THE FA GUIDE TO FLOODLIGHTING

- GUIDANCE NOTES FOR FACILITY OPERATORS CONSIDERING ARTIFICIAL LIGHTING FOR FOOTBALL

INTRODUCTION

Floodlighting plays an important role in the delivery of football across several key areas of the game.

It is a key requirement for clubs within the National League System and is also essential on Artificial Grass Pitches to ensure extended community use which allows for increased hours of play and football outcomes. This in turn assists in increasing revenues and improving sustainability of the facility.

The purpose of this document is to guide facility operators on the successful installation of artificial lighting for football. There are some key issues with regards to the development of sites with floodlights and these include planning, health and safety, costs – both installation and running costs, maintenance and achieving the required lux levels for the planned activities. This document highlights the main issues in relation to floodlighting for football, identifying key areas for floodlight implementation.

The document contains a process chart outlining the key areas that will need to be considered when developing a project involving floodlights. It discusses the appointment of lighting consultants, design and technical considerations, maintenance and potential issues relating to planning. Indicative costs are included as an outline guide for organisations when undertaking an early assessment of the financial viability of a floodlighting scheme.

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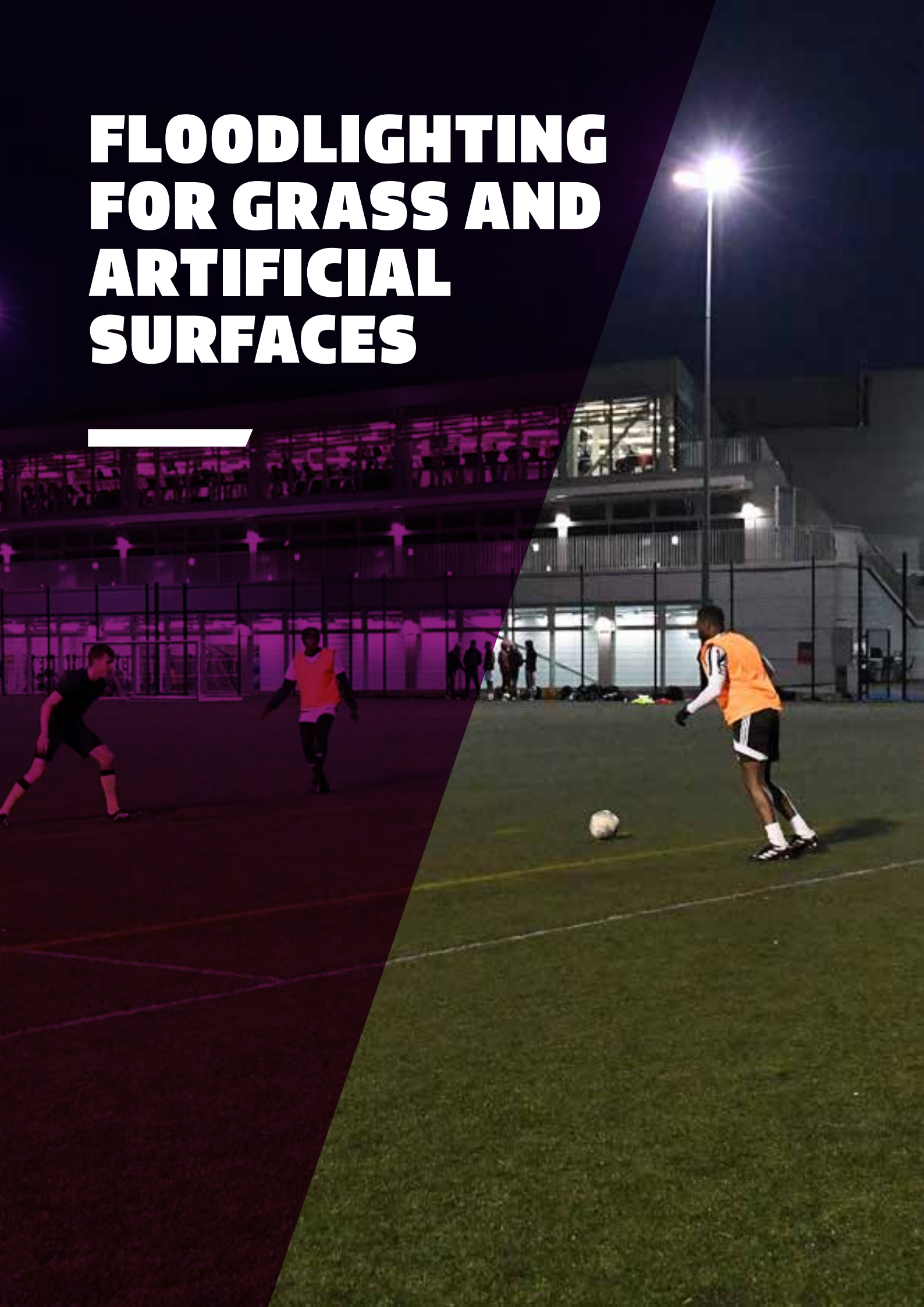
FLOODLIGHTING FOR GRASS AND ARTIFICIAL SURFACES



Grass pitches – Competitive matches

Clubs wishing to compete in FA competitions and in the National League System must achieve the required standard relevant to the level of competition.

They must obtain an approved Floodlighting Survey Chart and a Floodlighting Inspection Report in order for a club to be accepted for entry into a competition. See Maintenance & Testing section.

Leagues sanctioned by The Football Association or County Football Association may also operate a floodlighting standard. If a League sets a standard below that set by The Football Association, Clubs must still comply with The Football Association's minimum standards if they are to be accepted into FA Competitions. Similarly, if a League sets a standard higher, then the Club must comply with the League requirement.

