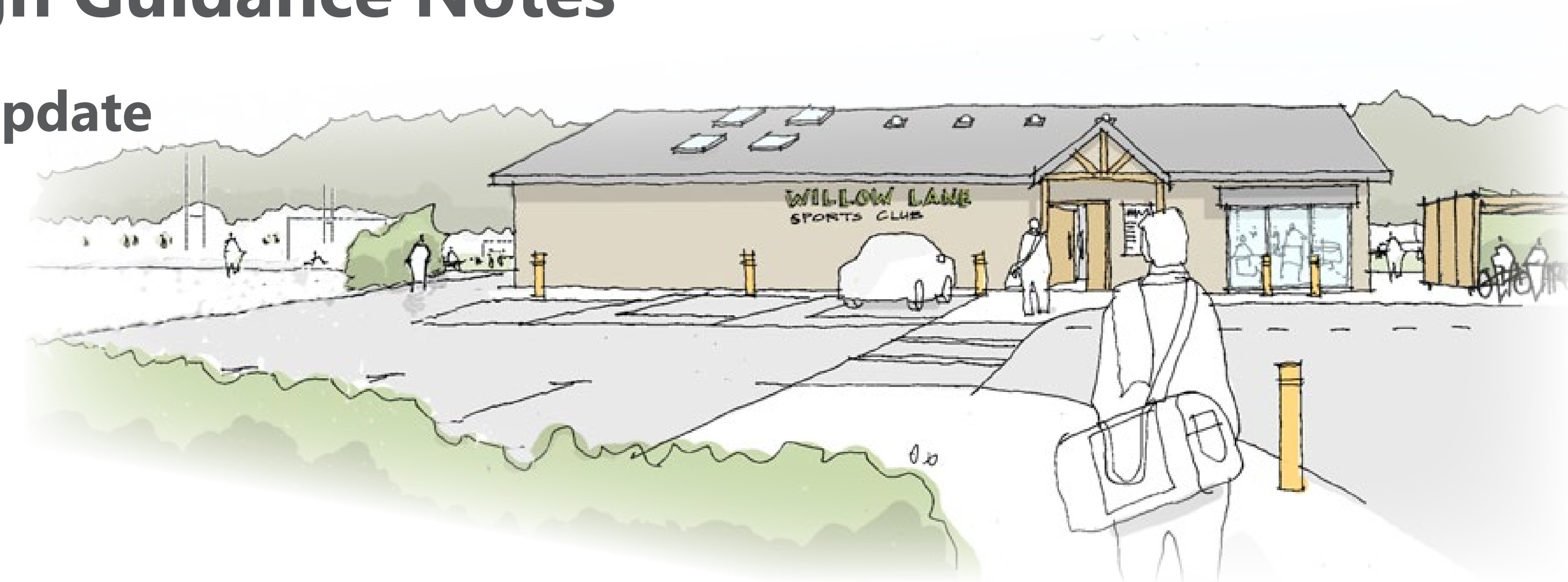
SPORT ENGLAND

Creating a sporting habit for life

Clubhouse

Design Guidance Notes

2016 Update



4 SUSTAINABILITY

ECB EHB LTA BRITISH TENNIS RFL RFU The FA

Display panels

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FOREWORD

These videos, display panels and guidance notes are intended to help clubs and their design teams work through and apply general principles and processes to achieve better clubhouses. The guidance covers all the key stages – from start to finish.

The information has been developed with the help and support of National Governing Bodies for the range of sport that use and operate such buildings and with input from specialists with particular technical knowledge.

Although clubhouse buildings are often small in scale and shared on a multi-sports community basis, they are nevertheless, essential elements in the sporting landscape. They provide the access, social areas, changing, storage and other essential support spaces for the particular sports.

It is important that the facilities are designed, operated and maintained well to help create a sporting habit for life.

All figures, timescales, legislation and regulations are based on data and information available at the time of writing.

https://www.sportengland.org/facilities-planning/tools-guidance/design-and-cost-guidance/pavilions-clubhouses/

CONTENTS

INTRODUCTION

The term 'sustainability' covers a wide range of issues and initiatives and can mean different things depending on context and circumstances. In this document the focus is on identifying practical measures that will make a clubhouse more comfortable, make more efficient use of energy and other resources and help change attitudes and behaviours.

The Sustainable Clubs website (see link below) provides guidance to help community sports clubs use environmental sustainability to reduce their running costs. It contains a range of advice from understanding how much energy a club uses through to identifying, prioritising and funding sustainability projects.

The guidance is aimed at users of all knowledge levels, whether they are considering sustainability for the first time in their club, or are more experienced and looking for further opportunities.

http://www.sustainableclubs.co.uk/

1.0 KEY CONSIDERATIONS

Profile of Use

Sports clubhouses vary in scale and complexity, dependent on the number and type of pitches and uses they serve. The accommodation generally includes changing rooms, shower facilities, toilets, separate official change accommodation, and social area with light catering facilities and storage.

Understanding the anticipated use of a space is a fundamental first step in sustainable design. A profile should be developed of when the building will be occupied, the pattern if use and the number of people. In many cases the pattern of use will be intermittent rather than a constant demand. This will help inform decisions about the best way to construct, heat, light and ventilate the building and the most appropriate controls, plant and technologies.

A sustainable building will require less:

- Water
- Energy
- Running cost
- Natural resources during construction

It can also be more comfortable

Site Constraints and Opportunities

All projects should be based on a robust analysis of the site, the proposed clubhouse building and to understand the issues around sustainability. Whether in an isolated and remote locations or close to the utility networks, it is important to finding the best location, orientation and the most cost effective and sustainable way to provide power, heat and water over the lifetime of the facility.

For new buildings, the principles of 'Intelligent Building Design' can help the use of natural resources and reduce the base line energy demand. The approach prioritises the use of passive measures to minimise the building energy requirements, achieving efficient buildings and reducing CO_2 emissions.

Priority 1	**Passive Measures (see pages 12-14)** – to minimise building energy use by considering the building form in order to avoid or minimise the need for mechanical cooling and heating, and artificial lighting
Priority 2	**Efficient Engineering Systems** – to minimise plant energy use by selecting the most appropriate engineering systems and optimising system performance with active controls
Priority 3	**Renewable Energy** – to use of appropriate on-site renewable energy technologies and local resources.

The selection of the most appropriate technologies will relate to:

- Site location and constraints
- Intended usage patterns
- Financial constraints

These will vary from project to project

Use of Renewable Energy

Renewable energy can be generated from natural resources such as the sun, wind and water, using technology which ensures that the energy stores are naturally replenished.

