



City of Westminster

# WESTMINSTER LIGHTING DESIGN GUIDE



V1

May 2020



## Foreword

This lighting design guide supports Westminster City's Lighting Master Plan 2019-2040 which lays down a strategy and strategic approach to manage the application and use of artificial light across the city. A co-ordinated use of artificial lighting after dark supports our night-time economy and enhances the environment for residents, tourists, workers and businesses alike and through this supports the night-time economy by drawing people out into an environment where they feel safe and can navigate and find their way around the city.

Lighting is not just about people and creating a safe environment. The use of the master plan and of this guide encourages the Council, land and property owners, designers as well as residents to use lighting sustainably. Lighting installations need to ensure quality through design by competent professionals so that that the lighting serves its purpose yet is mindful of the associated energy costs and any likely impact upon the environment, not just through the effects of obtrusive light but also from potential negative effects upon the diverse flora and fauna across the city.

Lighting can highlight, reveal and enhance the city's night-time character, identify and celebrate its unique heritage, history and cosmopolitan environment and provide a sense of place.

Sustainability plays an important part in any lighting installation and must rightly be considered and balanced with the lighting performance needs for the task(s) that are being lit such as highways, façades and monuments. Innovation plays an important part and careful consideration of how we adopt new light sources; control systems and lighting techniques will support this.

We need light to see, and artificial lighting has become an essential part of modern life. It helps provide a safe environment for a range of activities such as driving, cycling, walking and sports and can also enhance the environment by means of decorative and flood lighting of areas, features and buildings.



## Document control

| Version Number | Purpose   | File Name  | Date of Issue |
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| 1.0            | For issue | Public lighting (design) strategy  | Apr 2012      |
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|                |           |  |               |
|                |           |  |               |

## This document

The Westminster Lighting (Design) Guide has been developed through various iterations over a number of years and was formally known as the Street Lighting Design Guide. With the new title the document has been rebased commencing with version 1 dated April 2020.

The document covers the approach to be undertaken for any lighting design from concept through to commissioning and hand over to maintenance within Westminster be the project delivered through Westminster’s key partners or third parties.



# Index

|   | Page |
|---|------|
| 1 Introduction  | 5    |
| 2 Background  | 6    |
| 3 Requirements for designs and construction work          | 7    |
| 4 Lighting design approach                                | 11   |
| 5 Artificial lighting environmental impact requirements   | 27   |
| 6 Diversity, inclusion and equality                       | 34   |
| 7 Trees and vegetation                                    | 37   |
| 8 Wall mounted equipment                                  | 41   |
| 9 Electrical connections                                  | 46   |
| 10 Maintenance requirements                               | 47   |
| 11 Whole life costing                                     | 48   |
| 12 Buildability   | 49   |
| 13 Departure from Standards                               | 50   |
| 14 Design submission requirements for review / approval   | 52   |
| 15 Provision of 'as installed' information                | 53   |
| Annex A Westminster skill & care certificate              | 54   |
| Annex B List of Standards / Publications                  | 55   |
| Annex C Flow chart for 3 <sup>rd</sup> party design       | 57   |
| Annex D Asset data to be provided                         | 58   |
| Annex E Design application / submission check list        | 60   |
| Annex F Departure from Standards application and guidance | 61   |



## 1 Introduction

### 1.1 Public lighting strategy

Westminster City Council has developed this lighting design guide which defines a standard of lighting "The Westminster Standard" appropriate to the needs of the council and its highway and public realm users.

This guide should be read in conjunction with the following documents:

- Westminster City's Lighting Master Plan 2019-2040
- Westminster Way – Public realm strategy, which sets the required style for all street furniture.

This guide will serve to assist the clients and designers responsible for commissioning and designing exterior lighting within Westminster City Council to produce schemes that meet common criteria and the requirements of the Lighting Master Plan. The Guidelines should be used in conjunction with the appropriate European and British Standards, National guidance and Westminster documents.

Public lighting is only one aspect of the street scene and the type and design of a lighting scheme must show regard for, and be compatible with, other street furniture and the reduction of street clutter. Reference should be made to the Westminster Way document which sets the required style for the street furniture and streetscape.

### 1.2 The role of public lighting

In the urban street scene public lighting can provide the overall background level of lighting for secondary light sources such as shop fronts and the floodlighting of buildings and monuments. Public lighting can also create imaginative effects. Public lighting cannot be viewed in isolation and should never be seen simply as providing a certain fitting with a certain type of lamp.

"Good public lighting" is an art as well as a technical street furniture matter. The aim of public lighting is to encourage a safe environment for all highway users and pursuits, where people and vehicles can see and be seen.

Residential amenity and access / user requirements must be considered when positioning lights and specifying light levels, especially in narrow streets or where wall mounted luminaires are used.

Lighting classes and levels should be chosen to suit the needs of the user and environment ensuring a balance between the need for visual / dramatic effect through decorative lighting and the task lighting provided to ensure a safe environment, whilst suiting the scale and character of the area.

Westminster City Council encompasses a wide range of urban spaces from modern residential streets to internationally renowned tourist attractions and areas of great historic importance. The design of the lighting needs to be tailored to the individual circumstances of each situation. It should also comply with the lighting master plan which reflects the broad hierarchy of urban form and function within Westminster City Council.

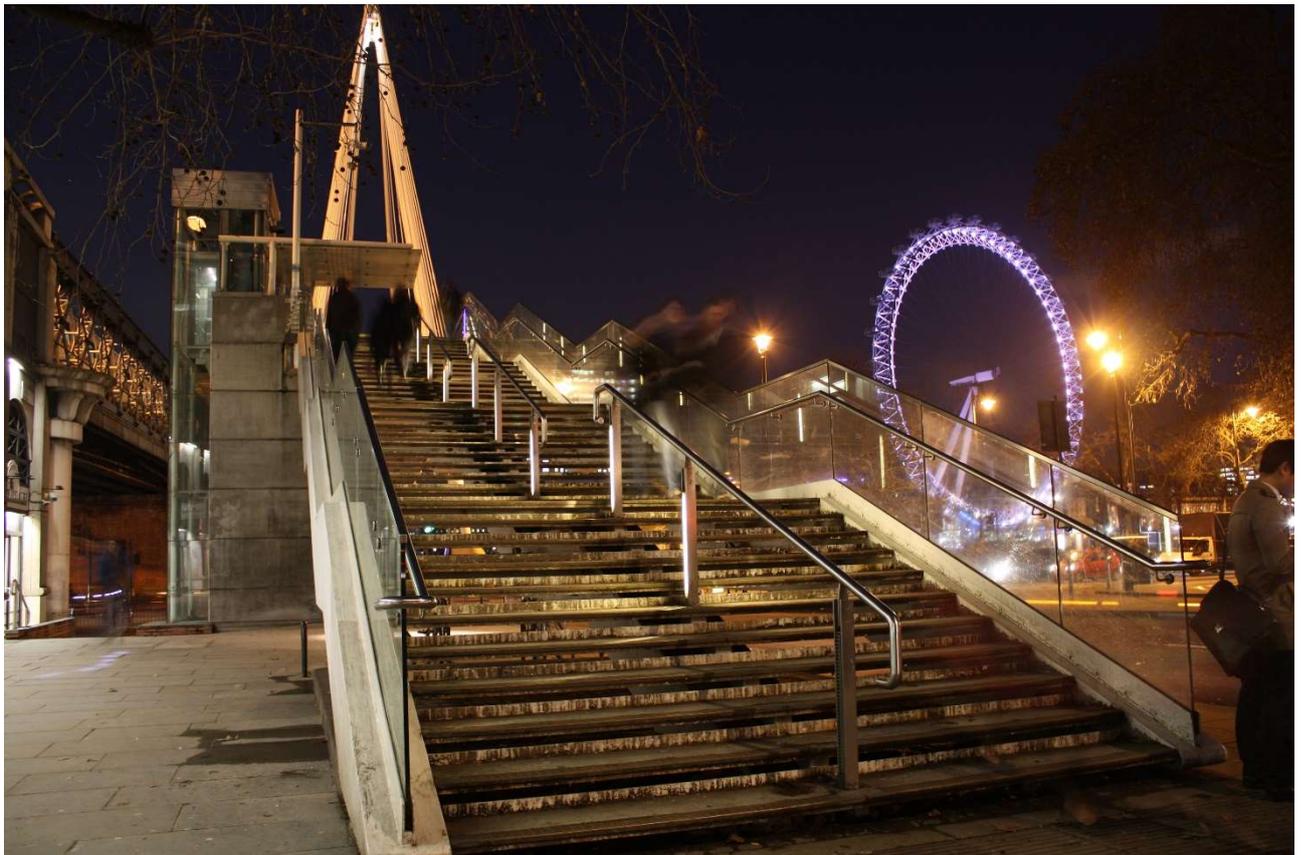


## 2 Background

Public lighting in Westminster City Council has developed over the years in line with technological improvements in lighting equipment and luminaires. The council has always recognised the importance of traditional lighting designs to compliment the historic character of the many Conservation Areas within the council.

Westminster City Council has approximately 15,000 lighting columns, with approximately 7,000 of a decorative traditional style. The council has many unique lighting columns and lanterns, for example the Westminster City Council Grey Wornum which was specifically designed by the eminent Architect, George Grey Wornum in the early 1950's. The Grey Wornum together with many other fine examples of lighting columns and lanterns have been preserved by the City Council and in recent times, refurbished to ensure illumination levels meet present day standards.

There is a need for higher levels of illumination in certain areas of the council due to increased vehicular and pedestrian usage. This has often resulted in traditional decorative forms of lighting being supplemented by modern forms of light. In such cases great care is needed to ensure modern lighting techniques blend well with unique settings. The lighting strategy indicates areas of historical value, possibly requiring an increased number of traditional columns and lanterns when replacements are being considered. The use of a central management system allows control over the lighting levels across the city to provide the right light, at the right time, in the right place thus permitting an adaptive lighting strategy to ensure that the appropriate lighting levels are provided at all times.



*Golden Jubilee Bridge*



## 3 Requirements for designers & construction work

### 3.1 Competency

#### 3.1.1 Client

The client commissioning any exterior lighting project must comply with the requirements of the Construction Design and Management (CDM) Regulations. In that no duty-holder must appoint a Principal Designer, Designer, Principal Contractor or Contractor unless they have taken reasonable steps to ensure that the organisation or individual they propose to appoint has the skills, knowledge, capacity and experience and, if they are an organisation, the organisational capability, necessary to fulfil the role in a manner that secures the health and safety of any person affected by the project.. This applies to any party involved within the design be it at the concept or feasibility stage through to detailed design, specification and construction stages.

#### 3.1.2 Designers

Competency for those undertaking the design of lighting installations shall be measured against the Institution of Lighting Professionals (ILP) 'Lighting professional development framework' document, [www.theilp.org.uk](http://www.theilp.org.uk) and the Highways Agency Document GG100 Quality Management Systems for Highway Design or similar professional body requirements. Competency is a measurement of the role the individual will take within the design process. All design approvals shall be undertaken by those professionals holding Membership of the ILP (MILP or FILP) or equivalent professional body membership, IEng or CEng plus demonstration of experience in the design and specification of public realm lighting related to the type of installation being designed.

#### 3.1.3 Manufacturers

Manufacturer supplied designs may often come with notes advising that the design has been prepared in accordance with certain clauses within their professional body's guidance documents. Often these will advise that the design is considered 'outline' and that the client should organise site visits and checks by suitably competent persons to ensure that all hazards and so forth are eliminated / reduced. Manufacturers should normally advise the client if this is the case prior to accepting such commissions. Designs by manufacturers will only be accepted for approval if they are detailed designs and have been undertaken by the relevant competent designers and have no related qualifying statements / references.

#### 3.1.4 Site staff / operatives

Competency of staff carrying out site surveys accessing electrical equipment and including contractors undertaking installation, maintenance and the work shall be taken as registration of the organisation and staff with the Highway Electrical Registration Scheme (HERS) [www.highwayelectrical.org.uk/HERS](http://www.highwayelectrical.org.uk/HERS) or sectors that are appropriate. For surveys not requiring access to electrical equipment then staff shall hold CSCS cards, [www.cscs.uk.com/](http://www.cscs.uk.com/)

Those accepting lighting commissions within Westminster are reminded that duty holders; Designers, Principal Designers, Contractor, Principal Contractors and workers must not accept an appointment to undertake a role unless they meet the requirements detailed above.



### 3.2 Public lighting risk strategy

#### 3.2.1 Managing risk

The principal of managing health and safety at work is the identification of hazards and the management of risk in order to remove or reduce to a minimum the possibility of injury and this is covered under the Management of Health and Safety at Work Regulations (MHSWR).

It is not the intent of this section to details all requirements with respect to the management of risk as anyone undertaking design, installation, and maintenance and de-commissioning has to meet the required competencies required under CDM and this guide. There are a number of key elements that are worthy of mention, as follows:

- The Health and Safety at Work Act (HASAWA) Section 2 sets out the duties of employers to employees, requiring employers to ensure, as far as is reasonably practicable, the health, safety and welfare of their employees at work.
- Similarly, Section 3 requires employers to conduct their undertaking in such a way that persons other than employees, including the general public, are not exposed to risks to their health and safety.
- The Management of Health and Safety at Work Regulations (MHSWR) takes this further and places an absolute requirement to carry out suitable and sufficient risk assessments. Westminster City Council the submission of the designer and construction risk assessments as part of and project design submission.

