Energy Solutions Limited
Highway Lighting

acting for

Lighting for Staffordshire Limited

and

Specification for Road Lighting and Lit Traffic Signs on New Developments and other New Installations and Alterations
# CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>3</td>
</tr>
<tr>
<td>2.0</td>
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</tr>
<tr>
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<tr>
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<td>37</td>
</tr>
<tr>
<td>Appendix 1</td>
<td>Street Lighting Column &amp; Sign Post, Door Orientation</td>
</tr>
<tr>
<td>Appendix 2</td>
<td>Typical layout of electrical equipment within base compartment of street lighting column or sign</td>
</tr>
<tr>
<td>Appendix 3</td>
<td>Process Requirements for Design, Construction and Adoption of a Lighting Scheme</td>
</tr>
<tr>
<td>Appendix 4</td>
<td>Documentation for Final Handover</td>
</tr>
</tbody>
</table>

Note: Whilst every care has been taken in developing this guidance document E.ON, Lighting for Staffordshire and Staffordshire County Council accept no liability for any loss or damage arising directly or indirectly, in connection with reliance on its contents except to the extent that such liability may not lawfully be excluded. Any enquiries should be submitted in writing to E.ON Energy Solutions Limited, Staffordshire PFI, 234 Victoria Road, Fenton, Stoke on Trent. ST4 2JA
1.0 INTRODUCTION

1.1 This specification details the standards applicable to the provision of street lighting in Staffordshire. The definition of street lighting shall encompass all items of Lighting Equipment and Lit Traffic Signs (as defined in Appendix 1 of the Street Lighting Design Policy (SLP500) provided on the public highway. Equipment installed by the Service Provider as part of the PFI project is covered by separate but similar standards detailed in the Service Specification.

1.2 Following the award of a 25-year PFI contract in March 2003, to Lighting for Staffordshire Limited, the responsibility for approval of all new street lighting schemes for adoption is now carried out on behalf of the Council by Lighting for Staffordshire’s service provider, E.ON Energy Services. Accordingly, this document sets out the requirements of all new lighting installations to meet the standards required by the PFI contract and references to “Appointed Contractor” shall mean Lighting for Staffordshire Limited or their authorised agent, E.ON Energy Services. References in this document to the Developer shall be taken to include Staffordshire County Council and their agents, Builders, Developers, Architects, Public Lighting Contractors and any other Third Parties.

1.3 The developer must seek prior permission from the appointed contractor for any works that may affect the existing highway lighting infrastructure. Failure to seek permission from the appointed contractor may result in notification to suspend the works.

1.4 All new developments and any other works of a Street lighting or Traffic Sign nature shall be provided with street lighting which shall be in accordance with the requirements set out in this specification (SLP501), the Street Lighting Design Policy (SLP500) and Highway Works Detail Drawings (SLP502). For the avoidance of doubt, the Appointed Contractor does not provide any general fitness for purpose warranty for compliance with these documents.

1.5 All materials, equipment, and installation works shall fully comply with this specification and the relevant British Standards or amendments thereto.

1.6 For the avoidance of doubt, the Appointed Contractor reserves the right to reject any Part of any work that is considered not to comply in all respects with the requirements of this specification. The equipment will only be fully accepted when all remedial Works have been carried out, at the Developers expense and to the Appointed Contractor’s satisfaction. The developer being responsible for all energy and maintenance charges prior to formal adoption. The developer shall inform the DLH and the supply authority when the installation is energised, and the developer will be liable for all charges until such time as the installation has been fully adopted.

1.7 Lighting scheme approval must be obtained in writing prior to commencement on site. Any alterations to the road layout, lighting column position or cable route that have in any way affected the approved design must be re-submitted for approval prior to construction.

1.8 Should the Developer wish to propose equipment or surface treatments not included in this standard specification, written approval shall be sought from the Appointed Contractor who may accept such equipment at his discretion, but may request a commuted sum as outlined in the Residential Design
Guide. The Appointed Contractor may also require the Developer to provide spare columns brackets or lanterns where these are of a non-standard type.

1.9 The Developer shall be aware of his obligations under Health and Safety legislation and shall ensure that the design reduces and controls risks during construction and ongoing maintenance and shall provide any information on his proposals for safe systems of work as the Appointed Contractor may request. The Appointed Contractor may at his discretion require modifications to be made to the design to reduce maintenance risks.

1.10 Upon completion of the works the Developer will forward on the completed CDM file and documentation to the Appointed Contractor.

1.11 All lamps, lanterns, control gear and photo electric control units used in conjunction with road lighting and traffic sign schemes must have an approved UMSUG rating and ELEXON code including special requirements to meet any approved dimming regime.

1.12 In the event that any aspect of the specification and associated documentation is unclear, the developer shall seek clarity in writing from the Authority and/or Appointed Contractor.
2.0 LIGHTING COLUMNS AND BRACKETS

2.1 Lighting columns and brackets shall be so designed to provide the correct mounting height for the lantern above the carriageway. All columns and brackets offered shall be of a design approved by the Appointed Contractor.

2.2 The lighting column manufacturer shall be registered with and certified by either British Standards Institute Quality Assurance Services or Lloyds Register Quality Assurance Ltd., for the manufacture, supply and verification of lighting columns under their Quality Assurance Schedule to BS EN ISO 9001:2000.

2.3 Columns and brackets shall fully comply with the requirements of BS EN 40 and the specific requirements of tables 1 and 2 to provide an overall minimum life expectancy of the product for 40 years.

2.4 Tubular Steel parallel sided columns are the Appointed Contractor's preferred choice. Sheet steel columns can be either circular in cross section or multi sided providing they are of one piece construction with a continuous taper and without transverse welds. The use of any non-hinged multi sided or tapered columns shall be agreed in writing with the Appointed Contractor prior to installation.

2.5 Tubular steel columns shall be manufactured without any transverse welds except at the reduction between the base and shaft, or where a spigot is required to locate a side entry bracket or post top lantern.

2.6 All columns and sign posts shall be, where possible, provided with a permanent mark to indicate the correct planting depth. In any event the developer should provide the manufacturer's details to indicate the correct planting depth using the door opening as a datum reference point. The developer will be required to replant, at their own cost, columns and signs that are not installed in accordance with the correct planting depth.

2.7 All street lighting columns installed on the highway shall as a minimum comply with the following standards:

- Shall be constructed from galvanised steel and the requirements below,
- BS EN 40: Lighting Columns*
- Sector Scheme Document NHSS6 for Lighting Columns
- BD 26/99 Design of Lighting Columns
- New lighting columns over 6m mounting height shall be designed to BS EN 40* and to carry in addition to the road lighting luminaire(s) a 0.3m² traffic sign mounted up to 300mm offset from the centre of the shaft to the centre of the sign at a height of 2.5m to the centre of the sign.
- New lighting columns up to and including 6m shall be designed to BS EN 40* and to carry in addition to the road lighting luminaire(s) a 0.3m² traffic sign mounted symmetrically on the shaft at a height of 2.5m to the centre of the sign.
- New lighting columns shall be hot dip galvanised to BSEN 1461;
- In addition to hot dip galvanising the lighting column root sections both internal and external shall be fully protected to a minimum of 250mm above ground level by the following process, described in Institution of Lighting Engineers Technical Report TR 22 and known as option R3.
  1st application Item 155, “T” wash (internal & external surface)
2nd application  Item 121, Epoxy MIO, AS. Mdf 100 microns (internal and external surfaces).

