed against the objective of securing sustainable development within Barnsley to meet its environmental, economic and social needs. The key policies to assess for energy and sustainable development are:

Policy CC1 Climate Change – this seeks to reduce the causes of and adapt to the further impact of climate change by:

- Giving preference to development of previously developed land in sustainable locations;
- Promoting the reduction of greenhouse gas emissions through sustainable design and construction techniques;

- Locating and designing development to reduce the risk of flooding;
- Promoting the use of Sustainable Drainage Systems (SuDS);
- Promoting and supporting the delivery of renewable and low carbon energy; and
- Promoting investment in Green Infrastructure to promote and encourage biodiversity gain.

Policy CC2 Sustainable Design and Construction – Development will be expected to minimise resource and energy consumption through the inclusion of sustainable design and construction features, where this is technically feasible and viable. All non-residential development will be expected, to achieve a minimum standard of BREEAM 'Very Good' (or any future national equivalent). This should be supported by preliminary assessments at planning application stage.

Policy RE1 Low Carbon and Renewable Energy – All developments will be expected to incorporate initially appropriate design measures, and thereafter decentralised, renewable or low carbon energy sources in order to reduce carbon dioxide emissions and should at least achieve the appropriate carbon compliance targets as defined in the Building Regulations.

The Sustainable Construction and Climate Change Adaptation SPD adopted in July 2023 provides additional guidance and information on how the above policies should be met. This includes a focus on energy efficiency and adaptation through application of the 'energy hierarchy', which involves applying a fabric first approach and thereby reducing initial energy demands before considering other measures such as renewable energy generation. It also includes the requirement for an Energy Sustainability Statement to be produced, the details for what must be included are within the updated Local Validation Requirements, which were released in May 2023. This document confirms the statement should:

- Demonstrate how CO_2 emissions have been minimised in line with the energy hierarchy
- Report estimated site-wide regulated CO_2 emissions and reductions after each stage of the energy hierarchy
- Investigate and commit to maximising the installation of renewable technologies on site demonstrated by CO_2 savings
- Include information on how the building's performance will be measured post-construction and how the performance gap will be addressed

2.3 Building Regulations

Building Regulations Part L covers the conservation of fuel and power in new buildings in England, its aim is to limit energy waste through a selection of minimum standards for both fabric elements and building services.

Approved Document L, Volume 2: Buildings other than dwellings gives guidance on how to comply with Part L of Schedule 1 to the Building Regulations and the energy efficiency requirements for buildings other than dwellings. The current version came into effect on 15 June 2022 and applies to work subject to a building notice, full plans application or initial notice submitted on or after this date.

- A new building must be built to a minimum standard of total energy performance, which is evaluated by comparing calculations of the 'actual building' against calculations of the performance of a theoretical building called the 'notional building'. The calculations use the following metrics;
    - Primary energy rate (kWh_{PE}/m^2 per year): this is influenced by the fabric and fuel. The building's primary energy rate (DPER) must be equal to or less than the target rate (TPER).
    - Emission rate ($kgCO^2/m^2$ per year): this is influenced by the fabric and fuel. The dwelling's predicted CO2 emissions rate (DER) must be equal to or less than the target rate (TER).
- The performance of the individual fabric elements and the fixed building service of the building should achieve reasonable overall standards of energy efficiency. Table 1.0 below details the limiting standards for fabric elements and air permeability for new buildings under Part L 2021

Table 1.0: Limiting standards for new fabric elements and air permeability in new buildings

Construction Element	Maximum U-value W/(m^2.K)
Roof (flat roof)	0.18
Roof (pitched roof)	0.16
Wall	0.26
Floor	0.18
Windows, roof windows, curtain walling	1.6
Rooflights	2.2
Pedestrian doors (including glazed doors)	1.6
Vehicle access and similar large doors	1.3
Air permeability	8.0 $m^3/(h.m^2)$ @ 50Pa

Energy & Sustainability



3.0 ENERGY & SUSTAINABILITY

Government guidance for carbon performance suggests a hierarchy of good practice in low carbon design, which is shown in Image 3.0 below. This is in line with the Local Validation Requirements, as discussed in Section 2.2, which states the statement should show how CO_2 emissions have been minimised in line with; using less energy, supplying energy efficiently and then maximising use of renewable and low carbon energy generation systems.

