

FLOODLIGHTING OUTDOOR TENNIS COURTS



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Introduction

Facilities providing floodlit tennis have an enormous advantage over those without lighting, attracting coaches, more players, extending playing time and increasing revenue from court fees during the winter months.

Between November and April when daylight is shorter and indoor provision is not available illuminating outdoor courts adds 35% more playing time.

Facility	Hours per annum
Outdoor non floodlit court (allowance of 35% for bad weather)	2500
Outdoor Floodlit court (allowance of 35% for bad weather)	3500

Glossary

The following terms used in this guide are defined below:-

Purchaser	The Club, Centre, Facility or Organization buying the floodlighting.
Supplier	The company the Club, Centre or Facility buys the framed-fabric structure from. Depending on the size of the project and the nature of other work being carried out at the same time, it could be the framed-fabric structure Manufacturer or Agent or a General or Court Contractor.
LTA	The Lawn Tennis Association.
Contract	Legally binding agreement between the Purchaser and the Supplier.
Illumination	The process of lighting an object or surface
Luminaire	Combination of the light fitting and the lamps[s] e.g. box /projector with lamp inside
Uniformity	The evenness of the distribution of light over the court surface. The uniformity of light is as important as the level of illumination, and therefore light should be spread evenly over the whole area, including behind the baselines, outside the sidelines, and above the court
Lux	Unit of measurement of illumination falling on the surface of the court. One Lux equals one lumen per square metre.
Light spillage	Two forms: horizontal illuminance - measured at ground level vertical light trespass – impact on the face of vertical surfaces – e.g. neighbouring windows
Glare	Two forms: Glare is not simply too much light. It affects both players, spectators and the surrounding environment and is highly subjective. There are

two types;

Disability glare impairs vision without necessarily causing discomfort.

Discomfort glare causes discomfort without necessarily impairing vision. It is related to the brightness of sources of illumination viz. the lamps, in the observer's field of view and other factors such as the brightness of the background e.g. night sky, against which they can be seen and the position of the observer. These factors working together give rise to the sensation of discomfort glare.

Discomfort and disability glare are minimised by the correct selection, siting and aiming of the floodlighting, relative to the observers position.

In general the application of floodlights incorporating double asymmetric reflectors at low aiming angles will contribute significantly to the control of glare. For further advice see ILP Guidance Notes on the Reduction of Light Pollution.

Principal Playing Area (PPA):	The area within the court lines
Total Playing Area (TPA):	The court area comprising the PPA plus 4.5m of each run back and 2.5m of each side run
Uniformity Factor:	The ratio of Minimum/Average lighting level
Maintained Illuminance:	The specified standard within the prescribed areas. This will be the value attained when degradation in performance, from the initial value, has occurred and the lamps are then considered to be at the end of their performance life. (Typical value 2/3000 hours).

How much light do I need?

LTA standard levels of illumination

The following illumination levels for artificial lighting within the prescribed areas must be matched to the different environments, measured at the playing surface. The standards are to be applied on a court-by-court basis, when operating individually. The court lighting is measured at the playing surface irrespective of the switching arrangements.

Standard	Maintained average illumination on PPA	Maintained average illumination on TPA	Uniformity within PPA Emin/Eav	Uniformity within TPA Emin/Eav
Recommended	500 Lux	400 Lux	0.7	0.6
Minimum	400 Lux	300 Lux	0.7	0.6

NB. Emin= lowest recorded value within the prescribed area. Eav = Arithmetic average of all readings within the prescribed area.

When preparing the performance specification, the required uniformity must be identified. Greater (better) uniformity will generally be achieved by systems using taller columns and / or a larger number of light sources.

How much will it cost?

The overall feasibility of a floodlighting project will depend upon the standard required, the initial cost of the system, the hourly running costs and the cost of maintenance and eventual replacement (see page 14,15). All these factors should therefore be given careful consideration, particularly as a more costly installation could also mean a more efficient (and therefore less expensive) system overall.

Installation costs

Individual court	£11,000
Block of 2 courts	£18,000
Block of 3 courts	£26,000
Block of 4 courts	£35,000

These are guideline costs and do not take account of any site specific issues particularly the provision of underground ducting or new power supplies. Please note that the prices do not include Fees, Contingencies or VAT.



Do I need planning permission?

Planning permission is usually necessary because the installation will normally involve the erection of new floodlighting columns and some changes in the use of the club grounds. The installation comprises an engineering application and therefore only a full planning application can be made. This requires drawings showing the location of the columns, their design and appearance, a datasheet, manufacturers leaflet for the luminaires and switchgear cabinets. The application will need to be supported by predictions of performance and the impact on any adjacent properties.

