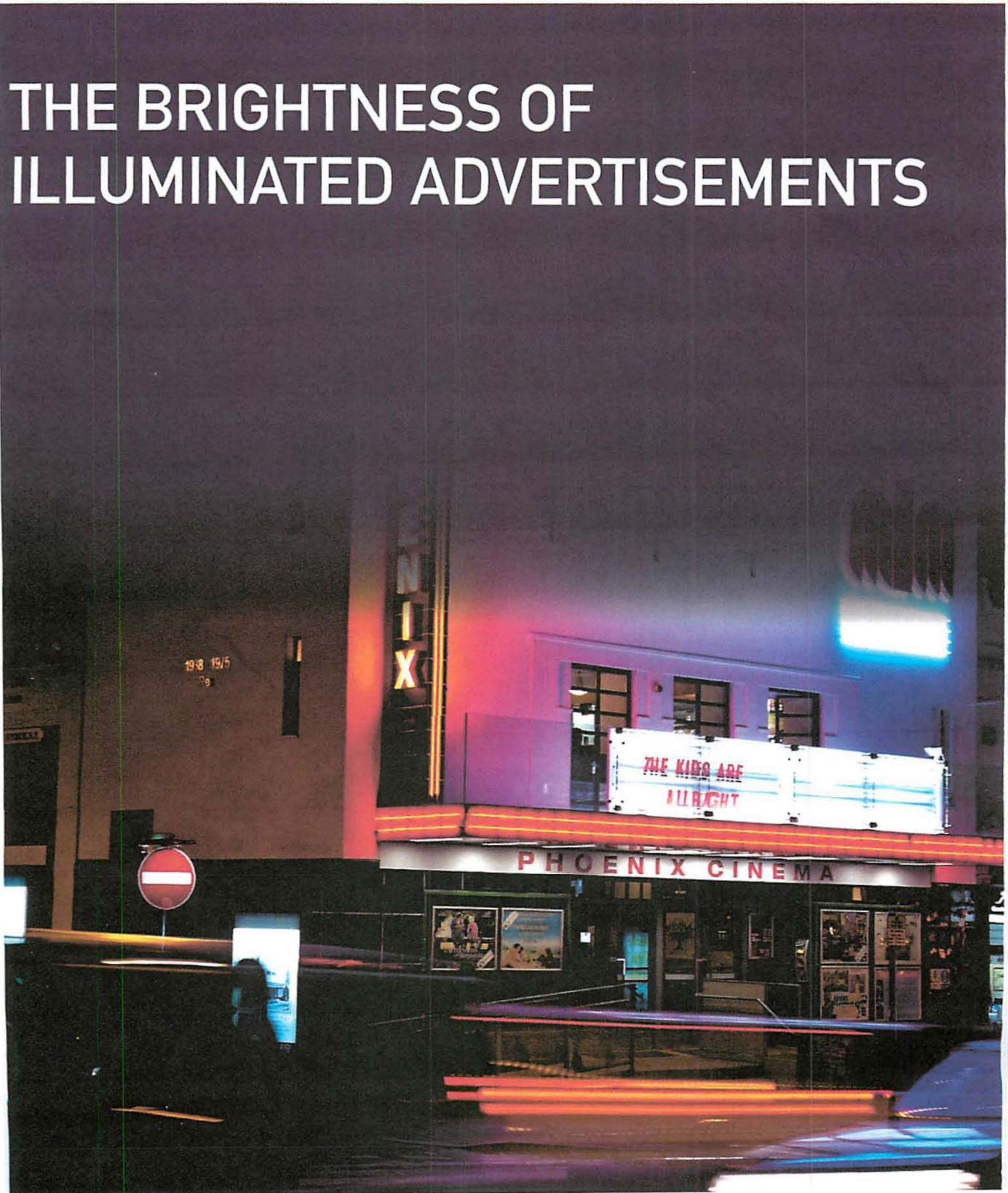


THE BRIGHTNESS OF ILLUMINATED ADVERTISEMENTS



Professional Lighting Guide

PLG 05

The Brightness of Illuminated Advertisements

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Institution of Lighting Professionals
Regent House
Regent Place
Rugby
Warwickshire
CV21 2PN

Tel: (01788) 576492
Email: info@theilp.org.uk

Website: www.theilp.org.uk

Registered Charity Number 268547

Drafting panel

This document has been prepared by the following drafting panel:

Peter Raynham (Chairman)	UCL
Nigel Parry	ILP
Dave Franks	City of Westminster
Nigel Gibbs	Dacorum Borough Council
Mark Ridler	BDP
Carol O'Riordan	Project Centre
Jeff Lewis	Lancashire County Council