3rd application Epoxy Glass Flake (2 pack) AS. Mdf 200 microns Colour Black (to external surface only).

- Root protection treatments shall be applied at the column manufacturer’s works and shall be applied according to the paint manufacturers’ recommendations. The root treatment shall be fully cured before any columns are transported.

- The Appointed Contractor reserves the right to reject any column that has a root treatment that in his opinion does not meet the above requirement or has been damaged prior to adoption. The Appointed Contractor may require documentary evidence that the column manufacturer has provided the specified root treatment.

* In applying BS EN 40, wind speed shall be taken as once in 40 years. In addition the fatigue requirements of BD 26/99 shall be applied to columns with a mounting height of 10m and above, but based on a 40-year life.

2.8 Five and six metre columns shall preferably be of post top type and the lantern shall mount directly on the top of the 76 mm shaft. Should the design call for a side entry lantern a separate side entry bracket will provided. In this case the column will have a stepped down spigot and the bracket will fit over this, brackets that fit over the 76mm section will not be permitted.

2.9 Column spigots shall be the same size throughout the range of columns required for each lighting scheme and all columns and brackets shall be of the same manufacturer, type, style and design.

2.10 Columns and bracket arms shall be free from sharp edges, burrs or irregularities.

2.11 The base compartment shall allow easy access for wiring and auxiliary equipment and be fitted with a backboard made from minimum thickness 12 mm hardwood or other substantial non-hygroscopic material. The backboard fixing nut or screw shall be flush with the face of the backboard so as not to obstruct the mounting of equipment thereon. The backboard shall be of sufficient size to hold all equipment, service cables and cut-out. The backboard shall be securely fixed within the columns.

Due consideration should be made at design stages to ensure the door aperture and base compartment are adequate to house the equipment to be provided and shall increase the standard sizes as required in consultation with the Appointed Contractor.

2.12 The cable entry slot shall be positioned directly below the door opening and have minimum dimensions of 75mm x 150mm for planted columns with the lower edge of the slot being 500mm below ground level. The cable entry slot shall be free from sharp edges and burrs.

2.13 Each column shall carry a unique identification mark to show the column and bracket manufacturer data sheet reference number. This identification mark
shall take the form of a non-ferrous data tag which shall be clearly and indelibly marked with the name of the column manufacturer, the date of manufacture, the catalogue or part number and a unique works order or data sheet reference number and details of the factory applied root treatment. On completion this tag shall be clearly visible on removal of the column door.

2.14 All new columns and lit traffic signs shall be fitted with internal warning notices in accordance with the Highways Works Detail Drawings (SLP502).

2.15 Where overhead lines or other hazards exist, external warning labels should be fitted generally as referred to on Highway Works Detail Drawing (SLP502).

2.16 A separate dedicated Main Earth Terminal block made of brass and with brass screws shall be fitted to the backboard of each column and the earthing terminals of all equipment shall be bonded separately to this terminal block. Crimped connectors shall be used wherever possible. The column door shall be bonded to the column earth stud, not the earth block. A label in accordance BS7671 shall be provided adjacent to the earth terminal block.

2.17 The dedicated earth terminal shall be supplied despite any other earth terminals, e.g. within the cut-out or on the column.

2.18 Each column shall have a manufacturer’s installed earth bonding stud so positioned as to be readily accessible through the door opening. The column shall be bonded using 6mm² copper PVC insulated cable coloured green/yellow from the Main Earthing Terminal to the earth bonding stud and secured by an 8mm (minimum diameter) bolt with two plain washers and nuts all of which should be manufactured from brass. A Safety electrical connection tag shall be installed per BS 7671 at this point.

2.19 The main earth conductor between the earth block in the REC fused cut-out and the dedicated Main Earth Terminal block shall be a minimum of 10mm² copper PVC insulated coloured yellow/green.

2.20 The bracket arm projection is the distance measured horizontally, from the centre line of the column to the point of entry into the lantern. The bracket shall provide for side entry lanterns and be suitable for use with the columns and lanterns offered. The bracket fixing shall be of such a design as not to allow any movement of the bracket either horizontally or vertically with respect to the column. All grub screws and fixing shall be manufactured from stainless steel. They shall be of suitable length for the column or bracket thickness and shall not protrude more than 15mm when installed. All brackets will have a nominal lift of 5º.

2.21 On prospectively adoptable footpaths and cycle tracks that are remote from the adjacent carriageway and/or in any situation where normal vehicular access is limited or not available, mid-hinged galvanised steel lighting columns that allow the lantern to be lowered to ground level for maintenance shall be provided. Mid-hinged columns shall be capable of being lowered to ground level without the need of additional plant or equipment.

Hinged Columns may also be required in any other location where safe access or the positioning of vehicles for maintenance purposes may restrict or block the carriageway for other road users, which may also include pedestrians. For example a column located in a footpath or verge within the...
vicinity of a central refuge whereby any vehicle access for maintenance purpose would unduly restrict or cause potential danger to any other road user should be considered.

Hinged columns shall be provided with tamper resistant locking mechanism. All other requirements of this specification must be followed. Positioning of the columns shall take into account factors such as boundary fences, trees and shrubs which may prevent or interfere with access or the correct and safe operation of the column and in all circumstances should be positioned within the completed surfaces of the footpath and not surrounding verges. Mid hinged columns will usually be required in any situation where there is the presence of overhead High Voltage power lines or in any situation where the high level working clearances required by G39 may not be achieved. It should be noted that for the purposes of future maintenance a further minimum clearance of 1m greater than the overall length of the unit including the root section should be used when calculating clearance from any overhead line.

2.22 All columns are to be provided with weather proof single doors, each with a tamper proof locking device. The locking device shall be greased upon installation.

2.23 Careful consideration to the orientation of the column door should be given prior to installation. Each door direction should be decided upon so that any operative undertaking future maintenance is provided the maximum protection possible from traffic and pedestrians. This should include the operative never having to have their back to any live carriageway unless the column is situated at the rear of the footpath and never having their back to oncoming traffic. The operative should never have to step into any live carriageway to undertake the removal or access to the door. The following table indicates the preferred door orientation and examples of acceptable and unacceptable practices can be found in Appendix 1 to this document.