Instead of buying all of the energy that the club needs from suppliers, it is possible to install renewable technology to generate energy. However, before considering this approach, ensure that the clubhouse is as energy efficient as it can be. This way, the energy that is self generated will have the maximum impact.

For further information on renewable energy, please refer to;

www.energysavingtrust.org.uk

The location of the proposed clubhouse may lend itself to certain technologies. For example a site close to a running water source may be able to utilise a micro hydro system for generating electricity or the underlying site geology may make the extraction of water for irrigation a feasible option. There are a range of 'off-grid' technologies that might be more suitable than making long and expensive connections to public utility networks e.g. water, electricity, or gas etc.

See separate 'Sustainability' display panel:

- **S2 Renewable energy**

Cost Benefit Analysis

For each technology it is important to weigh up the pros and cons and long term implications and decide what may be most suitable in a particular situation. In some cases the intermediate usage profile will not suit some technologies.

Sustainable buildings will use less water and energy and have lower operations and maintenance costs and by careful selection of materials they will use fewer natural resources during construction and be more comfortable. There is often some resistance to implementing sustainable building designs because they are initially considered more expensive. Similarly, sustainable design is often the first casualty when savings are made.

Such decisions should be made on the basis of the total cost over the project life cycle. The purchase, installation, running and maintenance costs should all be factored into the analysis. The availability of Government incentives can also be a key factor when assessing the financial viability of a project.

See: https://www.bre.co.uk/greenguide/podpage.jsp?id=2126

Check if financial incentives to help meet the government's energy targets* apply to the project:

- **Renewable Heat Incentive**
- **Feed in tariff payment**

* to meet 15% of the UK's energy demand from renewable sources by 2020

2.0 STATUTORY SUSTAINABILITY REQUIREMENTS

There are a number of regulations relating to sustainability that are either a statutory or legal requirement implemented by the government or imposed as a condition of the planning permission or the project funding.

The four main regulations applicable to a building project are;

- Energy Performance Certificates
- Building Regulations Part L
- BREEAM
- The Merton Rule

Energy Performance Certificates

Energy Performance Certificates (EPC) have been introduced to help improve awareness of the energy efficiency of buildings. All sports clubhouses now require an EPC on completion of construction, sale or rental. A specialist consultant will be required to provide calculations and issue the certificate.

Building Regulations Part L Conservation of Fuel and Power

The Part L of the Building Regulations - 'Conservation of Fuel and Power' applies to any building or Renovation work. Section 2 refers to buildings other than dwellings and is relevant to clubhouse projects. It includes the following:

- Achieving acceptable building carbon dioxide emissions
- Limits on U-values (i.e. the thermal performance of the building envelope); air permeability, heating controls, lighting efficiency and pipe work insulation
- Limiting the effect of solar gain, for example, by shading and orientation
- Quality of construction and commissioning, for example, continuity of insulation and heating controls
- Providing information in the form of a building manual to help users understand the systems and carry out maintenance and monitoring of energy consumption.

Drawings and documentation covering the above will be required for a Building Regulation application.

For further information, see http://www.planningportal.gov.uk/buildingregulations/

Also see also Design Guidance Note 1 Project Management: Section 6.0.

BREEAM

BREEAM is a widely used environmental assessment method for buildings developed by the Building Research Establishment (BRE). The building is scored against a list of criteria and the resulting BREEAM rating depends on the number of credits achieved.

A target BREEAM rating is usually specified by the client and many public and private organisations require new buildings to have a specific BREEAM rating. The approach can minimise running costs and carbon emissions and often for commercial buildings generate a higher resale value or rental with a BREEAM accreditation.

A specific BREEAM rating can also be a requirement of Planning Permission and applicable to a clubhouse project. This would then be a statutory requirement, and without compliance, the Planning Permission would not be valid.

A rating is achieved by meeting established criteria for which credits are awarded. There are different categories for Energy, Water Consumption and Efficiency, Pollution and Health and Wellbeing. The scores for each category are added together to provide a single overall score which is then translated into a rating on a scale as follows:

A specialist BREEAM assessor is required to validate the assessment and their report is in turn audited by BRE who provides the actual certificate.

The Merton Rule

From 2003, many planning authorities had a planning policy that required a percentage of a proposed buildings energy use to be provided by on site renewable energy, in order to reduce annual carbon dioxide emissions.

This was known as the Merton Rule, after the London Borough of Merton who first devised the scheme and became part of national guidance. However, planning policies have since changed and the Merton Rule has largely been superseded by the new energy requirements in the current Building Regulations.

For other regulations set out by the government, see;

https://www.gov.uk/topic/environmental-management

3.0 SUSTAINABLE CLUBHOUSE DESIGN

Clubhouse buildings should be designed to be as sustainable as possible with a focus on identifying sensible and achievable methods to insulate the building fabric, harvest the energy naturally available on site, and use efficient and renewable energy technology.

A range of options are described in the flowing pages:

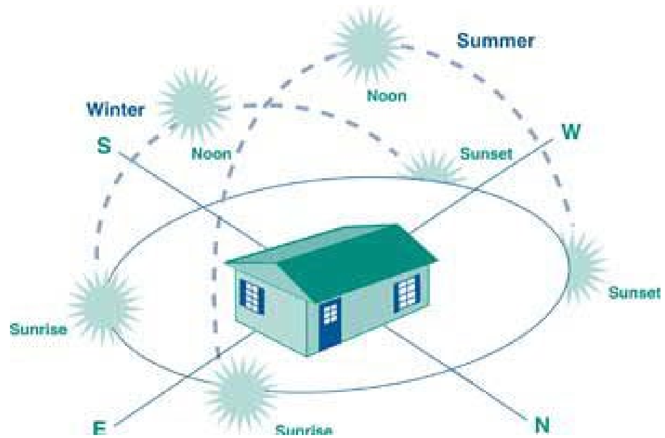
- 3.1 Passive design
- 3.2 Water supply and installations
- 3.3 Electricity supply and installations
- 3.4 Heating systems
- 3.5 Drainage systems

There are many ways that new or existing clubhouse can be enhanced and before large sums of money are invested, the full implications and cost benefits of available option need to be explored. Generally the reduction of energy use through improvements to the building fabric and reducing demand is much more cost-effective than introducing renewable energy.