Grass community pitches and training

Installation of floodlights on Community grass pitches tends to result in overuse and subsequently pitches that are not fit for purpose.

As such floodlight installations on community grass pitches are not encouraged. On average, a well maintained grass pitch should have a carrying capacity of about five to six hours of weekly use, depending on local conditions. The implementation of floodlights on such pitches will in most cases have a detrimental affect on the playing qualities of the pitch surface. This will require increased maintenance and therefore additional expense. It is therefore vital that organisations assess the intended use of the proposed pitch and assess the cost of implementing floodlights against any increase in outputs/income from the site when reviewed against available budgets for additional maintenance.

However it is recognised that not all clubs have access to appropriate artificial grass pitches and that in some cases the use of floodlights for training on separate training areas can help reduce the pressure on the main playing pitches. The recommended lux levels for a training pitch is 120 lux.

The use of portable floodlights could be considered but these will require suitable management and adequate storage when not in use. It is unlikely that any portable lights will be able to meet the 120 lux recommendations for training and the area that can be covered will be minimal.

3G Football Turf Pitches

Football Turf Pitches (3G) are designed to accommodate extended usage often up to 80 hours a week. This is the minimum for a project funded by The Football Foundation. However local planning restrictions may affect these timings. Projects involving AGP construction generally incorporate floodlights as part of the design for the overall project since floodlighting is required to maximise the use and improve the economic sustainability of artificial grass pitches.

Lighting of full size pitches is normally achieved by 2 or 3 lamps mounted onto an 8 column system which is positioned along the side of the pitch and outside of the fence-line. Typically 8 columns, fifteen or sixteen metres high, are used. These should be switchable so that segments of the pitch can be lit independently.

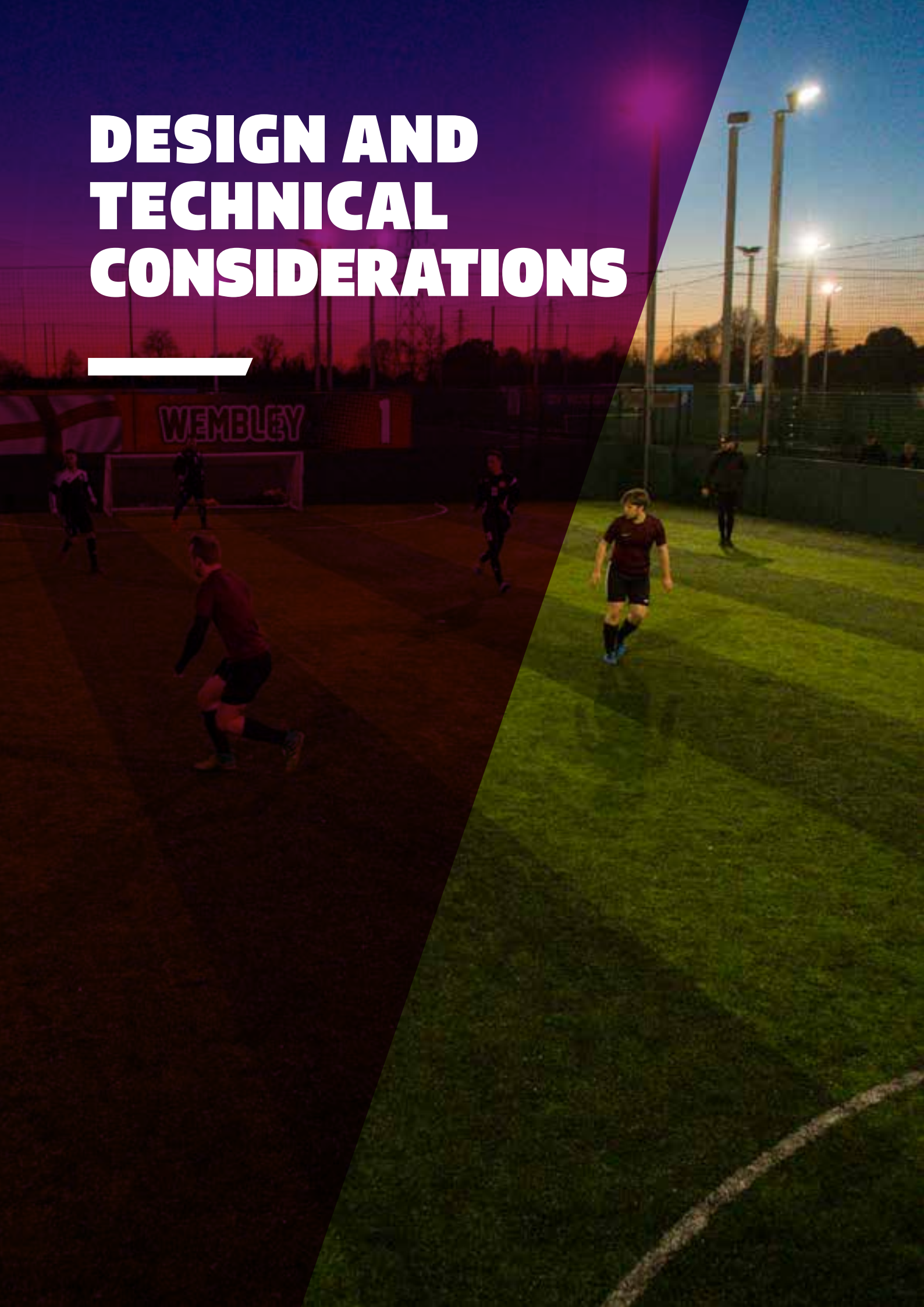
As many league and cup competitions specify the minimum level of lighting they require, it will be necessary to determine the competitions that the teams using the pitch will compete in and alter the design accordingly. Where no requirements are stated the minimum levels of performance should be in accordance with FIFA's Class II which for 11 a side football is a minimum maintained average illumination of 200 lux.

