



facilities guidance for

FLOODLIGHTING

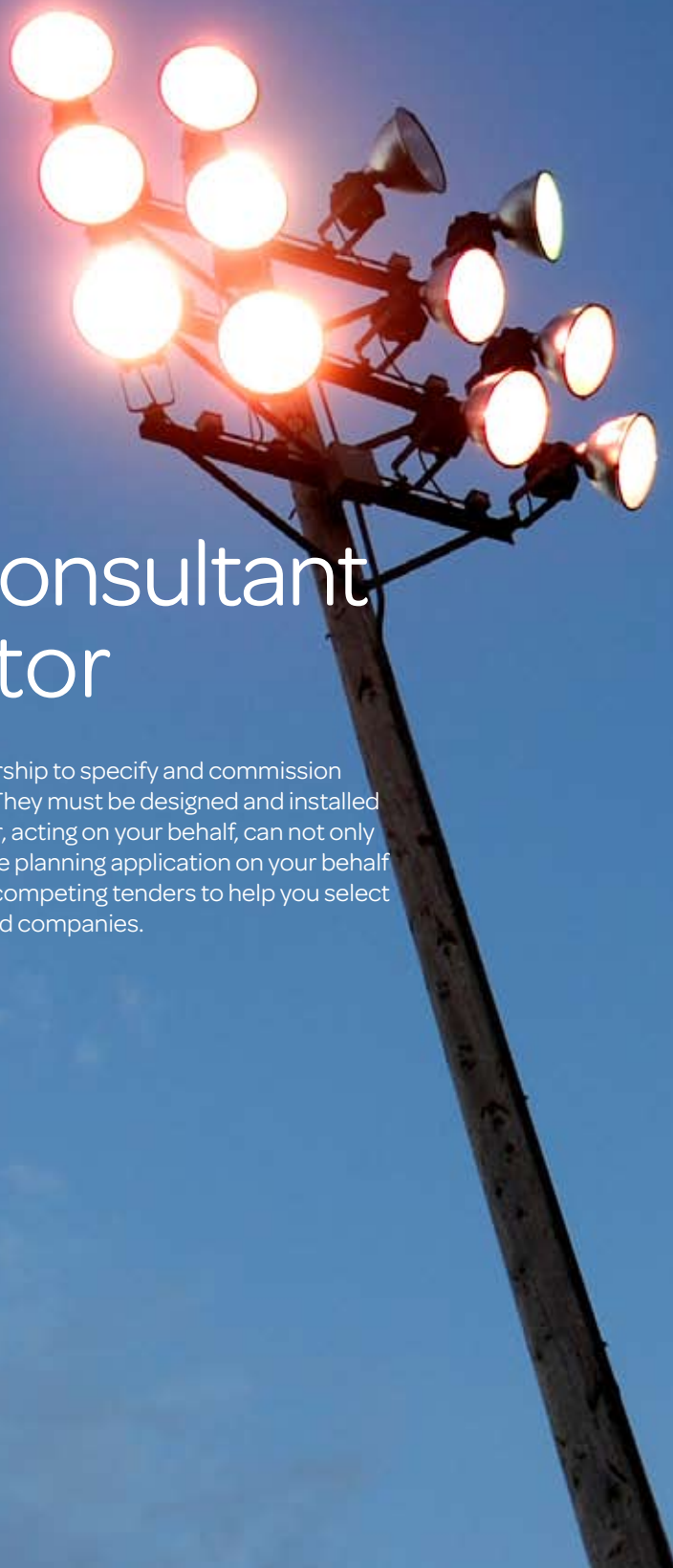


The IRFU's National Facilities Strategy is based upon research which identified a number of key facility issues which are affecting clubs and restricting the growth of the game. One of these issues was the lack of or poor quality of, floodlighting at rugby clubs, both for matches and for training.

Accordingly, the strategy includes "increasing the quantity and quality of floodlit areas" as one of its key objectives, and floodlighting is one of the improvements which are eligible under the Irish Rugby Football Union's grant and loan scheme.

The role of the consultant and/or contractor

Sports clubs rarely have the expertise within their membership to specify and commission floodlights, and lighting schemes are not for the amateur. They must be designed and installed to professional standards. An electrical or lighting engineer, acting on your behalf, can not only prepare the specification but can in many cases handle the planning application on your behalf (at least up to outline consent level) and can also analyse competing tenders to help you select the right contractor. The IRFU can provide a list of approved companies.