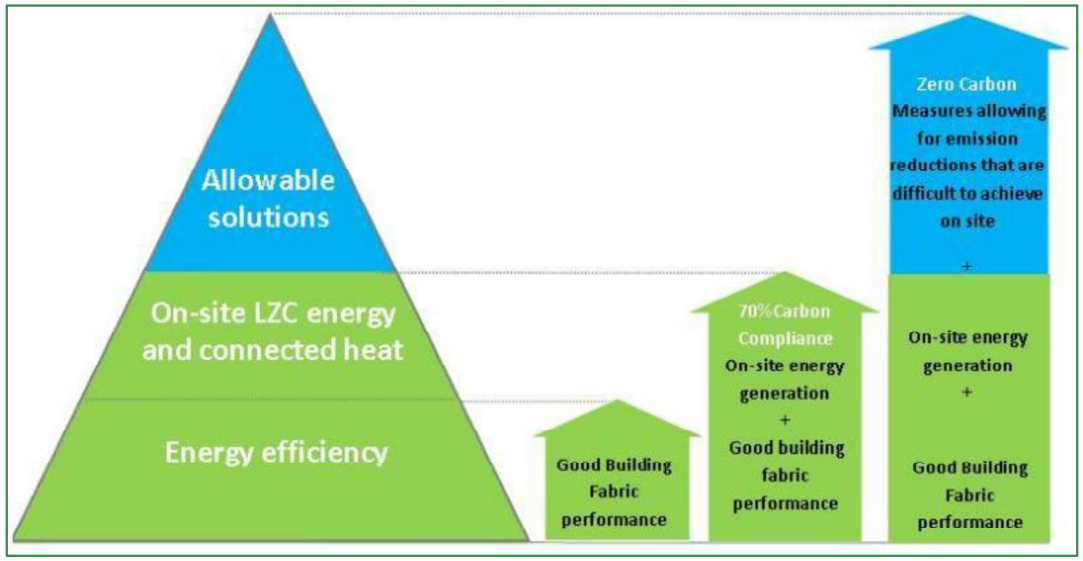


Image 3.0: Low Carbon Design Hierarchy

Energy efficiency can be achieved through the use of high-performance building materials to ensure thermal efficiency of the building envelope. This along with the implementation of efficient fixed services design and low and zero technologies, should allow designers to meet most carbon compliance requirements.

The last element of the hierarchy is the use of renewable energy solutions to generate the energy used on site. Ideally, these renewable energy sources should be installed locally. However, if this is not possible then 'Allowable Solutions' can be used to provide off-site renewable energy source to offset carbon emissions from the site. The proposed development will be designed in line with the hierarchy illustrated above.

3.1 Fabric and building services performance

In line with the first element of the energy hierarchy, 'Using less energy', as defined within the Local Validation Requirements, the development proposes the following standards:

- External Walls – Trapezoidal Profile metal composite wall panel system to achieve a u-value no higher than 0.26W/m²K
- External Roof – Trapezoidal Profile metal composite roof panel system to achieve a u-value no more than 0.16W/m²K
- Rooflights – Polycarbonate rooflights to match main roof profile to achieve a u-value no more than 2.2W/m²K
- Pedestrian pass doors – Severe duty steel doorset to achieve a u-value no more than 1.6W/m²K
- Vehicle access doors – Roller shutter door to achieve a u-value no more than 1.3W/m²K
- Air permeability – Aim to achieve a result of 8m³/h.m² @ 50Pa

In regards to the floor of the development, this is proposed to be a solid concrete slab with no insulation at present. This is due to the machinery and processes that will be undertaken within the building and therefore insulation is not appropriate due to the load tolerances required. Further investigations will be undertaken to establish whether there are any suitable products that could be installed and if any suitable options are found, these will be pursued and their feasibility assessed.

In line with the second element of the energy hierarchy, 'Supply energy efficiently', as defined within the Local Validation Requirements, the development proposes the following standards:

- Lighting – Highly efficiency LED lighting to be installed that will achieve a minimum average luminaire efficacy of 95 luminaire lumens per circuit watt with appropriate controls, such as presence detection or daylight controls, where suitable for the use of the space.
- Hot water – Dedicated electric hot water units with 100% efficiency to hot water outlets such as WC and kitchenette area. These will minimise any associated losses through having no distribution pipework and limited storage capacity.
- Ventilation – Dedicated local extract fan to WC to achieve an SFP of 0.3W/l.s

The fabric elements detailed above all aim to achieve levels that at a minimum do not exceed those required under Part L as shown in Table 1.0 in Section 2.3, apart from the floor for which justification has been provided, this shows that a fabric first approach is being followed in line with the energy hierarchy. Similarly, highly efficient building services are proposed to use the energy, which is in line with the next step of the hierarchy. Please note that the building is not proposed to have any fixed heating or cooling systems, so these have not been included in the building services. This impacts on the ability to calculate any CO_2 savings as a result of the options as shown above and further discussion on this is provided in Section 3.3 below.