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1 Introduction

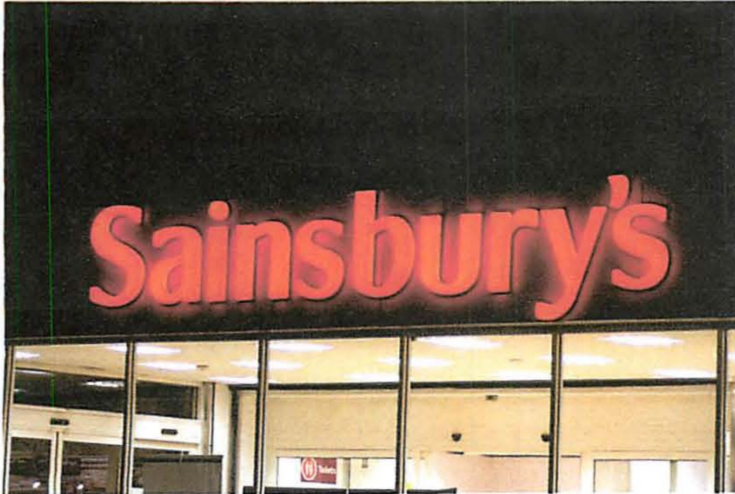
This publication has been prepared on behalf of the ILP Technical Committee for study and application. The document reports on current knowledge and experience within the specific fields of light and lighting described and is intended to be used by the ILP membership and other interested parties. It should be noted, however, that the status of this document is advisory and not mandatory. The ILP should be consulted regarding possible subsequent amendments. Any mention of organisations or products does not imply endorsement by the ILP. Whilst every care has been taken in the compilation of any lists, up to the time of going to press, these may not be comprehensive. Compliance with any recommendations does not itself confer immunity from legal obligations.

This document is intended to provide pragmatic guidance to all people involved with exterior illuminated advertisements. This document supersedes *TR05: Brightness of Illuminated Advertisements* published in 2001 and has been updated to reflect changes in lighting practice, technology and legal framework.

The scope of the guide is to cover installations of advertisements within the British Isles, however, the planning regulations vary from country to country and whilst the key requirements are given in Section 3.1 it is not possible in a document like this report to exhaustively cover every law applying to advertisements and signs in each country. Moreover, in many sections of this guide the processes follow a template derived from English planning regulations.

Illuminated signage and advertisements have become an integral part of our street scene and they are designed to have an impact. The aim of this document is to provide guidance on how to assess the impact of any additional signage. When considering any application for additional signage, thought should be given to how it is to be viewed within the street scene. One sign on its own may have a minimal impact on the street scene however many signs may have a negative impact on the street scene confusing the visual task or visual amenity.

This document provides clear guidance on individual illuminated signs. However it is the duty of the competent designer to apply this document with regard to the constraints of each application and the environment the application refers to.



2 Definitions

The definitions in this section are practical definitions of terms based on the various regulations that impact on the use of signs and day to day practice.

Advertisement

Any word, letter, model, sign, placard, board, notice, awning, blind, device or representation, whether illuminated or not, in the nature of, and employed wholly or partly for the purposes of advertisement, announcement or direction, and (without prejudice to the preceding provisions of this definition) including any hoarding or similar structure used, or designed or adapted for use, and anything else principally used, or designed or adapted principally for use for the display of advertisements.

Note:

1. A range of modern devices for outdoor are within this definition. These include rotating poster panels, and advertisements displayed on permanently fixed blinds.
2. The definition excludes anything employed as a memorial or railway signal.

Amenity

This includes visual amenity. The visual amenity includes general characteristics of the locality including features of historical, architectural, cultural, townscape, landscape or similar interest.

Illuminated advertisement

An advertisement which is designed or adapted to be illuminated by artificial lighting, directly or by reflection, and which is so illuminated (whether continuously or from time to time).

Business premises

Any building or part of a building normally used for the purpose of any professional, commercial or industrial undertaking, or for providing services to members of the public or of any association, and includes a public restaurant, licensed premises and a place of public entertainment. It excludes the following:

- A building designed for use as one or more separate dwellings. This is unless
 - It has been used in each of the 10 preceding years for the purpose of any professional, commercial, or industrial undertaking, or for providing services to members of the public or any association, or
 - It has been adapted for business purposes by the construction of a shop front or the making of a material alteration of a similar kind to its external appearance,
- A building used as an institution of a religious, educational, cultural, recreational, or medical or similar character,
- Any forecourt or other land forming part of the curtilage of a building, and
- Any fence, wall or similar screen or structure, unless it forms part of the fabric of a building.

Halo illumination

Illumination of the background text of the advertisement, where the light source cannot be viewed directly from any angle.

Lasers, search lights, beams of light, projected illuminated advertisements

Under the Advertisement Regulations all illuminated advertisements projected onto buildings, landscapes and into the sky require express consent.

Local Planning Authority (LPA)

The authority with local jurisdiction in determining an application for the display of advertisements. This may include a district council, a national park, the Department of Environment in Northern Ireland and the Council of the Isles of Scilly and similar authorities.

Media façade

A media façade is the envelope of a building in which a number of light emitting components have been incorporated so that they are visible to people outside the building. These components may be able to change intensity and colour, and may be addressed individually and controlled together. If these components are sufficiently close together and are furnished with appropriate control such that they may be resolved by the human eye to display a recognisable image and/or alphanumeric text then the façade will be considered a media screen for the purposes of this guidance.

