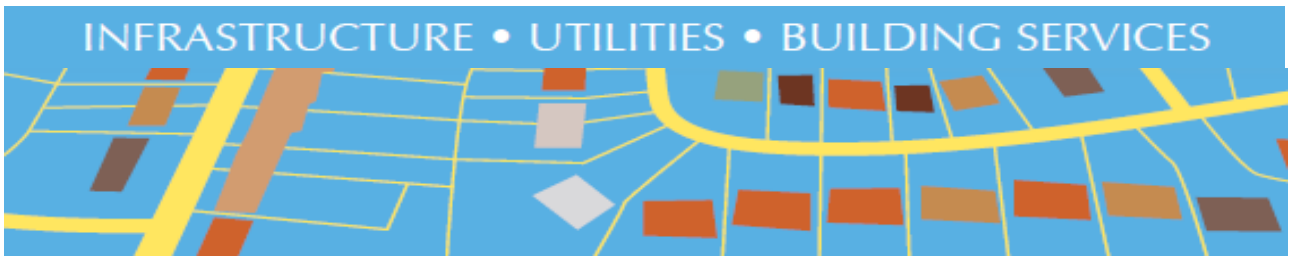
TONY MALKIN CONSULTING



MAUDLAND BANK SITE, PRESTON

SUSTAINABILITY

Energy Use, Renewable Energy & Water Conservation

March 2017

T: 07565 524999
E: tony@tonymalkinconsulting.co.uk
26 Grenville Road • Hazel Grove • SK7 5AF

MAUDLAND BANK SITE, PRESTON

SUSTAINABILITY – ENGINEERING SERVICES

Energy Use, Renewable Energy & Water Conservation

Introduction

The proposed Maudland Bank Site development located on land adjacent to Maudland Bank close to the intersection with Maudland Road and opposite Pedder Street, Preston

Student residential accommodation is proposed for the site, comprising of studio and cluster accommodation with cira 150 occupants with en-suite bathrooms, communal areas and kitchen areas.

Refer to Appendix A – Indicative Proposed Site Plan

The building will be assessed in both layout and orientation in conjunction with the overall development constraints, to gain the most benefit from passive solar design through orientation and room layouts.

The selection of materials and fabrics will be made under the requirement to benefit from thermal mass, heat absorption to provide the occupants internal stable temperatures through the seasons.

The buildings will be provided with high performance level of insulation, utilising renewable materials and minimising the use of products having high energy production wherever possible.

Energy Use

The design of the engineering services will be undertaken with the purpose of efficiently utilising the use of energy as far as practicably achievable, whilst providing function and occupiers with the required internal environment.

To achieve the optimum minimum use of energy; the buildings will be thermally modelled using a national calculation approved simulation software to show compliance to the current Building Regulations.

An energy performance rating will be determined and certificated.

Energy Efficiency Strategy

In achieving an energy efficient solution it will be necessary for the:-

- formulation of integrated building plans,
- selection of engineering services design parameters
- establishment of management and operational policies
- energy saving being an integral part to achieve the best performance.

Renewable energy technologies can potentially improve the sustainability credentials of the buildings, and their inclusion will be dependent on the following:-

- Technical feasibility
- Planning requirements
- Available grants & funding

An overall review has been undertaken to identify the potential renewable and sustainable design and energy considerations, with an allocation of both the advantages and disadvantages of each element.

