21st November 2019
Document Ref: STH.PS.LPA.SUS.01 Revision A
(Revision A: Additional details added to section 2.4)
Planning Ref: S.19/1122/REM

Additional Sustainability Details
Application Reference: S.19/1122/REM

1.0 Introduction

1.1 The applicant understands the committee's concerns in terms of ensuring the new school, which will form a landmark community building at the centre of the development as a whole, offers a sustainable design approach and sets a good example to future phases of development in terms of addressing the Climate Emergency.

1.2 It is noted that the committee requested PV / Solar panels on the school, however for the reasons outlined in the Briefing Note submitted to the LPA (reference STH.PS.LPA.BN.01 dated October 2019), this is not achievable in this particular instance. This document has therefore been prepared to demonstrate how the school designs have been developed to ensure it is still sustainable and significantly helps reduce carbon emissions through alternative measures.

1.3 It is important to note that all of the details provided within this document have / will form the requirements of tender packages for the procurement of the school. In doing so, it ensures that the delivery of the school secures these key sustainability requirements.

2.0 Sustainable Design Strategy

2.1 The design of the school follows a fabric first approach, which follows the principles of the Sustainable Design Hierarchy to limit energy consumption and reduce carbon emissions in the first instance. The fabric first approach was agreed with the LPA at the start of the design process.

2.2 It was recognised early on in the design process that sustainability would be key to the principles of the school and that due to various site constraints, PV or solar panels would not be feasible. As a result, the fabric first approach has looked to go above and beyond the requirements of Building Regulations to ensure significant betterment is achieved to offset the constraints limiting alternative green measures such as PV.

2.3 The following information has been provided by Smith Consult who are the Mechanical and Electrical Engineers for the school and will assist in clearly demonstrating the betterments being offered:

2.3.1 Building Fabric (U-values / Air Permeability)
Note – the lower the value, the greater the efficiency

Element	Building Regulations Requirement U-Value ($W/m^2.k$)	School Design U-Value ($W/m^2.k$)	Betterment Achieved (%)
Floor	0.25	0.20	20%
Walls	0.35	0.24	31%
Windows	2.2	1.6	27%
Roof	0.25	0.16	32%
Roof-lights	2.2	1.6	27%
Air Permeability	10 m^3/hour/m^2	6 m^3/hour/m^2	40%

2.3.2 As can be seen from the above, the design of the fabric of the building is offering significant betterment over the requirements of Building Regulations. This will ensure an energy efficient fabric to the school building and substantially reduce carbon footprint and energy demand.

2.4 Additional efficiencies over and above the fabric first approach will be secured via the following methods:

- Lighting will be provided by LED systems, which offer better efficiency, increased life span, less light pollution to the surrounding area and lower running costs.
- Lighting control will be via auto on / off systems. These will detect if a room is being utilised and if not, turn the lights off accordingly to ensure empty rooms are not being kept illuminated unnecessarily.
- Daylight dimming systems will be utilised on the lighting network. This adjusts the lighting levels according to the level of natural light available. For example, in autumn the artificial lighting levels will be higher in the morning and towards mid-afternoon when natural light levels are low, but will dim during the middle of the day when natural light should be providing the majority of the lighting requirements. This system has been proposed in conjunction with the building orientation to try to ensure natural light is maximised (see below) and energy consumption minimised.
- The school is orientated with the aim of reducing energy requirements by passive means. For example, the school frontage is east facing, with the façade of the teaching rooms either east or west facing with large windows provided to offer high levels of natural light and ventilation and effective solar shading to the windows to avoid over heating in the warmer months and ensure student / teacher comfort.
- Insulation systems will be designed to achieve the values identified in the table above in para 2.3.1 'School Design U-Value' as a minimum. The results will be analysed using detailed dynamic energy modelling to ensure the designs achieve this standard and potentially even go beyond it.
- Ventilation to the main hall is provided using low level windows and high level roof terminals. These utilise the 'stack effect' to provide effective ventilation even on windless days. The roof terminals to the hall also provide a means of ventilation for

the hall on winter days which will avoid cold draughts or the build-up of CO2 due to lack of ventilation.

- Ventilation to the classrooms is provided by opening windows and roof lights, which can be controlled by the individual teacher as it is recognised that not everyone has the same preferred level of comfort when it comes to room temperature. The system will avoid cold draughts and provide cross flow in summertime to maintain comfortable temperatures. Similarly heating controls will be provided within each classroom, so that the individual teachers can adjust the heating settings to suit their own classrooms needs. This will avoid the potential situation for the heating being on at the same temperature throughout the building and some teachers having windows / roof vents open at the same time as they believe it to be too warm within their particular room.
- Kitchen areas within schools are traditionally high energy demand due to the ventilation plant serving the kitchen area. This has been recognised by the design team and the designs will utilise inverter driven fans with low energy EC motors which meet the latest requirements of the European Directive.
- Heating will be provided by high efficiency condensing boilers and water heaters. Energy efficiency is maximised through the condensing process.
- The school designs will include zoning, so that areas which may be utilised outside of school hours (e.g. the main hall for sports activities in the evenings) can be illuminated and heated in isolation to the rest of the building to ensure that energy is not being wasted by heating and lighting parts of the building that are not in use.
- Heating and water distribution pipework will be insulated throughout the building utilising foil faced mineral wool insulation. This will ensure minimal heat loss from the pipes during distribution. This system also has a zero ozone depletion potential (ODP) and has an A+ Green Guide efficiency rating.

2.5 When the fabric first approach is combined with the above measures, the total CO_2 saving equates to 6200kg per year. To give some context, this would equate to approximately 80m^2 of PV panels. This is a significant CO_2 saving provided predominantly through a detailed and well-designed fabric first approach and sustainable electrical and mechanical design.

2.6 It is also important to note that the above approach provides the energy efficiencies whilst the school is in operation. PV or solar panels conversely would operate at their optimum in summer, when in reality the school would be closed for summer holidays for a large proportion of this time, so the benefits would not necessarily be maximised to their full potential.

3.0 Conclusions

3.1 The importance of sustainability and carbon reduction has been recognised by the applicant and the design team and been considered throughout the design process.

3.2 Site constraints limit more common green technologies such as PV and solar panels and therefore the designs have addressed sustainability through a fabric first approach combined with a well thought out mechanical and electrical design.

3.3 The fabric first approach was agreed with the LPA at the start of the design process.

3.4 The design team have ensured that the requirements of the fabric first approach exceed those specified by Building Regulations to ensure that the designs comfortably offset the fact that PV / solar panels cannot be used.

3.5 The fabric first approach will help achieve substantial betterment over the requirements of Building Regulations. When combined with the efficiencies secured through the mechanical and electrical designs it will provide a saving of 6200kg per year in CO_2 emissions.

3.6 The principles of the fabric first design requirements have / will form part of the tender requirements to ensure they are delivered during the construction of the school.

3.7 The sustainability measures provided ensure they are maximised during the schools operational times. Conversely, PV or solar panels would operate to their optimum in summer, when in reality the school will be closed for summer holidays for a large proportion of this time and therefore the benefits would not necessarily be maximised to their full potential.

3.8 The proposals therefore offer a sustainable design solution and ensure that this landmark building offers low energy consumption and helps achieve local and national targets for CO_2 reduction.