<table>
<thead>
<tr>
<th>COLUMN POSITION</th>
<th>DOOR POSITION</th>
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<tr>
<td>Back of footpath/verge</td>
<td>Facing road</td>
</tr>
<tr>
<td>Front of path where there is a verge area</td>
<td>Facing away from road or facing away from oncoming traffic (i.e. operative</td>
</tr>
<tr>
<td>separating footpath from carriageway</td>
<td>will face oncoming traffic when accessing)</td>
</tr>
<tr>
<td>Near kerb edge on wide footpaths</td>
<td>Facing away from the road</td>
</tr>
<tr>
<td>Near kerb edge on narrow footpaths</td>
<td>Facing away from oncoming traffic (i.e. operative will face oncoming traffic</td>
</tr>
<tr>
<td></td>
<td>when accessing)</td>
</tr>
<tr>
<td>Centre of central reserve</td>
<td>Facing away from oncoming traffic in a consistent direction</td>
</tr>
<tr>
<td>Near edge of central reserve on wide</td>
<td>Facing away from oncoming traffic or facing distant side of reserve</td>
</tr>
<tr>
<td>reservation</td>
<td></td>
</tr>
<tr>
<td>Near edge of central reserve on narrow</td>
<td>Facing away from oncoming traffic or facing distant side of reserve</td>
</tr>
<tr>
<td>reservation</td>
<td></td>
</tr>
</tbody>
</table>
2.24 Door openings and doors shall be free from sharp edges and burrs, they shall be provided at such a height above ground level and in such a position that access to all the equipment contained within can be achieved for the foreseeable future without the need for steps and ladders, and that a flat safe surface is available for an operative to stand on with unrestricted entry and egress.

2.25 Column doors and sign post doors shall be provided with an 8mm (minimum) Dia. Earthing terminal with two plain washers and nuts, all of which shall be manufactured from brass.

2.26 All column and sign post doors shall be bonded using 6mm copper tri rated flexible cables, PVC insulated and coloured yellow/green. The bonding cable shall be of sufficient length to allow the door to be placed on the adjacent ground or stand with the locking mechanism uppermost, and will have BS 7671 safety electrical connection labels at each termination.

2.27 Except doors required to be captive; all doors are to be interchangeable between similar types of columns on each scheme without adjustments. Should the column be installed in an elevated position or on a bridge or similar structure the door shall be secured to the column with an additional stainless steel chain, to prevent any risk of door loss or injury should the door fall for any reason.

2.28 Foundations for planted columns shall be according to the requirements of Highway Works Detail Drawings (SLP502).

2.29 Back fill materials shall be concrete equivalent to an ST5 mix. Foundation dimensions will depend on the ground conditions encountered; it will be the developer's responsibility to ensure the foundations are adequate and to provide evidence to the Appointed Contractor as required. Where the column or sign is not installed entirely in a footway or other permanently surfaced area, then the concrete foundation shall be extended to 25mm above the final surface level and then shall be trowelled to form a smooth surfaced (finish U2) concrete collar around the column or sign post. The surface of the collar shall slope away from the column or sign to prevent the build-up of water or debris. The diameter of the collar shall be 300mm greater than the column or sign post as a minimum. (See SLP502).

2.30 The galvanised columns specified are expected to have a minimum life of 25 years before any surface treatment is necessary, and therefore no defects in the galvanised surface are acceptable. Columns and Signposts showing any sign of rusting of the base metal will not be acceptable and will require replacing at the Developers expense. Where minor surface damage has occurred during installation the Appointed Contractor may, at his discretion allow the Developer to carry out a repair using an agreed method such as high build zinc rich paint. This however must be agreed in writing prior to undertaking any repair.

2.31 Consideration shall be given for any column that is to be sited in a position where the ground may become flooded. As a check list the following should be considered and implemented as required and full details of the environmental risk review provided to the Authority and Appointed Contractor prior to completion of the initial design.

- Can the column be re-sited out of potential flood water?
• Where this is not possible, considering the depth of potential flood water, should the door access and electrical components be raised to a higher level? Note: any door that will require raising to above the height whereby an operative can safely and easily access all equipment without the use of access equipment should separately be reviewed for access under the Working at Height Regulations.
• What additional and/or extended root protection should be applied to or should the column be manufactured from a non-ferrous material?
• Should additional electrical disconnection and protection be supplied for any circuit likely to be submerged?
### TABLE 1: STANDARD LIGHTING COLUMN REQUIREMENTS

<table>
<thead>
<tr>
<th>Column Height (m)</th>
<th>Planting Depth* (m)</th>
<th>Minimum Door Opening Height (m)</th>
<th>Minimum Door Opening Width (m)</th>
<th>Column Type</th>
<th>Bracket Arm Projection (m)</th>
<th>Spigot Dimensions Length Width (mm)</th>
<th>Lantern Weight (Kg)</th>
<th>Lantern Wind Area (Elevation) (m²)</th>
<th>Minimum Base Compartment Size (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>800</td>
<td>500</td>
<td>100</td>
<td>Side Entry</td>
<td>0.5</td>
<td>100 34</td>
<td>6.0</td>
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<td>600 110 100</td>
</tr>
<tr>
<td>5</td>
<td>800</td>
<td>500</td>
<td>100</td>
<td>Post Top</td>
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<td>76 76</td>
<td>6.0</td>
<td>0.15</td>
<td>600 110 100</td>
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<td>1000</td>
<td>500</td>
<td>100</td>
<td>Side Entry</td>
<td>0.75</td>
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<td>6 / 7</td>
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<td>500</td>
<td>100</td>
<td>Post Top</td>
<td>0.0</td>
<td>76 76</td>
<td>10.0</td>
<td>0.15</td>
<td>600 120 110</td>
</tr>
<tr>
<td>8</td>
<td>1200</td>
<td>600</td>
<td>115</td>
<td>Side Entry</td>
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<td>600 120 110</td>
</tr>
<tr>
<td>8</td>
<td>1200</td>
<td>600</td>
<td>115</td>
<td>Post Top</td>
<td>0.0</td>
<td>76 76</td>
<td>50.0</td>
<td>0.50</td>
<td>600 120 120</td>
</tr>
<tr>
<td>10</td>
<td>1500</td>
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<td>115</td>
<td>Side Entry</td>
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<td>100 42</td>
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<td>10</td>
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<td>Post Top</td>
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<tr>
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<td>600</td>
<td>115</td>
<td>Side Entry</td>
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<td>600 120 120</td>
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<tr>
<td>12</td>
<td>1700</td>
<td>600</td>
<td>115</td>
<td>Post Top</td>
<td>0.0</td>
<td>150 100</td>
<td>50.0</td>
<td>0.50</td>
<td>600 120 120</td>
</tr>
</tbody>
</table>

*Planting Depth – Where manufacturers planting depths differ from those detailed above, the manufacturer’s planting depth shall be used.

### TABLE 2: Rationalised ‘K’ Values

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<th>Column Exposure Class</th>
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<td>Rationalised ‘K’ Values</td>
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3.0 ELECTRICAL EQUIPMENT FOR ROAD LIGHTING

3.1 The Developer shall ensure, at the design stage, the compatibility of all new equipment with any of the existing equipment which is being reused and included in the new system or network being created by the Developer. Should the developer propose to re-use or alter an existing private cable network, full details of the proposals including details of the existing arrangements and full circuit diagrams of the proposals together with evidence that the revised installation will meet fully the requirements of BS 7671 are to be provided. This information shall be supplied to the Appointed Contractor and agreement in writing obtained before any work is commenced.