The main stages in undertaking any risk assessment are:

- Identify the hazards, anything with the potential to cause harm.
- Identify who may be harmed
- Assess the risks and extent of the risk
- Identify any existing controls that are applicable
- Identify the required standard
- Identify what preventative and protective measures / actions need to be carried out, by whom and when in order to reach the standard required. This may require the production of method statements detailing the steps which make up the mitigation process.
- Record the process
- Review and revise as necessary

### 3.3 Design

Design is defined as a plan or specification for the construction of an object, a system, changes to function / purpose of an item as well as how processes may be undertaken. This can extend from just deciding on site as to the position of an item or directing an operation through to the design of a large lighting installation.

#### 3.3.1 Who are the designers?

Designers are those who have a trade or a business which involves them in:

- Preparing designs for construction work including variations – this includes preparing drawings, designs, details, specification, bills of quantities and the specification of articles and substances, as well as all the related analysis, calculations, and preparatory work; or
- Arranging for their employees or other people under their control to prepare designs relating to an installation or part of an installation.

This means that designers include:

- Design practices contributing to or having overall responsibility for any part of the design.
- Anyone who specifies, modifies or alters a design, or who specifies a particular method of work or material, this can include clients
- Those procuring material's where the choice has been left open



- Contractors and manufacturers carrying out design work
- Temporary works design
- Heritage organisations who specify how work is to be done in detail.

It is recognised that all designers will have their own processes and procedures for undertaking the review and mitigation of risks as part of their design practice.

### 3.3.2 Designers

Designers are in a unique position to reduce the risks that arise during construction work and have a key role to play in CDM. Designs develop from initial concepts through to a detailed specification, often involving different teams and people at various stages. At each stage, designers from all disciplines can make a significant contribution by identifying and eliminating hazards and by reducing risks.

Designers' responsibilities extend beyond the construction phase of a project. They also need to consider the health and safety of those who will maintain, repair, clean and eventually demolish a structure. Failure to address these issues adequately at the design stage may make it difficult to devise a safe system of work. It could also cause additional costs later because either scaffolding or access equipment is required.

Designers under the MHSWR are required to carry out suitable and sufficient risk assessments, the Construction, Design and Management (CDM) Regulations, in particular Regulations 11 and 13, set out the duties of the designer with respect to construction work and this applies even if the work is not notifiable under the scope of the CDM Regulations.

Designers must weigh many factors as they prepare their designs. These must be weighed alongside other considerations, including cost (Capital & revenue), fitness for purpose, aesthetics, buildability, maintainability and environmental impact.

Designers must reduce foreseeable risk to health and safety, based on the information available when the design is prepared or modified. The greater the risk, the greater the weight that must be given to eliminating or reducing it. Designers must not produce designs that cannot be constructed and maintained safely.

Where risks remain, designers must provide the information needed to ensure that planning supervisors, other designers and contractors are aware of them and can take account of them and these should be present within the maintenance file.

### 3.3.3 Westminster public lighting specific considerations.

The designer when considering any public lighting within Westminster should be aware of and give due consideration within their design to the following aspects, some of which are more peculiar to the City of Westminster and may not have been encountered previously.

### 3.3.4 Design

All designers shall be competent as defined within this document and evidence of such competency shall be provided prior to them commencing any design work. As part of the design, the designer for the project shall physically inspect the site and undertake an appropriate survey to identify any hazards they may need to consider during the design process, again those undertaking such surveys must hold the appropriate competencies for the tasks being undertaken.

Aspects to be considered may include, but not be limited to, location of underground vaults and cellars, trees, depth of the Underground tube lines, existing services which can be immediately below the surface (all utility companies must be approached for details of their services at the outset of the design), potential



supply locations, potential location of equipment proposed, existing or temporary taking into account access arrangements for construction and maintenance plant and operatives.

### 3.3.5 Construction and maintenance

The designer must ensure that through their design and risk analysis that the lighting installation can be installed and maintained safely. This will include ensuring that all equipment must be easily maintainable through the use of standard access systems / plant with minimum disruption to motorists, pedestrians and access to premises and unless a departure from standards has been agreed, not require any specialist requirements or equipment.

The designers must ensure that the removal of any existing equipment as part of the project as well as the proposed equipment when it becomes life expired has been given due consideration and all risks considered.

Site clearance and the disposal of life expired equipment must be carefully assessed to determine if there are any materials that may have the potential for harm i.e. lead paint on cherished old columns, asbestos within luminaires, contain structurally critical elements that may lead to structural failure during removal and the like.



*Maintenance operations Downing Street*



## 4 Lighting design approach

Whilst it is true that public realm lighting should enable pedestrians and road traffic to journey safely along the highway, this is not its only role. “Successful lighting design should be a combination of the conventional objectives and the prudent and often sparing use of creating lighting”, the aim should be **the right light, in the right place, at the right time facilitated by the use of the right control system.**

The aim of lighting within Westminster City Council should not be to light the roads above all else. Rather the lighting level should generally be kept to the minimum standard in order that other selected lighting sources can predominate. The result of this type of thinking will help engender a sense of place and will establish a hierarchy of urban spaces and encourage more efficient lighting solutions.

The following sub-sections detail the various factors and considerations that the designer must take into account when undertaking any lighting design commission.

1. Co-ordinated design
2. Lighting performance
3. Special areas
4. Light source
5. Selection of street furniture / lighting equipment
6. Area enhancement lighting considerations
7. Existing equipment / lighting installations
8. Lighting controls
9. Artificial lighting environmental impact requirements
10. Diversity, inclusion and equality
11. Trees and vegetation
12. Wall mounted equipment
13. Security / CCTV
14. Electrical connections
15. Maintenance requirements
16. Whole life costing
17. Buildability
18. Departure from Standards

### 4.1 Co-ordinated design

#### 4.1.1 General

The appearance of light fittings and related equipment at night and during the day is equally important. During the day they should, as a minimum, be unobtrusive although in some areas they will more probably enhance the daytime street scene as discussed within the ‘Westminster Way’ document. By night, the light they give out should be both efficient, sufficient and where possible attractive.

#### 4.1.2 Appearance by night

##### 4.1.2.1 General

In determining the level of lighting in Special Areas the following factors should be considered (amongst others):

- Function of the space;
- Character and scale;



- Existing light from other sources;
- Building materials and textures;
- Lighting class / level in adjacent areas;
- Adaptive lighting;
- The potential for increasing lighting levels at key times to aid dispersal of people.

### 4.1.2.2 *Function*

The nature of the space should be established, and the type of buildings analysed. The usage of the buildings determines the level of pedestrian movements to be expected. The status of the road reflects the usage of the area by vehicles.

### 4.1.2.3 *Character and scale*

When considering lighting the scale of the space and its component factors must be taken into consideration.

The scale of the buildings when lit well can create points of drama. Many of these buildings have been placed on axial points of vistas. The levels of adjacent street lighting equipment should be low enough to allow the drama of floodlighting such landmark buildings. The optical performance of the equipment used to light the highway should be sympathetic to the needs of the building lighting and not distract from it or cause adverse spill light affecting the character lighting. Similarly, it is clear that small scale spaces should be sympathetically treated by the use of suitable fittings.

### 4.1.2.4 *Existing light from other sources*

The existing light from other sources could include:

- Up lighting at ground level, e.g. illumination of Plane trees located in the central islands in Park Lane;
- Floodlighting at ground level or wall mounted up-lighting and down-lighting;
- Spot lighting usually of monuments;
- Festoon lighting and other decorative lighting;
- Commercial lighting from shop fronts or cinemas etc;
- Light from advertising hoardings;
- Light spill from the interior of buildings;
- Traffic sign lighting; and
- Festive lighting.

### 4.1.2.5 *Building materials and textures*

“A designer must consider not only a buildings transparency, but its special materials and textures. Designers should be mindful of the different effects of light (white or yellow) on materials.” In general the lighter and the shinier the surface, the greater the materials ability to reflect light. The reflectance of each surface material should be assessed. Figures for various materials have been calculated by CIBSE.

## 4.1.3 Appearance by day

### 4.1.3.1 *General*

By day the minimum requirement of any street lighting scheme must be to be as unobtrusive as possible. This is usually the requirement in Special Areas also. However, this is often not the requirement of many of



the luminaire within these areas. Luminaires in Special Areas are often ornate pieces of street furniture that enhances the local environment and street scene.

4.1.3.2 Number of columns

The number of columns should be kept to a minimum. However, if these columns are sited to emphasise a particular architectural feature or view then more columns may be necessary. The column number may also increase to avoid using fewer, but taller columns to achieve the lighting requirements for a particular area. Where a single column can be used for more than one purpose for lighting areas this is to be done. A common combination is the lighting of roads and footpaths by different height luminaires or a single column.

4.1.3.3 Height of columns

The height of the column is to be in scale with its surroundings. All columns should try to avoid intrusion into the skyline (this may be impossible along long straight views). Some columns may provide street lighting at different levels on the one column.



St Martins, The Strand



MacKenzie Moncur



Wornum

Area enhancement column designs

4.2 Lighting performance

4.2.1 Required illumination levels

A staged approach is adopted for the assessment of the appropriate lighting level for each situation. British Standard 5489-1 & BS EN 13201-2 Road Lighting, detail the appropriate lighting levels for varying classes of road and footways. The classes used should be cross referenced to the hierarchy of roads and traffic flows in Westminster City Council in which roads and squares are categorised as designated roads, secondary roads or local roads as indicated below. This base level of lighting is referenced as **Stage One** for the purpose for the staged approach and will determine the base level of lighting dependant on the importance of the roads and its usage.

Westminster have used a common network hierarchy based on the importance of each street subdivided into carriageways, footways and cycleways. The network hierarchy aligns with the Code of Practice 'Well Managed Highway Infrastructure', recommendation 12 – Network Hierarchy of the Code states;

- A network hierarchy, or a series of related hierarchies, should be defined which comprises all elements of the highway network, including carriageways, footways, cycle routes, structures, lighting and rights of way



- The hierarchy should take into account current and expected use, resilience, and local economic and social factors such as industry, schools, hospitals and similar, as well as the desirability of continuity and of a consistent approach for walking and cycling.

A hierarchy for carriageways, footways and cycleways based on functionality factors and are advised in Tables 1a, 1b and 1c.

| Carriageways |  |  |
|--------------|--|--|
| WCC Category | Functionality Factor   | Functionality Definition   |
| SR           | Borough Principal Road Network   | The main signed traffic routes for through traffic. Transport for London road network (TLRN) maintained by TfL.  |
| A1           | Prestige   | High profile (eg Main Shopping Streets   Main Rail Terminus/Interchanges)   Ceremonial Routes   CAZ Frontage   International Shopping Centres and other Shopping Centres within the CAZ  |
| A2           | Special Streets  | Streets with special functionality (note these may include but not exclusively traffic sensitive streets and streets of operational and special engineering difficulty)  |
| B            | Very High Traffic Volume<br>Essential Services<br><br>Major Traffic Generators<br>Very High Cyclist Volume<br>Resilient Network<br>Major Bus Route<br>High HGV Usage | e.g. AADF>50k   Local Knowledge<br>e.g. Hospital   Fire Station   Police Station<br>e.g. Rail Station   Underground Station   Large School   Major Shopping Centres & District (Primary & Secondary) Shopping Centres<br>e.g. AADF>5000   Defined Cycle Route (XYZ)<br>Winter Service Resilient Network / Flood Hotspots<br>e.g. 24hr Bus Route   High frequency routes<br>Bus Depot   Street Cleansing Depots   Industrial Estate |
| C            | High Traffic Volume<br>Medium Traffic Generators<br>High Cyclist Volume<br>Resilient Network<br>Minor Bus Route  | e.g. 50k>AADF>15k   Local Knowledge<br>e.g. Local Shopping Centres (Shopping Parades)<br>e.g. 5000>AADF>1000   Local Knowledge (XYZ)<br>Winter Service Resilient Network<br>e.g. Medium frequency routes   |
| D            | Medium Traffic Volume<br>Minor Traffic Generators<br>Medium Cyclist Volume<br>Infrequent Bus Route<br>Medium HGV Usage   | e.g. 15k>AADF>3k   Local Knowledge<br>Places of Worship   GP Surgery<br>e.g. 1000>AADF>500   Local Knowledge (XYZ)<br>e.g. Low frequency routes<br>Routes to Bus Depot   Street Cleansing Depots   Industrial Estate   |
| E            | Low Traffic Volume<br>No Traffic Generator<br>Low Cyclist Volume   | e.g. AADF<3k   Local Knowledge<br>None of the above<br>e.g. AADF<500   Local Knowledge (XYZ)   |

Table 1a Carriageway hierarchy definitions



| Footways |   |   |
|----------|---|---|
| Category | Functionality Factor                          | Functionality Definition  |
| A1       | Prestige                                      | High profile (eg Main Shopping Streets   Tourist Attractions   Main Rail Terminus/Interchanges   Ceremonial Routes   CAZ Frontage   International Shopping Centres and other Shopping Cebrates within the CAZ |
| A2       | Special Streets                               | Streets with pedestrian access difficulties   Restricted working width  |
| B        | Very High Pedestrian Volume                   | e.g. Pedestrian footfall (Total + Peak)   Local Knowledge   |
|          | Essential Services                            | e.g. Hospital   Care Home   Police Station  |
|          | Major Traffic Generators<br>Major Bus Route   | e.g. Rail Station   Underground Station   Large School   Major Shopping Centres & District (Primary & Secondary) Shopping Centres   Large School or University<br>e.g. 24hr Bus Route   High frequency routes |
| C        | High Pedestrian Volume                        | e.g. Pedestrian footfall (Total + Peak)   Local Knowledge   |
|          | Medium Traffic Generators                     | e.g. Medium Schools   Local Shopping Centres (Shopping Parades)   |
|          | Vulnerable Users                              | e.g. GP Surgery   Senior Citizens Home  |
|          | Shared Use<br>Minor Bus Route                 | e.g. Shared Streets - Carriageway/Footway and Cycle/Footway<br>e.g. Medium frequency routes   |
| D        | Medium Pedestrian Volume                      | e.g. Pedestrian footfall (Total)   Local Knowledge  |
|          | Minor Traffic Generators                      | Small School   Places of Worship   GP Surgery   |
|          | Infrequent Bus Route                          | e.g. Low frequency routes   |
| E        | Low Pedestrian Volume<br>No Traffic Generator | e.g. Pedestrian footfall (Total)   Local Knowledge<br>None of the above   |