3.1
PASSIVE DESIGN

General

Passive Design measures generally involve low capital cost but give high long term returns. They involve ways of harnessing free natural resources from the site to heat, light or power the building. Clubhouses are usually relatively small buildings so the approach can be very effective in reducing energy consumption.



See separate 'Sustainability' display panel:

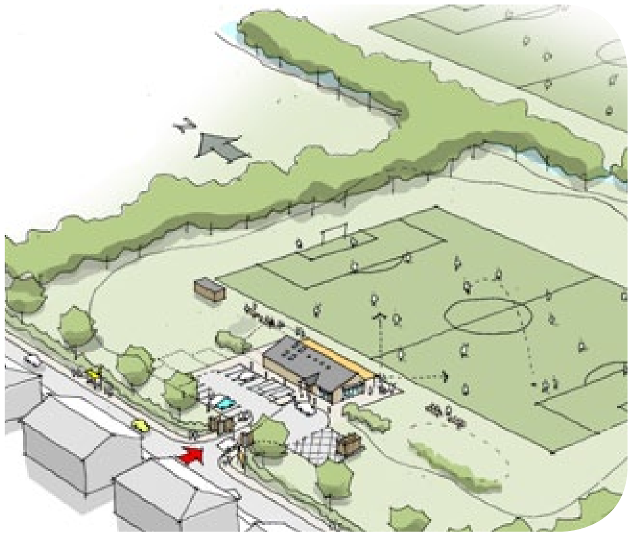
- **S1** Passive Design

Utilising Passive Energy

Location and Orientation

The location and orientation of a new building within the site is fundamental to harnessing these resources, and the design needs to incorporate these methods at an early stage.

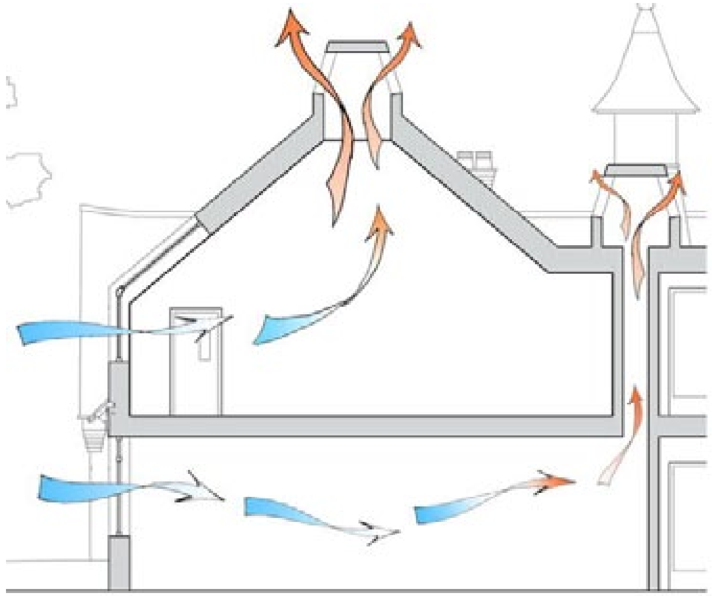
Buildings that are in a sheltered location can avoid the extremities of the weather and reduce heating and ventilation requirements.



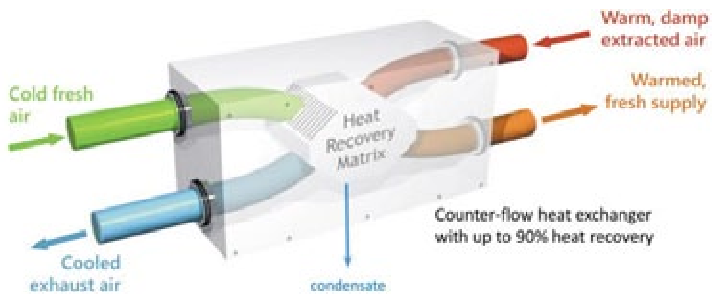
In the case of a refurbishment, the building orientation will already be determined, but there are still ways to retrofit passive design measures to improve the building's efficiency.

Natural Ventilation

Natural ventilation can be used during mid season / mid summer days by utilising cross ventilation between low and high level openings.



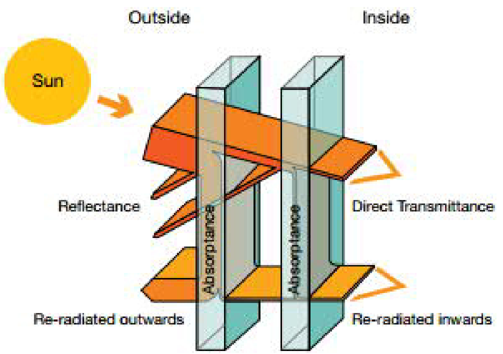
In winter, the addition of a heat recovery unit can temper the incoming air.



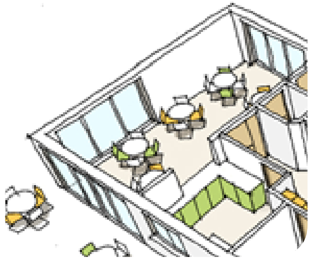
Fenestration

Natural lighting: Buildings that are lit during the day without using artificial lights can save energy, avoid heat gain from light fittings and make a more enjoyable space.

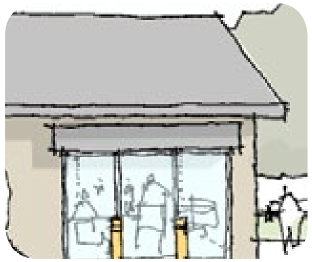
Solar control: The extent of glazing should be limited to what is necessary for viewing and daylighting to avoid unwanted levels of solar gain. Solar control glazing and/or curtains and blinds can reduce overheating.



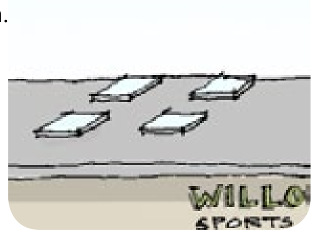
North-facing windows: These let in daylight without too much solar gain. However, beware of heat loss through north-facing windows. Existing windows can be refurbished to incorporate opening lights and increase the natural ventilation in the building.



South-facing windows: Deep eaves can help prevent too much sunshine entering through south-facing windows when the sun is high in the sky and reduce risks of overheating in summer, while still allowing in the low winter sun. For refurbishments, solar shading devices can be added in many cases.