3.2 Low and Zero Carbon Technologies

In line with the third element of the energy hierarchy, 'Maximising use of renewable and low carbon energy generation systems', as defined within the Local Validation Requirements, there are various low and zero carbon technologies, such as photovoltaic panels, wind turbines and CHP etc available on the market. However, not all are feasible due to capital expenditure, pay-back periods, availability, logistics and respective CO_2 emission reduction. It is often not feasible to outlay significant capital expenditure which has high payback periods and will save limited energy and CO_2 emissions.

The following section of this report aims to identify potential technologies for more detailed analysis and justify any technologies being excluded at this stage. A traffic light system has been adopted to represent the anticipated feasibility of these measures prior to undertaking modelling of the site.

The traffic light system should be interpreted as follows:

Red Technology not suitable.

Amber Technology may be suitable depending on building energy demands.

Green Technology may be suitable subject to payback and operational constraints.

Table 2.0 LZC feasibility

No.	Sustainable Element	Feasibility Comment	Feasible Yes/No
1	Wind Turbines	Wind Turbines generate electrical power from the earth's natural wind resource. The location of any wind turbines would need to be carefully considered as there are a number of buildings and trees within the vicinity of this building which could prevent/block wind potential. Planning could also be a consideration. It is generally considered that wind turbines do not operate well in urban environments unless they are tall enough to be unaffected by the deflection of wind by surrounding buildings. Given that the development site, it would not be viable to provide either a significant number of small turbines or a smaller number of large-scale turbines to meet a significant proportion of the development's energy demand.	No

2	Photovoltaic Panels	Photovoltaic (PV) panels could be installed; however, consideration should be made to the orientation of the panels and structural load for the roof, in order to maximise yield. Given the manufacturing nature of the building, this could be an effective means of utilising generated energy.	Yes
3	Solar Collectors	Solar collectors provide a mechanism to collect heat energy from the sun and transfer this to the water supply to the building, thus reducing the primary domestic hot water demand and subsequent energy consumption. The solar collectors could be mounted on the roof of the building. The system output would be dependent on the orientation of the solar array. The hot water usage profile for the building and availability of accessible roof space for a hot water system would have to be assessed, however, given the limited likely hot water demand, it is not thought this would provide any significant impact on reducing energy demand.	No
4	CHP	Combined Heat and Power (CHP) installations require careful sizing against the base loads of the building they are to serve. In order to operate efficiently it is preferable to have a steady base load. As the proposal does not include any heat demand, this would not be an appropriate system for the development.	No
5	ASHP	Air source heat pump (ASHP) systems offer a more practical alternative to GSHP's in that, generally, they offer much greater flexibility with regards to their installation and do not require the prior geological, or ground preparation work needed by GSHP's. With a seasonal efficiency of 300% or more, they are not quite as efficient as GSHP's. They do, however, offer a renewable energy source to provide low grade hot water for suitable for domestic hot water or heating installations. As the proposed development will not include any fixed heating or cooling systems, this is not an appropriate use of resources.	No
6	GSHP	The installation of a ground source heat pump (GSHP) needs to be carefully considered. The development's location and the size of the site could require that boreholes be dug rather than a more traditional slinky arrangement. This could significantly increase the cost thus potentially making the installation economically prohibitive. As the proposed development will not include any fixed heating or cooling systems, this is not an appropriate use of resources.	No
7	Biomass Boilers	The use of a central boiler plant utilising biofuel would mean the requirement for a biofuel storage tank and regular deliveries.	No

		Biomass boilers could be installed to provide the necessary energy for heating and domestic hot water. However, transportation and storage of fuel make the suitability of biomass highly dependent on available space. Further investigation of local planning, clean air and smoke control requirements would also be required to fully assess feasibility. Given the nature of the site and the proposed development, there are likely to be planning restrictions on the use of biomass systems for residential units. Storage requirements would be difficult to accommodate given the close proximity of development plan. In this case the use of biomass unlikely to be viable. As the proposed development will not include any fixed heating or cooling systems, this is not an appropriate use of resources.	
8	Heat Recovery Ventilation Units	Heat recovery systems allow energy from extracted air to be transferred to incoming air before it is supplied to the occupied space. For a heat recovery system to be effective, the building in question should have a good level of air tightness, as will be the case for this scheme. Given the nature of building being a warehouse for storage and manufacturing purposes, airtightness will be difficult and sufficient natural ventilation will likely be present. This system would not be an efficient or appropriate use of resources.	No
9	District Energy Systems	There are no existing district heating networks in close proximity to the site and as the proposed development will not include any fixed heating or cooling systems, this is not an appropriate use of resources.	No

3.3 Energy Performance

As mentioned at the end Section 3.1 above, the proposed building is a storage and manufacturing warehouse, which is planned to have no fixed heating or cooling system. This is due to the space being heated/cooled by latent heat from the machinery and processes undertaken within the building, which is in line with the existing manufacturing facility on site, which also has no heating or cooling system installed. Under Part L there is an exemption for:

- *Buildings with low energy demand which are industrial sites, workshops or non-residential agricultural buildings*

For the purposes of the exemption, low energy demand only relates to the energy used by fixed heating or cooling systems, not to energy required for or created by process needs, this includes buildings where the space is not generally heated or cooled other than by process heat.