Table 1b Footway hierarchy definitions

| Cycleways |                            |   |
|-----------|----------------------------|---|
| Category  | Functionality Factor       | Functionality Definition                        |
| X         | Cycle Superhighway Network | Cycle Superhighway                              |
| Y         | WCC Quietways              | Unsegregated cycleways                          |
| Z         | Docking Station            | Designated cycle hire stations and cycle stands |

Table 1c Cycleway hierarchy definitions

Local factors which may also be applicable to roads and areas also require due consideration and include

- (i) Pedestrian Subways
- (ii) Accident Black spots
- (iii) Light Pollution

The method of establishing lighting levels is based upon BS5489:2020 assessing the category of road and its usage, although relevant in the majority of circumstances this approach does not give consideration to special areas. The Special Areas Lighting Design section of this document gives consideration to both the "day" and "night" time streetscape and in particular the importance of achieving the correct mix and balance of lighting between road and the surrounding areas to enhance the aesthetic and architectural environment for the following areas;

- A Prime Sites and Important Streets which have been considered separately and appropriately;
  - (i) Ceremonial Routes
  - (ii) Commercial
  - (iii) Squares      Cultural  
                         Entertainment  
                         Residential
- B Areas of significant pedestrian use
  - (i) Commercial



- (ii) Routes between key locations, transport terminuses
- C Thames Corridor
- D Little Venice
- E Conservation Areas
- F High security areas

These unique areas within the City require further consideration when establishing lighting levels and therefore are assessed under **Stage two** of the staged approach

Stage One categories are considered to be the base standard for all road and areas taking into account street crime where appropriate. Lighting level shall be referenced to the Westminster street crime map to determine if the lighting class should be increased due to current levels of street crime.

The map is updated annually and is based upon street crime data where:

- 0 to 50 crimes per annum are classed as low;
- 50 to 100 as medium; and
- > 100 as high crime.

Enhanced or special lighting treatment is required at conflict areas or where there is a considerable level of pedestrian use at night e.g. areas immediately outside stations, key pedestrian routes, shopping areas and entertainment areas. This also applies for safety such as at road crossing points, in subways and pedestrian crossings for example.

Should a road or area require special consideration then the lighting design should meet the requirements for such areas as defined within BS5489-1, BS EN 13201-2 and national guidance such as that provided in the various ILP Professional Lighting Guides / technical reports.

Maintenance factors shall be in line with the recommendations with BS5489 and ILP guidance Note GN11

#### 4.2.2 Adaptive lighting strategy

Westminster's aim is to provide a sustainable lighting service providing the right light, in the right place, at the right time, with the right control system. This seeks to ensure that the lighting applied is both efficient and targeted.

- **The Right Light:** Refers to the quality of the light source, in being efficient, of the right colour temperature and colour quality.
- **The Right Place:-** Refers to the distribution of light across the road or area, limiting any impact beyond the boundary, and considers any environmental concerns
- **The Right Time:** Refers to the switching arrangement, be it dawn to dusk, or any adaptive lighting strategy
- **The Right Control System:-** Refers to the method of switching and monitoring to ensure that Westminster City Council has the correct level of control over the lighting.

In achieving the right combination of these elements, any lighting proposal can be considered as Ultra Efficient Lighting (UEL).

British Standard for Road Lighting (BS5489-1) permits the Council to consider adapting the lighting levels when the requirements of the lit task changes. This may relate to a section of Highway where pedestrian movements or traffic volume change during the night permitting a variation in the lighting levels which can potentially harvest an energy reduction.



The application of adaptive lighting throughout a public lighting installations operational life will bring significant revenue savings in the form of energy and carbon consumption reduction.

At no point are the lighting levels below the Standard required for the task / area being lit.

There are certain areas where adaptive lighting should not be implemented or can be considered but with extra caution and only once a site-specific risk assessment confirms that suitability. These are considered as follows:

- Public safety:

Public safety as always must be the overriding priority and the assumption is that compliance to BS5489-1:2020 will ensure that all risks are considered and accounted for within designs, including the application of adaptive lighting.

- High crime areas:

For streets that are identified as having high street crime rates it is recommended that if the lighting on these roads are being considered for adaptive lighting, prior discussions should take place with community protection to get an informed view, document what is discussed and then make an informed engineering judgement as to whether adaptive lighting would present a greater risk to public safety or not.

- Minimum lighting class:

The minimum lighting class that is acceptable in Westminster is P3 (BS5489-1:2020). This means that no lighting class can drop below this level, even when the lighting has been adapted.

- Gas lighting:

As part of Westminster's climate emergency, gas lights are being changed to electrical power and LED 'gas effect' retrofit lights install, maintaining the same aesthetic of the existing column and lantern. As part of this, the lights are brought up to current lighting levels and light levels adapted with the council's approved internal CMS nodes to control lighting levels.

- CCTV:

Lighting may be adapted on roads where CCTV cameras are present and CCTV operators shall be consulted about the adapted lighting. If it is found that adaptive lighting is affecting the quality of the recording of the CCTV then the CCTV team should discuss with the City's Street Lighting team to agree a solution, which may include not applying adaptive lighting in specific locations, or changing the type of CCTV camera in use.

- Private roads:

There are many private roads in Westminster. Some private roads are not maintained by Westminster, so the decision to implement adaptive lighting in these roads cannot be made by Westminster. However, on private roads which are maintained by Westminster, the lighting can be considered for adaptive lighting, following consultation with the landowners.

- Night bus routes:

Lighting on roads which 24 hour and night buses frequent, can be adapted, however the level at which that lighting can be adapted, should be slightly higher than the standard profiles.



### 4.2.3 Traffic Boundaries with other Authorities

Where adaptive lighting is applied to roads and areas within Westminster City Council’s control, there may be instances where the road joining the boundary is of a higher category than the adaptive category of the side road. For example, the road for adaptive lighting may form a junction with a Westminster road that can’t be adapted or that of another under a different authority’s control that will not be adapted. The road lighting Standards require that adjacent lit areas shall not be more than two equivalent lighting classes apart; therefore to avoid any potential conflict between adaptive roads and non-adaptive roads, there should be a transitional area forming the approach from the major road junction to the secondary road, which would reduce any effect of the adapted light on the junction forming the boundary.

In lighting the main junction with a differing authority, there should have been liaison with the authority controlling the junction to determine the position and adaptive lighting feasibility regarding the first column position spanning the junction and queuing area on the Westminster highway.

Applying the guidance provided within ILP professional lighting guide PLG02 Section 4.2, the area subtended by the queuing area is defined by the road length from the edge of the junction design area to a stretch of road long enough to provide 5 seconds of driving distance at the expected traffic speed. Based on a maximum permissible speed of 30mph in most Westminster highways, this equates to a road length up to 67m.

The following image represents an example of an intermediate area used. In this case we have shown a conflict area junction, on a smaller subsidiary road, where the intermediate area would extend to the junction of the conflict area.



*Adaptive lighting transition zone*

### 4.3 Energy performance

All highway lighting designs shall include for a demonstration that the proposed installation is energy efficient through the provision of the two BS13201-5 Energy performance indicators:

- Power density ( $W/lm\ m^2$ ); and
- Annual energy consumption indicator ( $Wh/m^2$ )



### 4.4 Special areas

Special Areas have been appraised in the Guidelines, however, it is important that the lighting designer considers all aspects and characteristics of each site, no two sites will be the same, the architectural aspects particularly of the Prime Sites must be considered in establishing whether the increased levels proposed are appropriate. The guidelines serve to assist the design to produce schemes to meet common criteria and fit within the overall Westminster Standard, however the exact detail of the design will vary.

The “Special Areas” where the levels proposed are above the base relate to shopping areas e.g. Regent Street, Oxford Street and Entertainment Squares e.g. Leicester Square. In both cases the increased levels are justified due to the activities in the area and therefore the need for additional light not just for safety, but to create the correct atmosphere within the night scene. These decisions may be tampered by the approach of providing the right light at the right time controlled by the right system and within Westminster the use of the Central Management System can ensure that the lighting provided is set with a suitable operational profile to ensure that this requirement is achieved.

#### 4.4.1 Description

Westminster City Council has a unique character. It is the centre for political, commercial and cultural activities within London, whilst also encompassing distinct local residential communities. This document does not cover all these very individual areas but rather sets out guidelines for street lighting design in these areas.

For lighting purposes, the area of Westminster City Council can be divided in different ways by;

- Land use
- Character
- Cultural/heritage associations

##### 4.4.1.1 Land Use

Predominantly:

- Commercially important (shops and business)
- Entertainment streets (cinema, theatre, restaurants)
- Unique residential areas (squares etc.)

##### 4.4.1.2 Character

by:

- Scale
- Building material
- Park land
- Long distance walking routes

##### 4.4.1.3 By cultural / heritage associations

Predominantly:

- Historical/monumental buildings (architecture)

Most areas will have a mix of land use, character and association. While different buildings should be examined, it is the overall impression of an area that is important, the predominant character/land use.



### 4.4.2 Special area requirements

Within the overall framework provided by the road hierarchy some areas will need special consideration in the design of street lighting:

- Cultural squares
- Entertainment squares
- Ceremonial routes
- Residential squares
- High security areas
- Commercial areas of significant pedestrian use
- Prime sites
- Areas for Special Conservation: Thames Corridor

The prime sites manual of Westminster City Council lists the following areas as 'Prime Sites' and 'Important Street' respectively.

#### 4.4.2.1 *Parliament Square:*

Including Little George Street, Margaret Street and Old Palace Yard. (Note that the central area of the Square is maintained by the Department of the Environment (DOE) to be consulted regarding any proposed work).

#### 4.4.2.2 *Trafalgar Square:*

Including part of Cockspur Street and Pall Mall. (Note that the central area of the Square is maintained by the DOE).

#### 4.4.2.3 *Piccadilly Circus:*

Including the south end of Shaftsbury Avenue and the rear of the London Pavilion.

#### 4.4.2.4 *Leicester Square:*

Including Coventry Street, Swiss Court, Leicester Street and Court, Cranbourn Street, Irving Street, St Martins Street and Panton Street.

#### 4.4.2.5 *Whitehall and Parliament Street (also a ceremonial route)*

#### 4.4.2.6 *Strand:*

From Trafalgar Square to the council boundary.

#### 4.4.2.7 *Piccadilly:*

Hyde Park Corner to Piccadilly Circus.

#### 4.4.2.8 *The Ceremonial Route:*

Victoria Station to Parliament Square, including Wilton Road as well as the whole of Victoria Street; The Mall and Constitution Hill.

#### 4.4.2.9 *Regent Street:*

Regent Street from Piccadilly Circus to Langham Place.



*Marble Arch Fountains*

#### 4.4.3 Conservation areas and listed buildings

The majority of land within Westminster City Council is a Designated Conservation Area, of which there are 55 named areas.

Many of these areas have a uniform use or building type e.g., the Queens Park Estate or the suburb of Pimlico. Some have been continuously redeveloped to provide a *“varied urban grain of great character”*

It is the council’s duty to *“pay special attention to the desirability of preserving or enhancing the character or appearance of conservation areas”*.

As with building development it is essential that any lighting design within conservation areas *“employs the highest standards of design, respects the discipline imposed by the existing townscape, preserves or enhances the character and appearance of conservation areas and protects the architectural and historic interest....”*

Several of the conservation areas have already had their *“physical fabric”* up-graded, e.g. Leicester Square, Trafalgar Square and Portland Place. The street lighting of these areas has been improved using traditional-type luminaire and column designs or discrete wall mounted area projectors, found either within the area itself, or in neighbouring areas. Where possible historic photographs should be used as a source of original street lighting records.

Where there has been substantial redevelopment in these areas and the result is a *“varied urban grain of rich character”*. The use of historic-type lanterns is not necessarily the correct design judgement to make. Many of these areas are visually complex and a simple uniform lantern and column may unify the scene more effectively than a traditionally ornate design.

#### 4.4.4 Listed buildings

As with conservation areas any proposed new structure (lighting column and luminaire) should not have an *“adverse visual impact on the settings of listed buildings.”* As mentioned previously luminaires and lighting



columns should be of an appropriate style to enhance rather than detract from historic / interesting buildings.

Consultation must be undertaken with the Westminster City Council when proposing structures close to or in the curtilage of such buildings.

#### 4.4.5 Listed and cherished lamp standards

Westminster will seek the preservation of historic street furniture and other structures, due reference shall be made to the Westminster Way and Westminster's Cherished Column Strategy

#### 4.4.6 Gas lighting

Westminster have many gas lit streets and have developed a gas lighting strategy that shall be applied where lighting schemes are to be undertaken in these areas, due reference shall be made to the Westminster Way and Westminster's gas lighting strategy.