To minimise running costs and for flexibility of use, the lighting system should allow part illumination of the pitch (half pitch and/ or thirds) and a lower level of lighting for training which is a minimum maintained average illumination of 120 lux. Typically artificial grass pitches are designed for multi sport use and so do consider the needs of all priority sports users.

Due to the extended hours of use associated with Artificial Grass Pitches it is recommended that all AGP floodlighting installations utilise the latest Light Emitting Diode(LED) lighting technology. LED lighting offers many advantages over conventional Metal Halide systems, including energy saving, long lamp life, instant light, flexible dimming and improved colour.

LED technology is more expensive than Metal Halide, however, the reductions in energy and maintenance costs will result in a payback of the additional installation expense. The projected payback period should be calculated prior to any project commencing to ensure that LED lighting is sustainable.

DESIGN AND TECHNICAL CONSIDERATIONS



Ensuring that an appropriate feasibility study and design specification is prepared by a suitable specialist in line with the club and league requirements will limit any issues and unnecessary expense.

Floodlights must be designed and installed by qualified professionals as highlighted above. When designing a floodlighting system, it is important that an assessment of the available power supply is made to determine if adequate capacity is on hand as bringing a new supply to site can increase costs dramatically. See costs section.

The total installed power requirements for an eleven-a-side pitch is likely to be in the order of 35 to 40 kilowatts. Equally it is important to consider that long term power supply needs not only include playing areas but also other ancillary facilities on site as this may dictate the capacity of incoming power and the installation plan.

Annual energy costs should be evaluated from one supplier to the next along with maintenance costs and budgeted in the clubs business plan so that the long term annual costs are achievable from the outset.

Lighting requirements

Lighting should provide uniform illumination over the pitch appropriate for the proposed grade of play. Lighting requirements are dictated by good, safe and stable visual conditions for players and viewing requirements of spectators.

Particular attention should be paid to providing low glare and uniform lighting within goalmouth areas to ensure good viewing conditions for goalkeepers. Equally consideration needs to be taken to limit the visual obstruction of the match for spectators wherever possible.

Access for installation, maintenance, budget (capital and ongoing maintenance and energy costs) and potential planning challenges are among but not limited to the additional considerations when designing floodlighting installations that meet a clubs needs.

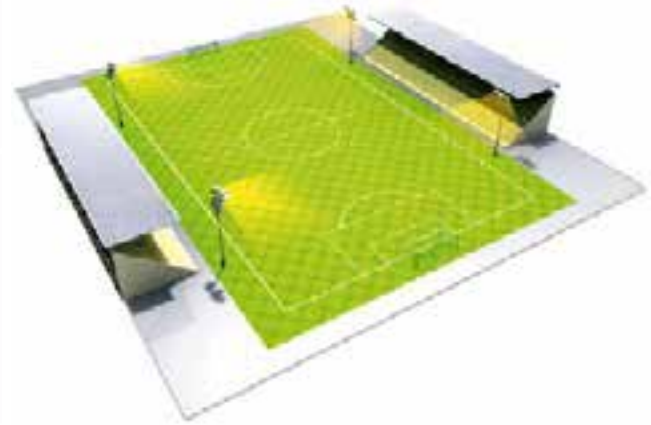
Columns

The number of columns is dictated by your needs and the site conditions. The required and future lighting levels, the visual impact of columns, minimising light spillage, clubhouse and spectator locations are part of the consideration when designing the right model for your facility. Particular attention should be taken to ensure player safety and therefore no lighting structures should be placed within 5m of the side lines or goal lines. Furthermore, care should be taken to ensure that the structures do not obstruct the sightlines of spectators and spectator walkways.

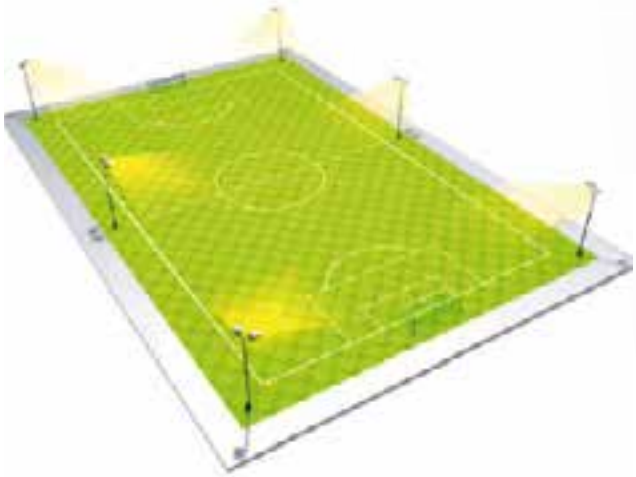
Specialist sports lighting manufacturers have developed a range of products to meet the needs of football. These include fixed masts, raising and lowering of masts and telescopic masts designed to meet different needs and budgets. Telescopic masts whilst more expensive, are often used in sensitive locations and can solve planning issues where the visual intrusion of columns is a concern, however the operator must take into account the extra time required to raise and lower the columns. Other factors may also include supply costs and access both installation and on going maintenance. We would advise facility operators to conduct a simple analysis of the pro's and cons of the solution options available to them.