Rooflights, sun tubes and high-level windows: These can let in daylight to internal areas and reduce the demands on artificial lighting. Opening rooflights can improve the stack effect of the natural ventilation. A well-ventilated space will avoid condensation.



Insulating the Building Fabric

General

Improving the thermal performance of the building fabric is a very effective way to reduce energy consumption. By optimising the insulation and air permeability, the building does the work rather than relying on additional energy sources.

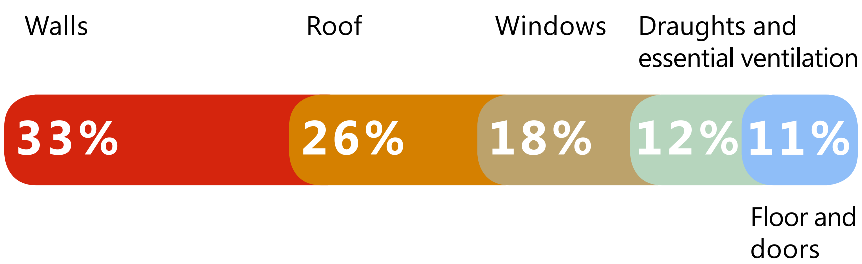
New Buildings

A huge range of building materials are available, all with different insulation properties. Most types of construction will require a separate insulation layer in addition to the primary construction. However, more more modern building materials may have insulation properties as an integral part of the fabric.

Good detailing and monitoring is required during the construction process to avoid unwanted heat loss by air infiltration through the fabric. Particularly at points where different building elements meet.

Existing Buildings

Existing buildings may be draughty and have very little insulation. In a typical* un-insulated building, the percentage of heat lost is through the following:



It is possible to introduce or improve insulation to the floors, walls, windows and roofs of existing buildings. For further information, please see Document 3 Refurbishment.

High Insulation Levels

There is often a strong economic argument for adopting U-values (i.e. a measure of how thermally efficient the various components are) and air permeability (i.e. a measure of how well sealed a building is) that are better than the minimum (notional) values in Part L of the Building Regulations. Examples of enhanced values are set out in the following table.

Building fabric parameter		Part L2A 2013 values		Examples of enhanced values
		Maximum permissible	Notional	
U-values (W/m^2K)	Wall	**0.35**	**0.26**	**0.18**
	Window	**2.2**	**1.6**	**1.4**
	Rooflight	**2.2**	**1.6**	**1.4**
	Floor (Ground level)	**0.25**	**0.22**	**0.15**
	Roof	**0.25**	**0.18**	**0.15**
Air permeability ($m^3/hr.m^2$) at an applied pressure of 50 Pa		**10**	**3**	**3**

Once the building fabric is thermally efficient, the efficiency of the heating system should be considered.

* assumptions based on a house

3.2 WATER SUPPLY AND INSTALLATIONS

Types of Water Supply

General

A water supply to a clubhouse building can be via:

- Mains supply network
- Bore hole on site
- Rainwater harvesting system
- Water course
- Road transport bulk supply

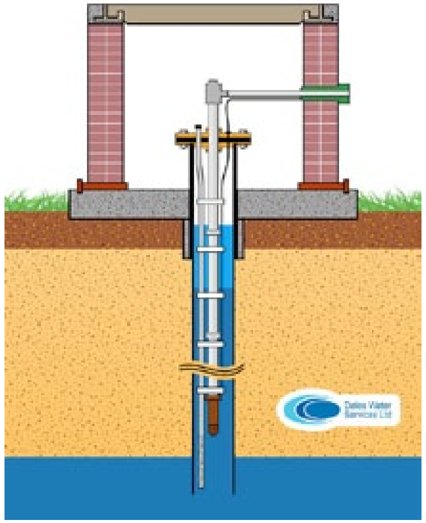
Mains Supply

Clubhouses will require a potable supply for drinking water and washing facilities and in most cases this will be through a connection to the nearest mains supply network. Non- potable water may be required for irrigation to pitches and this might be supplied from rainwater harvesting or by a licence from a bore hole or a local water course. However, even if 'off grid' supply solutions are feasible, a mains water connection may be required as a back-up.

Bore Holes

A borehole can be a reliable off-grid option for a water supply if the site conditions allow. The depth of borehole required and the quality of the water extracted both depend on the underlying geology of the site. The process for assessing the feasibility and commissioning a borehole can be quite lengthy and should be approached at an early stage. Consultation with the Environment Agency (EA) is also required and an abstraction licence from the EA is required for more than 20m^3/day. This would cover the potable water demand of most clubhouses but would not be sufficient for an irrigation system.

Regularly maintenance by a specialist contractor is also recommended to avoid damage or contamination. National Water Association recommends borehole owners carry out a water quality test at least once a year and have additional tests if there is any change in the colour, odour or taste of the water, or there are any maintenance issues.



Water Course

Similar issues apply to the extraction for water from a nearby water course and a careful feasibility exercise and consultation with the Environmental Agency is required.

Rainwater Harvesting (RWH)

Rainwater collected from roofs or the surrounds of a building is feasible in most areas of the UK and can be used for flushing WCs and grounds maintenance.

A storage tank will be required and a degree of water treatment and filtration may be necessary depending on the cleanliness of the collection areas and the length of time the water is stored.

A back up supply from the mains is required for the majority of rainwater harvesting schemes to ensures demand can be met during dry periods. In addition a separate source will be required for the potable supply. An automatic controls will be required for mains top-up and it is good practice to provide a physical air gap between the mains supply and RWH tank to avoid contamination. In addition, the reclaimed water should be at a lower pressure than the mains-fed supply .

Road Transport Bulk Supply

On remote sites, it might be appropriate to supply water on a bulk purchase basis and deliver by road.

Efficient Installations

General

Saving water will reduce mains water bills. There are various ways to reduce the amount of water used by restricting the flow and limiting the time a tap or shower is in use. Examples are discussed below.

Sinks

Subject to water pressure, the fitting of an aerator that mixes air and water together, can be fitted to a tap to reduce the amount of water that is used. The payback can be less than a one year. Automatic tap controls can also be used to ensure that a taps is not left on unnecessarily.

There are two main types of self-closing taps:

- Electronic infra-red sensor taps allow the water flow to be controlled through a sensor which detects the presence of the user's hands under the tap.
- Push button taps only allow the tap to be on for a set period of time.

Payback on both of these devices is around 2-3 years.