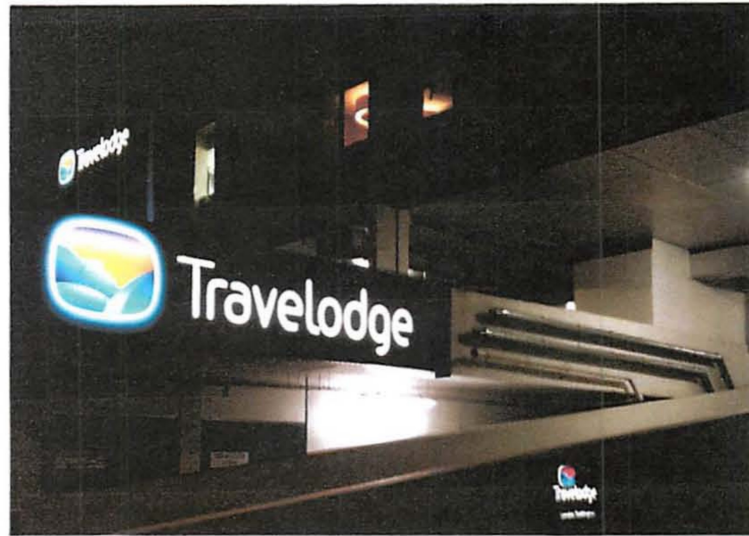
Media screen

A media screen is a surface composed of components that emit light. These components may be able to change intensity and colour, and may be addressed individually and controlled together. The components are sufficiently close together and are furnished with appropriate control such that they may be resolved by the human eye to display a recognisable image and/or alphanumeric text. These images may be static or change dynamically. If changed frequently then these images can be read as video or film.

Retail park

A group of three or more retail stores, at least one of which has a minimum internal floor area of 1,000 square metres and which:

- are set apart from existing shopping centres but within an existing or proposed urban area;
- sell primarily goods other than food; and
- share one or more communal car parks.



3 Planning

3.1 Statutory regulations/controls

In this and subsequent sections the terms regulations and controls are used interchangeably as they have similar meanings. This section gives an overview of the regulations that impact on advertisements across the UK; however it does not address all aspects of the advertisement controls. Therefore this guidance must be used with caution and reference made to the regulations themselves.

Statutory Requirements for Advertisements

England

The Town and Country Planning Act 1990¹ provides powers for the Secretary of State to make regulations 'restricting or regulating the display of advertisements so far as appears to the Secretary of State to be expedient in the interests of amenity or public safety'. This power is under sections 220-224 of the Town and Country Planning Act 1990.

The Town and Country Planning (Control of Advertisements) (England) Regulations 2007² have been in force since 6 April 2007. These Regulations revoked and replaced the earlier versions issued in the 1990s. Section 336(i) of the T&P Act 1990 (as amended by section 24 of the Planning and Compensation Act 1991³) provides a comprehensive definition of the term advertisement (see above) of which there are 3 types. Firstly there are many advertisements which are outside any control. The Regulations automatically support a second group of advertisements as '**deemed consent**' under Part 2. These advertisements do not require the LPA's consent. This is subject to a compliance with specified 'Conditions and Limitations' which are explored below and include some illuminated signs. Thirdly where such advertisements

¹ *et seq*: See Section 11 References

cannot be installed as 'deemed consent' these signs will require the '**express consent**' of the LPA.

A wide range of advertisements featuring illumination can be displayed under 'deemed consent' including following Classes of Advertisement:

Class 1: Functional Advertisements – Government, Local Authorities etc;

Class 2B: Professional, Personal, Trade;

Class 2C: Miscellaneous Temporary Advertisements;

Class 4A: Illuminated Advertisements on Business Premises;

Class 4B: Other Illuminated Advertisements Excluded from Class 4A;

Class 5: Other Advertisements on Business Premises;

Class 8: Advertisements on Hoardings;

Class 13: Advertisements on Sites Used for the Preceding 10 Years for the Display of Advertisements without Express Consent, and

Class 14: Advertisement Displayed after the Expiry of Express Consent.

It is not feasible or within the remit of this publication to refer to the specified 'Constraints and Limitations' of each class. However, there are some common themes which control the illumination of advertisements under Classes 2B, 2C, 4A, 4B and 8. These include the need to comply with 'deemed consent' and therefore such advertisements do not require 'express consent'. The advertisements should comply with the following features:

- Static
- No intermittent light sources, flashing lights, moving parts or features, exposed cold cathode tubing, animation or retroflective material
- Illumination in a manner reasonably required to fulfil the purpose of advertisement, and
- Maximum permitted luminance levels are given in Table 1.

Note: See Table 2 for luminance levels outside England

Table 1: Luminance limits in England	
Illuminated area	Maximum luminance (cdm ⁻²)
More than 10 m ²	300
Not more than 10 m ²	600

The calculation of luminance is based on 2 criteria:

- No unilluminated part of the advertisement is to be taken into account, and
- Each advertisement (or in the case of double-sided *projecting* advertisements) each side of the advertisement is to be taken into account separately.

For classes 4A and 4B for Illuminated Advertisement on Business premises there are additional controls:

- Halo Illumination, or
- 'So long as no part of the background of the advertisement is illuminated, by illumination of each character or symbol of the advertisement from within'.

Areas of Special Control (ASC)

These restrict the type of advertisement which can be installed over the normal 'deemed consent' criteria. The 2007 Regulations and those applicable to Wales and Scotland enable designation by a LPA with subsequent approval by the Secretary of State. These can be revoked or modified and require review every 5 years. Often ASC are in Areas of Outstanding Natural Beauty or National Parks.

The 2007 Regulations preclude the installing of Classes 4A, 4B, 8, 13 and 14 and therefore illuminated advertisements without 'express consent'. This gives the LPA opportunities to consider whether it is appropriate to give consent to such advertisements in the interests of amenity and public safety. Due to the sensitive special requirements associated with ASC there may be robust amenity reasons why such illuminated signage should be restricted. In Scotland there is no opportunity to display such signs whatsoever.