3.2 The Developer shall provide any necessary technical data on materials and installation methods to be used when requested by the Appointed Contractor.

3.3 Electrical equipment installed within the base compartment of columns or posts shall be positioned as shown on Highway Works Detail Drawings (SLP502) a further example of layout is provided in Appendix 2 of this document.

3.4 The earth continuity conductor shall be connected to all earthing terminals (provided for all metal parts of each lighting unit) using eye type terminal ends. All such connections and joints shall be selected for the appropriate cable conductor and terminal lug size. They shall be mechanically sound, electrically continuous and protected against corrosion. Where substantial copper or other non-ferrous clamping terminals are not provided in or on the equipment, it is the responsibility of the developer to supply and fit them.

4.0 LANTERNS AND LAMPS

4.1 The lanterns shall be gear in head type and be as specified for each individual lighting scheme, be new and of sound, robust construction and be capable of being easily dismantled for repair and maintenance purposes. The bowl or other components giving access to the interior of the lantern must, when in the closed position, be firmly attached so that there is no likelihood of it becoming detached and blown against the fixed part of the lantern, bracket or column. The bowl or access panel shall seat uniformly on a thick resilient gasket so that the whole of the lantern is dust and weather proof.

4.2 Electronic gear is to be provided and shall be installed by the lantern manufacturer during production and shall be compatible with the lantern and lamp and shall fully meet any relevant requirements of this specification.

4.3 All lanterns shall be fitted with equipment to provide fully functional and programmable dimming compatible with an open protocol CMS system and be selected to conform to the apparatus being installed as part of the Authority’s Private Finance Initiative illumination, dimming and control strategy.

4.4 All equipment shall be selected to ensure that it complies with a minimum of 0.85 in respect of power factor correction where required.

4.5 All hinges, toggle catches, captive screws and captive nuts shall be made of non-corrosive material. The lamp enclosure shall have a minimum protection rating of IP65.
4.6 The means of supporting the lamp shall be designed so that the position of the lamp, compared with the optical components remains substantially the same under all normal conditions throughout life. Where the optical system includes prismatic refractors, these shall be moulded on the interior of the bowl and have a smooth exterior surface to simplify cleaning.

4.7 Lamps, reflectors, refractors and bowls shall be cleaned and free from obscuring film after installation.

4.8 SON/T and Cosmopolis lanterns shall have a ‘Pot Optic’ light control system comprising a one piece moulded reflector. Adjustment to alter the light distribution pattern, being made by means of a positive locking mechanism, shall not disturb the reflector. The lanterns shall have a separate control gear module, which is interchangeable and can be replaced. Where luminaires with a fixed optical system have been specified and installed, the Appointed Contractor may request the Developer to provide evidence that luminaires with the correct optical system have been installed. The cost of any verification work to be borne by the Developer.

4.9 The lamps offered shall be of a type approved by the Appointed Contractor, must conform to the requirements of BS 4533 and be compatible with all other equipment supplied. Lamps shall be from an approved manufacturer and shall comply with their relevant British Standard:

- Each lamp supplied shall be new and shall have the month and year of installation marked on the lamp cap using indelible ink. Any lamps not thus clearly marked shall be rejected and shall be replaced with new lamps at the Developers expense prior to adoption.
- The appointed Contractor may reject any lamps found to have been installed for more than 24 months prior to adoption and may require these to be replaced with new lamps at the developers expense.
- The Appointed Contractor may carry out his own inspection of any installation during the hours of darkness and will require the Developer to rectify any defects prior to adoption.
- Where new equipment is installed on a Council Adopted Highway and the Appointed Contractor finds the equipment is not working correctly, the Appointed Contractor will require the Developer to rectify the defect and restore the equipment to correct working order prior to final acceptance of the scheme.
5.0 LARGE BASE TRAFFIC SIGN POSTS

5.1 Large base traffic signs shall be so designed to provide the correct mounting height of the sign/s and appropriate lantern/s without the need for an extension arm/bracket.

5.2 The sign post manufacturer shall be registered with and certified by either British Standards Institute Quality Assurance Services or Lloyds Register Quality Assurance Ltd., for the manufacture, supply and verification of lighting columns and sign posts under their Quality Assurance Schedule to BS EN ISO 9001:2000.

5.3 Traffic sign posts shall be manufactured from tubular steel and fully comply with the requirements of BS EN 40 and the specific requirements of tables 1 and 2 (See section 2 “Lighting Columns” for details).

5.4 Tubular steel sign posts shall be manufactured without any transverse welds except at the reduction between the base and shaft.

5.5 All sign posts shall be, where possible, provided with a permanent mark to indicate the correct planting depth. In any event the developer should provide the manufacturer’s details to indicate the correct planting depth using the door opening as a datum reference point. The developer will be required to replant, at their own cost, signs that are not installed in accordance with the correct planting depth.

5.6 All traffic sign posts installed on the highway shall as a minimum comply with the following standards

- Shall be constructed from galvanised steel and the requirements below,
- BS EN 40 : Lighting Columns
- Sector Scheme Document NHSS6 for Lighting Columns
- BD 26/99 Design of Lighting Columns

- New traffic sign posts over 6m shall be designed to BS EN 40* and should be capable of mounting the sign plate/s up to 300mm offset from the centre of the shaft to the centre of the sign at a height of 2.5m to the centre of the sign.
- New traffic sign posts up to and including 6m shall be designed to BS EN 40* and capable of mounting the traffic sign plate/s symmetrically on the shaft at a height of 2.5m to the centre of the sign.
- New traffic sign posts shall be hot dip galvanised to BSEN 1461;
- In addition to hot dip galvanising the traffic sign post root sections both internal and external shall be fully protected to a minimum of 250mm above ground level by the following process, described in Institution of Lighting Engineers Technical Report TR 22 and known as option R3.

1st application Item 155, “T” wash (internal & external surface)
2nd application Item 121, Epoxy MIO, AS. Mdft 100 microns (internal and external surfaces).
3rd application Epoxy Glass Flake (2 pack) AS. Mdft 200 microns Colour Black (to external surface only).

- Root protection treatments shall be applied at the column manufacturer’s works and shall be applied according to the paint manufacturers’
recommendations. The root treatment shall be fully cured before any columns are transported.

- The Appointed Contractor reserves the right to reject any column that has a root treatment that in his opinion does not meet the above requirement or has been damaged prior to adoption. The Appointed Contractor may require documentary evidence that the column manufacturer has provided the specified root treatment.

  * In applying BS EN 40, wind speed shall be taken as once in 40 years.