Design solutions

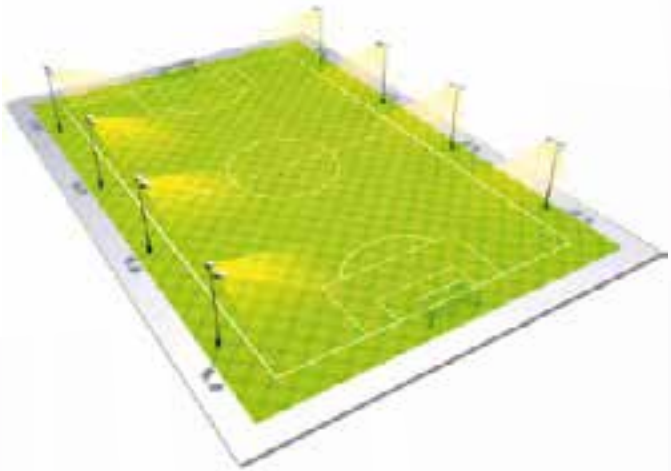
Typically eight, six or four columns of between 15m to 18m in height are used for grass pitches suitable for FA competitions and National League System.



Grade A (Step 1)
Conference Standard
4 x 18m masts
Average Illuminance 250 lux (maintained)



Grade B – G (Steps 2-7)
Minimum FA standard for new installations
6 x 15m masts
Average illuminance 200 lux (maintained)



3G Football Turf Pitches
8 x 15m masts
Average illuminance 200 lux (maintained)

Modern lamp technology and designs have significantly improved the efficiency of lighting systems when compared with older installations with reduced running costs and improved spill control a major benefit. Floodlights fitted with Metal Halide lamps and using flat style optical systems are typically 30% more efficient than older asymmetric lighting systems.

The recent introduction of Light Emitting Diode(LED) light sources are offering further energy and maintenance savings in the region of 25% to 40% over modern Metal Halide systems. LED systems offer additional benefits over Metal Halide including instant light with no warm up, extended lamp life of over 50,000 hours, flexible dimming and the ability to run on single phase power supplies. As LED systems improve and become more affordable Metal Halide systems will eventually be phased out.

The FIFA – Guide to the artificial lighting of football pitches & Sport England Artificial Sports Lighting guidance documents, contains more detailed information about the design and technology used for artificial sports lighting.

It is vitally important the club thinks about how and when they plan to use the lights.

This will influence the designs. For example remote switches or web based applications will allow the facility owner to switch the lights on/off from an accessible point within the club house or via a smart phone or tablet which is particularly useful on dark winter evenings. Variable switches and dimming will allow the facility owner to illuminate parts of the pitch they wish to use, particularly useful for training and managing/ rotating pitch use.

Furthermore there are often practical solutions to other site issues. For example the columns can provide electrical sockets to parts of the ground that previously have been out of reach, brackets can be mounted for tanoys/public address systems, lights for spectator areas/footpaths or training areas.

A club should check the required floodlighting standard with the league and process required for acceptance to play in that league. As a general guide the table below shows the minimum standards that apply to non-league clubs in the pyramid:

		2018 onwards			
	Ground Grade / Step	Eave	Emin	Emin/Eave	Emin/Emax
Conference	Grade A (Step 1)	250 lux	150 lux	0.60	0.30
Conference N & S	Grade B (Step 2)	200 lux	120 lux	0.60	0.30
	Grade C (Step 3)	120 lux / 200 lux (new)*	n/a	0.60	0.30
	Grade D (Step 4)	120 lux / 200 lux (new)*	n/a	0.60	0.30
	Grade E (Step 5 – 4)	120 lux / 200 lux (new)*	n/a	0.60	0.30
	Grade F (Step 5)	120 lux / 200 lux (new)*	n/a	0.60	0.30
	Grade G (Step 6)	120 lux / 200 lux (new)*	n/a	0.60	0.30

*120 lux refers to existing systems, any upgrades or new installations should achieve 200 lux

Please click here for FA Competition criteria for the current season.

Please note lighting for clubs in the professional game or for televised matches are not covered in this guidance brief.

PROCESS FOR FLOODLIGHTING INSTALLATION

STAGE	ACTIONS	COMPLETED
1 INCEPTION	Scope out project brief and demonstrate the need for floodlights	
	Consult with key stakeholders (league, proposed users, local authority planners, County FA)	
	Determine floodlighting standards required for level of competition	
	Identify planned use, time and hours of use per week.	
	Engage with lighting specialist for initial consultation and determine outline feasibility	
	Outline Budget (capital & revenue)	
	Risks – Unsecured finance, planning challenges	
2 FEASIBILITY	Appoint an accredited lighting consultant	
	Conduct electrical surveys to assess power supply (your appointed lighting consultant can provide assistance)	
	Hold informal talks with LA planning department	
	Design feasibility –explore viable options (advantages disadvantages)	
3 OUTLINE PROPOSALS AND SCHEME DESIGN	Lighting specialist to produce schematics, layouts and specification	
	Actively engage and consult with local residents, particularly those most affected by the scheme	
	Obtain budget estimates, review funding and consider a contingency for any unknown risks	
	Submit Planning application	
4 PROCUREMENT	At this stage tender and obtain cost certainty select and appoint contractors (where required & appropriate)	
5 CONSTRUCTION PLANS	Site preparation	
	Supply and installation of floodlights	
	Testing to be conducted by an independent lighting consultant or engineer	
6 COMPLETION	Sign off	
	Illumination & electrical certification	
7 MAINTENANCE	Annual general maintenance (in accordance with manufacturer guidelines)	
	Bi annual electrical & illumination certification	

Appointment of lighting consultants

The early appointment of a lighting specialist or approved contractor (see design section) is critical to the success of your project.