Renewable and Sustainable Design and Energy Considerations

Considerations	Advantages	Disadvantages
Photo voltaic	Very clean and technically well proven technology	Expensive technology / roof and wall cladding issues
	Savings in electricity running costs and greenhouse gas emissions. Long term independence from fuel price inflation	Installation process/space for inverters and batteries required
	Architectural integration; no moving parts; self-cleaning panels	Separate metering required
	Possible resale of energy to grid	Output subject to solar radiation; shade from clouds, trees or nearby buildings reducing output
	Best orientation – south and tilted between 30 and 60 degrees	Large surface area required; relatively low efficiencies; maintenance access required.
Ground Source Heat Pump	Environmentally friendly; low energy consumption technology	Necessity to balance the heating load over the year to ensure long term efficiency
	Savings in electricity running costs and greenhouse gas emissions; long term independence from fuel price inflation	High installation costs and uncertainty about ground geology
		Under floor heating systems required

Combined Heat & Power (CHP)	Current cost of electricity and gas promoting the use of CHP	Plant space required for generator and buffer vessels
	Saving in running costs and greenhouse gas emissions. Long term independence from fuel price inflation	Require backup systems for failure and planned maintenance
	Potential to use biofuels	Viability dependant on future electricity and gas prices
	Technology independent of the meteorological conditions	Noisy equipment with requirement for plant attenuation .
Solar Hot Water System	Environmentally friendly; a renewable energy	Roof area required integration with fabric.
	Savings in electricity & gas, greenhouse gas. Long term independence from price inflation	Cost of installation
	Equipment is well established; annual solar radiation level determined from established data	Necessary to back up system
	Best orientation – south and tilted between 30 and 60 degrees; no moving parts	Dependant on meteorological condition; subject to low radiation likely in winter
Wind Technology	Renewable energy	Wind mean air velocities below practical limits in low rise applications
	Saving in electricity costs and greenhouse emissions	Planning approval required
	An effective renewable technology	High capital & maintenance cost
	Historical wind data information available	Structural considerations required
Rainwater Recycling	Water saving for irrigation and toilet flushing	Energy consumption for pumps and treatment
	Environmentally friendly	Back up needed
	Water attenuation	Space required for plant and equipment

Grey Water Recycling	Water saving for toilet flushing	Volume of toilet flushing exceeds collection from showers and basins
	Environmentally friendly	Energy consumption for pumps and treatment
		Space required for plant and equipment
Biomass	Renewable energy	Large plant and fuel storage required
	Saving in gas and electricity and greenhouse gas emissions	Regular maintenance, noise generation, frequent deliveries required
	Potential to generates local economy	Subject to local sourcing
Ventilation heat recovery	Reuse of generated energy	Additional capital cost outlay
	Reduces overall energy wastage	Additional space requirement

Engineering Services Energy Strategy

The following summarises a strategy which can be adopted to minimise energy consumption, coupled with a range of available alternative/renewable technologies and their potential application and advantages and dis-advantages in technical terms.

An energy conscious approach will be adapted to the overall designs, which will be within three categories:-

- Optimisation of building envelope
- Specification of energy efficient plant and services equipment
- Zoning of services to maximise operating efficiencies.

The designs will ensure the requirements of the Building Regulations are met, and where practicable exceeded.

As part of this process a thermal analysis of the building will be carried out to achieve an optimum balance of efficiency between the building envelope and engineering services, consistent with the overall design concept.

Energy saving features to be considered include:-

- Optimising fabric ‘U’ values
- Use of building projections to give shading from solar gain
- Use of sun control glazing
- high efficient boilers
- heat recovery through ventilation extract
- heat recovery through wash-down water
- high efficiency lighting
- low energy loss motors
- ground source heat pumps

With regard to engineering services and the inclusion of energy reducing features, the potential features to be incorporated would be:-

- Condensing Boilers
- Heating Controls
- Flue gas recovery devices (if not part of the condensing boiler)
- Lighting fittings
- Lighting controls
- Water efficient taps and showers
- Heat recovery from ventilation extract
- Heat recovery from hot wash-down water

Following planning approval the engineering services proposal will be developed with the specific requirements for the operation of the proposed production, warehouse and office facility, incorporating all or as many energy saving and recovery systems as possible to minimise the overall energy footprint of the proposed facility.

APPENDIX A – Development Proposal

Reproduced here to assist the Sustainability Planning Statement