How do I Apply?

Firstly, a club should obtain the appropriate form from the local planning authority. All the authorities are governed by the Town and Country Planning Act of 1990 and most of the rules, regulations and fees are laid down by Central Government. Each authority will have an overall policy and plan for its particular area and it may be possible to arrange a pre-application consultation meeting with Planning before submitting a completed application. There are usually fees to be paid for this service from the Council.

The Planning Dept. will dictate the information it requires and how it can accept it. Many Local Authorities will only accept applications on-line via the Government portal and will not accept paper based submissions. It will be necessary to draw up a location plan and a site plan of the proposed scheme, together with a data pack to illustrate the column layout, the predicted performance and associated spillage, light trespass, sky glow and glare, together with details of the lighting fitting proposed. The majority of the specialist floodlighting contractors are fully familiar with the requirements of the planning authorities, and have historically provided the data packs free of charge on the understanding that they be invited to tender for the works when the project reaches that stage. It is recommended that any scheme be developed in accordance with the "Guidance Notes for the Reduction of Light Pollution" as published by the Institute of Lighting Professionals (ILP).

Initially the local planning department will assess the application. They will make their own judgement on how it affects local amenities; they will consult with local residents and other interested parties such as the authority's Department of Recreation and Culture and ultimately they will report to the appropriate planning committee. The latter is largely comprised of elected councillors. The Council is also obliged to make information available, including any letters of observation from interested parties, to the public and press. Members of the public, including the applicants, may attend meetings as observers. It should be noted that where proposals are clearly consistent with the Council's policies and there are no subsequent objections, applications might be dealt with under 'delegated powers' but this is becoming increasingly rare. As such, the applications are determined by the Planning Officer without the need for the applications to go to Committee, hence saving time.



How long will it take?

Most authorities work on a regular cycle of meetings and so it is likely that an answer will be given within eight to twelve weeks of submission. However, before a decision the planning officers may contact the club for clarification, or advise the club in its own interests to change certain details in the application. Such action inevitably means deferment of the eventual decision. One of three answers can be expected:

Granted Outright: This gives permission to carry on with the development straightaway. The club has usually three years within which to put the permission into effect. It should be noted that all applications are subject to a variety of conditions, the most common being a curfew time to limit operation.

Granted Subject to Conditions: The conditions will regulate certain aspects of the development, such as the height of the structure supporting the lamps, the intensity of the light, the hours of play and the use of car parking, service roads and highways.

Outright Refusal: The council must give full reasons if an application is refused or conditions imposed.

Applicants who are aggrieved by a refusal, or disagree with the conditions, can appeal to the Deputy Prime Minister. Appeals must be made on a form which is obtainable from: The Planning Inspectorate, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6PN.

In obtaining planning permission, clubs have found that the most sensitive factors are:

- the number and height of the lighting columns and appearance of the fittings.
- Initial and maintained Illuminance levels
- Sky Glow – ‘halo’ effect over the playing area
- Glare – Impact of high intensity light source against a dark background
- the “spillage” of light from the playing area to surrounding residential development, highways and service roads
- vertical light trespass onto the face of adjoining windows
- the times of operation (often restricted to before 10.00pm each evening) and extra usage of the club created by the installation of floodlighting.

More information on the planning permission process can be found via the following link

http://www.sportengland.org/facilities_planning/making_a_planning_application.aspx



Do we have enough Power?

One of the major issues involved in the design of a new floodlighting system is whether or not the existing power supply is adequate. There are a number of demands on the power supply to the site e.g. the clubhouse. The total of all existing loads will need to be checked to verify any spare capacity for the new floodlighting installation. Advice can be sought from a design consultant, electrical contractor or installer of the system. A club with up to 2 courts may be able to utilise the existing “domestic” single phase supply for floodlighting.

At sites with more than two floodlit courts the Electricity Company will usually require a “commercial” three-phase power supply to be installed to ensure they can match the overall demands of all consumers by balancing the loads on the supply.

Provision of the correct power supply, to a location adjacent to the courts will be the responsibility of the Club / Organisation.

To ensure the power supply required is correctly quantified the following information must be established at the earliest possible date in the project development.

Confirmation of the supply voltage and frequency of the electrical supply.

The power factor of the proposed lighting

Total power load for the complete facility. This must be expressed in the units of total power, the Kva rating, when defining requirements to the Electricity Co.

How will the power supply be installed?

If a new supply is needed it may be installed into an existing building, or into an Intake Enclosure, local to the court block.