#### 4.4.7 Summary

The design of street lighting within conservation areas should be undertaken with careful regard to the architecture and historic context of the particular area . The use of historic luminaire and column types should be considered, and where appropriate used. Many existing lamp standards may well be listed, or due to be listed. Special thought should be undertaken when considering lamp standards in close proximity to listed buildings. The Westminster Way, lighting policies shall be used to appraise the range of existing and suitable equipment

### 4.5 Light source

The colour of the light source used and how well the street lighting performs is of particular importance as it affects how an area is perceived.

The choice of light source is a fundamental element of lighting design. Light sources are constantly changing, in particular their performance in relation to lumen output, colour rendering, source life and lumen maintenance.

In general, new public lighting designs should be carried out utilising LED light sources with a colour temperature of 3,000K as the standard light source and these should be used in conjunction with drivers that support adaptive lighting. All design work must be based upon luminaire absolute photometry data.

For retro-fit installations upgrading existing luminaires the designer must ensure that the retro-fit solution is compatible with the luminaire (CE compliance under the EU Blue Book including thermal management, EMC requirements etc.) as well as the photometric performance of the retro-fit solution being no less than that of the original luminaire.

All light sources, lamps, drivers and luminaires shall comply with the requirements of the applicable EU Regulations, the Circular Economy for Luminaires, the requirements of the Energy using Products (EuP) and Energy related Products (ErP) Directives as appropriate to the tertiary lighting sector. The correct CE technical data / files shall be reviewed and supplied for all equipment.

Only luminaires and light sources with Elexon UMSUG approval shall be used when connected to un-metered connections.

### 4.6 Selection of street furniture / lighting equipment

The type and style of street lighting furniture should be in accordance with;

- i) City of Westminster 'The Westminster Way' Public realm strategy, Design principals and practice



- ii) Westminster public lighting specification
- iii) Standard Specification for Street Lighting Installations
- iv) Standard Drawings for Street Lighting Installations

These documents are available from Westminster City Council public lighting department upon application

### 4.7 Area enhancement lighting considerations

#### 4.7.1 Introduction

The purpose of this section is to considerations and requirements for any decorative / enhancement lighting that may be considered within a public realm development.

These may include but not be limited to:

- Uplighters for trees, monuments and sculptures
- Fountain and water features
- Bench lighting
- Handrails

This section should be read in conjunction with section 5, artificial lighting environmental impact requirements.

#### 4.7.2 Requirements for enhanced lighting equipment

When considering any lighting equipment for the purpose of enhanced area / feature lighting the designer must consider the following aspects. Surface / below surface luminaires should be avoided wherever possible especially where they will be subjected to street cleansing operations. These issues may greatly increase frequency and costs of maintenance. The preferred method, to provide feature up lighting ensuring adverse environmental impacts and effective maintenance, is to have the luminaires above ground within other above ground street furniture, such as seating/benches, walls, bollards, to avoid the above issues.

#### 4.7.3 Street cleansing operations.

All equipment located either within the surfacing or in close proximity to it will be subject to street cleansing operations and as such must be specified, designed located and installed such that these operations have no detrimental effect on either the lighting equipment in terms of its integrity or fixing nor the performance of the installation. Such cleaning operations can include high pressure water jets, steam cleaning, detritus collection, surface scrubbing etc.

Typical street cleansing equipment is as follows:





*Mechanical, jet washing and manual cleansing operations*

#### 4.7.4 Control of artificial optical radiation at Work Regulations (AOR)

Enhanced area / feature lighting is often in close proximity to the public and therefore requires the designer to consider photobiological safety of the light sources and luminaires to ensure that observers exposure to such sources does not exceed recommended exposure levels.

In order to facilitate client compliance with the control of artificial optical radiation at work regulations, the designer shall eliminate or reduce the photobiological risk to the workers and the public. Where possible all equipment shall be selected from the exempt risk group number (RG0), in special cases where RG0 products are not available RG1 rated products may be considered. No products rated RG2 or RG3 shall be used.

Manufacturers who do not also provide exposure data shall be used and their equipment must not be fitted to the Westminster network.

A methodology to determine the photobiological risk group (RG) classification of a luminaire is described in BS EN 62471: Photobiological safety of lamps and lamp systems. Note where a luminaire has a different RG classification for UVA and “blue light”, the higher risk group shall be used.

#### 4.7.5 Drainage considerations

All surface mounted equipment, with the exception of that associated with water features, shall be located within areas with positive drainage away from the luminaire.



*Up lighters installed with poor drainage*

#### 4.7.6 Equipment impact loading

The designer shall consider the use of the area where the lighting equipment is to be used and ensure that its specification and the installation design including foundations, mounting arrangements and the like are



suitable for expected loadings. These may relate to footfall, street cleansing operations, vehicles and in some areas ceremonial duties which may include horse hooves or even gun carriages.

#### 4.7.7 Water ingress

All equipment shall be or fully encapsulated or IP67 as a minimum and in addition the electrical system shall be such that all terminals are suitable rated and the luminaires / gear compartments where heat build-up or cooling may be considered a concern shall have IP67 breathable filters / membranes.

#### 4.7.8 Surface temperatures

Glazed surfaces when in operation must be safe to the touch.

#### 4.7.9 Optical requirements

The designer shall ensure that the requirements of lighting control as detailed within the artificial lighting environmental impact requirements of this document are complied with and evidenced where required.

Optical control must be such that the task is lit, and any light emitted in other directions is blocked or minimized.

#### 4.7.10 Maintenance operations

All lighting installations shall be designed to ensure that maintenance activities can be undertaken without any undue access difficulties for plant, equipment and personnel. Equipment must be maintainable without the risk of water or dirt ingress affecting its future performance and operation.



*Water ingress following maintenance operations*

#### 4.7.11 Vandalism

All lighting installations shall be designed to ensure that vandal resistance is considered with respect to equipment, installation and accessibility activities.

### 4.8 Specific installations

#### 4.8.1 Bench lighting

The application of bench and under bench lighting has been very problematic within Westminster with installations having operational reliability problems, being prone to damage through street cleansing operations or vandalised. In most cases access to the lighting system has been difficult.

Westminster would therefore prefer not to see under bench lighting proposed.



Westminster will only consider under bench lighting in exceptional circumstances and key requirements subject to approval will be:

- Minimal clearance of 400mm from area surface to the lighting fitting(s)
- The bench shall have a suitable recess designed into it that will accommodate the luminaire(s) and electrical connections
- The light effect shall be such that the light is projected downwards
- All luminaires to be fully encapsulated
- Electrical supply to be low voltage
- The area surrounding the benches shall have positive drainage away from the bench to facilitate maintenance access.

### 4.8.2 Lighting curfew

All enhanced lighting may be subject to a curfew after which time the lighting shall be either turned off or the lighting levels reduced. Such aspects shall be agreed with Westminster Asset Manager for lighting.

## 4.9 Approval requirements

### 4.9.1 Approval procedure

All enhanced lighting equipment shall be considered as non-standard and as such shall be subject to approval by the Westminster. Applications shall be made through the Westminster Asset Manager (Lighting). Non-standard lighting equipment will be subject to a revenue impact assessment to compare maintenance and replacement costs against standard lighting equipment within the contract. Additional costs, if non-standard items are approved by Westminster City Council will be charged to the applicant.

### 4.10 Existing equipment / lighting installations

The relationship and light contribution between existing equipment to remain within / adjacent to any new lighting installation must be taken into account within the design process and must be shown on the proposal drawings.

When a replacement lighting scheme is to be installed, the designer must ensure that all signs, bollards and other equipment fed from the columns to be removed are given a feed from the new installation via a transfer of the existing cabling, or if this is not possible, via a new cable/distribution network.

When a replacement lighting scheme is to be installed, the designer must ensure that all non-illuminated signs and fixtures on columns to be removed are suitably transferred to new columns or supports as applicable.

All lighting proposals shall be passed to Westminster City Council's Parking Team for comment to ensure that any alteration or requirements regarding existing enforcement signage is catered for.

A new scheme within an existing street may require more or less columns than existing, where the installation only addresses part of the street's existing lighting then the remaining columns / signs / bollards shall be re-numbered as directed by Westminster's Lighting Manager. The lighting designer shall consult with the Lighting Manager to determine the requirements for the numbering of the proposed and existing lighting infrastructure.

#### 4.10.1 Gas lit areas

Where gas lighting exists, and lighting levels need to be improved then the 'Westminster Way' and Westminster City Council gas lighting strategy documents shall be consulted to determine the acceptable range of solutions.



#### 4.11 Lighting controls

All lighting shall be controlled by a Central Management System (CMS). The designer shall liaise with Westminster's Lighting Manager to determine the requirements for this system for the design being developed.



*Victoria Embankment*



## 5 Artificial lighting environmental impact requirements

### 5.1 Introduction

Designers shall always be mindful of the potential for obtrusive lighting and shall minimise and control such potential effects.

Light pollution / obtrusive light is caused by luminaires directing light into areas beyond the boundary of the area on which the source is intended to light. The adverse impacts of poor night-time lighting include:

- i) the brightening of skies over many of our towns and cities (sky glow), destroying our view of the stars;
- ii) the impaired ability to see detail, sometimes resulting in visual discomfort (glare);
- iii) the spilling of light beyond the boundary intended to light
- iv) wasted energy

It is widely recognised that truly dark skies are not a practical proposition for inner city and urban areas. However, consideration to the following points should be given:

- The selection of luminaires according to the appropriate user task, applicable 'G class' or Threshold Increment as applicable for the road or area under consideration;
- Limiting the amount of light distributed in an upward direction.

The use of full cut-off luminaires may be appropriate in areas of architectural importance where specific attention is required for lighting buildings. It should be noted that such restrictions are not really suitable within the council environment. Controlling the level of light spill from the highway can create a better contrast with adjacent floodlit buildings and enhance the aesthetic and architectural environment.

Standard' luminaires, as defined within the Westminster Way and Street furniture guide, should be used in residential areas, with subtle amounts of light being spilled onto adjacent gardens and properties. Subtle amounts of light spill in these areas can assist in aiding community safety and help create a better perception of the neighbourhood. Where required, to prevent light intrusion approved shields shall be fitted within the luminaires.

Light should be restricted towards residential windows and where it is considered that a concern may arise from a resident the designer shall incorporate appropriate manufacturers designed shields within the luminaire.

### 5.2 Requirements

Westminster City Council being mindful of their environmental responsibilities with regard to the provision and impact of artificial lighting within the city have looked to the development of a process which can be applied to all external lighting schemes be they directly through Westminster or undertaken by third parties to ensure that the appropriate application of lighting is achieved and considers.

- Carbon and energy use, from the point of view of a whole life review process including manufacture, operational and disposal aspects
- Light pollution / sky glow
- Obtrusive light
- Potential of any effect on wildlife, more applicable near parks, gardens and waterways



It should be noted that public realm / street lighting is not defined as being on a premise and as such does not come under obtrusive light impact with regard to nuisance. This is not to say that public realm / street lighting should not be designed to meet best practicable means to limit its environmental and obtrusive lighting impacts. Public lighting is included within the review when considering energy, carbon use and light control.

Key reference documents include:

- ILP GN01/20 *Guidance Notes for the Reduction of Obtrusive Light*
- Commission Internationale De L'Eclairage (CIE - International Commission on Illumination (2003)). CIE 150:2003. *Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations*
- CIE (1997). CIE 126:1997. *Guidelines for Minimising Sky Glow*
- ILP Technical Report TR5 Brightness of illuminated advertisements
- GN09/19 Domestic security lighting, getting it right

### 5.3 Assessment of Impacts, Mitigation and Residual Effects

This lays down the performance criteria and requirements to which the exterior lighting of any proposed development should be designed and installed. This includes lighting associated with the construction of the project as well as the completed installation.

All lighting should be designed under the principal of Ultra Efficient Lighting (UEL) which is defined as providing the right light will be provided at the right time in the right place controlled by the right system.

Due consideration should also be given to the requirements of Green Public Procurement for all lighting installations as published through DEFRA. The guiding principal being a whole life costing approach taking due consideration of construction, operational, maintenance and dismantling costs over the life of the installation and should be undertaken by competent lighting design professionals.

When required on a particular scheme the consideration will be given to possible curfew requirements for the external lighting associated with any proposed development (not public lighting), and post curfew may require lighting levels to be reduced after a certain time or the lighting switched off.

### 5.4 Construction

#### 5.4.1 Effect of External Lighting during Construction

During the construction phase of a project there will be the need to provide temporary lighting for the construction works and security.

Lighting used during the construction works should comprise of standard light fixings. The construction working areas would generally be surrounded by hoarding on which will be provided minimal directional lighting, as required for security purposes and for activities during hours of working during the winter months. Cranes will be lit as required for safety purposes and to allow their safe operation. Safety lighting will be provided within buildings during internal fit out activities.

Construction works will be limited to agreed working hours, therefore some construction work may be undertaken during the hours of darkness over the winter months. Any temporary / construction lighting needs to be suitably designed and installed to meet the requirements of lighting performance within the assigned environmental zone. This should be checked at the temporary lighting design and commissioning stages by a competent lighting professional (defined as a Member of the ILP).



Provided the above is followed then the temporary / construction lighting such as that installed under Westminster's Scaffolding and hoarding guidance document should not be considered as a nuisance and will be suitable for purpose.

### 5.4.2 Mitigation

It is assumed that industry standard lighting required for the construction phase will be implemented, as such the following mitigation measures will be followed as a minimum.