Regulations in countries other than England

Wales

The 1992 Regulations, amended in 1996, are applicable. This is in conjunction with Welsh Office Circular 14/92⁴ and TAN7⁵ Technical Advice Note 'Outdoor Advertisement Control'. There are differences between the 1992/1996 Regulations and the 2007 Regulations. The different luminance limits for Wales are given in Table 2.

Table 2: Luminance Levels for Wales and Northern Ireland	
Illuminated area	Maximum luminance (cdm ⁻²)
More than 10 m ²	400
2 to 10 m ²	600
0.5 to 2 m ²	800
Less than 0.5 m ²	1,000

Scotland

The basis of advertisement control are the Town and Country Planning (Control of Advertisements) (Scotland) Regulations 1984. The approach to advertisement control has common ground with the 2007 Regulations relevant to England. However, there are some differences, including luminance levels and no parallel to Advertisement Class 4A which covers illuminated advertisements for 'Retail Parks'. The regulations are complimented by Circulars 10/1984, 22/1986, 10/1992 and 31/1992.

Note: In Scotland an Advertisement is defined under section 277 of the Town & Country Planning (Scotland) Act 1997⁶

Northern Ireland

Control is exercised through the Planning (Control of Advertisements) Regulations (NI) 1992⁷ (amended 1998). This is through the Department of Environment for NI. These regulations have common ground with the 2007 Regulations relevant to England Regulations complimented by Planning Policy Statement 17⁸. In Northern Ireland the Luminance limits are the same as those for Wales see Table 2.

Note: In Northern Ireland an Advertisement is defined under article 2(2) of the Planning (NI) Order 1991⁹, as amended by article 24 of the Planning (Amendment) (NI) Order 2003¹⁰.

Republic of Ireland

Advertising is defined through the Planning and Development Act 2000¹¹. A range of exempt developments (advertisements) are identified as classes under the Planning and Development Regulations 2001¹². These classes have parallels to the 2007 Regulations relevant to England, but with a range of noticeable variations. With regard to illuminated advertisements, there is no equivalent 'deemed consent' for Class 4 Illuminated Advertisements on Business Premises under the 2007 Regulations.

Isle of Man

This is subject to the Control of Advertising Regulations 2005¹³. It is set against the Town and Country Planning Act 1999, with greater control than the 2007 Regulations relevant to England.

Guernsey

There is very tight control over advertisements.

Jersey

The Planning and Building (Display of Advertisements) (Jersey) Order 2006¹⁴. This has parallels to the 2007 Regulations with a stricter control over 'approved advertisements'.

Standard Conditions and Maintenance

The Regulations in England also provide conditions of installation that impose conditions upon the installation requiring maintenance throughout its life.

With the exception of one type of advertisement all that are displayed are required to comply by five Standard Conditions of the Regulations. Those that directly relate to maintenance are:

Condition 2

No advertisement shall be sited or displayed so as to

- a) Endanger persons using the highway, railway, waterway, dock harbour or aerodrome (civil or military);
- b) obscure, or hinder the ready interpretation of, any traffic sign, railway signal or aid to navigation by water or air; or
- c) hinder the operation of any device used for the purpose of security or surveillance or for measuring the speed of a vehicle.

Condition 3

Any advertisements displayed, and any site used for the display of advertisements, shall be maintained in a condition that does not impair the visual amenity of the site.

Condition 4

Any structure or hoarding erected or used principally for the purpose of displaying advertisements shall be maintained in a condition that does not endanger the public.

Condition 5

Where an advertisement is required under these Regulations to be removed, the site shall be left in a condition that does not endanger the public or impair visual amenity.

The display of an advertisement which fails to comply with any of the Standard Conditions will be unauthorised under the Regulations. This is because it is an offence 'to display an advertisement in contravention of the Regulations' and can result in a prosecution by a LPA.

Maintenance Amenity and Public Safety

Maintenance of an advertisement(s) in the interests of amenity and public safety is absolutely fundamental to the Regulations in England. Failure to comply has accordingly an inbuilt legal mechanism to rectify unauthorised display of advertisements.

The approach to the application of Standard Conditions is very similar in Wales, Scotland and Northern Ireland.

Other Conditions

If an advertisement is installed without compliance to other conditions imposed under express consent (see 'Planning Procedures' section 3.2) the sign will be unauthorised.

3.2 Planning procedures: where express consent is necessary

Amenity and Public Safety

Control is limited to the following considerations:

Amenity

This addresses the relationship of the advertisement with the prevailing environment, as referred to by the definitions. The LPA's assessment may include very sensitive environments such as conservation areas, the setting of listed buildings, ancient monuments, Areas of Outstanding Natural Beauty and national parks. It is common for these to coincide with designated ASCs which preclude the display of some advertisements normally allowed under 'deemed consent'.

Public Safety

Crime prevention has recently been added to the longstanding list of public safety issues – road, railway, air and transport implications. Illuminated signs (flashing or static lighting), brightness and colour are identified as key in assessing the structured approach to maintained public safety.

The Development Plan

In England since 2007 there is a requirement for LPAs to take account development plan policies in their decisions. This is so far as they relate to amenity and public safety.

The concepts of 'amenity' and 'public safety' are comprehensively addressed in DCLG Circular 03/2007¹⁵.