Please note that during the project development it may prove more economic for the power supply to be terminated at an Intake Point at the site boundary, instead of local to the court block. This will minimise the work done by the Electricity Co. (themselves a monopoly) and hence contain the cost by utilising the services of either a local contractor or the floodlighting contractor. They will complete the feed cable installation from the intake point. This arrangement is commonly used if there are other facilities being installed, on other parts of the site which may also require electric power now or at a future date. [E.g. floodlighting for outdoor courts, a pitch or clubhouse etc.]

In this case, at the Intake Point a Main Isolator and a ‘switchboard’ or ‘switchfuse’ will be needed. The function of this equipment is to control and protect the feed cables to the various locations. The cables are called ‘sub-mains’.

When any sub-main serves an area that includes floodlighting it is critical that this cable is designed to ensure that the volt drop on it does not exceed 1.5% of the supply voltage. Any local contractor instructed to carry out the provision of the intake equipment and / or the sub main cable[s] needs to be briefed accordingly and advised that the “Zs” value must not exceed 0.3 ohms.

The sub-main will be terminated at the isolator of a Power Distribution Unit [PDU], inside a building or within a Feeder Pillar local to the court block. The supply voltage will be measured when the building and / or the floodlighting only is operating under full load.

Failure to follow this guidance, in respect of sub main design, can lead to an unacceptable loss of performance from the floodlighting.

What will our lighting scheme be like?

When considering a suitable lighting scheme for a particular site the basic design criteria is to:

- Meet the LTA minimum standards of maintained average illuminance within the prescribed areas of each court, the Principal Play and Total Play Areas. (PPA & TPA). (see below).
- Maximise the uniformity on the prescribed areas of each court, the Principal Play and Total Play Areas. (PPA & TPA).
- Provide high quality colour rendition with minimum glare, sky glow and spillage.
- Minimise the height and quantity of floodlighting columns
- Minimise the effect on the environment.
- Provide a lighting installation dedicated to tennis
- Provide a cost effective solution

It is critical that the design clearly identifies the prescribed areas to be illuminated and the uniformity, and addresses the problem of illuminating the side of the ball that the player looks at in preparing a stroke whether it be driven low over the net or falling from a high lob. Thus the ideal is to simulate daylight where the light is diffuse, that is, it appears to come from everywhere. Similarly it is important that the player does not perceive a multitude of “suns in the sky” when serving or going for overheads. Noticeable variation in illumination levels makes the ball appear to speed up or slow down, and distorts a player’s judgement.

Conventional tennis court lighting systems consist of a number of floodlights mounted on several columns located at various points around the courts. Generally, the minimum column height is 6m, the maximum not normally exceeding 10m, and there are different



types of lamps and light fitting each with its own characteristics. The type of system is predominantly dictated by local issues; residents, houses, the environment, residential or open field and by the planning authority.

Open site or sports field

For those sites with few residential houses, but some local natural screening the most commonly applied solution is the application of four 10m high columns, per court, arranged in a corner lit configuration, with four projector fittings per court inclined at low aiming angles.

This arrangement minimises the number of columns and glare for neighbours and is attractive to the planning authorities. This solution minimises glare to players and maximises uniformity, significantly better than the LTA minimum requirements.

N.B. If the site does not have any local natural screening then care must be taken to avoid the floodlighting and /or the columns being too obtrusive. In these cases alternative design concepts (see page 6) may be more suitable and expert advice should be sought in choosing the most appropriate design.

Contentious area with environmental/planning issues

Planning authorities are less likely to accept columns at 10m in residential areas. Reducing the height of the columns from 10m to 8m along with correct fitting selection can be considered. It will result in higher levels of illuminance but lower, poorer uniformity. The projectors are aimed a little higher, approx. 5 degrees above the horizontal. The improvement in light fitting design since 2005 has made this a practical alternative to the 10m high column scheme.

Another solution to these more contentious sites is the application of six low level columns [6m to 8m high] per court, fitted with a minimum of six lower powered luminaires per court. This will produce the correct uniformity, minimise glare and control spillage. Although more columns and luminaires are required with this scheme, the impact in daylight is reduced by the lower column height, but offset by the increased number of columns – all key factors in planning terms. When planning approval can be achieved for the use of multiple 8m high columns, the uniformity is equal to that of the 10m high corner lit scheme described previously.

Developing the floodlighting system will also involve matching the environment to the appropriate LTA standard and selecting the appropriate type of lamp. See p10 Light Sources & Lamps.