Toilets

There are a number of low cost options available to reduce WC water use. Many older toilets will flush just as effectively with less water. By putting a cistern displacement device (Hippo) into a cistern, the amount of water that is flushed away is reduced. This can make significant and sustained savings to the water bills.

Hippos should never be fitted to more recently installed WC's as the cisterns use a smaller 6 litre flush and fitting a volume adjuster will result in a poor flush and a higher volume of water being used through unneccessary secondary flushes.

Retrofitting a variable flush or dual flush can also reduce the volume of water used for flushing.

Urinals

Many urinals do not have controls meaning that they flush continuously, even when there is no occupation.

Consider installing passive infrared motion sensors, which control flushing by detecting movement.

Payback for replacing the existing urinals with waterless urinals can be less than one year for a large club.

Showers

Showers are responsible for the majority of hot water use in a club.

Fitting a shower aerator between the hose and showerhead, or replacing the existing shower head with an aerating version, will mix air and water together under pressure, reducing water use, but increasing the apparent flow.

Another option to reduce the water used is to install push button controls which close after a set period of time. Cost and savings for this measure will be dependent on the delay time that is set during installation.

See separate 'Sustainability' display panel:

- **S3** Water saving measures

Greywater Recycling

Greywater is wastewater generated from wash-hand basins, showers and baths and in some cases, discharge from dishwashers and kitchen sinks.

Because it is relatively clean in comparison to foul water, it can be recycled on site via a number of stages of filtration for uses such as toilet flushing and landscape irrigation. However, it is imporant to note that recycled greywater of this kind is never safe to drink.

3.3 ELECTRICAL SUPPLY AND INSTALLATIONS

Types of Power Supply

Options for an electrical power supply applicable to a clubhouse are as follows;

- Connection to the electricity network
- Onsite renewable systems
- Combination of mains and onsite renewables
- Off grid solutions

See separate 'Sustainability' display panel:

- S2 Renewable energy

Mains Power

For many clubhouses a direct connection to the local utility network will the simplest and the most cost effective solution to achieving a reliable and robust supply. However, this can be supplemented by renewable and off grid systems as discussed below.

On-site Renewables

Solar Photovoltaics (PV): Solar PV is an electrical system which converts the suns energy into electricity. Photovoltaic cells are fixed to the roof of the building and convert the sunlight into electricity which can be used to run household appliances and lighting. The panels can be expensive to install but evidence shows that they should pay for themselves over approximately 10 years. Larger systems are usually more cost-effective than smaller systems.

For best efficiency a south facing roof unobstructed by trees or tall buildings is required with the panels at a pitch of 35-45°


Thin film PV system


Mounted PV panel system

Wind Turbines: For clubhouses in a particularly windy location, it may be possible to generate energy from a wind turbine. However, a small turbine in an urban location is unlikely to see a return on the investment. There are also potential safety, disruption and noise nuisance factors that may need to be considered.

Hydroelectricity: Hydro technology uses running water to generate electricity, from say a small stream or a river. Small or micro hydroelectricity systems, are also called hydropower systems or just hydro systems, and can produce enough electricity for lighting and electrical appliances in an average home.

Hydropower is very site specific. Most sites will not have access to a suitable resource even if they have a water course running nearby. Contact a certificated installer, who can assess the site.

For further information see: http://www.british-hydro.org/

Feed-in Tariffs: If installing an electricity-generating technology from a renewable or low-carbon source such as solar PV or wind turbine, this could qualify for the UK Government's Feed-in Tariffs scheme (FITs). The electricity generated and any surplus electricity can be exported to the grid and provide a source of income.

For further information, see:

www.energysavingtrust.org.uk/domestic/content/feed-tariff-scheme

Combination of Mains and Renewables

An alternative is for the club to have a conventional connection to the electricity network that is then supplemented by renewable technologies. These can then export back into the grid when they generate an excess electricity. This would provide a source of income for the club that would off-set electricity. Such electricity-generating technology from a renewable or low-carbon source such as solar PV or wind turbine, could qualify for the UK Government's Feed-in Tariffs scheme (FITs).

For further information, see:

www.energysavingtrust.org.uk/domestic/content/feed-tariff-scheme

Off-grid Solutions

There are a number of 'off-grid' systems that are available and to ensure a reliable and robust system, a battery storage is often advisable. Deep-cycle batteries can have a number of inputs from different renewable technologies. The system is able to store surplus energy when demand is low, and deliver power when it is needed. With good controls and system design, a battery bank can last 5 years or more. Space allowance should be considered at an early stage in the design.

Efficient Lighting Installations

Lighting is one of the easiest areas to save energy.

Lighting arrangement and use

By changing the way that lights are used can save money and energy. Here are a few easy things to help start saving:

- Always turn lights out when leaving a room, regardless of how long for
- Be conscious of how many lights are on and whether they all need to be in use
- Arrange light switches so that they are convenient to turn off i.e. place switches near the door to a room and each end of a corridor
- Zone lighting areas so not every light in a room is on at once.

Lighting Controls

Automatic controls can also save money. Movement sensors can turn lights on when a room is occupied and switch them off when the room is empty. Use either a movement sensor or a timer on external lights so they are only in use when needed.

Energy Saving Bulbs

Traditional light bulbs are extremely inefficient. There are two main types of energy efficient light bulbs available in the UK.

- Compact Fluorescent Lamps (CFLs)
- Light Emitting Diodes (LEDs).

CFLs are a cost-effective option for most general lighting requirements. Replacing a traditional light bulb with a CFL of the same brightness will save you about £3 per year, or £50 over the lifetime of the bulb.

LEDs are initially more expensive to buy than CFLs, but they are more efficient and may have a longer life and will save more money in the long term.

3.4 HEATING SYSTEMS

General

All clubhouses will require space heating and a hot water supply for washing facilities and catering. The heating demand will depend on the scale of the facilities and the predicted usage patterns.