Preparing your scheme

At the outset, you should think about the long term direction in which your club or site is going and whether you are likely to install further lighting in the future, not just for matches or for training but also for the clubhouse, for car parking or for external areas. This may affect the routing of cables, and will also influence the capacity of the incoming power, which will be a 3-phase supply. In some cases, a transformer may be required.

To establish whether the existing power supply to your site will be capable of bearing the necessary loads, your electrical engineer should carry out a full assessment of the existing load requirements, the proposed floodlights, and any future developments. Once this has been done, your electrical engineer should contact your electricity supplier at a very early stage of your project to ask them for written confirmation of their requirements. They may require you to bear part or all of any installation costs.

Some basic issues which need to be addressed at this stage include:

- whether the switchgear will be accessible to users (e.g. players) or whether a remote control is preferable
- the scale of your upgrade, as this will influence the type of metering required. This will be either whole current metering or CT metering, which carries a higher monthly standing charge
- how the power cabling will reach the lighting columns, whether the routing will require ducting (e.g. under roads or car parks) and whether the main lighting will also be used for training (e.g. for half of the pitch)

Rugby clubs generally install floodlights for two purposes. Firstly, floodlighting for the matches will allow teams to play beyond the limits imposed by daylight on winter afternoons, and the specification

(see pages 4 and 5) will meet the needs not only of players but also of spectators, referees and touch judges. Lighting for televised matches and schemes for major stadia are not, however, covered in this publication.

Secondly, training lighting will enable players to train on winter evenings and, if the lighting is carefully designed (or if mobile units are employed), will spread the pattern of use and prevent excessive wear and tear. More advice on this issue is provided later in this document.

Some thought should be given, even at this stage, to the way in which the lighting will be maintained, as this affects the type of lighting column which will be installed. Major servicing will normally be carried out by a contractor, but minor work (e.g. lamp cleaning) can be undertaken at club level if hinged columns are specified even though their capital cost is higher. Mid-point hinged columns avoid the need for expensive lowering equipment which is necessary for columns hinged at the base.

Finally, it is important to try to estimate all the whole-life costs involved with the installation of a lighting scheme. Capital costs will include not just the floodlighting contract but also professional fees, planning application fees, any connection or supply charges, and possibly financing charges.

Running costs will include energy charges, depreciation and maintenance charges.

At this stage, rather than going out to tender, it may be wise to seek two or three budget quotations for your scheme as a tender may only be valid for one or two months. Quotations will be based on 'normal ground conditions', so if your site is abnormal you must make this clear through a topographical and ground investigation report.



Planning permission

Floodlighting is a sensitive environmental issue, both for the planning policies of your local planning authority as set out in its Local Plan and also for local residents, who will be consulted as a result of your planning application. Your first step, therefore, should be to consult the planning department, and you must not minimise or play down what you are planning to do. If you have a lighting engineer acting on your behalf, they can help you prepare your submission. It may also be worth inviting local residents and pressure groups to view your proposals, otherwise the first they will hear about the project will be the formal consultation from the planning department. Be responsive to people's views, and do not adopt an entrenched position.

As well as its existing planning policies, the local authority will be influenced by the practical details of your particular scheme and there are a number of features which you yourself can influence to help overcome the factors which often lead to a planning refusal:

Visibility, which includes both the height of the columns (typically between 12 and 18m) and also sky glow - the contribution made by your lighting to the night-time glow which is a feature of most urban areas. Some of this glow is (unavoidable) reflected from the ground surface, but some may be from wrongly specified or badly adjusted lighting units.

Spillage, sometimes called light trespass, which is the amount of 'wasted' light shining beyond the specific area which you wish to illuminate. This can affect surrounding properties, and can be minimised by carefully aimed lighting units, correctly specified. By a seeming paradox, the higher the columns are, the less spillage there will be. Because of the sensitivity of this issue, the Institution of Lighting Engineers have published an advisory document "Guidance Notes on the Avoidance of Light Pollution", which can be downloaded free or obtained by the post from the institution.

Glare can also cause offence, when the lamps themselves are directly visible to residents or to nearby motorists. Glare can be reduced or avoided by floodlights mounted at the correct height and carefully aimed and adjusted.

Finally, your planning application will require you to state at what hours the lights will be switched on and what the pattern of use will be. Local people may not object to the lighting itself but they may object to games (or training) taking place in the evening if this involves noise or extra traffic movements. If planning consent is granted, there will probably be conditions attached which set out the times when the lights can be used, and any objectors to the scheme are likely to monitor your compliance with these conditions.