Column layouts & fittings

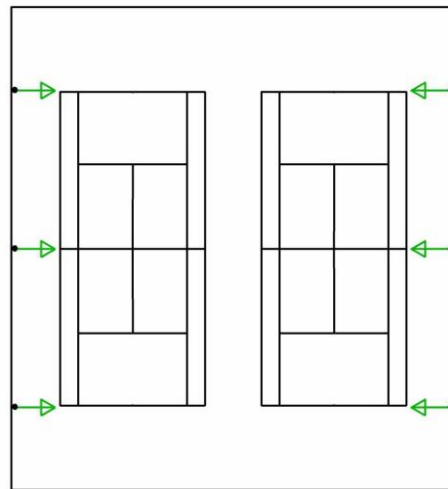
Careful planning in the location of columns and the luminaire heights is essential to lighting design. Ideally lights should be as high as possible in order to maximise uniformity, but due to other factors all lighting systems are a compromise to some degree. When courts are lit individually, the minimum height for floodlighting columns is 6.7m, the maximum not normally exceeding 10m. Alternatively courts can be lit as a block of three and a cost effective solution is to apply four 10m columns.

Most layouts involve lighting the courts from the corners or in a corner and side lit configuration. Where the site conditions and/or court spacing allows, the side lit layout should be used. Lighting from the side of the court will result in minimum glare to players.

Where appropriate adjoining courts can share columns to support the light fittings.

The relative merits of the alternative column layouts are detailed below:

Side Lit Scheme



Side lit layout - typically up to 8m with 'Box' fittings

Two courts controlled as ONE block and lit from the SIDES only

Advantages

Less glare within the court area

Less glare outside intended area

Good control of light spillage

With columns 8m high and above – high levels of uniformity


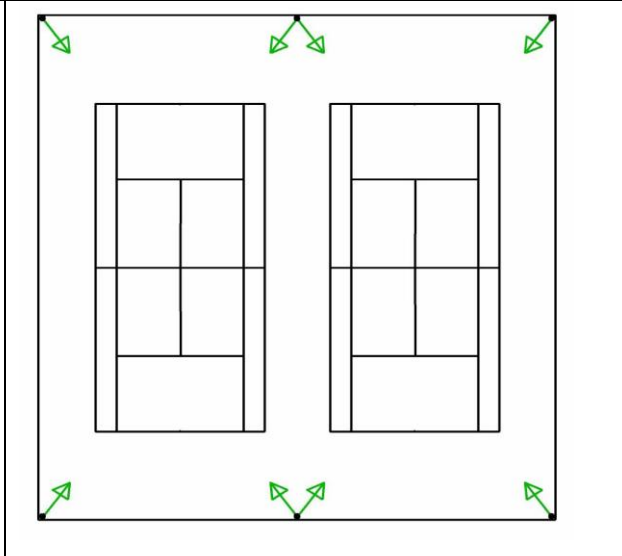
Multi court lighting in blocks of two and three courts is possible

Disadvantages

Difficulties experienced where two or more courts are to be illuminated individually, unless a minimum of 7m is available to safely locate columns between courts at the baseline.

Usually a minimum of three columns is required each side of each court, hence not as cost effective as other solutions when lighting courts individually.

Corner Lit Scheme

	
<p>Corner lit layout - typically 10m with 'Projector' fitting. (Min. column height 8m)</p>	<p>Two courts lit & controlled individually from the corners of each court.</p>

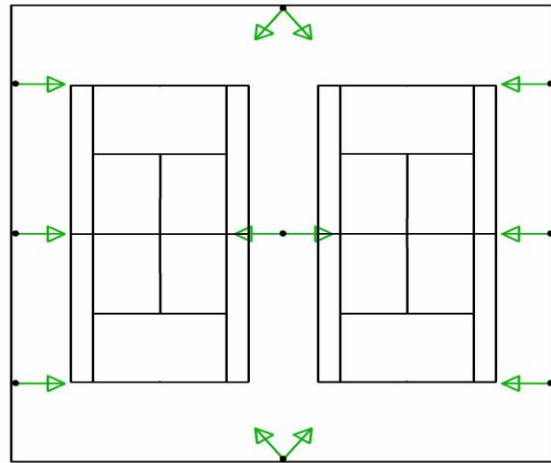
Advantages

- Least number of columns to achieve LTA recommended standards.
- High level of illumination on surface of ball approaching player
- High standards of uniformity
- More suitable for three or more courts, where individual court switching is required and limited room is available between courts
- Cost effective

Disadvantages

- Potential for excessive glare. Careful selection of aiming angles required.
- Column height may be considered obtrusive in daylight
- Column locations usually required outside the fence area.