An 'approved' contractor or consultant is one which is in possession of the NICEIC (National Inspection Council for Electrical Installation Contracting) Approved Contractor's award; ISO 9000/BS5750 (International Standards Organisation/British Standard) or a qualified lighting engineer and member of the Institute of Lighting Professionals.

A lighting specialist will guide you through all aspects of your project including feasibility, design, planning, installation and maintenance.

Before appointing lighting specialists it is important to scope out the project brief, establishing clear requirements and identifying any known constraints. Some of the key requirements to consider are;

- Outline project objectives
- Justification of need, existing and planned weekly hours of use & when and level of play and required floodlighting criteria in your league.
- Site/pitch details including site map with boundaries if available.
- Critical date for completion (if known)
- Budget – capital & revenue secured and unsecured.
- Risks – Finance, planning.

A template project brief attached at appendix A and programme of use template at appendix B.

Construction programming and payment schedules

The optimal time to complete works is outside of the winter playing season usually in the spring and summer periods (March to September).

The winter months are usually avoided due to the trench and reinstatement work required around the pitch. Typically, for a new installation, the construction period is 5 – 6 weeks. This consists of up to 2 weeks to complete the trench, cabling and foundation works. Then a period of 2 weeks to allow the foundations to cure and then a further 2 weeks for installation and final certification of use. Appendix C shows an example on site checklist that a contractor would carry out prior to starting works. The checklist also includes the client's responsibility.

Facility operators should discuss and agree the payment schedule up front and on appointment of the contractor. Usually a lighting contractor will expect an up front deposit payment, payment on part completion and further payment on certificated completion/handover. Often contractors are open to negotiating depending upon your cash flow situation.

The facility operator needs to be fully appraised of all the costs relating to the scheme and your responsibilities and commitments. See costs section on page 19.

Maintenance and testing

On completion of the installation the contractor must provide NIC EIC electrical test certificates to ensure that the electrical system is safe to operate in a public area.

The pitch lighting levels must be tested by an independent lighting consultant or approved contractor and not by the installing contractor. Illuminance levels should be recorded on the FA Floodlighting Survey Chart and Floodlighting Inspection Report, see appendix D.

Following installation or re-lamping a lighting system will normally suffer a deterioration in lighting performance over time due to reduced lamp output and dirt accumulation on the floodlight front glass. With Metal Halide systems the deterioration is typically in the order of 20% to 30%, however with the improved performance of LED lighting the deterioration is lower at 5% to 10%.

Regular maintenance will help reduce any deterioration and thereby extend the life of lamps, floodlights and columns. Failure to carry out general maintenance in accordance with manufacturer guidelines will result in a declining performance system, can affect warranty and ultimately leads to a system that is deemed unsafe.

Routine maintenance including cleaning of lamp glass, realignment and planned lamp replacement should be carried out in accordance with manufacturer guidelines. Often facility operators can combine this with other contractual maintenance operations on site minimising costs and manpower. Items such as lamp replacement are sometimes covered under the manufacturer's warranty and in these instances will represent a significant cost saving for the facility operator.

It is vital that clubs have written confirmation of maintenance obligations.

Bi -annual maintenance should include electrical testing, illumination testing and certification. Clubs competing in the National League System are required to provide an updated certification (Floodlighting Survey Chart & Floodlighting Inspection report, see appendix D) every two years.

These are necessary to ensure the lighting system continues to meet the required standards after installation. Readings shall be on a grid of 88 markings (8 across, 11 down) evenly spaced with the outside readings falling 2.5m inside the pitch boundary line. The average of all the readings is taken to be the average illumination level in lux of the floodlighting installation. Often lighting companies that design and install the floodlights offer a range of maintenance options and can include the bi annual testing as part of the service at a cost.

The inspection reports should be carried out by qualified lighting engineers. The measurements should be made using a calibrated luminance meter. It should have been calibrated with 12 months of the measurement and the meter's serial number and last calibration date contained within the inspection report.

Costs

It is important to consider all costs related to a floodlighting project including capital spend, revenue and lifecycle costs. Capital expenditure not only includes the floodlighting contract and installation but also professional fees, planning fees and any connection or supply charges. Typically a new FA entry level match competition standard floodlighting installation of six masts (2 floodlights on each mast) 200 lux will cost in the region of £40,000. For 250 lux on an eight mast system (3 floodlights on each mast) will cost in the region of £60,000. Training lights at 75 - 100 lux on 4 masts (2 floodlights on each mast) will cost in the region of £30,000. The indicative costs above relate to Metal Halide installations, for LED lighting these costs will increase by approximately 30%.

Discussions relating to the budget, lighting requirements and ambitions of the club / facility operator should take place with your approved lighting consultant as indicated above at stage 3.

Clubs should seek guidance at the feasibility stage regarding revenue costs including energy supply, maintenance and replacement costs and budget accordingly. Your current energy supplier should be able to provide an estimate based on your proposed usage timetable. It is advisable to obtain an indicative maintenance budget for the proposed scheme during the design stages of the project. An example formula of calculating cost of ownership can be found at Appendix E.

A typical Metal Halide floodlighting system will have a life span of between 20 & 25 years before full replacement. LED lighting systems offer extended lamp life and it is expected that typical systems will have a life span of between 30 & 40 years.

It is strongly recommended that facility operators consider the replacement costs (sinking fund) and budget accordingly for such eventualities.

PLANNING PERMISSION

Before submitting a planning application for floodlights, consultation with the local planning department is recommended.

Planners will also advise of other organisations to consult with (e.g. Environmental Health) so that the level of information can be confirmed before an application is made. An accurate assessment of the proposed usage is useful when discussing floodlighting plans (See appendix B).