Any lighting that will need to be installed for the construction phase will need to provide the correct lighting levels for the safety of both the construction workers and general users of the Site.

Lighting installed for the construction site will need to be designed such that where possible all luminaires are mounted within the site hoarding and are directed into the working area and should only be operational during construction works. A level of lighting may be needed for security purposes.

Any temporary lighting for the users of the Site should be provided at a level not lower than is required under CIBSE guidance documents to provide a safe working environment. Where temporary luminaires are required these should be carefully selected for the task required and a photometric design undertaken to ensure it complies with the relevant sections of this chapter, such as the ILP Guidance Notes for the Reduction of Obtrusive Light (ILP, 2020).

Good practice guidance documents prepared by the Construction Industry Research and Information Association (CIRIA) note that lighting on construction sites is typically required as part of on-site security and health and safety requirements. However, the online CIRIA Guidance (<http://www.ciria.org/complianceplus/>) also notes that potential effects towards surrounding receptors need to be minimised through the controlled application of lighting in accordance with current best practice standards.

### 5.4.3 Operation

#### 5.4.3.1 *Effect of External Lighting during Operation*

Such lighting should be implemented with due consideration for the use of best practicable means to prevent, or to counteract the effects of the artificial light on the surrounding area, this should include effect on any sensitive receptors who have views of the site. The lighting shall be designed by competent designers and assessed against the guidance documentation mentioned within this chapter and specific documents relating to lighting for such developments and will be assessed on an area by area basis based on its proposed usage.

The standards that address the lighting performance / levels for the areas of development include but are not limited to the following documents:

- BS EN 13201; Road lighting
- BS 5489-1:2003; Road lighting
- ILP Guidance Note GN01/20
- ILP Professional Technical Report PLG05, Brightness of illuminated advertisement's;
- CIBSE (LG1) 'Lighting guide for the Industrial Environment',
- CIBSE (LG4) Lighting guide for sports lighting',
- CIBSE LG6 Lighting guide, The outdoor environment and



- CIE 129, Guide for lighting exterior work areas.

Through careful consideration of the lighting equipment chosen for each area and photometric calculations the lighting designers can take due regard to mitigating potential obtrusive light and nuisance impacts. The designs shall include an obtrusive light study to demonstrate that based on the proposed lighting design that the sensitive receptors will not receive excessive amounts of light as a result of the Proposed Development.

The choice of luminaire, location, mounting height, lamp wattage and control is generally the mitigation for the lighting scheme and is in effect in-built into the scheme (i.e. the choice of lighting is part of the design of the scheme and is in accordance with best practice). The design shall be checked against all identified receptors to ensure that it is within the limits required for the environmental zone applied to the Development.

#### 5.4.4 Illuminated advertising signage

All illuminated advertising signage should meet the requirements of the ILPs Professional Lighting Guide PLG05, Brightness of illuminated advertisement's which defines the limits of performance and brightness based upon the environmental area and the background against which it is viewed.

#### 5.4.5 Monitoring and follow up

The design aspect is not sufficient alone and many good lighting designs fail when they are not installed correctly, it is therefore important that the lighting is installed to the design requirements and checked / signed off on site by the designer. All fittings will need to be carefully installed and the views of the lighting from the point of view of all receptors visually checked and any required adjustments made at the time of commissioning.

Illumination within the buildings should also be carefully considered as although light emitted from within buildings tends to fall outside the requirements of lighting nuisance / pollution it can have an impact. The consideration of these aspects must carefully control the internal lighting such that it 'remains within the building' and what light is emitted out is controlled in a suitable manner.

### 5.5 Special considerations

#### 5.5.1 Architectural lighting

A key aspect of any architectural be it a façade, public area feature, monument and the like is that it is balanced within the street scape, the lighting levels used, light source and colour temperatures should be such that the finished lighting installation fits within the context of the street / public realm from the view point of the observers without the building / feature standing out or becoming a beacon.

Such lighting should also be designed such that it does not become a nuisance nor contribute to the highway lighting.

#### 5.5.2 Fauna and flora

Westminster includes a diverse range of fauna and flora including bats and any lighting with areas where bats or other protected species may exist shall be carefully considered and applicable national guidance followed such as the Institution of Lighting Professionals / Bat Conservation Trusts Guidance Note GN08/18 Bats and artificial lighting in the UK.

#### 5.5.3 Display and media screens

These are covered by the ILP in their Professional Technical Report PLG05. The requirements of these screens to be acceptable will include aspects such as:



- Limiting night luminance based against the background the sign is viewed against, these are being finalised at this time and will be in the order of 3,000 to 10,000 cd/m<sup>2</sup>;
- Limiting daytime luminance values;
- Where there is moving traffic with sight of the screen the use of moving images would not be permitted;
- A maximum change / rate colour time for the displays;
- Consideration would also need to be given to highway safety with respect to any traffic signal installations. Where the motorist has a view of the traffic signal aspect with the display screen or shroud behind it then the use of red, amber or green would not be permitted;
- Such signage / media screens shall be designed that the display is design through suitable optics / louvers that only the intended audience can view the screens; and
- The display not to become a source of illumination to the surrounding area as is the case with many such installations, especially when they have a white content within the image. Required to provide horizontal illuminance calculations for the area immediately in front of the proposed screen and the adjacent roadways.

### 5.6 Traffic safety

When building facades are illuminated the due consideration needs to be given to highway safety from the viewpoint of users of adjacent traffic signal installations. Where the motorist or pedestrian has a view of the traffic signal aspect with the display screen or lit facade behind it then the use of red, amber or green will not be permitted as potential exists to 'lose' the signal aspect in the lit facade.



*Images of traffic signal aspects confused in background effect lighting*

### 5.7 Post installation assessments

Most complaints arise not from the fact that lighting has been provided but due to it being incorrectly installed. Therefore, it is important that all lighting installations are checked against the original specification and, where required, photometric measurements are taken to ensure that the required lighting levels, be they for the area being lit or limitations placed on the surrounding area, are achieved.



It is expected that the designer of any lit installation will review the installed lighting scheme, confirm that the products specified have been used, that they have been installed and set up / aimed as per the design and that all control systems are working and that the end user / client understands how to use them.



*Poor lighting design with excessive spill light*



## 6 Diversity / Inclusion / Equality

Due consideration shall be given within the design to enable all persons of all abilities to be able to safely navigate the street, this will include for wheelchair access clearances along footpaths and may therefore require due consideration for wall mounted luminaires through the Westminster Wayleave Process.

This requirement shall also apply during the construction phase with regard to the closure of footpaths and identifying safe ways through the construction works for wheelchairs, buggies and such like.

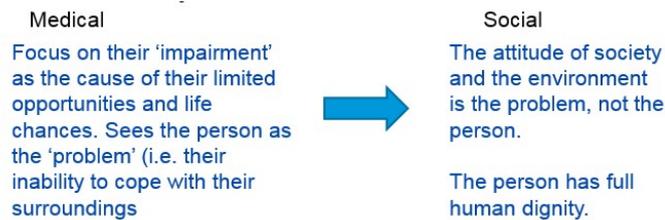
### 6.1 Equality Act 2010

The Equality Act 2010 requires a duty of care to accommodate everyone’s needs in all schemes and developments (subject to reasonableness).

The main groups that we typically need to consider most often in terms of transport are:

- Disability;
- Age; and
- Language

All groups would feature in terms of safety such as the installation of CCTV, ensuring all users can use the footway without having to cross the road / enter the carriageway to get around objects such as columns.



Some considerations:

- Only 5% of disabled people use a wheelchair (and half of these can travel short distances out of their wheelchair);
- 1 in 8 people are employed at night (which is also disproportionately female);
- Can’t design just for day (in winter it is dark by 4pm);
- Lighting can be controlled to encourage activities and enable infrastructure at night (i.e. maximise the opportunity for night-time activities);
- Darkness precludes usage, especially if in sharp contrast with surrounding environment (e.g. Leicester Square Gardens); and
- Light is fundamental to the infrastructure for urban inclusivity.



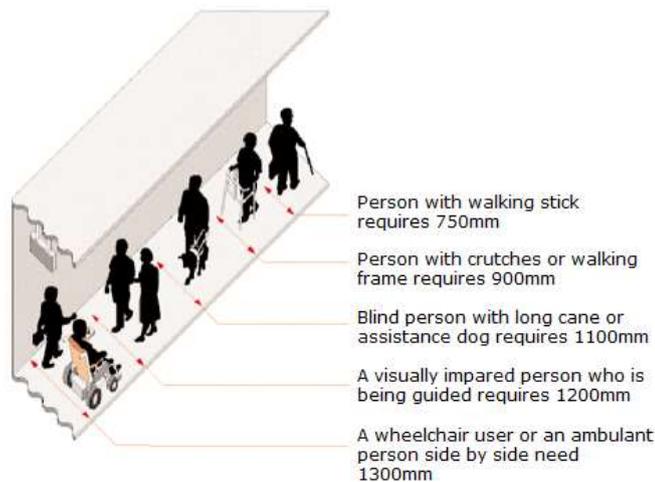
The lighting design needs to take into account potential users' physical difficulties, gender and sensory impairment requirements. Visually impaired people need a good level of lighting in and around transport points and, if information such as a bus timetable is displayed, be in a print size that they can read easily under artificial lighting. But almost everyone else benefits from good lighting, not least because it gives a greater sense of security, and practically everyone finds reading timetables easier if the print is clear and large.

Users should expect, as with bus shelters and bus stops that they should be well lit with enough illumination to enable reading as well as a good level of lighting will also improve personal security.

The lighting levels and equipment proposed should align to the Westminster lighting standard and diversity / inclusion access requirements.

The above addresses the diverse range of user concerns over:

- Crime and anti-social behaviour when going out at night;
- Night-time traffic accidents; and
- Trip, slips and falls accidents.





Users should be considered by mode of transport (motorist, passenger, cyclists, walker etc), age, mobility, disability, race, religion / belief, sex, sexual orientation, pregnancy & maternity and relationship. Although it is debatable as to how lighting could / could not affect some of these groups.

Due consideration shall be given within the design to enable all persons of all abilities to be able to safely navigate the street; this will include wheelchair access clearances along footpaths and may therefore require due consideration for wall mounted luminaires. The guidelines within the London Local Authority and Transport for London Act 2013 – Part 2 Section 4 ‘Lighting Attachments and Street Signs’<sup>1</sup> empowers the City of Westminster to install lights and signs on buildings to reducing the need to erect columns on the pavement, which means walkways will be safer for people with impaired vision or mobility by reducing the number of obstacles they encounter, hence improving pedestrian comfort and equality of access.

### 6.2 Crime & Disorder Act

Section 17 of the Crime and Disorder Act 1998 creates a general duty upon each local authority to take account of community safety in all areas of its work. *‘Without prejudice to any other obligation imposed on it, it shall be the duty of each authority to which this section applies to exercise its various functions with due regard to the likely effect of the exercise of those functions on, and the need to do all that it reasonably can to prevent, crime and disorder in its area.’*

Metropolitan Police website gives access to crime statistics for the city.

<https://www.police.uk/metropolitan/>

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<sup>1</sup> [http://www.legislation.gov.uk/ukla/2013/5/pdfs/ukla\\_20130005\\_en.pdf](http://www.legislation.gov.uk/ukla/2013/5/pdfs/ukla_20130005_en.pdf)



## 7 Trees and vegetation

The street lighting layouts proposed must appraise all obstacles in the footway, in particular trees. Every consideration must be given to ensure that the most practical solution to the problem of shadow and obstruction of light from trees. The designer may have to alter the design criteria to ensure the most effective scheme is proposed and installed. For example, the use of shorter columns or spacing in line with the original column locations. Archive information should be used where available to check the proposed lighting design against historical references.

### 7.1 Considerations to be made

Trees form an important and integral component of the Westminster public realm and street scene. When planning the installation of any item within the public realm due consultation and consideration of the other features must be made, perhaps more so for trees when considering the longer term and how they may grow. The effect of the trees during the various yearly seasons must also be considered, periods of when they are in leaf being of specific concern to the provision of lighting and the operation of the lighting control system. It should also be noted that lighting is considered to adversely affect some tree types in that the trees may not shed their leaves where the light falls upon them. Likewise, trees should be located and maintained to ensure that they avoid causing adverse effects to other services.

Westminster City Council has a prescribed list of trees that may be used within the public realm and these are detailed in the document *Trees and the Public Realm, a tree strategy for Westminster*.

When considering trees and public lighting, careful choice of tree type and location should be made with respect to the way the street or area is lit or is to be lit. The best approach is to have trees located on one side of a street and the lighting on the other, however canopies still need to be maintained as they extend across the road and site conditions may not make this option feasible.



*Matthew Parker Street showing trees on one side and lighting on the other.*

Where substantial mature trees exist, the canopy heights can be maintained and the lighting designed such that the luminaires are located under canopy height as can be seen below.



*Adjacent to Christ Church Gardens, luminaires below canopy height*

Where it is not considered possible for the trees and lighting to be segregated to different sides of the road then it is essential that the lighting which provides a safety and security function is fully considered with regard to tree type and location, especially as the trees mature.

Trees should therefore be situated using mid column spacing and preferably on a setback behind the columns, especially where the columns are fitted with post top luminaires rather than luminaires on brackets. Future and existing tree canopies should be considered from the aspect of luminaire distribution to enable the street / area to be lit. There will perhaps be a level of compromise required through discussion and at times due consideration may be given to changes to the existing lighting installation.