3.3 Conditions when Express Consent is granted by a LPA

The imposition of conditions in addition to the standard 5 conditions can be imposed so long as they are in the interests of amenity and public safety. These should only be imposed if they are:

- a) necessary;
- b) relevant to advertisement control (i.e. amenity and public safety);
- c) relevant to the proposed advertisement;

- d) enforceable;
- e) precise, and
- f) reasonable in all other respects.

Such conditions can include luminance, type (static/flashing/non-flashing lights/no animation) and limiting the hours of use. Restricting overnight illumination will reduce energy consumption.

3.4 Details required for advertising application submitted to an LPA for Express Consent

These are explained in Appendix A of DCLG Circular 03/2007¹⁶ and should include:

- a) Details of the proposed location, positioning and dimensions of the sign face;
- b) Type of illumination; internal or external, static, intermittent or moving;
- c) Details of the luminaires, lamp type, including details of any baffles, louvres or cowls;
- d) Mounting height of the luminaire(s)/lamp(s);
- e) Location and orientation of the luminaire(s) and
- f) Design maximum luminance/factory measurements.

In England, Scotland and Wales the Regulations enable the LPAs to request further information..

3.5 Associated Matters

Other Consents for Advertisements

Listed building consent will be required from the LPA for an advertisement attached to or within the curtilage of pre-1948 objects and structures. Scheduled Ancient Monument Consent will be necessary from the Secretary of State before any work can be carried out which might affect a monument.



4 Brightness and luminance

The fundamental relationship on which the recommendations contained within this report are based, is that between luminance and brightness.

Luminance is a characteristic of the sign, dependent on the position of the observer, but independent of the surrounding conditions. Generally a sign face is non uniform and the luminance will vary across it. The luminance will also vary with the direction of viewing, being a maximum for direct frontal observation. The highly diffusing plastic materials normally used in signs result in the luminance remaining near the maximum over a fairly wide range of viewing angles, falling off steeply for very oblique viewing.

Brightness is the visual sensation associated with luminance, experienced by an observer. It depends on four main factors:

- a) luminance
- b) size
- c) contrast
- d) the observer

In addition, other factors, which may affect brightness, are the position of the sign with respect to the observer's field of view, particularly when it appears on the periphery; the effect of phototropism, and the uniformity of luminance across the sign face.

The difficulties associated with the problem of sign luminance may be appreciated by considering two identical signs in different settings. If one is placed in a well lit shopping area it will appear to be considerably less bright than its counterpart in a dark country lane. The one may be attractive and the other offensive, although the signs themselves are identical. The luminance is the same for both signs but the

contrast between the sign and its surroundings and therefore the brightness is quite different.

The LPA is concerned primarily with brightness, whilst the manufacturer is able to control luminance only. It is possible to set upper limits of luminance for defined types of location and graded size of sign, such that compliance with them will minimise the number of illuminated advertisements that are subjectively too bright yet will permit them to be adequately bright for their purpose.

During the preparation of this report many observations and measurements have been taken of illuminated advertisements in a variety of locations including Central London, provincial cities, suburban areas, mixed residential and shopping areas, retail parks, pedestrian precincts and areas of special historical and architectural interest. The measured luminance has been related to acceptable degrees of subjective brightness for many sizes of illuminated advertisements in widely different environments.

The measurements taken on signs and fascias cover maximum luminance and average luminance. There is always some variation of luminance over a sign and the average, even after several measurements have been made, can only be estimated approximately. Therefore the recommendations within this report deal with limits on the maximum luminance of a sign. This has the advantage that:

- a) Where, as often happens, the brightest area can be selected by eye, only one measurement is required and the maximum is a definite figure.
- b) Signs with large variations of brightness are more likely to infringe limits imposed upon the maximum luminance than upon the average.

The uniformity of luminance across a defined illuminated area must be kept within reasonable limits so as to ensure a pleasing and effective result (see section 8). It may be of help to designers and manufacturers of signs to consider the luminance gradient of illuminated advertisement signs. A method for testing both luminance and luminance gradient is described in Section 9.

In setting upper limits for the luminance of signs it is important to take account of the considerable reduction in brightness which may occur during the life of the installation. The overriding consideration must be that it should not present a hazard when the lighting is



Internally illuminated sign with good uniformity

commissioned. In practice, design calculations would normally be set at a datum point of 100 hours after the initial light source lumen output, and therefore measurements should not be taken before the light sources have been in commission for 100 hours. In practice, it is considered that installations are likely to have a luminance between 50% and 80% of the initial value for a major part of their life, depending on maintenance.

Large format media screens pose additional problems when trying to assess brightness, this is because the luminance of the sign varies with both time and position on the sign. For this reason it is recommended that the sign be set to a full output white when it is being measured to ensure that the maximum luminance of the sign is measured.



5 Limiting the luminance of illuminated advertisements

In all cases the limit of luminance should be determined by relating the details of the installation to Table 4 of this report, taking into account its method of illumination, size, location, and orientation.

Consideration should be made to introducing a system of control that imposes a limit on the maximum luminance and time of operation of an advertisement. Any system of control must be easy to understand, interpret, apply and enforce within the present Regulations. It is essential that any luminance limits specified should have regard to amenity and public safety. At the same time, account must be taken of the amenities to which good illuminated advertisement installations contribute and of the commercial interests involved.