5.7 Traffic sign posts and bracket arms shall be free from sharp edges, burrs or irregularities.

5.8 The base compartment shall allow easy access for wiring and auxiliary equipment and be fitted with a backboard made from minimum thickness 12 mm hardwood or other substantial non-hygrosopic material. The backboard fixing nut or screw shall be flush with the face of the backboard so as not to obstruct the mounting of equipment thereon. The backboard shall be of sufficient size to hold all equipment, service cables and cut-out. The backboard shall be securely fixed within the traffic sign post. Due consideration should be made at design stages to ensure the door aperture and base compartment are adequate to house the equipment to be provided and shall increase the standard sizes as required in consultation with the Appointed Contractor.

5.9 The cable entry slot shall be positioned directly below the door opening and have minimum dimensions of 75mm x 150mm for planted sign posts with the lower edge of the slot being 500mm below ground level. The cable entry slot shall be free from sharp edges and burrs.

5.10 Each traffic sign post shall carry a unique identification mark to show the sign post manufacturer data sheet reference number, all as described on Highway Works Detail Drawing. (SLP502). This identification mark shall take the form of a non-ferrous tag which shall be clearly and indelibly marked with the name of the sign post manufacturer, the date of manufacture, the catalogue or part number and a unique works order or data sheet reference number and details of the factory applied root treatment.

5.11 All new traffic sign posts shall be fitted with internal warning notices in accordance with Highways Works Detail Drawings. (SLP502)

5.12 Where overhead lines or other hazards exist, external warning labels should be fitted generally as referred to on Highway Works Details Drawings. (SLP502)

5.13 A separate dedicated Main Earth Terminal block made of brass and with brass screws shall be fitted to the backboard of each traffic sign post and the earthing terminals of all equipment shall be bonded separately to this terminal block. Crimped connectors shall be used wherever possible. The traffic sign post door shall be bonded to the column earth stud, not the earth block. A label in accordance BS7671 shall be provided adjacent to the earth terminal block.
5.14 The dedicated earth terminal shall be supplied despite any other earth terminals, e.g. within the cut-out or on the column.

5.15 Each traffic sign post shall have a manufacturer’s installed earth bonding stud so positioned as to be readily accessible through the door opening. The column shall be bonded using 6mm² copper PVC insulated cable coloured green/yellow from the Main Earthing Terminal to the earth bonding stud and secured by an 8mm (minimum diameter) bolt with two plain washers and nuts all of which should be manufactured from brass. A Safety electrical connection tag shall be installed per BS 7671 at this point.

5.16 The main earth conductor between the earth block in the REC fused cut-out and the dedicated Main Earth Terminal block shall be a minimum of 10mm² copper PVC insulated coloured yellow/green.

5.17 All traffic sign posts are to be provided with weather proof single doors, each with a tamper proof locking device. The locking device shall be greased upon installation. The location of the door openings shall be as the following table:

<table>
<thead>
<tr>
<th>SIGN POST POSITION</th>
<th>DOOR POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back of footpath/verge</td>
<td>Facing road</td>
</tr>
<tr>
<td>Front of path where there is a verge area separating footprint from carriageway</td>
<td>Facing away from road or facing away from oncoming traffic (i.e. operative will face oncoming traffic when accessing)</td>
</tr>
<tr>
<td>Near kerb edge on wide footpaths</td>
<td>Facing away from the road</td>
</tr>
<tr>
<td>Near kerb edge on narrow footpaths</td>
<td>Facing away from oncoming traffic (i.e. operative will face oncoming traffic when accessing)</td>
</tr>
<tr>
<td>Centre of central reserve</td>
<td>Facing away from oncoming traffic in a consistent direction</td>
</tr>
<tr>
<td>Near edge of central reserve on wide reservation</td>
<td>Facing away from oncoming traffic or facing distant side of reserve</td>
</tr>
<tr>
<td>Near edge of central reserve on narrow reservation</td>
<td>Facing away from oncoming traffic or facing distant side of reserve</td>
</tr>
</tbody>
</table>

5.18 Traffic Sign Posts shall have a minimum door opening of 450mm by 105mm and all door openings and doors shall be free from sharp edges and burrs. They shall also be provided at such a height above ground level and in such a position that access to all the equipment contained within can be achieved for the foreseeable future without the need for steps and ladders, and that a flat safe surface is available for an operative to stand on with unrestricted entry and egress.

It will be the Developers responsibility to ensure the base compartment of any sign is of adequate size to house the equipment to be provided and to increase the standard dimensions if required in consultation with the Appointed Contractor.
5.19 Traffic sign post doors shall be provided with an 8mm (minimum) Dia. Earthing terminal with two plain washers and nuts, all of which shall be manufactured from brass.

5.20 All traffic sign post doors shall be bonded using 6mm copper tri rated flexible cables, PVC insulated and coloured yellow/green. The bonding cable shall be of sufficient length to allow the door to be placed on the adjacent ground or stand with the locking mechanism uppermost, and will have BS 7671 safety electrical connection labels at each termination.

5.21 Except doors required to be captive; all doors are to be interchangeable between similar types of traffic sign posts on each scheme without adjustments. Should the traffic sign post be installed in an elevated position or on a bridge or similar structure the door shall be secured to the column with an additional stainless steel chain, to prevent any risk of door loss or injury should the door fall for any reason.

5.22 Foundations for planted traffic sign posts shall be according to the requirements of Highway Works Detail Drawings. (SLP502)

5.23 Back fill materials shall be concrete equivalent to an ST5 mix. Foundation dimensions will depend on the ground conditions encountered; it will be the developer’s responsibility to ensure the foundations are adequate and to provide evidence to the Appointed Contractor if required.

5.24 Assets installed in exposed locations such as central refuge islands and the like shall be installed using a proprietary cast-in retention socket arrangement designed to accept standard diameter sign posts and incorporating an accessible screw fixing system to enable secure fixing of the post yet quick and simple removal in the event of damage. Note: the Developer must utilise a private cable network system to feed the asset which shall also include a local isolation point. For columns and signs of up to 6m a standard 145mm diameter socket shall be used. For columns and signs over 6m confirmation should be sought in writing from the Authority or Appointed Contractor.

5.25 Where the traffic sign post is not installed entirely in a footway or other permanently surfaced area, then the concrete foundation shall be extended to 25mm above the final surface level and then shall be trowelled to form a smooth surfaced concrete collar around the sign post. The surface of the collar shall slope away from the sign to prevent the build up of water or debris. The diameter of the collar shall be 300mm greater than the sign post as a minimum. (See SLP502).

5.26 The galvanised traffic sign posts specified are expected to have a minimum life of 25 years before any surface treatment is necessary, and therefore no defects in the galvanised surface are acceptable. Signposts showing any sign of rusting of the base metal will not be acceptable and will require replacing at the Developers expense. Where minor surface damage has occurred during installation the Appointed Contractor may, at his discretion allow the Developer to carry out a repair using an agreed method such as high build zinc rich paint.

5.27 Posts with a square or rectangular section shall not normally be used for lit sign posts, if these are to be specified, the Developer shall consult with the
Appointed Contractor in advance to determine the Appointed Contractors specific requirements.

5.28 Separate service boxes shall not normally be specified. If these are to be specified the Developer shall consult with the Appointed Contractor in advance to determine the Appointed Contractors requirements.