Types of Heating System

The main types of heating system applicable to a clubhouse are as follows;

- Central heating
- Electric heating
- Renewable energy heating system

See separate 'Sustainability' display panel:

- **S2 Renewable energy**

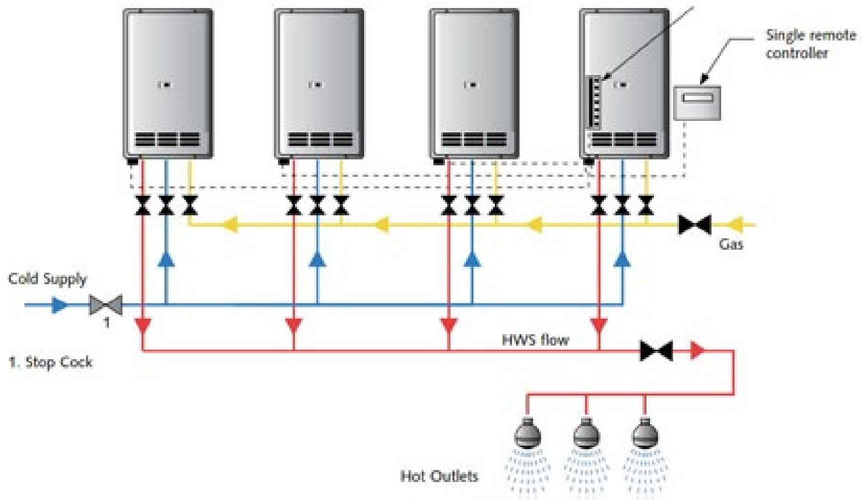
Central Heating

This is the most common form of space heating. A boiler heats up water that is then pumped through pipes to radiators in the building and provides hot water to the hot water taps and shower.

They can be fuelled by either gas, oil or LPG depending on availability. Combination (combi) boilers, refer to a type that heat the hot water as it is needed and therefore avoid the need for storage. These are often recommended for clubhouses as they provide hot water on demand, but specialist advice is needed as every situation may differ.

LPG is a highly efficient fuel that has the environmental benefit of producing the cleanest emissions of the three fuels (oil, diesel and LPG). There are a number of established LPG suppliers who will supply storage tanks to customers, which can either be purchased or rented.

Instantaneous LPG boilers are also available on the market that would be suitable for an intermittent demand where storage of hot water is neither financially or energy efficient. Such units are often compact and can be combined in multiples to suit the demand requirements.



Electric Heating

Electricity is the most expensive heating fuel available in the UK. The preferred option for clubs with storage heaters is to replace them with a boiler. This can cost a considerable amount to install but can save money in the long term.

If a direct gas supply is not available for the clubhouse building but it is available nearby, the project may be eligible for a grant towards the cost of having a new connection.

Renewable Energy Heating System

Biomass boilers are highly efficient and have low emissions. They can replace oil or gas boilers to heat hot water and radiators (or underfloor heating).

They can burn either:

- logs
- wood chips
- wood pellets
- other forms of biomass.

A renewable heating system will cost considerably more than a conventional system to install but there are subsidies available from the government. See: https://www.gov.uk/non-domestic-renewable-heat-incentive

Micro Combined Heat and Power

A small scale or micro Combined Heat and Power (CHP) system can provide a low carbon method of generating electricity on-site and simultaneously provide a source of the waste heat. Generally, this approach in not likely to be feasible for a Clubhouse project due to the likelihood of intermittent usage patterns. Efficiencies in CHP units are achieved when the plant can run constantly and the usage pattern is more continuous. In addition, a mains electrical supply is likely to be required due to the imbalance in the ratio of the heat to electricity that is produced.

Improving Existing Heating Systems

If the clubhouse has an existing central heating system, the following energy saving measures should be considered:

Replace the Boiler

Replacing the boiler with a newer, more efficient model will depend on how old the existing boiler is and how much money will have to be invested. The older the boiler, the more inefficient it is likely to be.

Fit Thermostat and Controls

If the boiler is generating a lot of hot water at a time when it is not required, then this is a waste of energy. Whatever the age of the boiler, the right controls will allow the heating and hot water to be set to come on and off when needed, and how warm each area needs to be heated. It is possible to install zonal heating controls without replacing your boiler.

Switch to a Cheaper Gas Supplier

Shop around by switching to a cheaper gas supplier. By going on the price comparison websites, prices from different energy providers can be compared to find the cheapest energy provider.

Insulate the Hot Water Cylinder and Pipework

In the case of a cylinder and boiler system that it not being replaced, it may be a good idea to insulate the hot water cylinder or change to a better fitting tank jacket for the cylinder. Fitting a jacket around the cylinder can potentially save up to £35 per year.

A lot of energy can be lost through uninsulated pipework, particularly if the hot water tap is remote from the boiler or hot water cylinder.

Lagging pipes can offer a low cost ‘quick win’ for saving energy.

On-site Renewables

Heat Pumps

Air source heat pumps absorb heat from the outside air. This heat can then be used to heat radiators, underfloor heating systems, or warm air convectors and hot water.

Ground source heat pumps work in a similar way but use pipes which are buried in the land around the clubhouse to extract heat from the ground.

The cost of installing air and ground source heat pumps varies considerably depending on the size of the system. However, they should lower fuel bills considerably and will require only small levels of electricity to function. The heat delivered is relatively low and works best with underfloor heating and a very well insulated building.

Biomass

Wood-fuelled heating systems, also called biomass systems, can burn wood pellets, chips or logs to provide warmth to power central heating and hot water boilers.

A wood-fuelled biomass boiler could make considerable savings on the heating bills. However, they are expensive to install and there are maintenance issues associated with the removal of ash and storage of the fuel.

Although the price of wood fuel varies considerably, it is often cheaper than other heating options. Wood fuel boiler systems could benefit from financial support from the Renewable Heat Incentive.

See: https://www.gov.uk/non-domestic-renewable-heat-incentive

Solar Thermal

Solar water heating systems use the heat from the sun to create hot water. The system uses solar panels fitted to the roof. These collect heat from the sun and use it to heat up water which is stored in a hot water cylinder. A conventional boiler or immersion heater can be used to bring the water up to temperature, or to provide hot water when solar energy is unavailable. Solar thermal systems differ from solar photovoltaic (PV) systems, which generate electricity rather than heat.

There are maintenance issues, particularly keeping the panels clean, and there is considerable plumbing and pipework.

3.5 DRAINAGE SYSTEMS

Types of Drainage System

The main types of drainage system are as follows;

- Public sewer
- Cess Pool
- Septic tank
- Water treatment plant

Public Sewer Connection

The length of the connection to the nearest public sewer system will be a key consideration. An on-site pumping station will be required if the invert level of sewer is too high to allow for the installation of a gravity connection.