When submitting a planning application for floodlights the planning authority is likely to require a lighting spillage drawing showing the levels of light pollution and their impact on the surrounding neighbourhood and their properties. Lighting engineers or lighting specialist can provide such plots and in many cases handle the planning application.

Consideration needs to be given to the visibility of the lighting columns and pitch location in relation to nearby residential properties. Recent FA guidance had suggested that there should be a minimum of 65m from the perimeter of the pitch to the nearest residential building and not garden boundaries. However there are plenty of floodlit facilities that operate under this distance.

The use of soil bunding and tree-planting can significantly reduce noise levels and visual impact of columns. When constructing new pitches consideration should be given to its orientation and site location avoiding sensitive planning issues wherever possible. It is advisable to research the impact of other similar local floodlit facilities so that a strong justification can be put forward to outweigh any concerns.

Consideration also needs to be taken regarding the hours and pattern of use. For example, An Artificial Grass Pitch funded through the Football Foundation will be required to make available 80 hours of weekly use. Failure to consider these issues may lead to planning challenges, therefore early consultation with Local Authority planning departments are strongly recommended to discuss the issues you may face.

Furthermore engage residents that might be affected by your scheme early on and actively respond to their views and concerns. It might be possible to negotiate longer winter evening use in return for shorter summer use when residents will be using their gardens.

On receiving planning consent, often conditions are attached it is therefore vital that the club fully understand the impact of these conditions on your ability to deliver your activities and strictly adhere to these conditions to protect future use. For example a planning authority might limit the number of floodlit matches for a grass pitch per week due to the impact on neighbouring properties. A facility operator must be careful to ensure that the business case for the floodlights takes into account these restrictions.

Glossary of terms

Term	Symbol	Explanation
Illuminance	E	The quantity of light falling on a surface is termed illuminance ('E')
	E.ave	The average horizontal illuminance as a result of either calculation or measurement
	E.min	Minimum pitch illuminance on a surface at a specific point.
Diversity Ratio	Emin/Emax	
Uniformity Ratio	Emin/Eave	
Lux		The measurement of light. The unit of illuminance lumen/m2, incident on a pitch surface. 1 Lux = 1 Lumen/m2

APPENDICES

Appendix A: Project brief template

Club/project name	
Site address	
Primary contact and role	
Contact's telephone number and email address	
Project objective	
Tenure (freehold / lease and length remaining)	
FA / League requirements (Grade / Step 1-7)	
Critical date for completion (if known)	
Pitch dimensions	
Location boundary map (attach copy)	
Site access / car parking / public transport	
New columns or upgrade to existing?	
Constant light level and uniformity requirement	
Future upgrade to a different light level?	
Annual operating hours (define usage - attach programme of use)	
Planning submitted / approved? (if approved, supply copy)	
Scope of work required? (mechanical / electrical / civil)	
Planning environmental zone for spill light	
Known risks (finance / planning / etc)	
Has the County FA / League been informed of your plans?	

Supplementary considerations a Lighting Specialist may ask:

A Ground Conditions

- Site service drawing showing post past and present services.
- Ground make up, is the pitch:
  1. On a landfill site?
  2. In an area susceptible to flooding?
  3. Have you ever had the need to carry out borehole texting? If so provide a copy of report

B Installation

- Is there an existing lighting system to be removed? If so please provide details.
- Is there an adequate power supply for proposed lighting system?
- Is there an isolator? If not, who is to supply and install?
- Is there more than one power supply on site? If so please give as much detail as possible.
- Determine where switching is required from, i.e.. feeder pillar, mains room etc.
- Is there a requirement for half-pitch switching?

Appendix B1: Example of programme of use template

GRASS PITCH – PROGRAMME OF USE															
Day \ Time	**Morning – Early Afternoon 9.00am – 3.00pm (non-floodlit)**		**Afternoon 3.00pm – 6.00pm (floodlit period)**				**Evening 6.00pm – 10.00pm (floodlit period)**				**Total Hours Pitch in Use**	**Total Games / Sessions per season**	**Total Hours Floodlights in Use**	**Total Hours Pitch Use – Season**
Monday	Weekly Maintenance														
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)						
	0	0	0	0	0		0	0	0		0.0	0	0	0	
Tuesday							First Team League Match or First Team Training								
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)						
	0	0	0	0	0		1.5	35	2.1		1.5	35	2.1	52.5	
Wednesday	Weekly Maintenance						Under-18 League Match								
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)						
	0	0	0	0	0		1.5	22	2.1		1.5	22	2.1	33	
Thursday															
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)						
	0	0	0	0	0		0	0	0		0.0	0	0	0	
Friday			Weekly Maintenance												
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)						
	0	0	0	0	0		0	0	0		0.0	0	0	0	
Saturday	Pre-Match Pitch Preperation		First Team League Match or Reserve Team Match				Post-Match Maintenance								
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)						
	0	0	1.5	42	2.1		0	0	0		1.5	42	2.1	63	
Sunday			Women Team League Match												
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)						
	0	0	1.5	22	2.1		0	0	0		1.5	22	2.1	33	
Totals									**Totals**		**6.0**	**121**	**8.4**	**182**	

Appendix B2: Programme of use template

GRASS PITCH – PROGRAMME OF USE													
Day \ Time	**Morning – Early Afternoon 9.00am – 3.00pm (non-floodlit)**		**Afternoon 3.00pm – 6.00pm (floodlit period)**				**Evening 6.00pm – 10.00pm (floodlit period)**			**Total Hours Pitch in Use**	**Total Games / Sessions per season**	**Total Hours Floodlights in Use**	**Total Hours Pitch Use – Season**
Monday	Weekly Maintenance												
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)				
Tuesday							First Team League Match or First Team Training						
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)				
Wednesday	Weekly Maintenance						Under-18 League Match						
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)				
Thursday													
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)				
Friday			Weekly Maintenance										
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)				
Saturday	Pre-Match Pitch Preperation		First Team League Match or Reserve Team Match				Post-Match Maintenance						
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)				
Sunday			Women Team League Match										
	Pitch in use (Hours)	Games / sessions per season	Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)		Pitch in use (Hours)	Games / sessions per season	Floodlights in use (Hours)				
Totals									**Totals**				