For externally illuminated advertisements the provisions of the ILP Guidance Notes¹⁷ for the Reduction of Light Pollution should be applied. In particular:

- a) Luminaires should be positioned such that the light source itself is not directly visible from any usual viewing angle (e.g. to road users or residents).
- b) Luminaires should be adequately secured and positioned such that they light away from adjacent properties or highways. Diffusers, shields or louvres should be incorporated where necessary to control spill light.
- c) Illumination should be switched off when not required – e.g. during the day and after agreed curfews.
- d) Light should be directed downwards. If there is no alternative to up-lighting, then specifically designed lighting equipment – that once installed minimises the spread of light near to, or above the horizontal



A large media screen during the day

complete with all necessary shields and baffles to minimise sky glow – should be used.

Media screens that may be effective during the day are likely to exceed the night time luminance limits. They will require a system that controls luminance accordingly and takes into account any curfews, and the changing time of sunset, and dawn throughout the year.

The limit of luminance to be imposed as a condition of consent should be determined by relating the details of the application to Table 4 of this Report.

The recommended limits of luminance also apply to externally illuminated advertisements and such lighting should be examined to ensure that luminaires are positioned such that the light source itself is not directly visible from any usual viewing angle (e.g. to road users or residents).

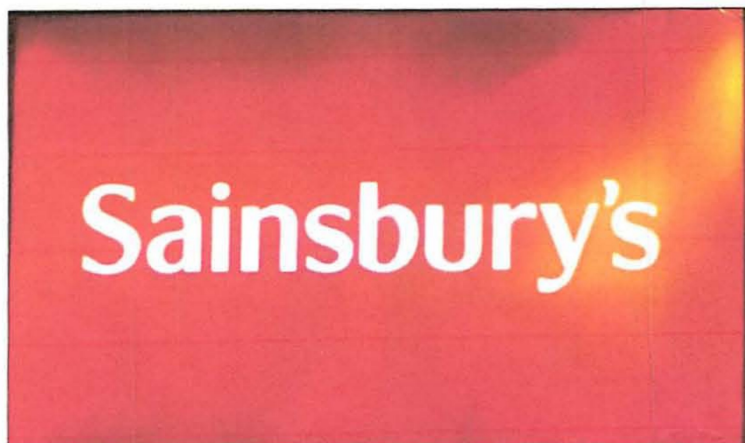
The ILP has produced Guidance Notes for the Reduction of Light Pollution and the general principles contained therein are worthy of consideration for all lighting installations. In particular the Guidance Notes detail a number of ways which may be used to reduce the problems of unnecessary, obtrusive light:

- a) Switch off illumination when not required – one possible solution is a curfew with further limitations on lighting levels between agreed hours (e.g. off between 23.00hr and dawn).
- b) For signs with external illumination direct light downwards whenever possible. If there is no alternative to up-lighting, then the use of shields and baffles to help reduce light spill. Use specifically designed lighting equipment that once installed minimises the spread of light near to, or above the horizontal.
- c) Do not “over” light.
- d) For large self luminous signs consider louvres or shields above the sign, this will also reduce the amount of daylight falling on the sign.



6 Definition of illuminated areas

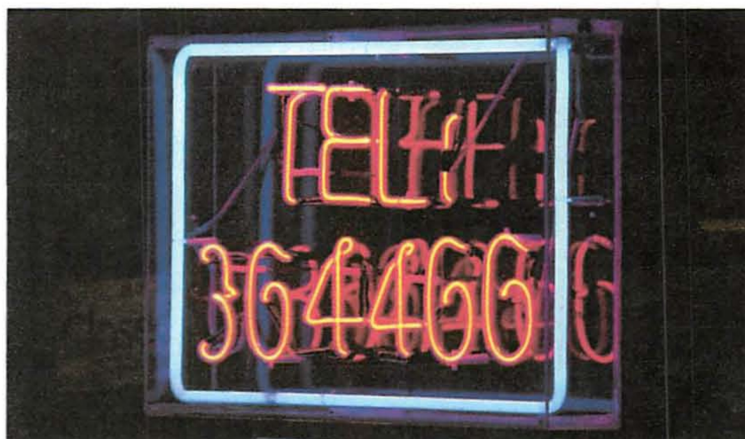
Where the illuminated advertisement consists of an illuminated background upon which a legend, words or symbols have been superimposed, the illuminated area is defined as the overall area of the panel.



Example of an illuminated box advertisement

Where the illuminated advertisement consists of fret cut, individual letters or individual elements such as exposed light sources (e.g. cold cathode tubes) the illuminated area shall be defined as the background of the advertisement. That is the area of the background in a simple geometric shape or a combination of such shapes in which the letters or elements are completely contained.

In the case of double sided illuminated advertisements, the areas of both faces should be treated as summed.



Example of a cold cathode "Neon" advertisement

However, for the purposes of the maximum limits specified in Table 4, the illuminated area will relate to one side only.

In the case of those illuminated advertisements containing dished panels or those with two panels at an angle to each other the illuminated area should be defined as the area capable of being viewed at one time at any angle not exceeding 40 degrees to the normal.



Figure 1: Example of a "halo" type advertisement

"Halo" advertisements shall be designed so that the light source cannot be viewed directly from any angle. The illuminated area is defined as the background of the advertisement. This is the area of the background in a simple geometric shape or a combination of such shapes in which the letters or elements are completely contained, rather than the letters or

elements themselves, which would be seen in silhouette.

In the case of media screens, if only a part of the screen is planned to be illuminated at time of application, the illuminated area should be defined as the maximum area of the screen installed that potentially could be illuminated.