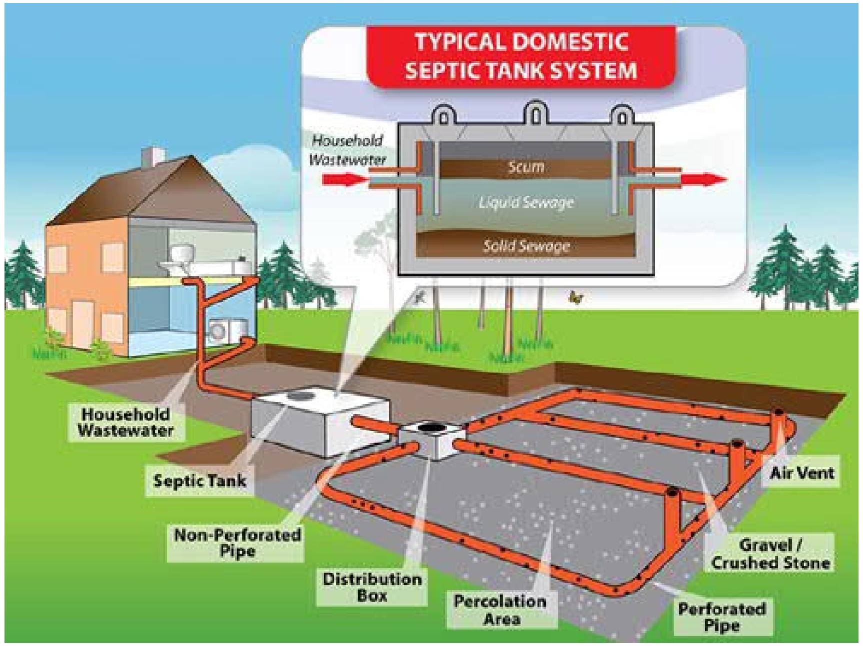
Alternatively there are a range of off grid solutions that are discussed below:

Cess Pit

A cess pit is likely to be the least sustainable option for sewage disposal. It would consist of a covered watertight tank with no outlet and used solely for the storage of sewage. The approach relies on the regular removal of raw sewage to a suitable disposal site by a specialist contractor. A suitable access route would be required for the vehicle.

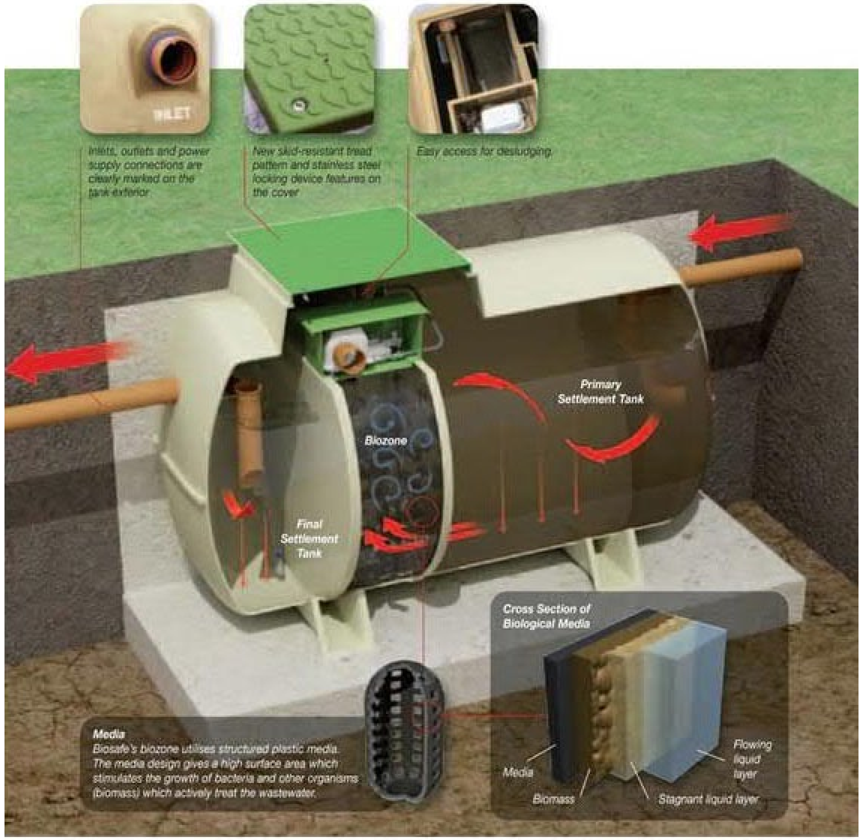
Septic Tank

A septic tank consist of a multiple chamber system with a land drainage network that attenuates effluent and discharges through percolation into the ground. An adjacent suitably sized area of land with an appropriate soil type is required for discharge field. It needs to be well away from watercourses ,wells of boreholes. The building regulations impose strict limits on the location of septic tanks and drainage fields to avoid contamination. Annual maintenance is required to de-sludge and to avoid the introduction of substances that are toxic to microorganisms.



Water Treatment Plant

A water treatment system is similarity to a septic tank, but also improves effluent quality by using a number of biological treatment zones. This allows the micro-organisms to break down organic matter prior to discharge into ground or suitable watercourse.



4.0
REDUCING CONSUMPTION

Green Management Strategy

A green management strategy can help to ensure all club members and officials are aware of, and actively engage in, environmental energy saving issues.

There are several different aspects that can make up a green management strategy:

Green Travel Plan

A green travel plan is a package of measures to assist in managing the transport needs of an organisation.

A travel plan can promote the uptake of sustainable travel modes to and from a site and reduce the reliance upon single occupancy car travel. Hence, options like car sharing, public transport. walking and cycling are encouraged. Compared to single occupancy car travel, these options have reduced environmental impacts, help cut congestion, and are socially inclusive by facilitating travel for those without access to a car.

Information should be included on the club website and/or notice boards on how to reach the clubhouse by public transport, or how to reach other venues (e.g. away fixtures).

Incentives can also be used to encourage green travel such as the allocation of parking spaces for those who car share.

Reduction of Wasted Energy

Club members who are aware of energy saving issues can also be empowered to be proactive in promoting the wise use of energy within the clubhouse. Similarly to measures limiting wastage of physical resources to help reduce the carbon footprint of the clubhouse e.g. emailing club newsletters rather than printing on paper, significant energy savings can be achieved by focusing on the human aspect of managing such resources.

Changing People's Attitudes

The way people think about heating and cooling buildings can have a significant effect on energy use, cost, comfort and environmental impact. There are many ways in which club members can help improve performance and reduce costs, regardless of whether any energy saving technology has been incorporated.

Use Doors Appropriately

Ask that people make sure external doors are not left open when entering or leaving the building and are properly closed, to limit the heat leaving the building

Keep doors between heated rooms and unheated rooms closed.