Appendix C: An example on site checklist

Project details

Club/project name		
Site address		
Date of evaluation		
Field dimensions		
If existing columns, give heights, quantity and locations		
Constant light level and uniformity desired		
Estimated annual operating hours		

Client responsibilities

Provide access into and around site to all proposed lighting column locations and trench routes	
Supply drawings showing all service locations including gas, electricity, water, irrigation and any other services that may be on site	
Locate and visibly mark location of any irrigation system prior to excavation commencing	
Remove any trees, branches, shrubs etc either causing obstruction to installation or casting shadows when fixtures installed	
Provide information on ground makeup	
Provide sub-soil boring report if required	
Identify agreed on site storage / compound area	
Provide on site welfare facilities for work force; advise representative if this is not possible	

Contractor responsibilities

All areas to be excavated must be CAT scanned prior to commencement of works	
Provide risk assessments for all works	
Provide skips for removal of packaging and other waste from site	

Scope of works - Civils

Provide machinery to unload and distribute equipment around site	
Provide adequately sized on site secure storage container to accommodate xxx fixtures along with associated cross arms, boxed harness and ballast enclosures	
Survey in lighting column locations as defined on scans ensuring lighting area has been measured and is correct based upon scan design	
Excavate ground for installation of pre cast bases	
Install bases in line with the attached CIS	
Plumb and set in position	
Provide concrete to set pre-cast base foundations, back fill and pack	
Prepare trenches for pole to pole cables to a minimum of 450mm	
Prepare trenches for mains routes as detailed; trench to a minimum depth of 450mm for pole to pole and mains cable routes distances as detailed (please note tarmac cut and reinstatement required for mains cable)	
Install cable ducting where specified	
Lay pole-to-pole cable into trenching, install electrical warning tape at required depth, back fill and pack trenches	
Provide and install adequately sized pitch side feeder pillar	
Leave spoil in area agreed with customer OR remove spoil from site	
Provide cable layout drawing in CAD format within one week of completion of installation of project	

Scope of works - Mechanical

Assemble pole sections	
Attach cross arms, fixtures, wire harness and ballast enclosures to assembled pole sections	
Lift fully assembled lighting columns onto pre-cast bases and aim lasers to designated aiming points on pitch / field	
Make harness connections	

Scope of works - Electrical

Provide and install distribution board	
Provide and install adequately sized pole-to-pole cable	
Provide and install adequately sized mains cable	
Provide and install grounding rods to all lighting columns	
Provide and install adequately sized pitch side feeder pillar	
Make all electrical connections and terminate all necessary wiring	
Test and commission	
Submit all as-built drawings and test certificates within one week of completion of installation of project	

Appendix D: Floodlighting survey chart and floodlighting inspection report

Clubs wishing to compete in FA Competitions must have floodlighting installations of a particular standard in order to be eligible to compete. A Club must therefore have a valid approved Floodlighting Survey Chart and Floodlighting Inspection Report.

The detailed criteria specified by The FA are set out below. The purpose of these criteria is to ensure that minimum standards of lighting are maintained throughout the Competition.

Leagues sanctioned by The FA or County FAs may also operate a floodlighting standard. Clubs will need to comply with the standards set by The FA for its own Competitions regardless of the standards set by a specific League. If a League sets a standard below that set by The FA , Clubs must still comply with The FA's minimum standards if they are to be accepted into FA Competitions.

Criteria

1) Floodlighting and readings

- There must be an approved Floodlighting Survey Chart and a Floodlighting Inspection Report in order for a Club to be accepted for entry into a Competition. An approved Chart and Report shall be valid for 24 months from the date it is signed by the "approved" contractor completing the inspection. A club shall be notified of non-approval of the Chart and Report together with the reasons for this. The FA may conditionally admit a Club to enter a Competition on satisfaction of the criteria within a specified time limit.
- The average lux value shall be no less than 120.
- No single reading shall be less than 25% of the highest reading.
- Illumination levels shall be recorded on the horizontal plane at ground level, using a 12 inch square flat board or a self levelling tripod not more than 12 inches above the ground, supporting a corrected Silicon Photometer Cell accurate to 1%, which in turn feeds a digital display.
- Details of the light meter used shall be given together with the calibration certificate. The light meter shall be subject to an annual calibration check.
- Readings shall be on a grid of 88 markings (8 across and 11 down) evenly spaced with the outside readings falling 2.5m in from the pitch boundary line. The average of all the readings is taken to be the average illumination level in lux of the floodlighting installation.