7 Definition of zones

An area may be zoned according to general level of illumination. There are five zones, which have been defined in accordance with the definitions in the ILP Guidance Notes for the Reduction of Light Pollution and CIE documents¹⁸. These zones are as follows:

Table 3: Environmental zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark	UNESCO Starlight Reserves, IDA Dark Sky Parks
E1	Natural	Intrinsically dark	National Parks, Areas of Outstanding Natural Beauty etc
E2	Rural	Low district brightness	Village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Small town centres or suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

In addition to the above environmental zones there are Areas of Special Control of Advertisements, see section 3.1.



8 Recommendations

The maximum value of luminance anywhere on the surface of an advertisement at any time during the night is given in Table 4. This guide makes no recommendations about the luminance distribution across the advertisement as this is a matter of design and the message that the sign has to convey.

Table 4: Maximum permitted recommended luminance (cdm^{-2})					
Illuminated area (m^2)	Zone E0	Zone E1	Zone E2	Zone E3	Zone E4
Up to 10	0	100	400	600	600
Over 10	0	n/a	200	300	300

Note:

1. For digital signs when the content may change then the rate of change should be limited to once every five seconds. Moving images, animation, video or full motion images should not be displayed at locations where they could present a hazard for example if they could be seen by drivers in moving traffic. During the daytime sign luminance should never exceed $5,000\text{cdm}^{-2}$.
2. LPAs may wish to impose additional controls by setting limits on the times when the illuminated advertisement may be lit.
3. The above recommendations for maximum luminance may not apply to recognised display centres, such as Piccadilly Circus, which must be considered as special cases. Recognised display centres usually exhibit the following features:
 - a. concentration of illuminated advertisements, some of which do not relate to the business premises on which they are erected.
 - b. extensive use of animation.

4. Mounting of illuminated advertisements well above the building frontage height. In such instances an approach based on advertisements with an illuminated area greater than 10m^2 having a maximum luminance of 1000cdm^{-2} would be a reasonable starting point, depending on the precise nature and extent of the installation.



9 Testing and verification

The maximum recommended levels of luminance contained within this report are intended to be used in order to satisfy the requirements of all parties and on the basis of sound engineering judgement and amenity considerations. It may be necessary to include other areas within particular zones, such as areas of particular architectural and historical interest within zone E1, so as to ensure that the illumination of advertisements is in keeping not only with its purpose, but also with the environment. Such an example would be a Dark Landscape Park within an otherwise Zone E3 or E4 location.

The checking of luminance levels to ensure compliance with the Advertisement Consent, or for the purposes of measurements in those cases when dispute or doubt arises, requires the use of a suitable reliable instrument capable of direct measurement. It is possible that the local authority's lighting engineer will already possess a suitable instrument, but if this is not the case it is recommended that one should be acquired for the express purpose of obtaining luminance measurements of illuminated advertisements. It is recommended that any luminance meter used should comply with the requirements for a Type F meter as defined by *BS 7920:2005 Luminance meters. Requirements and test methods*.

Whenever a performance measurement is carried out there are a number of factors that may impact upon the performance of the lighting installation being tested. There are a number of issues associated with the lighting equipment and others that relate to the environment.

It is important to ensure that the output of the lamps is stable. In general this requires that they have been run for at least 100 hours and they have had time to run up and reach thermal stability, which may take half an hour or so. Also if the lamps have been in use for a long time then their output may be lower than the nominal output. Similarly if the sign has been running for a long time the build up of dirt on the surfaces may be reducing the light output. Many lamp types are sensitive to changes in temperature so it is important to record the temperature when taking readings. The supply voltage can significantly change the output of some lamps so it is a good idea to measure the supply voltage. As there can be a voltage drop in the supply cabling it is best to measure the voltage in the supply network as close to the luminaires as possible.

For media screens it is necessary to set the whole sign to display white as this is the colour with the highest luminance.

Signs using exposed light sources (e.g. cold cathode tubing) should be measured at right angles to the sign at a distance such that the shortest dimension of the lit area fills a diameter of the viewing circle.

Internally illuminated signs would usually have the maximum value of luminance in the white portion; coloured portions would generally have a luminance value of between 0.02 and 0.80 of the value of the white portion, assuming a uniform illumination and depending on the colour and transmission characteristics of the coloured portions.

Readings should be taken only at night to avoid any contribution from daylight and care should be taken to avoid any misleading readings, such as might be caused by or from other light sources in the measurement field of a luminance meter.

The number of points to measure on is a function of the size of the sign. It is normal to measure the luminance on a regular grid of points with the maximum distance between the points (p) being given by the formula below where d is the distance of