Corner and Side Lit Scheme



Corner and side lit – typically from 6m with 'Box' fittings

Advantages

Uses lowest column heights that can be applied to meet LTA minimum standards

Facilitates the application of 'box type' fittings – perceived by most planning authorities as more suitable for contentious site locations.

More suitable for two or more courts, where limited room is available between courts

Good control of glare, sky glow and spillage

Disadvantages

Large number of columns required to achieve minimum standards

Larger number of fittings than the equivalent corner lit scheme

More costly to install

The use of corner lighting systems is not recommended where national or international levels of play are involved.

Typically the lamp control gear is housed at the base of the floodlighting columns inside the columns themselves. The mains protection (MCBs) and control switchgear is usually located either within the tennis facility premises or within a purpose-built weatherproof cabinet local to the court block. This is called a feeder pillar.

Fitting Selection

Fitting selection is closely related to the column layout as illustrated below:

Box Fittings



Projector Fittings



Height	Typically applied up to 8m	Typically applied from 8m upwards
Cost	Approx 5% higher capital cost than equivalent corner lit scheme	Cost effective solution
Position	Side or Corner and Side lit	Side or Corner
Planning	Greater No. of fittings Possibility for energy savings from alternative lamp configurations	Height of columns has an impact on the environment in daylight but is offset by the need for fewer columns and fittings
Performance	LTA minimum Std. Six [6] 1Kw fittings per court are required. LTA recommended eight [8] 1Kw fittings per court LTA minimum uniformity at 6m Best uniformity at 8m Low glare Very close control of spillage Good sky glow control	LTA recommended Std. Four 2Kw fittings per court are required. Best uniformity Glare control subject to careful fitting selection and aiming angles. Good spillage and sky glow control

Light sources / lamps

For conventional systems there are essentially two different types of light source, incandescent and high pressure discharge lamps. Incandescent are now rarely used. There are two principal types of high pressure discharge lamps which give out a markedly different colour light:-

Metal Halide [MH]

High pressure sodium [Son].

Metal halide lamps emit a brilliant white light whereas high pressure sodium lighting has a pale yellow tinge. The latter should not be confused with low pressure sodium roadway lighting

The colour of the court surface can also significantly affect the performance of the floodlighting. Different colours absorb and reflect different amounts of light depending on its own colour content. White light contains a high proportion of all colours and therefore reflects equally well from any coloured surface, while yellow light contains a high proportion of yellow and reflects best from a yellow surface. When playing tennis under floodlights the reflected light is used just as much as the light directly radiated from the lamps and so lamps should be selected accordingly. The reflected light is normally the only source of light for underlighting a falling ball. Also the ambience created by playing in white light is usually better than with sodium lighting which tends to make some colours, such as red, look dull and dingy.

The merits of Metal Halide and Sodium are detailed below:

Metal Halide Lighting



Advantages	Disadvantages
Efficient lamp	Higher replacement cost than Sodium.
Low power required to achieve LTA standards	Takes time to reach full output, approx 10 to 15 minutes
Low running cost	Lamps that have just been turned off [e.g. end of token period] require a 'cool down' period before being switched on again. Typical overall time is 15 minutes.
Approx.75p/ hr. at LTA minimum standard.*	
Approx.£1.00/ hr. at LTA recommended standard.*	
Very good colour rendition	
Lamp performance life typically 2/3000 hours under normal switching intervals as applied to tennis lighting usage	

* These values are based on the unit cost of electricity at domestic rates.



Sodium Lighting



Advantages

Very efficient lamp

Lower power required to achieve LTA standards

Lower running cost than metal halide values depend on final scheme design e.g. min standards can be achieved from 10m columns at approx. 40p/hr

Lamp performance life typically 4/5000 hours under normal switching intervals as applied to tennis lighting usage.

Low replacement cost, approx. half that of metal halide

Disadvantages

Poor colour rendition when compared to metal halide

Takes time to reach full output, approx 10 to 15 mins

Lamps that have just been turned off (e.g. end of token period) require a 'cool down' period before being switched on again. Typically this is 15 minutes.

Maintenance of the Floodlights.

When should lamps be replaced?

The average life of a lamp is different for each type. It should also be borne in mind that lamps deteriorate in their effectiveness from the moment they are first switched on and ideally they should be replaced at the end of their performance life which is usually well before they finally fail. The temptation is to wait for a lamp to fail before it is replaced. Equally the manufacturer does not usually guarantee the life of a lamp and so the club can be unlucky and lose one long before its average life expectancy. But in order to maintain uniformity lamps should be replaced as a complete set per court.

How do I maintain the floodlights?