Those considering new lighting installations must also consider existing trees and to preferably locate columns away from trees (i.e. on the opposite side of the road) or design the lighting such that the trees and their canopies do not adversely affect the lighting performance. This may require discussion with the Westminster Arboricultural officers and subsequent pruning / pollarding recommended.

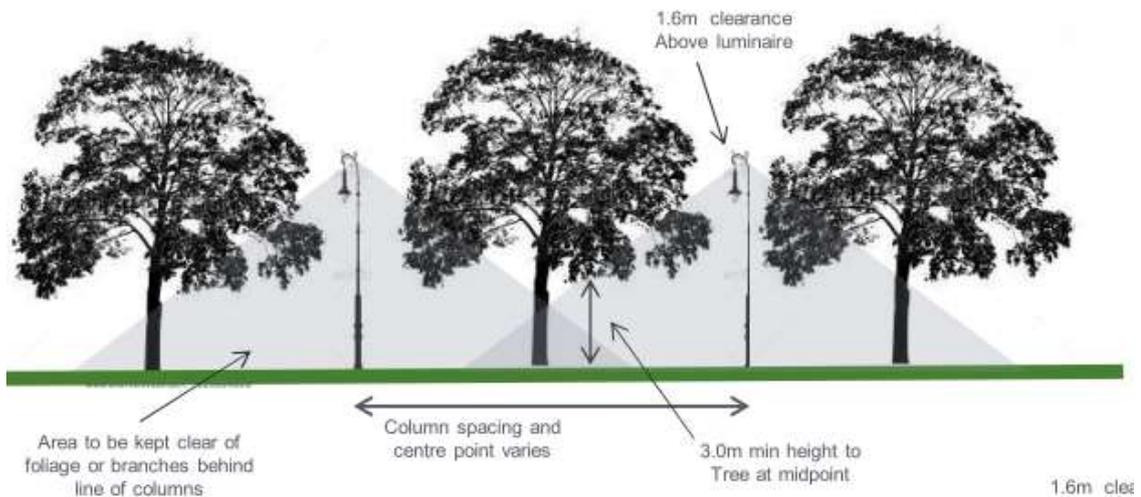


*Columns spaced midway between trees, Parliament Square & Victoria Street*

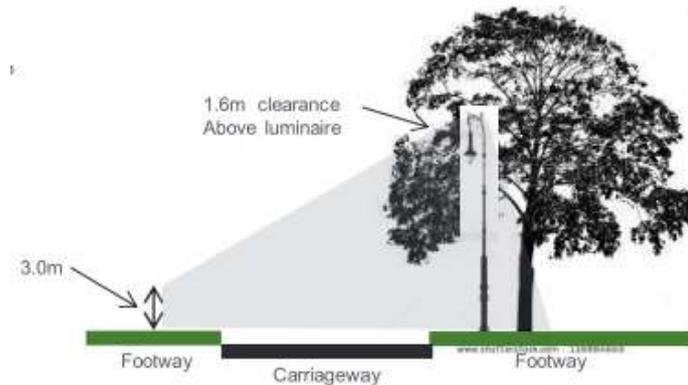


In all cases early consultation between the Westminster Public Lighting and Arboriculture officers / teams must be undertaken when either party is considering an installation so that the requirements of both parties can be considered, and a working solution obtained.

Trees must be considered and maintained through careful choice of variety, location and maintenance. The following diagrams demonstrate areas to be kept free of foliage and branches in order to avoid interference with the street lighting performance and permit un-obstructed illumination of the carriageway and footway. As a rule of thumb, the luminaire should be visible from the centre point between columns and this requirement should exist for at least the period between routine tree inspections and maintenance operations.



*Areas to be maintained free of foliage and branches*



*Areas to be maintained free of foliage and branches*

### 7.2 Typical concerns

The following images are provided essentially to illustrate typical concerns and problems that arise with respect to public lighting and trees, assisting designers to consider how - through careful design, planning and maintenance - such issues may be prevented in the future.



*Birdcage Walk, the lighting on the right hand side (path lighting) is of a height where it sits below the tree canopies, however the lighting on the left (road lighting) being higher is now within the tree canopies, affecting the performance of the installation and communication of the control system.*



*Lighting column with bracket adjacent to tree, the canopy having grown out across the street thus blocking off light to the footway and road past the tree.*



*Trees planted 'in front' of line of columns which as they mature will block the performance of the lighting*



## 8 Wall mounted equipment

Where wall mounted luminaires are required then their location and that of the associated electrical supply cabinet and cabling must be considered carefully to ensure that their location is not affected by the design of the façade they are too located upon, their location on the façade is suitable for mounting and their operation does not adversely affect any façade lighting that may be present.

When considering any fixing to a building, those undertaking the design and installation of such works shall refer to the Construction Fixings Association (CFA) guidance note regarding anchorage systems ([www.the-cfa.co.uk](http://www.the-cfa.co.uk)).

The suitability of the building structure to sustain the loads transferred from the proposed lighting and associate equipment must be established and recorded within the project documentation, prior to any installation work, by a competent person e.g. structural engineer. In general, concrete elements which are part of the load bearing structure will be suitable. Masonry structures may be suitable if they are load bearing and of solid, rather than cavity, construction and composed of strong masonry units with sound mortar joints.

It is important that safe fixings / anchorages for the brackets are achieved and that will require an understanding of the structure to which the brackets are to be fixed, the choice of anchorage, bracket details and what it is to support to name but three considerations. It is therefore important that the lighting designer ensure either directly or through the project manager that a structural assessment of the structure is undertaken by a structural engineer within the process who then signs off that design element.

The key responsibilities are shown below:

| Requirement                                  | Responsibility      |                 |
|--|---------------------|-----------------|
| Details of bracket and luminaire             | Lighting Designer   | Project Manager |
| Check structure for suitability for loadings | Structural Engineer |                 |
| Choice of anchorage arrangement              | Structural Engineer |                 |
| Calculate loadings                           | Structural Engineer |                 |
| Install anchor(s)                            | Structural Engineer |                 |
| Proof test anchors                           | Tester              |                 |
| Certification as required                    | Supervisor          |                 |

In order to ensure the security of the bracket and luminaire the integrity of the structure to which they are to be fixed must be understood. This will then dictate the best choice of anchor with regard to the building fabric and the loads to be attached.

The majority of buildings within Westminster are of concrete or masonry construction and therefore British Standard BS 8539:2012 Code of practice for the selection and installation of post-installed anchors in concrete and masonry will apply.

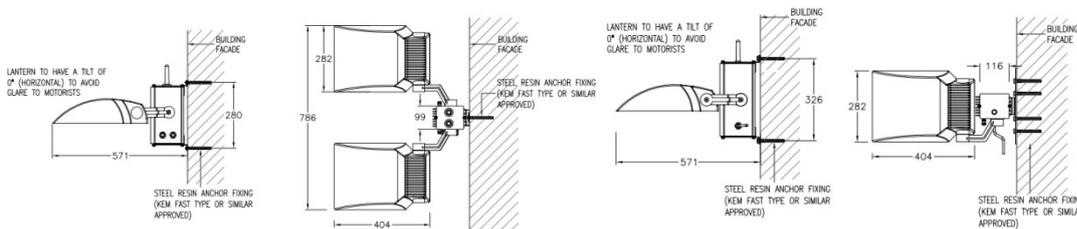
### 8.1 Suitability of the structure

The suitability of the building structure to sustain the loads transferred from the bracket must be established and recorded within the project documentation, prior to any design and installation work. This must be undertaken by a competent person e.g. structural engineer.



As a general rule, concrete elements which are part of a load bearing structure will be suitable, but care must be taken not to drill into any reinforcement elements. Masonry structures may be suitable if they are load bearing and of solid, rather than cavity, construction and composed of strong masonry units with sound mortar joints. Cavity brickwork constructions and especially cladding panels may not be capable of transferring the tensile loads involved and require careful consideration.

Brackets are normally attached to anchorages such that the load is directed into the anchorage at differing angles depending upon the anchorage location and bracket details. Where brackets have top and bottom anchorages then the lower ones will be subjected to more of a downwards force whereas the high ones will also have a slight forwards force applied. This effectively means that the correct choice of anchor and installation is critical. Brackets that just have two horizontal anchorages are subject to forces both forward and downwards.



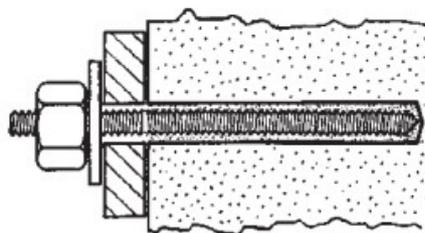
Single and double luminaire arrangement examples

### 8.2 Type of anchor

There are various forms of anchorage that the designer can consider, and these are briefly summarised as follows, the designer must look to use the right system for the structure being fixed too and the load attached.

#### 8.2.1 Resin studs

A nut and washer attached to a threaded rod set into resin which may be used in concrete or into solid brickwork in which case resin sleeves may be needed. Care must be taken to ensure adequate thread engagement is achieved within the nut and adequate stud embedment within the based material.



#### 8.2.2 Brackets

It is unlikely that a single anchor will be used for a bracket and luminaire arrangement as it will not support the loads. Brackets will come in various shapes and sizes to suit the style of equipment being used, be it heritage or modern and for these M12 resin stud anchors should be considered, the number depending upon the bracket style which in part will be dictated by the building structure and the loads being attached. When considering fixing the bracket onto masonry the dimensions of the plate should be chosen such that the spacing between anchors will match the brick course. Bracket width must be considered to allow standard test equipment to be positioned over the bracket or the anchor tested before the bracket is attached.



### 8.2.3 Resin anchors

Resin anchors are suitable for use in concrete and hard masonry including brickwork, stonework and concrete blockwork as they do not stress the base material as would be the case with expansion anchors

Resin spin-in capsules are best used for anchors to be set in concrete although when used with care injection systems may be used. The latter are ideal for use in masonry and should be considered in conjunction with a special mesh sleeve in solid brickwork to take account of the lack of resin in the joint between leaves or perforated bricks.

Curing time is a limiting factor which must be taken into account in the planning of these installations. Curing times for all resin systems are set by the manufacturer to give a strength suitable for loading and tightening but they do not imply 100% curing at the stated time. Tightening or loading before the recommended curing time has elapsed may damage the resin bond and reduce safety margins

### 8.2.4 Embedment depths

Embedment depths in concrete are straightforward and should follow the manufacturer's recommendations.

Embedment depths for anchors in solid brickwork depend upon the structure. To gain maximum strength from anchors set into 9" solid brickwork it is important to achieve optimum embedment into the rearmost leaf which then benefits from load transfer via the front leaf, see (A) below. Maximum hole depth for anchoring into the rear brick of 9" structures should be 170mm. Any deeper risks breaking the back of the brick out under the drilling action.

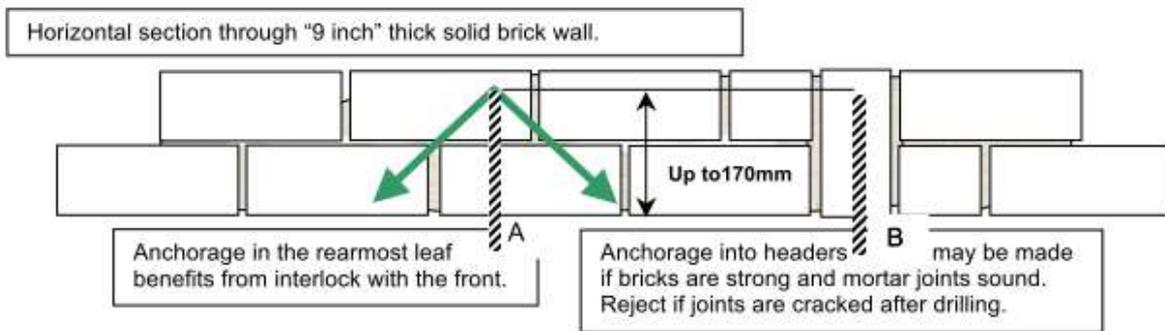


Image from the CFA

### 8.2.5 Anchor positioning

The correct location of anchors is important to ensure that the structure can support the loadings. The recommendations of the anchor manufacturer should be followed regarding close edge distances and spacings between anchors used in pairs or groups.

### 8.2.6 Anchor positioning in brickwork

Anchors which are used to fit brackets to the structure should be located at least one full masonry unit from a vertical edge, in brickwork this means at least 280mm. This distance may need to be increase substantially for lateral or shear loads the distance may depend on the magnitude of the load and condition of the masonry.

A minimum edge distance of at least 2m should be allowed from a horizontal edge in brickwork for loads in any direction.