Understanding technical issues

Whilst your scheme will be designed and installed by professionals, it will still be helpful if you understand some of the technical language involved, especially when discussing your scheme with a lighting engineer and also when meeting planning officers or local residents.

Light levels

The most usual measure of lighting levels for sport is lux (lumens per square metre) which is a measure of horizontal illumination (Eh).

Uniformity

Uniformity is referred to in documents as 'U', and is a measure of the evenness of the lighting over the whole area. Readings are taken on a grid of 120 points of the playing area.

Glare

As well as glare, referred to earlier, which affects neighbours or passers-by, glare can also create problems for players and officials. It is measured by the Glare Rating (GR), on 9 points on the halfway line, 22m line and on the try line.

Colour

Colour rendering (Ra) refers to the accuracy, or 'life-like' quality of the lighting. On the Ra index, the figure of 100 is used to represent bright daylight.

Maintained illuminance

Lighting will not always remain as bright as when it is first switched on and a lamp can lose up to 20% of its effectiveness during the first two or three years, depending on the cleaning regime and on depreciation of the lamps. For this reason, schemes are usually specified in terms of the minimum average maintained illuminance (Eav).

Lighting for rugby

The principal source of standards for sports lighting is the Chartered Institution of Building Services Engineers (CIBSE), who use a classification system employing three categories as the standards reflect, in most sports, the level at which the game is being played. The categories are:

Class I: Top-level competition such as international and national competitions, generally involving large numbers of spectators.

Class II: mid-level competition such as regional or local club competitions, with medium-sized spectator capacity. Some high level training.

Class III: low-level completion, generally without spectators, training, and recreational activities.

The requirements of Class I are not covered in this publication;

IRFU minimum requirements are as follows:

	Lux (Eav)	Uniformity	Glare (GR)	Colour (Ra)
Class II: Medium-level competition, e.g. regional, or club events	200	0.6	<50	<60
Class III: Lower-level completion, general training or recreation	100	.05	<55	>20

These figures apply to the playing area of the pitch, which includes the field of play and the in-goal areas. Beyond the playing area is a safety zone, which should be not less than 5m (where practicable) from the touchlines and which should be illuminated to a level of 25% of that of the playing area. Refer to Facilities Guidance Note, which provides information on pitch dimensions and 'definitions'.

Lighting columns should not be erected within this 5m safety zone (where practicable) otherwise the club will need to manage the ongoing risk assessment.

Installing a lighting system



Standards

Lighting columns and lamp units must meet the current European Standard (EN) or the relevant British Standard (BS). The present standard (in 2006) is BS EN 60 598. The manufacturer must be Quality Assured, in compliance with BS EN ISO 9000:2000

Lamps

There are effectively three types of lamp unit.

'Projector' type lamps are circular, producing a cone-shaped narrow beam of light which is effective for long projections and is usually employed where the layout requires high (30m) columns positioned in the four corners of the ground for Class I competition.

'Double asymmetric' floodlights give a fan shaped beam and are not the most commonly used. They are particularly suitable for layouts with columns at the side of the pitch, but have the marked disadvantage of causing light pollution as a result of the spillage of light.

'Flat glass', or zero upward lights have the front face parallel to the playing surface, thus limiting upward light and light trespass. For this reason, they are more likely to find favour with planning authorities.

Lighting systems

There is a variety of light sources, but the choice for sports installations effectively lies between the following:

High pressure sodium

(SON) is good value for money and has a long lamp life with a low replacement cost, but the main disadvantage is the poor colour rendering. For this reason, high pressure sodium is more suitable for training areas than for matchplay.

Metal halide

(MBI), while more expensive, provides a good quality colour rendering and is the favoured choice for match lighting. **The IRFU currently recommend this system for both training and match standard systems.**

Tungsten halogen and high pressure mercury systems are no longer used for permanent systems.