5.29 Where sign posts are installed without a post top mounted luminaire then they shall be provided with an external fit grey PVC post cap to prevent ingress of water. Stub posts shall have a securely fixed cap at the top and bottom of the post.

5.30 Where planted straight posts are required in addition to the large base sign post to assist in the support of larger signs, these shall be finished to the same standard and have an applied root protection equal to that provided on the large base sign post.

5.31 Consideration shall be given for any sign post that is to be sited in a position where the ground may become flooded. As a check list the following should be considered and implemented as required and full details of the environmental risk review provided to the Authority and Appointed Contractor prior to completion of the initial design.
- Can the sign post be re-sited out of potential flood water?
- Where this is not possible, considering the depth of potential flood water, should the door access and electrical components be raised to a higher level? Note: any door that will require raising to above the height whereby an operative can safely and easily access all equipment without the use of access equipment should separately be reviewed for access under the Working at Height Regulations.
- What additional and/or extended root protection should be applied to or should the sign post be manufactured from a non-ferrous material?
- Should additional electrical disconnection and protection be supplied for any circuit likely to be submerged?

6.0 TRAFFIC SIGN LUMINAIRES

6.1 Traffic sign luminaires shall comply with the Traffic Signs Regulations and General Directions current at the time of design and shall provide a light distribution in accordance with BS 12899 or any subsequent amendments.

6.2 Traffic sign luminaires shall be constructed from LM6 cast or extruded aluminium in accordance with BS 12899. All fixings used for securing of the glazing panel and/or, the post top bracketry must penetrate captive stainless steel nuts and not directly into the aluminium body or bracket.

6.3 Access to the interior of traffic sign luminaire shall be by a captive semi-rebated M8 male triangular headed fixing screw or captive male anti vandal allen screw. Where the access to the interior is by a hinged glazing panel, it shall be provided by a full length hinge. Hinges moulded as part of the glazing panel are not acceptable. The glazing panel shall be held captive to the body when opened.
6.4 Traffic sign luminaires shall have a removable gear tray of gauge not less than 1.2 mm with either a high specular anodic coating complying with BS 1615, or a stoved white coating applied over a suitable primer.

6.5 The gear tray shall be provided with a means of electrical isolation and/or disconnection by means of a plug and socket which ensures that the earth terminal is the last to disconnect and the first to reconnect without removal of the gear tray. Control gear for the lamps shall be separately fused, where applicable, in order to enable any one lamp to operate in the event of the failure of the other circuit(s). Capacitors shall be fitted which shall provide a power factor of not less than 0.85 lagging and shall comply with Clause 12.5 of this Specification.

6.6 LED and Fluorescent traffic sign luminaires shall incorporate lamps of the correct type and wattage, to meet the requirements of 6.1 above.

6.7 Overhead traffic sign luminaires shall be provided with a variety of support systems which shall allow for single and back to back fixing arrangements by post top, clip or banding systems. The support bracket of overhead traffic sign luminaires shall be of a suitable length to provide the correct optical performance and ensure that the luminaire, when correctly installed, shall not obstruct or overhang the sign plate it is illuminating.

6.8 Support systems for Type A and Type B traffic sign luminaires shall be designed as an integral part of body of the luminaire. All other overhead traffic sign luminaire types shall have support brackets manufactured from not less than 25mm external diameter solid drawn mild steel tube or square section of comparable dimensions. All post top mounted traffic sign luminaires shall be suitable for mounting on a 76mm diameter post and be supplied with 3 no. hardened stainless steel pinch screws equally spaced around the socket to allow the unit to be securely fixed under a wind loading of 160 kgm/m².

6.9 Ground mounted luminaires for lit traffic signs shall not normally be specified; where these are required the Developer shall consult the Appointed Contractor in advance to agree in writing the Appointed Contractors requirements.

6.10 Traffic sign luminaire supports shall include an effective arrangement to prevent the forced rotation of the luminaire in any plane.

6.11 Glazing panels for fluorescent traffic sign luminaires shall be manufactured from 3 mm polycarbonate. Glazing panels for large sign luminaires shall be manufactured from toughened heat resistant glass.

6.12 The glazing panel shall when closed; compress onto a part rebated one piece gasket to give the luminaires a degree of protection rating of at least IP56 to BS EN 60529.

6.13 All luminaires shall be supplied complete with a miniature one piece photo cell unit complying with section 12.2 of this specification.

6.14 All set screws, pins, nuts, washers, anti tamper fixings and pivot spindles shall be manufactured from stainless steel to BS 6105, or equivalent.

6.15 External surfaces of the luminaire body and supports shall be treated with an acid cleaner followed by a chromate conversion coat and finished with a 150
micron (minimum) thermosetting polyester powder coating in Aircraft Grey BS381C:1980 No. 693

6.16 The Developer shall provide information on the proposed traffic sign luminaires as required by the Appointed Contractor.

6.17 Where extra low voltage installations are specified they shall be fed as shown on Highway Works Detail Drawings (SLP502).

6.18 Where a school flashing sign is required it shall be of high vandal resistant type with fully electronic switching with an automatic time adjustable switch off mode. The unit shall be activated by means of a hidden magnetic switch and shall be fitted with two high intensity LED lamps. The unit shall a maximum wattage consumption of 8w.

6.19 Where Belisha Beacons are specified the equipment shall comply with the general requirements for traffic sign posts and also The Traffic Signs Regulations and General Directions 2002. In addition to the root treatment as detailed in 5.6 above the posts shall receive a four coat paint system as described in ILE Technical Report 26 (Painting of Lighting Columns) 13.1.1 Option N1, similar to G2a. The colour being black with white bands.

The unit will be fitted with a post top mounted vandal resistant gallery and globe assembly with high output LED lighting unit with integral solid state flashing unit for standard BC bi-pin lamp-holder.

All LED’s will be white in colour and the unit will have a maximum wattage of 12w.

Where a combined road lighting lantern is to be installed on the same post as the belisha beacon this shall comply with section 4 of this specification.

6.20 Where refuge indicator lamps are specified the posts shall comply with the specification for large base traffic sign posts and shall also comply with The Traffic Signs Regulations and General Directions 1994; Part II paragraph 40.

A clearance of not less than 2.1 metres shall be available from the bottom of any sign mounted on the indicator lamp post to ground level.

The white bands at the top of the post are to be visible to oncoming traffic, being clear of any attached signs and/or sign lighting units after installation.

The refuge indicator luminaire shall comply with The Traffic Signs Regulations and General Directions 1994: Section 5 paragraph 45.

The unit will be fitted with a post top mounted vandal resistant gallery and globe assembly with high output LED lighting unit for standard BC bi-pin lamp-holder.

All LED’s will be white in colour and the unit will have a maximum wattage of 12w.

The private cable system feeding the refuge indicator shall be switched to provide illumination during the hours of darkness only.
The means of control shall be at the origin of the circuit and shall be either a din rail mounted solar electronic time switch with battery backup or an electronic current sensing switching device capable of using the column photocell as the driver for illuminating the unit. The general arrangement is shown on Highway Works Detail Drawings (SLP502).