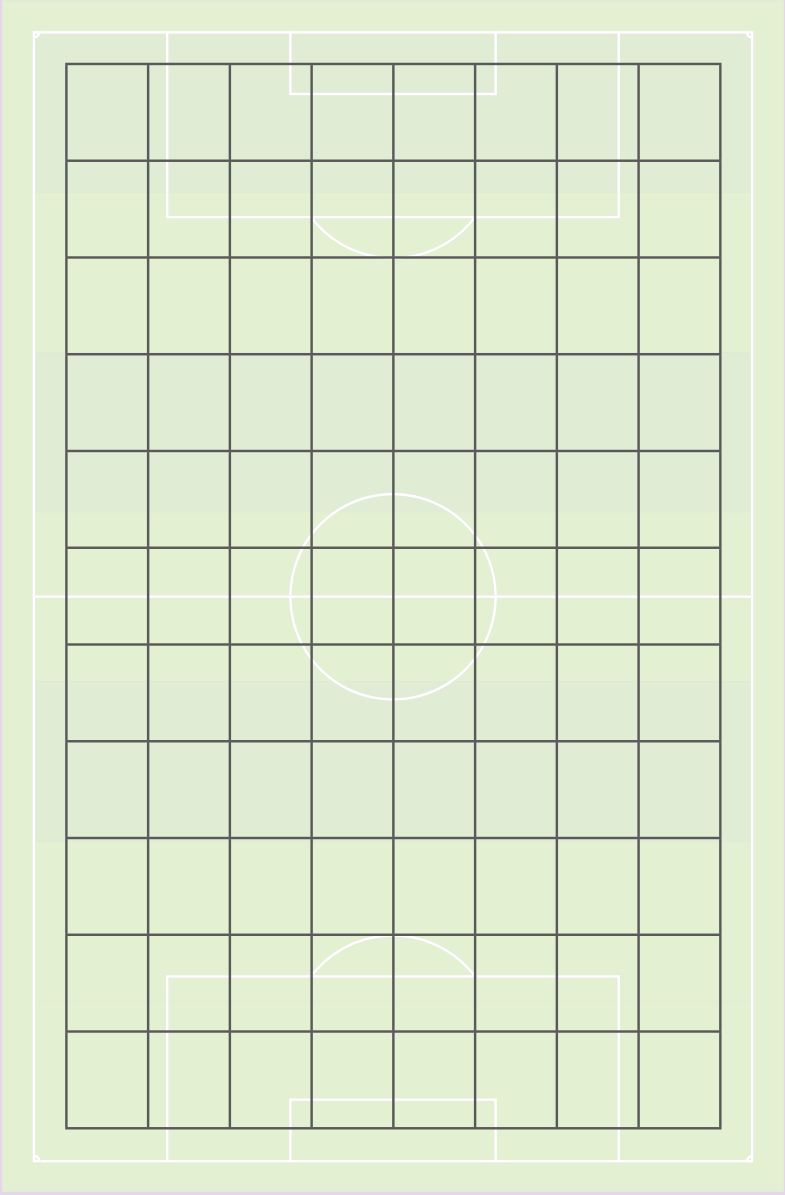
2) Floodlighting contractors

- An "approved" contractor must complete charts and Reports.
- An "approved" contractor is one which is in possession of the NICEIC (National Inspection Council for Electrical Installation Contracting) Approved Contractor's award; ISO 9000/BS 5750 (International Standards Organisation/ British Standard) or is a member of the Electrical Contractor's Association.
- Clubs should state this requirement when looking for a floodlighting contractor.
- Clubs in Leagues operating a floodlighting standard will need to comply with their League's instructions regarding submitting Charts and Reports to their League, rather than to The FA. The Leagues will then provide the relevant information to The FA.

FLOODLIGHTING SURVEY CHART

Horizontal illumination level surveys to be taken on a grid pattern of 88 markings of 8 across and 11 down, evenly spaced, with the outside reading falling 2.5m inside the pitch boundary line. The light meter must be placed not more than 12 inches above the ground. The average of all the readings is taken to be the average illumination level in lux of the floodlighting installation.

Club / facility			
Date		Time	
Total average			
Survey carried out by (state name and company)			



This grid must be submitted together with a signed Floodlight Inspection Report supplied by an approved lighting contractor. The position of the towers must be indicated on the survey chart.

Signed (secretary)		Date	

Floodlighting inspection report

Name of club	
Club Address	
Lighting Contractor	
Date of inspection	
Time at which readings were taken	
Weather conditions	
Number of towers	
Approximate height of towers	
Total number of lamps	
Type of light source	
Makers / Installers of system	
Date of installation	
Wattage per lamp	
Number of lamps not working	
Average lux value	
Lowest reading	
Highest reading	
State the type of light meter used together with the calibration certificate	
Inspectors opinion on uniformity of lighting	
General condition of system	
Could the average lux level of the installation be increased by fitting additional lamps, taking into considerations cable sizes and control equipment?	
Any other comments	

Signed:_____ Position:_____

Appendix E: Cost of ownership calculation formula template

ENERGY CONSUMPTION

Number of fittings	(box A)			
kW demand per fitting	(box B)		A x B =	(box C)
kWh rate	(box D)		C x D =	(box E)
Annual usage hours	(box F)		E x F =	(box G)
10 years	10 (box H)		G x H = £	(box I)

COST FOR MAINTENANCE OVER 10 YEARS

Assume four repairs at £900.00 each, if not included with manufacturer's warranty				
Number of fittings		(box J)		
Cost per repairs	900	(box K)	J x K =	(box L)
Number of repairs	4	(box M)	L x M =	(box N)

COST TO RE-LAMP ALL FITTINGS IF REQUIRED TO MAINTAIN TARGET LUX LEVEL

Annual hours of usage		(box 0)		
10 years	10	(box P)	O x P =	(box Q)
Lamp replacement hours		(box R)	Q / R =	(box S)
Lamp and labour cost	150	(box T)	S x T =	(box U)
Number of fittings		(box V)	U x V = £	(box W)

TOTAL 10-YEAR COST OF OWNERSHIP

Energy consumption	Box I =
Cost for maintenance	Box N =
Cost to re-lamp	Box W =
TOTAL 10-YEAR COST OF OWNERSHIP	I + N + W =


The FA
FOR ALL