Maintenance of the lighting system is one of the most important issues to consider when choosing equipment. Apart from replacing lamps, the lens and reflector of each fitting have to be kept clean and the aiming of the fitting may need to be adjusted to retain uniformity.

When a system is installed, according to its design, each lamp should be aimed to direct light to a particular area of a particular court. After a long period, the aim may become distorted by vibration or high winds. Also, because luminaires are designed to produce beams using highly polished reflectors as in car headlamps, it is important to keep the interior moisture-free to minimise corrosion. A regular check of the sealing arrangements of the fitting should be made as part of the regular maintenance. Most floodlights have a sealed glass lens which may be opened to wipe clean the reflector and replace the lamp. The illumination levels and the resulting uniformity should also be included in the maintenance procedures.

Minor Service:

Periodic inspection to keep the face of the light fitting (luminaire) lens clean

All equipment, exposed to the elements, should be checked to ensure the integrity of the weather sealing

An inspection to ensure the tightness of ALL electrical connections

Interim Service:

All work listed under the 'minor service' schedule plus a test to monitor the degradation in performance of the lamps and hence the overall lighting installation. This test would be identical to those carried out prior to handover and would thus be on a court-by-court basis.

Major Service:

Re-lamping of each court where it has been previously established that performance has dropped from the original installation level (initial value) to the 'maintained level' – specified in the original design. N.B LTA standards are set at the 'maintained level'.

All work listed under the 'minor service' section should also be carried out, together with a fully documented test.



Health and safety requirements should be taken into account when servicing floodlighting. Adequate protection of the court surface must be considered with the use of a high level maintenance vehicle or working platform.

How much does it cost?

Typical Maintenance Costs

On a metal halide scheme of four (4) courts the budget should include allowance for the following

Minor service £ 600 - Annually

Interim Service £ 850 - After two years of operation from previous re-lamping

Major Service £ 1,000 per court - As dictated by the results of the Interim service approx. every 4/5 years.

What allowance should be made for lifecycle costs and sinking funds?

To maintain acceptable floodlighting standards it is necessary to replace items such as columns, luminaires etc. over time. This will, in general be due to:

deterioration from wear and tear in normal use

the fairly harsh environment in which most of the equipment is operating

misuse or lack of full maintenance, or a combination of the above

It is considered essential to budget for this need and to create a sinking fund related to the initial capital purchase. Each floodlighting scheme is unique and site specific. To calculate an accurate sinking fund for a particular site the capital cost of component elements is needed. Based over a large number of schemes we know that an average charge of £2.00 should be added on to the total charge of using floodlights on a single court per hour (see how much should we charge?). The table below gives an indication of the minimum working life that you could expect from each element over a 20 year lifecycle.

Elements that need replacing	Minimum Life Expectancy	
Protection and control systems	Allow 5 years	Approx. 20% of the capital cost should be included four times in a 20 year life cycle budget

<p>Fittings</p> <p>(The replacement of the complete light fitting(s) at the top of the columns i.e. luminaires)</p>	<p>Allow 10 years</p>	<p>The full capital cost should be included twice in a 20 year life cycle</p>
<p>Light columns</p> <p>Cables</p> <p>(Replacement at end of their overall life)</p>	<p>Allow 20 years</p>	<p>Full capital cost should be included once in a 20 year life cycle budget</p>

Separate allowance should be made for the predicted impact of inflation and VAT changes over the estimated life cycle period.

How much should we charge?

Experience has shown that to cover the electricity charges make allowance for the servicing costs and to contribute towards a 'sinking fund' for ultimate equipment replacement, a charge of approx. £5.00 per hour should be made. This is broken down into the following costs;

Electricity	£1.00p / ct / hr
Routine Maintenance	£2.00 / ct / hr
Lifecycle Costs / Sinking Fund	£2.00 / ct / hr

All values are average and based on prices tendered to Sept 2011

This is based on the fact that there are approx. 1200 hours of darkness per year, based on curfew time of 10pm, and that club usage is typically 300 hours per court per year.

How do I control my lighting?

It is important that the club should recoup the running, maintenance and life cycle costs of any floodlighting system by charging for floodlit court time. The most common methods of control are by coin, token or card meters. Specialist sports floodlighting contractors will normally be able to offer meters to operate the system. It should be checked that:

The meters can be overridden by a key so that when the club is running a match or tournament the referee or players are not continually feeding them.

The charge per hour may be simply adjusted by the club management so that prices can be adjusted as costs increase;

The meters are robust and may be placed in a relatively secure part of the clubhouse, preferably out of view from outside. (Coin operated machines are a great attraction to passing vandals!)