Consider fitting draft excluders to the internal doors between unheated and heated rooms.

If the sun warms some rooms but not others, leave internal doors open to let the warm air circulate throughout the building.

Switch Lights Off

If automatic lighting control has not been incorporated in your clubhouse, encourage people to switch lights off when leaving a room.

Use notices on doors to help remind people.

Use Curtains and Radiators Appropriately

Encourage people to draw the curtains in the club room during hours of darkness to reduce the amount of heat escaping through the windows.

Also make sure radiators are not blocked by furniture to maximise their heating efficiency.

Use an Energy Notice Board

A central 'energy notice board' should be populated with weekly and monthly energy consumption information and comparisons, progress on current projects and any other relevant information to be publicised.

Displaying weekly meter readings will help make people aware of club energy usage and convey the effect their actions have on energy usage.

For further information on sustainable clubs, please refer to the below website;

www.sustainableclubs.co.uk

5.0 OVERVIEW

Comparison of Options

General

An overview of design options covered earlier in this document are set out in the following table.

Priority (subject to site analysis)	Systems	Key issues	General suitability for clubhouses
	PASSIVE DESIGN	• **Baseline for cost-benefit analyis**	
●	Building orientation	• Proximity to sports pitches • Layout of pitches	HIGH
●	Building envelope	• Avoidance of complex geometry	HIGH
●	Natural lighting	• To reduce artifical lighting loads • Viewing to sport / activity areas • Control of solar gain • Windows / rooflights / sun tubes to suit building layout	HIGH
●	Natural ventilation	• To reduce cooling loads • Opening window / rooflights / roof vents to suit building form	HIGH
●	Heat recovery with ventilation system	• To reduce heating loads	HIGH
●	Building insulation	• To reduce heating loads	HIGH

Priority (subject to site analysis)	Systems	Key issues	General suitability for clubhouses
	WATER SUPPLY		
●	Connect to public water supply network	• **Baseline for cost benefit analysis** • Locations of nearest supply network	HIGH
	Renewable: Rainwater harvesting	• Size of collection area (roofs and gutters) • Rainfall frequency (annual average rainfall versus the water consumption rate) • Storage tanks for reuse (surface or buried tanks) • Treatment if used as a potable supply (UV sterilisation / testing to Building Regulation standards) • Need for a standby supply	MEDIUM
	Renewable: Private water supply	• Availability and consistency of a direct water source? (borehole/ watercourse) • Hydrogeological survey information • EA licence required if abstracting more than $20m^3$/day • Water quality testing, regular maintenance and upkeep • Avoidance of groundwater pollution (distance from septic tank, soakaways, drains and other potential sources)	LOW
	Bulk buy supply	• Storage tank required • Need for good road transport network	LOW (unless a remote site)

Priority (subject to site analysis)	Systems	Key issues	General suitability for clubhouses
	POWER SUPPLY AND LIGHTING		
●	Conventional: Connection to public electricity supply	• **Baseline for cost benefit analysis** • Locations of nearest supply network	HIGH
	Renewable: Photovoltaics	• Must be free from shade • Best orientated within 45 degrees of south and at 30 degree incline • Maintenance – 6 month cleaning and 10 year full electrical inspection	HIGH
	Renewable: Micro Hydro Electric Power	• Requires a naturally-flowing water supply	LOW
	Renewable: Wind Power	• Requires average wind speed of 5m/s to be cost effective • Safety zone required away from populated areas and sports grounds • Potential visual disturbance, noise and planning issues on an urban site	LOW
	Other: Micro Combined Heat and Power	• Less suitable for intermittent demand • Pattern of demand (Most suitable for continuous rather than intermittent heating and hot water)	LOW

Priority (subject to site analysis)	Systems	Key issues	General suitability for clubhouses
	SPACE HEATING		
●	Conventional: Connection to public electricity or gas supply	• **Baseline for cost benefit analysis** • Locations of nearest supply network • Selection of an efficient boiler system	HIGH
●	Conventional: LPG or Oil	• **Baseline for cost benefit analysis** • Locations of nearest supply network • Space for delivery and storage required • Selection of an efficient boiler system	HIGH
	Renewable: Heat Pumps: Air Source Heat Pump	• Electrical input required • Dependent on external air temperatures • May need supplementary heating	MEDIUM / LOW
	Renewable: Heat Pumps: Ground Source Heat Pump	• Less suitable for intermittent demand • Suitable for low temperature space heating • Ground condition requires assessment	LOW
	Renewable: PV Thermal	• Less suitable for intermittent demand • Must be free from shade • Best orientated within 45 degrees of south and at 30 degree incline • Maintenance– 6 month cleaning and 10 year full electrical inspection (Higher maintenance than Photovoltaics)	LOW
	Renewable: Wood-fuelled Heating with Thermal Store	• Less suitable for intermittent demand • Space for delivery and storage required • Less suitable for urban sites	LOW
	Micro Combined Heat and Power	• Less suitable for intermittent demand • Pattern of demand (Most suitable for continuous use)	LOW

Priority (subject to site analysis)	Systems	Key issues	General suitability for clubhouses
	DRAINAGE		
●	Conventional: Connection to Public Sewage System	• **Baseline for cost benefit analysis** • Distance to public sewer • Levels and need for pumping station	HIGH
	Other: Water Treatment Plant (biological)	• As Septic Tank (see below) but with smaller area	MEDIUM
	Other: Cess Pit	• Suitable area required for storage tank • Appropriate vehicular access for extraction • Running costs dependent on agreement with local contractor	LOW
	Other: Septic Tank (multi-chamber)	• Suitable area required for tank and soil type for discharge field • Remote from watercourse and well/boreholes. (Building Regulations limits to avoid contamination) • Soil percolation test required to determine sizing • Works best with consistent flow and volume of sewage • Maintenance: De-sludge annually, avoidance of substances that are toxic to microorganisms	LOW

SPORT ENGLAND

Creating a sporting habit for life

Alternative Languages and Formats:

This document can be provided in alternative languages, or alternative formats such as large print, Braille, tape and on disk upon request. Call the Sport England switchboard on 08458 508 508 for more details.

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User Guide:

Before using this design guidance note for any specific projects all users should refer to the User Guide to understand when and how to use the guidance as well as understanding the limitations of use.

Click here for **'User Guide'**

Click here for current **'Design and Cost Guidance'**

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To find out more about Sport England and to get the latest news and information about our various initiatives and programmes, please go to www.sportengland.org

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