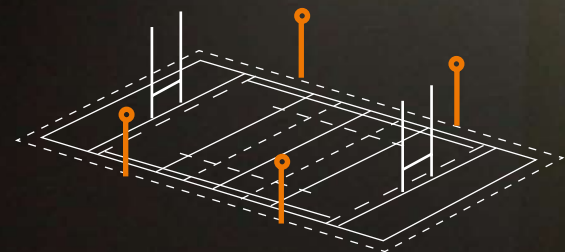


Diagram 1: Four column layout

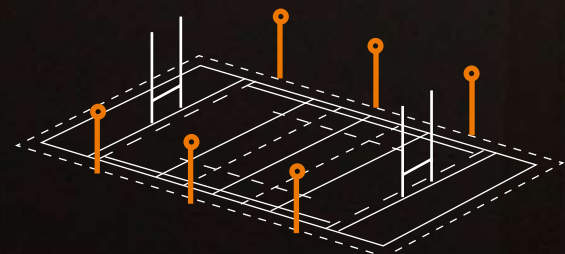


Diagram 2: Six column layout

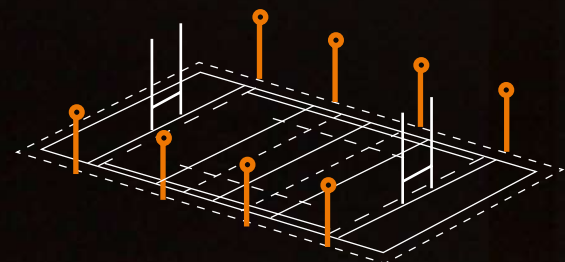


Diagram 3: Eight column layout

Layouts

Lighting column layouts for matches (at 200 lux) can be based on four, six, or eight column systems, with poles at 13, 15, 16 or 18m height. If there is any likelihood of fall-off in illuminance towards the goal lines, this must be corrected in the design and positioning of the lighting columns rather than by placing additional masts behind the goals as this will direct light along the main axis of play and cause excessive glare for the players.

Diagrams 1, 2 and 3 show typical column layouts. See page 5 regarding the safe positioning of lighting columns.

Corner lighting avoids placing columns between the spectators and the game, but relies upon higher columns which may cause planning objections.

Training lights at 100 lux can be achieved with four, six or eight columns, preferably covering the full pitch in order to distribute wear and tear of the surface. If only half of the pitch can be used, four columns (two opposite two) are recommended. The IRFU do not normally recommend a single row of (say) three floodlights, for safety reasons.

Mobile units

Mobile lighting units are only recommended where it is not possible to install permanent training lights. Planning consent is not normally required, though it is wise to confirm this with your local planning department. The units are self-contained, usually with a diesel-powered generator there are also battery-powered systems. Lamps are metal halide or, occasionally, tungsten halogen. Four, or preferably six units will light a training area for medium or low-level training, allowing clubs to rotate the grassed area they use for training. Units have extending masts rising to about 9m.

The lux level and the area lit by the mobile units cannot be calculated accurately as suppliers vary in their estimates. For this reason, clubs should exercise caution and should recognise that mobile light training may not meet the 100 lux level recommended for training lights.

Diagram 4 on page 7 shows a typical mobile training light unit.

Maintenance

Lamps must be cleaned and bulbs replaced on a regular schedule, as advised by the manufacturer, and it is essential to maintain the equipment properly in order to extend the life of the units and to ensure that the lighting remains at a safe level. Clubs will have to decide (on the advice of the lighting engineer acting on their behalf) whether their members and/or ground staff can carry out this work or whether it should form part of a maintenance contract. Where staff carry out maintenance, clubs should be mindful of health and safety procedures and training implications.

Longer term maintenance will be the responsibility of a maintenance contractor and a report of all maintenance should be kept in written form, dated and signed.

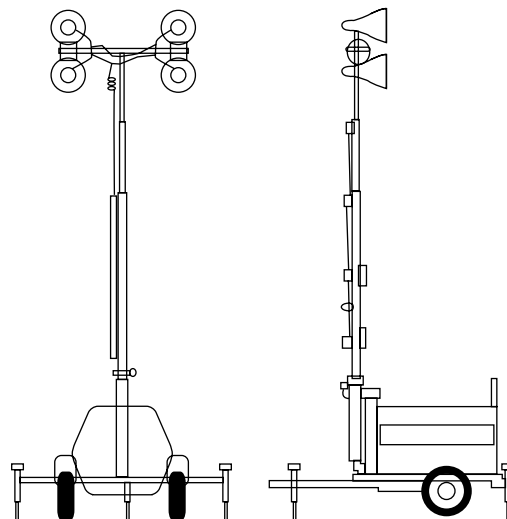


Diagram 4: Typical mobile training light unit

Useful contacts:

Institute of Engineers of Ireland

22 Clyde Road
Dublin 4
Ireland

Branch Club Rugby Development Manager:

Munster Rugby

Tel: 021 4323563
Fax: 021 4323956

Leinster Rugby

Tel: 01 2693224
Fax: 01 2693142

Connacht Rugby

Tel: 091 561568
Fax: 0909 643083

Ulster Rugby

Tel: 048 90493111
Fax: 028 90491 522

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