Based on this definition, the development is therefore deemed to be exempt from Part L requirements and compliance. In addition, due to the lack of heating/cooling system it is not possible to accurately complete an SBEM calculation to attempt to capture the potential CO_2 savings from the proposed measures in Sections 3.1 and 3.2 above. This is because a heating system must still be assumed within the calculation, even though there will not be one present, which skews the figures and therefore any CO_2 savings resulting from the measures. Furthermore, with the lack of heating/cooling systems, any CO_2 emissions from regulated energy will likely to be very minor as only lighting and hot water will apply, the lighting will be minimised by the use of LEDs throughout and the hot water usage will be very minimal based on one WC and a possible small kitchenette.

Despite being exempt from Part L requirements, the development is still committed to putting in place measures that will reduce operational energy demand, create savings in terms of CO_2 emissions and create a sustainable building in line with the ethos and policies of the Barnsley Local Plan.

- Fabric first – u-values of fabric elements (excluding the floor, as discussed in Section 3.1) to at least match the requirements of Part L with hopes to better these
- Highly efficient building services – installation of LED lighting, electric point of source water heaters and compliant extract fans
- Renewable energy generation – feasibility of installation of PV panels to the roof of the building

Conclusion



4.0 CONCLUSION

As per the requirements of the Sustainable Construction and Climate Adaptation SPD and its accompanying Local Validation Requirements, this statement should demonstrate how CO_2 emissions will be minimised in the proposed development in line with the following energy hierarchy:

- Using less energy – this will be achieved by following fabric first principles, the walls, roof and openings will all achieve u-values to meet the Part L minimum requirements along with the air permeability to at least match Part L.
- Supply energy efficiently – this will be achieved of highly efficient building services, including LED lighting throughout, electric point of use water heaters and extract fans meeting Part L requirements.
- Maximising use of renewable and low carbon energy generation systems – this will be achieved by investigating the feasibility of installation of PV panels to the roof.

As discussed within Section 3.3, due to the nature of the development and lack of fixed heating/cooling systems, the building will be exempt from Part L compliance requirements and this also means it has not been possible to calculate the associated CO_2 savings for the proposed measures as mentioned above. However, it is clear that by following these principles there will be associated savings in CO_2 emissions, for example going with LED lighting over traditional technologies like fluorescent or halogen fittings as is common in industrial buildings could result in savings of 50-70%+ in terms of emissions in terms of this one aspect of the build.

While exact CO_2 savings cannot be provided for this development in line with the requirements of the Energy Sustainability Statement, it should be noted as per comments in Section 3.3 that due to the lack of heating/cooling systems, the regulated energy load and therefore any resulting CO_2 emissions from this will likely be minimal. As discussed previously, the only regulated energy will be in regards to the lighting and hot water, which through the use of LEDs for the lighting and very minimal hot water demand for the development, has been minimised.

The majority of energy usage to the development will be unregulated, likely to be through the machinery and processes that will be undertaken within the building. The development is committed to investigating the feasibility of installing PV panels to the roof and maximising any potential renewable energy generation, which would look to assist with offsetting some of this energy usage. While there are no building systems that will require commissioning, points above and discussed previously show that a fabric first approach is being followed.

To conclude, the proposed measures not only meet the requirements of the energy hierarchy but also those of the relevant policies in the Local Plan as discussed in Section 2.2:

- Policy CC1 Climate Change – there will be an associated reduction in greenhouse gas emissions as a result of the proposed sustainable design and construction and the potential of PV to the roof is promoting and supporting the delivery of renewable energy.
- Policy CC2 Sustainable Design and Construction – low u-values will be achieved on walls, roof and openings, a good standard of air permeability and use of highly efficient building services will all contribute to minimising resource and energy consumption.
- Policy RE1 Low Carbon and Renewable Energy – by installing highly efficient building services, the development will minimise it's regulated energy load and thereafter the potential for PV panels to the roof of the building will seek to reduce this minimal regulated load further and look to contribute towards reducing the unregulated energy consumption.