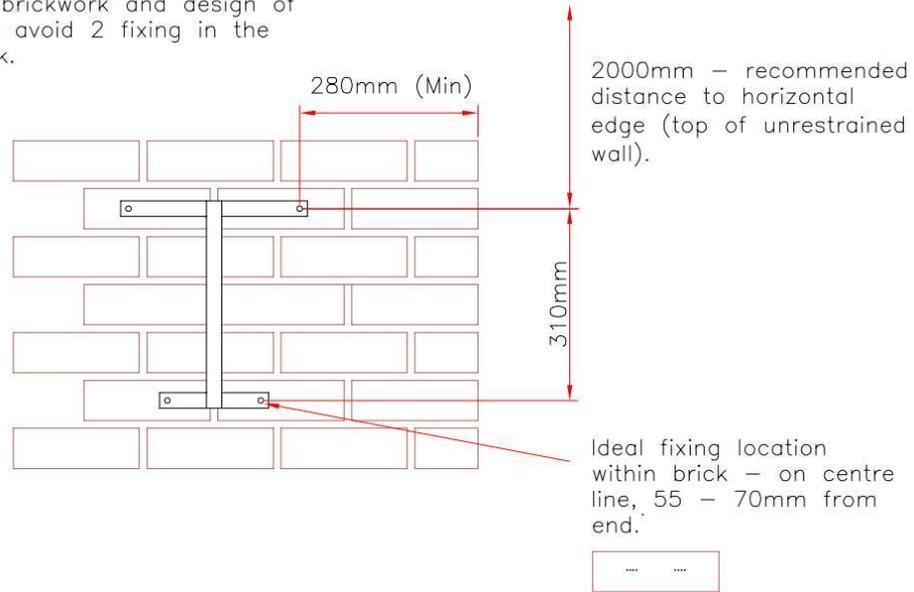


It is noted that this requirement may cause positioning difficulties on structures in order to achieve the desired lighting performance. Where these requirements cannot be met then a Structural Engineer needs to consider the design and if the recommended clearances are encroached upon the full details shall be recorded in the Technical File.

Centre spacing between anchors should be chosen to avoid setting two anchors in the same brick.

When drilling into brickwork the anchor should ideally be located in the solid portion of the brick rather than into the mortar joint. If the brickwork has been rendered the location of the centres of the courses of bricks should be identified by removing the render or by test drillings.

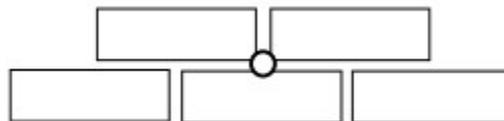
Diagram: Showing location of fixings in brickwork and design of bracket to avoid 2 fixing in the same brick.



Indicative bracket anchor fixing example

If however anchors may not be fixed into the bricks themselves, e.g. as a result of a conservation order, then the following approach may be sanctioned by the responsible engineer if approved by the manufacturer: (resin anchors may provide a good solution for fixings into joints).

- Choose an anchor with a diameter significantly larger than the width of the mortar joints, e.g. >14mm in a 10mm joint
- Fix into the base of the junction between bed and perpendicular joints
- Proof tests must be carried out, on each individual anchor



### 8.3 Proof tests

#### 8.3.1 Test Procedures

Test procedures for either Preliminary or Proof tests should be carried out in accordance with the CFA Guidance Note. Prior to carrying out any tests on anchors the tester should examine carefully the structure



surrounding the anchor position and note any conditions giving rise to concern that the anchorage may not sustain the required load.

Such conditions will include deterioration of masonry units or mortar joints and damage such as cracks across masonry units or in mortar joints. Wherever a tester is concerned that the structure may not be sufficiently strong then that concern should be reported in the test report and it made clear that any test results (even positive ones) do not imply that the structure can take the loads.

### 8.3.2 Regular inspection

The regular inspection of all brackets and their anchor points is required to ensure that the anchor points remain in serviceable condition, are capable of sustaining the required loads and have not suffered any damage or deterioration likely to affect this capability.

Brackets shall be inspected in accordance with the Institution of Lighting professionals Technical Report TR22. When the bracket is inspected the anchorage shall also be checked.

The regular inspection should be carried out to a specification determined by the original Installer and stated in the Technical File.

Regular inspection shall be carried out by competent persons and should include the following aspects;

Every visit:

- Nuts on stud anchors to be checked for nominal tightness (i.e. cannot be undone by fingers / not loose)
- Visual inspection of componentry for rust
- Visual inspection of surrounding substrate to check for damage including cracks in masonry or mortar joints.
- Every three years.
- Test loads to be applied, usually to be the same as the proof test load applied at the time of installation. If the load test equipment cannot be positioned due to bracket design then a weight test shall be applied and the bracket checked to ensure no movement of the bracket or anchorages, the load attached to the bracket end shall be between 1.25 and no more than 1.5 x the applied load.

### 8.4 Technical file

Installers of anchors for supporting brackets under CDM must pass to the client a Technical File that will enable future examiners of the anchorages to fully inspect and load test them

Details which should be covered include:

- All loading calculations and the derivation of loads applied to the fixings for each building
- Details of the anchors that have been installed (type and make), in the case of resin anchors the stud or socket diameter used, make and type of resin, hole diameter and embedment depth, installation torque applied
- The test loads applied at the time of installation
- Any restrictions regarding life expectancy
- The requirements for regular inspections



## 9 Electrical connections

Where possible Distribution Network Operator (DNO) single phase 230Volt 50Hz supplies shall be used to individual street lighting columns and traffic signs. The designer should check with the DNO, UK Power Networks (UKPN) for supply availability.

Street furniture sited on remote traffic islands or centre reservations, including illuminated bollards should be supplied by a private cabling network (3 core), connected via a suitable double pole isolator and fuse to an adjacent DNO supplied lighting column.

Wall mounted luminaires shall be supplied from discretely located mini pillars with the cabling run discretely along the building facade using suitable cable such as 3 core Hi-Tuff or similar. The cable shall be run in galvanised conduit for additional protection for the first 2.5 metres above ground level.

Typical supply cable termination arrangements are detailed in the standard drawings for Street Lighting Installations.

Where cabling may be visible then due consideration should be given to the colour of the cables outer sheath such that blends into the façade upon which it is run.

Existing columns without doors shall where possible be supplied from adjacent equipment such as signs or columns with doors to enable electrical isolation the option of supply pillars is considered and these shall only be used in discrete locations.

It should be noted that certain electrical equipment within the highway may require a TT supply which will include for localised earthing arrangements. The requirements for such supplies are detailed within the IET's Highway electrical street furniture guide and these requirements shall be followed.



## 10 Maintenance requirements

The designer shall give due consideration for future maintenance of the lighting installation ensuring that all equipment can be safely accessed using standard public light maintenance equipment and plant wherever possible. This shall include due consideration for where plant can be safely located to access the equipment.



*Public lighting maintenance operations*



## 11 Whole life costing

When a new or replacement lighting scheme is to be provided, then that scheme shall be the most cost effective in terms of whole life costing, energy and carbon usage.

Whole life costing includes the initial capital (installation) and running (maintenance and energy) costs and carbon emissions over a 50 year period, Westminster's whole life public lighting costing model shall be used for all designs and can be obtained from Westminster's Lighting Manager.

The designer shall provide energy and carbon calculations for the existing and proposed lighting installation. These calculations shall use the industry Elexon / UMSUG electrical load data (circuit watts) for the light source being used and the switching / burning hours shall be taken from the UMSUG 'operational information switch regime spread sheet for the operational profiles being applied to the installation. This information can be obtained from

<http://www.elexon.co.uk/pages/chargecodesandswitchregimes.aspx>

All inputs and calculations shall be clearly identified.

The exceptions to this are when other objectives are of greater importance i.e.

- (i) Aesthetics - special equipment and requirements
- (ii) Environmental Issues

Even with the above limitations there may be more than one design solution



## 12 Buildability

The designer shall ensure buildability of their proposals by carrying out a detailed pre-design site survey taking due account of:

- Property boundary lines
- Potential light intrusion issues
- NRSWA investigations regarding existing utility services
- Adjacent lighting installations
- Existing lighting installation
- Existing signage
- Existing equipment electrical connections and cable routes, where applicable
- DDA compliance concerns
- Construction hazards such as adjacent waterways
- Security features and areas
- Wi-Fi / telecom network equipment (this carries a high cost for repositioning which will be project charged)
- CCTV requirements and sight lines
- Decluttering opportunities
- Where equipment may be located in vulnerable locations due consideration shall be given to the use of ground sockets and a ducted cable network
- Potential parking suspension requirements
- Permissible construction depth restrictions including consideration of:
  - Cellars / vaults under the footway / highway
  - Other structures, i.e. tube stations, storm drains etc
- Overhead features
  - Trees and vegetation
  - Cables
  - Bridges
- Attachments, such as festive lighting requirements, flower baskets and banners.

It should be noted that the competency requirements detailed earlier in this document apply for those undertaking the above investigations.

Where required the designer shall arrange for trial holes or ground radar surveys to be carried out to confirm buildability.



## 13 Departure from Standards

### 13.1 Introduction

European and British Standards and Westminster City Council's own lighting guidance documents and specifications have been drawn up following extensive research, trials and experience to ensure a consistent, safe and acceptable level of performance for the various aspects to which they relate. The Standards, guidance documents and specifications have been written to cover a wide range of design situations and this flexibility should be exploited to arrive at optimal solutions to design problems and resolution of shortfalls identified by assessments. All Westminster City Council lighting schemes shall be designed strictly in accordance with current Standards and specifications, unless a Departure from those Standards has been specifically authorised.

There will be situations where features of the site, innovation of design, construction methods, materials or developments in associated Standards might make it advantageous to depart from a Standard (Departure), or from a set of Standards. In such cases a Departure from Standard may be considered, where special circumstances demand, providing they are consistent with current legislation and with Westminster's policy. This includes ensuring safety standards, maintainability and giving value for money on a whole life cost basis.

Everyone involved in processing a Departure, at whatever stage, whether making the submission, recommending the decision or authorising it, has a duty and responsibility to apply appropriate skill and care in that task. If negligent, they and their employers may be criticised, and to some degree be liable and accountable, in the event of dispute or legal process.

It is strongly advised that as part of early project development, Departures are discussed with Westminster prior to their formal submission.

### 13.2 How to submit a Departure Application

The Proposer shall complete the Departure Submission Form, which can be found in Annex F of this document. The Proposer shall enter the relevant information under each heading on the Departure Submission Form; all headings are compulsory.

Responses to a request for Departure will be advised within four (4) weeks of request.

### 13.3 The proposer's role and responsibilities.

- To facilitate a speedy response, discuss the proposed Departure with Westminster's appointed representatives, (i.e. Contract B's Lighting Design Director or Manager) through an accepted pre-submission process. This process is needed to enable Westminster to confirm to the Proposer that the Departure request can be submitted for review.
- Is responsible for the accuracy and validity of the statements made within their proposals. The Proposer should ensure that the highest degree of professional skill and care has been used in its preparation.
- Reviews and analyses the full extent of his proposal and its validity before a submission is made. This review must take account of all the design principles and requirements stipulated under the main contract and must not contravene the relevant national and European laws and legislations.
- Ensures that the information provided in the submission complies with the requirements set out in the relevant procedures/guidelines and that all the sections of the "Submission Form" are correctly filled out and completed.



## City of Westminster

- Must demonstrate clearly that the proposal is justified and beneficial for all Stakeholders in respect of Safety, Environment, Durability, Economy and the Network Availability.
- Evaluates every proposal in terms of short and long term risks and hazards prior to submission. A statement demonstrating that an assessment has been carried out, and identifying if there are any potential risks, must accompany every proposal.
- Complies with the Authorising Officer decision and any conditions in the submission or added by assessors or the Authorising Officer.



*Edbrooke Road*



## 14 Design submission requirements for review / approval

The following documentation shall be provided for all design submissions.

- Evidence of designer competency;
- The designer shall complete and submit Westminster City Council's Skill and Care Certificate (refer to Annex A) with all public lighting designs;
- Detailed scheme plans of a suitable scale, i.e. 1:500 detailing but not limited to, column locations, luminaire details including optic settings, termination details, cable roots with off-sets, sign locations, Central Management System details, schematic diagrams where required and the like;
- Lighting design calculations using street lighting design software such as Lighting Reality, Calculux, DialLux and the design calculations shall show all inputs, installation parameters and required performance outputs;
- Energy consumption of existing installation, where applicable, and proposed installation, this shall be produced based upon published Elexon charging code structure for un-metered supplies and the Unmetered Supplies operational charge code data;
- Energy performance calculations in accordance with BS EN 13201-5 Performance indications;
- Cable calculations;
- Works specification;
- Whole life costing summary;
- Summary of equipment proposed;
- Designer and construction risk assessments;
- Specification for the equipment and works to be undertaken;
- Where a contractor is proposed details of their registration to NHSS8;
- Evidence of buildability checks being carried out; and
- Wayleaves and listed building consent where required.

Note:

Those undertaking such design work shall, at the outset arrange to meet with Westminster's lighting representatives to discuss and agree the requirements of the project. This will include but not be limited to the awareness of the applicable City of Westminster lighting guidance documentation, lighting performance requirements, equipment to be use, the application process etc.



## 15 Provision of 'as installed information'

Within three (3) weeks of the completion of the project, adoption inspection sign off the designer / contractor shall provide the following information:

- Maintenance manual
- As installed drawings (CAD) 1:500 scale detailing the location of all equipment, termination and routes of cables and the like.
- All appropriate test certificates
- Completed inventory update application, see City of Westminster Document Annex D



# Annex A

## Westminster Skill & Car Certificate

### Lighting Design

We certify that reasonable professional skill and care have been used in the preparation of the public lighting and electrical design of the scheme noted below;

Scheme title: .....

Location: .....

With a view to:

- I. The design has been undertaken by competent designers as defined under the ILP Designer Competency requirements, evidence of road lighting design competency (training & experience);
- II. That reasonable professional skill and care were used to ensure that the street lighting design has been carried out in accordance with the Westminster City Council's requirements as detailed within:
  - Westminster City Council's Public Lighting Design Guide;
  - Westminster Way, Public Realm Guide; and
  - BS EN 13201:2003, BS 5489-1: 2013 and appropriate Institution of Lighting Professionals guidance.
- iii It has been accurately translated into Contract Drawings, which have also been checked. The unique numbers of these drawings are

.....  
.....