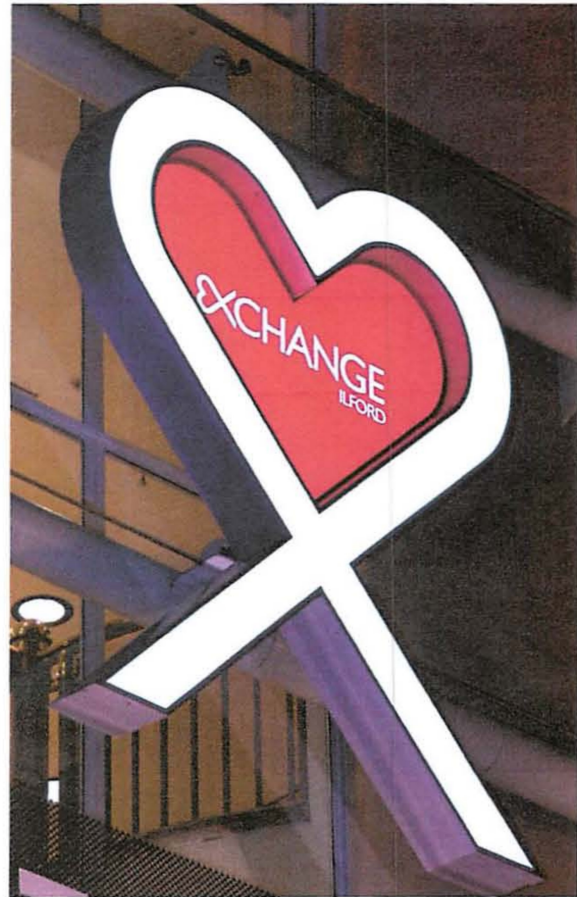
$$p = 0.2 \times 5^{\log d}$$

the longest side of the sign. The number of points in this dimension should be selected so that the distance between them is p or slightly less. Then in the other direction select the number of points necessary to give a similar distance between points thus giving an almost square grid. Table 5, below, gives information on the spacing of measurement points for a range of sign sizes. The points are laid out uniformly across the whole sign with the edge points being a half spacing in from the edge of the sign.

Table 5: Grid point requirements

Sign Size [m]		Points in Width		Points in Height	
Width	Height	No. Points	Spacing [m]	No. Points	Spacing [m]
0.6	0.4	5.0	0.120	3	0.133
1.0	0.6	5.0	0.200	3	0.200
1.5	0.9	6.0	0.250	4	0.225
2.0	1.3	7.0	0.286	5	0.260
3.0	1.9	7.0	0.429	4	0.475
5.0	3.1	9.0	0.556	6	0.517
7.0	4.4	9.0	0.778	6	0.733
10.0	6.3	10.0	1.000	6	1.050

Measurements shall be taken with the luminance meter as close to the normal of the centre of the sign as practically possible and at a distance from the sign such that the diameter of the measurement patch of the meter on the sign is less than half the spacing between measurement points.



10 Maintenance

There are examples of poorly maintained illuminated advertisements in most areas resulting in, at best, a non-uniform unpleasant appearance and at worst the exposing of the light sources.

For any signage to deliver best value, it needs to be maintained throughout its life, although there is no duty to ensure that the illumination is operational unless this is a requirement of the original consent. However, if it is, it should be maintained to ensure that it operates within the design parameters, delivering the expected design performance (illumination and uniformity) throughout the installations life, in accordance with original consent, ensuring that public safety is assured.

With advances in technologies the sign design should consider the use of low energy, low maintenance solutions and perhaps with advanced control to ensure that the sign can be adapted in the future. By applying this approach the installation can optimise maintenance obligations and manage energy use responsibly, thereby reducing the carbon impact of the installation.

Sign maintenance and regular sign servicing plays an essential role; if managed properly and effectively, can deliver the benefits of enhanced sign performance and extend the design life thus saving money in the long run.

Illumination Maintenance Services (IMS) available include preventative, proactive and emergency programs.

When it comes to maintenance, preventative or planned maintenance will ensure all sign components are as reliable as possible, maintaining brand image and integrity. This would include all aspects of cleaning, inspection; testing, re-lamping and reporting are performed on a routine basis.

Reactive maintenance responds when signs fail and therefore revenue is lost in site closures while remedial work takes place within critical response times.

Planned sign maintenance

- A strategic sign maintenance programme that will significantly reduce the possibility of complete sign replacement in the long-run.
- Sign maintenance work is planned around site activity, and can be completed while premises remain fully operational (critical for sites that operate 24hrs).
- Aimed at preventing sign/illumination failure and ensuring an unfaltering corporate image.
- Minimises site disruption as signage work can be scheduled to commence during quieter periods. Site closures may be necessary for safety reasons; however, it will be at a time to suit you and your business.
- Is significantly less expensive than emergency corrective action for failed sign illumination/promotional price changes.
- Ensures that all sign components covered by mandatory health and safety regulations are inspected and replaced as necessary.
- Reduces costs in travel as work can be co-ordinated with other jobs in the surrounding areas.
- Engineers will become familiar with the sites and parochial problems associated with them.
- May appear pricey as an upfront cost is often incurred.
- Allows more reliable, long-term financial planning and forecasting, rather than surprise expense.

Reactive sign maintenance

- A sign maintenance solution that relies entirely on an emergency call-out basis.
- May lead to sites having an unkempt image.
- Each site visit is less cost-effective and will often lead to re-visits, as plans cannot be made for the required signage and servicing kit to be pre-loaded onto vehicles.
- Can sometimes cost less because you only spend what is necessary at the time.
- In the case of a site accident due to faulty or unregulated equipment, the legal and financial repercussions could be crippling.
- Relies entirely on the customer to keep up-to-date with any health and safety requirements.
- Can lead to sudden failure of signage or a decrease in component quality/performance over a period of time.
- Can be used in response to sign failure caused by vehicle impact, vandalism, storm damage etc.

11 References

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Institution of Lighting Professionals
Regent House, Regent Place,
Rugby, CV21 2PN
T: 01788 576492
www.theilp.org.uk