With high pressure discharge lamps it is important to note that if the lights go out then they will need to be left typically 10/15 minutes before they can be switched back on. Devices are available that give a visual warning several minutes before the lights are about to go out so that players are not disrupted and lamp life is protected.

It is possible to track the lamp maintenance intervals by installing a counter to record the 'burning hours' of each court. If the courts are switched individually a separate meter is required for each court; if they are switched as a group only one meter is required per group.

To ensure safety when leaving the courts exit lighting should be considered. This is usually achieved by retaining one of the court floodlights for an overrun period at the end of the pre-paid time or just prior to the curfew time imposed by the planning authority.

To ensure safe access to and from the court block, courtesy lighting or security lighting should also be considered.

What are the procurement methods?

It is critical to have a Scope of Works document for a project preferably prepared with professional help. This is a multi-page document which sets out the requirements for the floodlighting, the performance and installation standards to be applied, and the supporting documentation to be provided. This document is known as the Employers Requirements or ER.



Contractors would be appointed on a design and build basis, whereby the contractor is responsible for the detailed design, supply installation and testing of the scheme to meet the performance criteria set out in the Scope of Works document.

When choosing contractors, clubs should approach reputable specialists in sports lighting (www.sapca.org.uk). It is always useful to check the reputation of firms at other floodlit tennis facilities, particularly where the systems are at least two or three years old. There are other electrical contractors that will offer floodlighting, but whilst they may appear relatively cheap, their proposals need careful analysis to ensure all aspects of the installation have been included otherwise they may not provide the best value for money. Similarly, “do-it-yourself” installations carried out by clubs might also be false economy if the desired performance level of lighting and electrical safety is not achieved. Also work done by willing volunteers may leave them and the Club exposed unless they are fully qualified and insured for the works and for working at height.

When selecting a contracting company the following points should be considered:

Does the firm manufacture its own products?

Does the firm offer a full design service, backed by appropriate PI cover?

Do the products conform with the appropriate British and European standards?

What guarantees are available?

Does the company carry out its own installation, and is this always done in accordance with the mandatory electrical wiring regulations (BS 7671, as amended) ?

What after sales service is available, and at what cost?

Are spare parts readily available?

Clubs should seek quotations and/or design proposals from at least three firms, and it is important to ask contractors to provide full specifications with their quotes.



How do I develop a floodlighting scheme?

When considering installing or replacing floodlighting it is easy to become perplexed by all the special terminology; illumination levels (measured in lux), evenness of light distribution, (defined as uniformity), the number of lumens per watt generated by a particular type of lamp. But these elements are important contributors to a successful scheme and the context in which the system is placed can have a profound impact on its overall effectiveness. Clubs are strongly advised to look at and play under as many different working systems as they can and listen to the experiences of others who already have floodlighting. Above all else, be aware that you are buying illumination, not just columns and lights.

The first issues to consider when planning a floodlighting scheme are:

How much light do I need?

How much will it cost?

Do I need planning permission?

Do we have enough power?

What design will best suit our club & the local environment?

Floodlighting is highly subjective. The main difficulty facing any club wishing to install a lighting system is the balancing of a number of conflicting constraints governing its design. Some of these constraints are imposed by external bodies such as a local planning authority or electricity suppliers. The best design solutions will be a balance between available power, cost, and ease of maintenance, system management, and, player preference / perception.

Once all the above have been considered you will need to present your requirements in a logical order to enable either the Design Consultant or, more commonly, the Design and Build contractor to present proposals and submit quotations for your scheme.

The information and actions needed to create an Employers Requirements document which sets out your requirements are:

1. A site/location plan (including numbering of courts) to support the planning application and later to inform the contractors when quotations are being sought. It should show the position of the court block and its relationship to adjacent properties, roads, etc.
2. The areas to be illuminated must be identified using the established terms:
 - a) Principal Playing Area
 - b) Total Playing Area



3. The level of illumination in each prescribed area is to be established at the required average value, with a finite uniformity ratio attached to the figure.
4. Consideration must be given to glare control, 'overspill' and 'vertical light trespass' of the lighting and the extent to which this can be accepted.
5. The different types of lighting system available must be related to the overall requirements and matched to the performance standards required and cost plans.
6. The location and availability of a suitable power source must be identified, together with the associated protection equipment.
7. The requirements for manual switching or token meters and any other control features required e.g. time clock, visual warning and egress controls must be identified.
8. The routing and type of cables and cable ducts are to be identified.
9. The operating, maintenance and life cycle costs will need to be quantified to form part of the overall business plan.
10. Consultation with Local Authority Planning Officers and, in some instances, with the Electricity Supply Authority will be required

Frequently Answered Questions

Do I need planning approval?