7.0 GROUND ILLUMINATED TRAFFIC BOLLARDS

7.1 Ground illuminated traffic bollard body shells shall be formed from material such as ethylene vinyl acetate, and shall be flexible, shape recoverable, UV stabilised and resist tearing. The base of the body shell; shall be strengthened by either a galvanised steel or aluminium strip insert to achieve the correct fit to the plinth section of the base unit and provide functional stiffness and shape recovery. The internal and external surfaces of the body shall have smooth finishes to facilitate cleaning and shall be resistant to abrasion.

7.2 Illuminated sign faces and panels shall form an integral part of the moulding. Where required, illuminated sign faces shall display the appropriate diagrams referred to in the Traffic Signs Regulations and General Directions, 1994. The body shell shall be suitable for incorporating up to four prescribed sign aspects each of 270 mm diameter or one prescribed sign aspect of 600 mm diameter as described in the schedules of bollards.

7.3 Body shells shall be attached to the hinged frame by means of 4 no. M8 stainless steel nuts and bolts that shall have been designed not to tear the body shell material when the body is flexed.

7.4 The base units of ground illuminated traffic bollards shall be constructed from sheet steel, and sheet steel of minimum thickness 3 gauge (swg.) hot dip galvanised to BSEN:1461 and shall incorporate a boxed out seating collar to denote finished ground level. Base lit bollards using aluminium or aluminium alloys in any form will not be accepted.

7.5 The top of the base units shall incorporate a removable 5 mm vacuum formed domed clear polycarbonate glazing panel of sufficient sizes to overlap the light aperture by a minimum of 50mm all around the aperture. A recessed seal internally affixed to the panel shall compress down onto a raised circumferential flange with a minimum width of 10 mm incorporated on the base. The glazing panel shall be attached to the base unit by means of 4 no. Stainless steel M8 bolts and washers.

7.6 The base unit shall have a minimum degree of protection rating IP67 to BS 5490.

7.7 Base units shall incorporate a hinged frame to allow the body of the bollard to be swung away from the base for inspection without disturbing the polycarbonate glazing panel. The frame shall be hinged by means of a full length pivot spindle across the rear of the base and shall be accessed by means of one anti-tamper fixing. This fixing shall be in a horizontal plane and access shall be unobstructed at all times.
The surface surrounding the bollard shall not obstruct the operation of the bollard hinge mechanism and shall allow a full 90 degree tilt of the body shell. The finished surface around the bollard shell should also slope away from the bollard base to avoid the build up of debris around the bollard and to direct surface water away from the bollard.

Where the bollard is installed in an unsurfaced area the concrete foundation of the bollard shall continue to finished surface level indicated on the bollard base and shall form a smooth concrete collar of min 150mm around the bollard.

7.8 Base units shall incorporate a backboard made from minimum thickness 12 mm hardwood or other substantial non-hygroscopic material suitable for and of sufficient size to accommodate electrical equipment, cable terminations and wiring.

7.9 Base units shall be bolted down to the insitu ST2 equivalent mix concrete base using 4 no. M16 indent bolts, nuts and washers at fixing centres in accordance with BS EN 12899.

7.10 Access for two cables shall be through the rear of the base. Each cable shall be individually sealed to the base by means of an IP68 nylon cable stuffing gland screwed into the machined end of a 75 mm long external cable entry turret. The external cable entry turret shall form an integral part of the base unit and shall have a minimum internal diameter of 20 mm and be provided with a 25 mm internal conduit thread. The cable glands shall be capable of sealing onto cables with an external diameter of between 9 and 16 mm O.D. The external cable entry turrets, glands and cables, to a minimum length of 150 mm, shall be covered and sealed by the use of heat or cold shrink tubing after installation. Redundant cable entries shall be fitted with a 25 mm conduit thread blanking plug and shall be sealed by the use of a heat shrink blank end cable shroud after installation.

7.11 The gear tray and lighting unit shall be incorporated in to the base unit and shall be removable for maintenance purposes. The gear tray and lighting unit shall be provided with a means of electrical isolation and/or disconnection. The gear tray shall incorporate a minimum of two 11 watt PL lamps mounted on a true parabolic reflector to illuminate the aspects in accordance with BS EN 12899. LED light sources may be selected as a preferred alternative and these should fully meet the requirements of BS EN 12899 for illumination purposes.

A prominent and indelible notice with the legend “isolate before opening at col no/ pillar no” shall be provided. The actual column or feeder pillar number providing isolation will be included on the label.

This label shall be permanent and visible before the base unit needs to be opened.

Irrespective of the form of isolation provided, the supply cable to the bollard will be terminated within the bollard base in a suitably rated cut out which will contain a suitably rated HRC fuse link. Final connection between the fused cut out within the bollard base and the gear tray shall be a minimum of 0.75mm² 3 core heat resistant flexible cable reference 3183TQ.

7.12 Control gear for the lamps shall be securely attached to the gear tray and shall be independent and separately fused in order to enable any one lamp to operate in the event of the failure of the other circuit(s). Capacitors shall be fitted which shall provide a power factor of not less than 0.85 lagging and shall comply with paragraph 12.5 of this Specification. Lamps shall continue
to operate after average conditions of vehicle impact to and flexing of the body shell.

7.13 All set screws, pins, nuts, washers, anti tamper fixings and pivot spindles shall be manufactured from stainless steel to BS 6105, or equivalent.

7.14 All bollards shall be fed by a private cable network as described in paragraph 15 of this Specification and supplied from a separately fused point of supply within a suitable item of adjacent apparatus. The supply point shall be identified by affixing a white letter “F” on a blue background on the feed apparatus in a position that is visible from the bollard. The bollard maintenance number shall be clearly and indelibly indicated within the bollard base, to facilitate the correct numbering of replacement body shells when the original is missing.

7.15 The developer shall provide information on the proposed ground illuminated traffic bollard as required by the Appointed Contractor.

7.16 Bollards shall be fed via a private cable system utilising 6.00/10.0 mm Steel Wire Armoured Cable (to a maximum length as calculated under BS 7671), the cable shall be terminated within the bollard base using brass compression glands, brass lock nuts and PVC shroud and either separate brass gland plates or a brass gland plate integral with the cut out. Terminations using worm drive clamps or similar are not permitted.

7.17 The private cable system feeding internally lit bollards shall be switched to provide illumination during the hours of darkness only. The means of control shall be at the origin of the circuit and shall be either a din rail mounted solar electronic time switch with battery backup or an electronic current sensing switching device capable of using the column photocell as the initiator for illuminating the unit. The general arrangement is shown on Highway Works Detail Drawings (SLP502).

7.18 Consideration shall be given for any illuminated bollard that is to be sited in a position where the ground may become flooded. As a check list the following should be considered and implemented as required and full details of the environmental risk review provided to the Authority and Appointed Contractor prior to completion of the initial design.
- Can the illuminated bollard be substituted for a non-illuminated reflective spring back bollard?
- Can the bollard be re-sited out of potential flood water?
- Should additional electrical disconnection and protection be supplied for any circuit likely to be submerged?