Name of Consultant <sup>1</sup> / Contractor<sup>1</sup> .....

Name: ..... Signed :.....  
(Design Team Leader<sup>2</sup>, Partner<sup>2</sup> / Associates<sup>2</sup> / Director<sup>2</sup>)

Engineering Qualification<sup>2</sup> .....  
(Design Team Leader)

Date: .....

2. The certificate is approved by FM Conway / WSP as agents for WESTMINSTER CITY COUNCIL<sup>3</sup>

Signed: ..... Name: .....

Position <sup>2</sup>: ..... Date: .....

3. The above is accepted on behalf of the TECHNICAL APPROVING AUTHORITY WESTMINSTER CITY COUNCIL.

Signed: ..... Date: .....

Name: Service Development Manager (Public Lighting) Westminster City Council.

- Notes
- 1 Delete as appropriate
  - 2 IEng MILP or equivalent – evidence of road lighting design competency (training & experience)
  - 3 Only applicable where the design has been carried out by a non-Westminster service provider



# Annex B

## List of Standards/Publications

Some of the existing standards relevant to the design of road lighting and subways are listed below. The list is not exhaustive and additional publications may be relevant, please also refer to the lighting / electrical standards interaction map in section 2.29.

### British Standards Institution Publications

- BS 5489-1:2020: Road Lighting
- BS 5489-2:2016
- BS EN 13201- parts 2 to 5 Road Lighting
- BS 7671 Wiring Regulations
- PD6547 Guidance on the use of BS EN 40-3-1 and BS EN 40-3-3

### ILP Technical Reports, for example

- PLG02 The application of conflict areas on the highway
- PLG03 Lighting for subsidiary roads; using white light
- PLG05 Brightness of illuminated advertisement screens
- PLG08 Guidance on the application of adaptive lighting within the Public Realm
- TR12 Lighting of pedestrian crossings
- TR13 Lighting of subways
- TR25 Lighting of traffic calming features
- TR27 Code of practice for variable lighting levels for highway
- GP03 Code of practice for electrical safety in highway electrical operations
- GN01/20 Guidance notes for the reduction of obtrusive light
- GN11/20 Maintenance factor determination and its impacts on the performance and overall efficiency of LED luminaires
- GN22/19 Asset management toolkit, Minot structures

### Westminster City Council Publications

- Westminster Way, Urban Realm Guide
- ANNEX 02 Highways Infrastructure Maintenance Management Plans
- ANNEX 03 Withdrawn
- ANNEX 04 Cherished Lighting Strategy (Combined)
- ANNEX 05 Westminster artificial lighting environmental impact strategy
- ANNEX 06 Westminster column protective coating strategy



## City of Westminster

ANNEX 07 Westminster CCTV strategy (Draft)

ANNEX 09 Light Against Crime Methodology

ANNEX 10 Illuminated Guide Post (IPG) Strategy

ANNEX 11 Westminster Gas Lighting Review

ANNEX 16 Westminster Festive Lighting Guide

ANNEX 17 Westminster Wayleave Process

ANNEX 18 Westminster Warranty Guide

ANNEX 19 Westminster Zebra Crossing Review

ANNEX 21 Westminster Suite of Lighting Column Foundations Report

### Other Publications

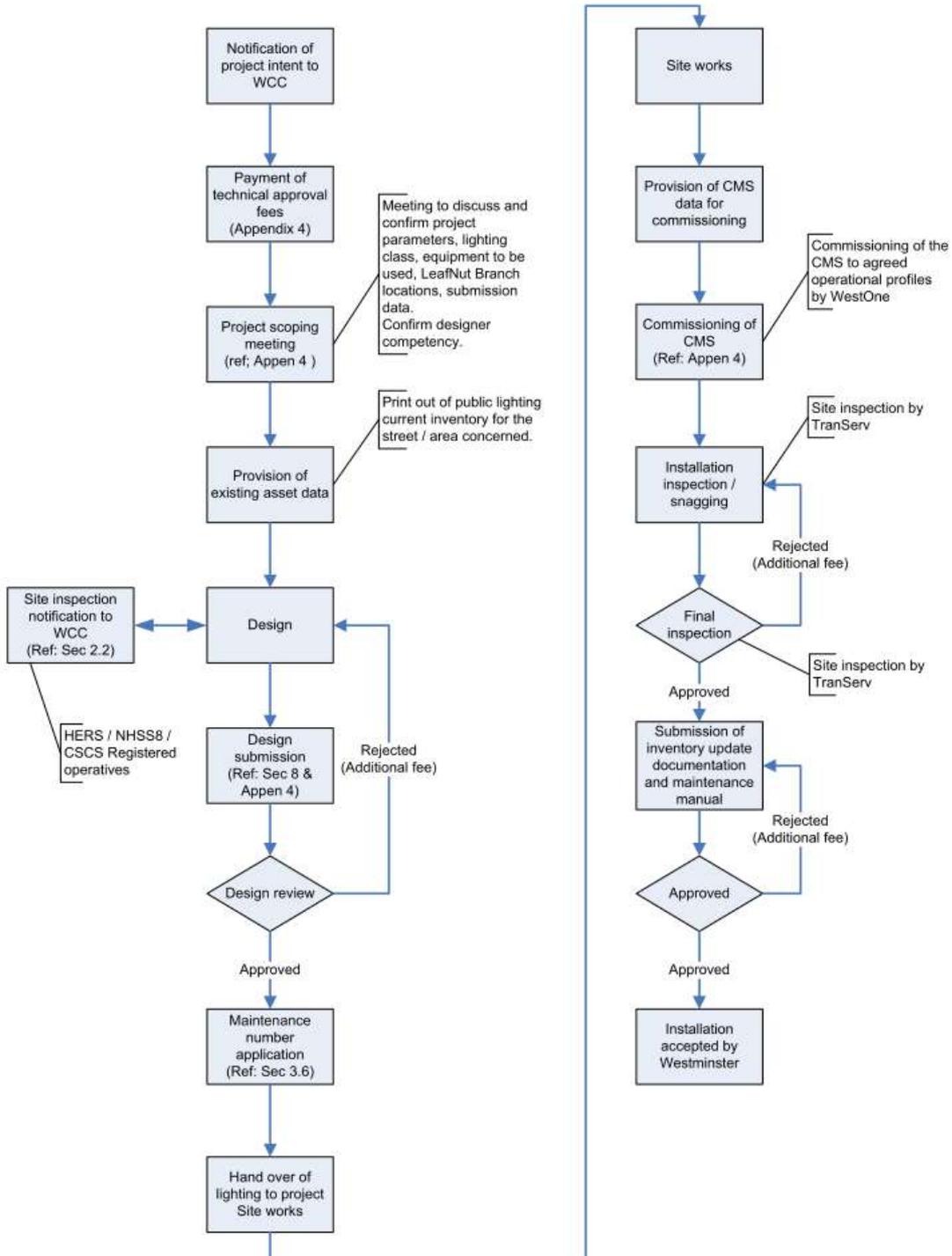
IET Guide to highway electrical furniture



# Annex C

## Flow chart for 3<sup>rd</sup> party designs

The following flow chart highlights key points within any public realm lighting project where the client / designer shall liaise with representatives of Westminster City Council’s public lighting team.





## Annex D

### Asset data to be provided to enable the updating of the Westminster public lighting inventory

#### Details required to in order to update the public lighting data base

Following the final inspection of the installation and prior to final scheme approval / sign off the developer shall complete the Westminster City Council inventory updating schedule, City of Westminster Contract Annex 27 data. This is available electronically and contains some 78 separate fields per item of apparatus including but not limited to:

- Road name
- Unit / feature type
- Unit number
- Central asset ID
- Ward
- Eastings
- Northings
- Location
- Lamp type
- Lamp wattage / lumen output
- Control type
- Gear type
- CMS supplier
- CMS leaf / node reference / ID
- CMS Branch / node ID
- Column type
- Column material
- Column manufacturer
- Mounting height
- Column fixing
- Number of lamps
- Number of luminaires
- Luminaire manufacturer
- Luminaire type / model
- Luminaire distribution
- Luminaire setting
- Luminaire IP rating
- Bracket type
- Bracket projection
- Position
- Protective decide type
- Protective devise rating
- DNO fuse rating
- Access requirements
- Bracket type
- Bracket fixing
- Designed lighting class
- Achieved lighting class
- Cable type
- Cable length
- Column cross section
- Column root protection
- Column root type
- Door access
- Column embellishments
- External protective coating
- Finish type
- Finish colour
- Gear location
- On a bridge
- Ground conditions
- Isolation type
- Isolation location
- Lamp colour temperature
- Lamp colour rendering
- Listed structure
- Loading for hanging baskets
- Loading for festive decorations
- No of approved attachments
- Metered / unmetered supply
- Outgoing circuits
- Overhead lines
- Pedestrian density
- Recyclability
- Service owner
- Spill light protection
- Earth loop impedance
- Access time restrictions



## City of Westminster

Details of all existing equipment that has been removed shall also be supplied and will relate to:

- Road
- Unit type
- Unit reference number
- Location



# Annex E

## Design application / submission check list

### Design submission check list

The following is provided as a check list for all submission as detailed within section 9 of this document.

| Item  | Included |
|---|----------|
| Design review application and fee                                 |          |
| Evidence of designer competency                                   |          |
| Westminster skill & care certificate                              |          |
| Scheme plans  |          |
| Lighting design calculations                                      |          |
| Energy and carbon calculations                                    |          |
| Cable calculations  |          |
| Foundation details  |          |
| Whole life costing calculations                                   |          |
| Summary of equipment proposed                                     |          |
| Designer and construction risk assessments                        |          |
| Project specification for works and standard details              |          |
| Contractor HERS registration details                              |          |
| Evidence of buildability checks                                   |          |
| Wayleave / listed building consents / applications where required |          |



# Annex F

## Departure from standards application and guidance

### Departure submission form

#### Departure type

*Please select from Standards, Design Guide, Westminster Way.....*

Proposer;

Proposer's Reference:

Scheme name and location:

Innovation      yes / no

*Proposers are encouraged to submit proposals based on innovative ideas. If the Departure is considered innovative, the Proposer should identify how it is to be considered as such under benefits, impacts and risks*

#### Added value

*Added Value is the net value of the Benefits less the Impacts to Westminster City Council, its road users and the wider community when comparing a design incorporating the proposed Departure with a design fully in accordance with Standards.*

#### Departure summary

*Clear and concise description of what the Departure is.*

#### Submission details

1. Submission

*Details of the proposed Departure and other relevant information*

2. Technical information / justification

a. Supporting documentation

*Proposer to provide comprehensive technical and back up information to aid the assessment of the proposal including drawings, plans etc.*

b. Specialist information

*Where proprietary systems are proposed, the Departure submission must include an appropriate level of documentation and certification to substantiate and validate the proposed system*

3. Benefits

a. Safety

*consider all motorised and non-motorised users & CDM requirements*

b. Technical

*consider all relevant technical issues*

c. Programme

*consider any effects on the project's critical path*

d. Budget

*effects on the project's budget*

e. Environmental

*consider all relevant environmental issues*



- f. Innovation *only applicable to Risks*
- g. Maintenance *consider implications for future maintenance*
- h. Network availability *during construction, maintenance and normal use*
- 4. Impacts
  - a. Safety *consider all motorised and non-motorised users & CDM requirements*
  - b. Technical *consider all relevant technical issues*
  - c. Programme *consider any effects on the project's critical path*
  - d. Budget *effects on the project's budget*
  - e. Environmental *consider all relevant environmental issues*
  - f. Innovation *only applicable to Risks*
  - g. Maintenance *consider implications for future maintenance*
  - h. Network availability *during construction, maintenance and normal use*
- 5. Risks
  - a. Safety *consider all motorised and non-motorised users & CDM requirements*
  - b. Technical *consider all relevant technical issues*
  - c. Programme *consider any effects on the project's critical path*
  - d. Budget *effects on the project's budget*
  - e. Environmental *consider all relevant environmental issues*
  - f. Innovation *only applicable to Risks*
  - g. Maintenance *consider implications for future maintenance*
  - h. Network availability *during construction, maintenance and normal use*
  - i. Mitigation
- 6. Overall justification
 

*To support the Added Value selected the Proposer must demonstrate that the outweigh the Impacts.*
- 7. General comments
 

*For any comments or additional information.*

Design organisations declaration

- (i) We confirm on behalf of ..... [Design Organisation] that this application for a Departure from Standards has been assessed in accordance with Westminster City Council's design requirements, and that:
  - in our professional view the proposed Departure from Standard is fully justified in terms of the above-mentioned assessment
  - the residual risks are as low as reasonably practicable and the design with the departure has a net benefit when compared to a fully compliant design.
- (ii) On the basis of the above, we recommend approval of the attached application for a Departure from Standard.
- (iii) We confirm that we have used reasonable professional skill and care in the preparation of the design (encompassing the Departure from Standard).



- (iv) We confirm our understanding that approval of this application, if granted, is on the basis that the mitigation measures listed in the application are to be incorporated into the design.

Designer's Name: .....  
 (Designer/Design Team Leader)

Job Title: .....

Date: .....

Proposer's Name: .....  
 (Design Manager/Design Director)

Job Title: .....

Date: .....

### Quick checklist for design manager / design director

Before you sign this off, has the designer:

- Explained what departure is actually being proposed?
- Why it is being proposed?
- Set out the costs and other disbenefits of complying with standards?

You are responsible for ensuring that this departure application is in accordance with the Guidelines