Yes. For all new installations and where the light source, column height or layout is changed from that already in place. If courtesy / amenity lighting is to be installed this will also usually need approval, together with any remote control boxes or power distribution feeder/ service pillars.

What is a planning agreement?

This is the formal document which confirms a local authority's agreement to your development. It may contain "conditions" that will apply to your particular project e.g. curfew time, colour of columns.

Who prepares the location and site plan drawings?

On larger schemes the Project Architect, Engineer or Surveyor. On smaller 'Design and Build' schemes a Club member may be able to produce the required information using downloaded maps of the site for the location plans at the scales dictated by the Planning Authorities, on payment of the required fee.. Dimensioned drawings of the court block[s] are needed for the preparation of Data Packs. They must include details of the overall size of the block, the court numbers and the spaces between the play lines of each court and the depth of back runs and the width of the side runs.

What is a data pack?

Data packs are produced to varying standards by most lighting contractors/manufacturers (found on SAPCA list). Basically they contain all the design details of the lighting scheme showing light distribution (predictions of horizontal illuminance on the court surface), light spillage around the perimeter of the courts and where necessary the impact of vertical light trespass all based on the fittings selected by the designer. These elements are shown mostly in the form of computer printouts – graphical tables, contour maps and drawings. They clearly show the cut off points and reduction in overspill that specified fittings can achieve. Datapacks are particularly important in environmentally sensitive areas and useful tools for planning authorities to evaluate your scheme.

What are Cable Ducts & Drawpits?

Cable Ducts are heavy duty purpose designed plastic tubes, available to the trade from electrical wholesalers. They usually run underneath the court surface to contain the power cables serving the various floodlighting columns. Drawpits are "manholes" strategically placed on or around the court block. Together the cable ducts and drawpits form a containment system to facilitate the initial installation and or future replacement of the power



cables serving each of the columns. If power cable routes can be buried close to the perimeter of the court block in soft ground the ducting provision can be minimised.

What provision needs to be made for ducting and drawpits?

When building new courts the aim of any court contractor should be;

To minimise the amount of ducting and drawpits whilst achieving the required containment system defined above.

To ensure any future re-cabling can be achieved without disturbing the courts surfaces or adjacent 'hard' areas.

If installed 'in advance' of the floodlighting it should include column sleeves set out to exactly match the lighting design already approved by planning.

Ducting provision is categorised as follows;

Full - where ducting is needed to every column and would usually apply where there is no soft ground around the perimeter of the court block.

Partial - can be applied where only some of the cables have to be run in ducting under the court surface.

Minimal - where none of the cables pass under the court surface but may need similar containment under hard standings e.g. patios or pathways.

Why should I change the lamp before it fails?

The performance of the light deteriorates to a level at which it cannot achieve the original performance standard. Lamps need to be changed as a complete set per court in order to ensure that uniformity (evenness of light distribution) is maintained.

Does the LTA support the application of sodium lighting?

Yes because in certain circumstances the lower power required by sodium systems may enable an LTA compliant scheme to be accommodated on the existing power supply. Modern high pressure sodium lighting can provide very acceptable lighting conditions when the impact of lower maintenance and running costs is set against the higher colour rendition achieved by metal halide.

We are keeping the columns and just changing the light fittings, do we need planning permission?

In these circumstances you are likely to need approval for a change of fitting, particularly if you are changing the type of lamp e.g. sodium to metal halide and/or the performance standard. However, there are other technical and commercial issues to address. The new



fittings may be of a greater weight than the original and therefore impose a bigger load on existing columns. They may also require larger lamp control gear, which is unlikely to fit inside the existing columns. Commercially, contractors may be reluctant to supply and fit new lamp fittings on to old columns as there could be a conflict of responsibilities in the event of column failure.

Further Information:

ILP. (2000). Guidance Notes for the Reduction of Light Pollution. The Institute of Lighting Professionals Tel: 01788 576492

Website: www.ilp.co.uk

Who installs the power supply?

The local Electricity Company will provide a new, or replacement, power supply. However, you must check their quote very carefully as it will contain exclusions which will need to be covered by a local contractor for the groundworks, and an electrical contractor to prepare for the connection.

Who installs the Electricity meter?

The Clubs Electricity Supplier, who may not be the Electricity Company.

Who will connect the meter to your electrical equipment?

This work should be entrusted to a local NICEIC approved electrical contractor who will work in conjunction with the Electricity Supplier.

www.LTA.org.uk

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