8.0 INTERNALLY ILLUMINATED SIGNS

8.1 Internally illuminated signs shall only be used on the express written instruction of the Appointed Contractor and shall comply with the Traffic Signs Regulations and General Directions current at the time of design.
9.0 SIGN PLATE CONSTRUCTION AND ASSEMBLY

9.1 Unless otherwise specified by the Appointed Contractor, sign plates shall be manufactured either from sheet aluminium of not less than 11 swg or 3 mm thickness or from extruded aluminium plank sections. All reflective sign plates shall have a permanent indicator on the non reflective side with the name of the manufacturer, the date of manufacture, class of reflective material and the works order or other identifying reference number.

9.2 All sign plates shall be manufactured in accordance with BSEN 12899: 2001, Class Ref 2 (which has superseded BS 873: Part 6: 1983, Class 1).

9.3 The whole of the back surface of all sign plates shall be covered with grey non-reflective plastic sheeting or other grey finish for which a manufacturer's guarantee of not less than 7 years has been obtained. (For some conservation areas a similar black finish may be used with written permission of the Appointed Contractor).

9.4 All stiffening and framing to sign plates shall be in aluminium section of suitable strength and coloured to match the back to sign.

9.5 All sign plates shall be provided with stiffening or framing, unless otherwise specified on the signs schedule.

9.6 Signs and frames shall meet the mechanical properties and construction requirements of BSEN 12899: 2001. Puncturing of the sign face material for the purpose of affixing the stiffening shall not be permitted.

9.7 Rivets shall be spaced to suit structural requirements of BSEN 12899: 2001 and shall be spaced uniformly at not more than 150mm apart.

9.8 All brackets, 'U' bolts and clips used in sign assemblies shall be manufactured from stainless steel or in the case of plank type signs, extruded aluminium. They shall be complete with stainless steel nuts and bolts and with 2 No stainless steel washers and 1 No stainless steel spring washer for each bolt.

9.9 The minimum number of clips for each sign supporting post shall be as follows:

<table>
<thead>
<tr>
<th>Depth of Sign (Metres)</th>
<th>Minimum Number of Clips</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1.0</td>
<td>2</td>
</tr>
<tr>
<td>1.0 - 3.0</td>
<td>3</td>
</tr>
<tr>
<td>3.0 - 4.5</td>
<td>4</td>
</tr>
<tr>
<td>4.5 - 6.0</td>
<td>5</td>
</tr>
<tr>
<td>over 6.0</td>
<td>6</td>
</tr>
</tbody>
</table>

The above table does not apply to signs made up in a modular or plank type form.

9.10 The Appointed Contractor’s written approval is to be obtained before using any steel banding.
9.11 For signs mounted on a single post an effective arrangement to prevent forced rotation shall be provided.

9.12 Where purlins are used, the sign stiffening and framing shall be continuous in the vertical direction.

9.13 Purlins shall be attached to each vertical member of the sign frame and the distance of the top and bottom purlins from the parallel sign edges shall not exceed 500 mm. Intermediate purlins shall be spaced equally apart at centres not exceeding 1.0 m. A connection shall be made at every point where a purlin crosses a post.

10.0 LIGHTING COLUMN AND SIGN POST PAINTING

10.1 Should it be proposed that any item of equipment be painted a full painting specification and permission shall be obtained from the appointed contractor in writing.

11.0 LOCAOTIONAL MARKING AND NUMBERING

11.1 All equipment shall be provided with location marks for inspection and maintenance after erection.

11.2 (i) Equipment mounted in the central reserve are to have 75 mm high numbering on both sides of the post. Each number is to face the oncoming traffic at an angle of approximately 45°.

(ii)Verge or footpath mounted equipment are to have 50 mm high numbering on the front of the column or post facing the road.

(iii)The numbers shall be BLACK characters on a WHITE background extending to 25 mm beyond any character in any direction, fixed at a height of 2.0 Metres above adjacent ground level, or at a suitable height to avoid obscuration by attachments. The numbers shall be applied vertically to the post. The Appointed Contractor or his representative may vary the colour of the characters and/or background, by written instruction.

11.3 Lit traffic bollards are to have 50 mm high numbering on each of the four sides. The numbers shall be BLACK characters applied vertically directly to the lower side aspect 0.25 metres above adjacent ground level. A corresponding number shall be installed within the base compartment so that it is visible when the shell is detached.

11.4 Where possible it is desirable that the numbering sequence shall be provided at the design stage and submitted with the design for approval by the Appointed Contractor. The proposed numbering scheme shall be consistent with any existing numbering in the area.

In any event a numbering system shall be agreed and marked on site prior to final adoption of the scheme or the end of the defect maintenance period. Any costs of renumbering to be borne by the developer.
11.5 A Staffordshire County Council “Door Missing” label shall be affixed to every street lighting column and sign within the base compartment and ensuring that it is visible.

11.6 Where signs or columns are situated directly under or in close proximity to overhead power lines, a warning label shall be fitted per the Highway Works Detail Drawings (SLP502).

12.0 ANCILLARY EQUIPMENT

12.1 Should it be necessary for the Developer to provide wall mounted control boxes or any non standard arrangement not covered by the standard drawings, then the details of each scheme shall be agreed in writing with the Appointed Contractor in advance of any work being carried out.

12.2 Photo Cells (PECU)

12.2.1 All PECU’s shall be manufactured to BS 5972 including all relevant standards for electromagnetic interference, immunity and harmonic currents along with the following conditions.

12.2.2 The switch on level shall be 35 Lux and provide a negative differential switch ‘ON/OFF’ ratio of 1.0 to 0.5. (signs to be 35/18)

12.2.3 The PECU shall have a maximum 24 hour power consumption of less than 3 watts (e.g. a low loss electronic photocell having a UMSUG rated nominal electrical consumption of 0.25 watts).

12.2.4 Individual road lighting units shall be switched by means of a one part photo electric cell mounted on top of the lantern by means of a NEMA socket, installed by the lantern manufacturer which shall be fitted with a gasket to provide an IP66 seal when fitted to the lantern. Group control of lighting systems shall not be used unless agreed with the Appointed Contractor in writing.

12.2.5 Individual illuminated lit traffic signs shall be switched by a negative ratio one part miniature photo electric cell. Consideration shall be given to the positioning of the PEC within the lantern where the sign lantern is situated under an artificial lighting source or obstruction that may affect the correct operation of the unit.

12.2.6 PECU’s shall be omni-directional and designed so that momentary lighting from extraneous sources will not operate the cell mechanism. A time delay of 20 to 30 seconds shall be incorporated into the circuitry.

12.2.7 The PECU shall be designed so that in the event of failure of the control unit will cause the load to be switched on. If a triac or other semi-conductor is fitted a method of ensuring that the load remains switched on shall be provided in the event of a large overload destroying the device.

12.2.8 The light detector shall have a spectral response that closely matches the CIE photopic curve and shall not drift by more than 1% over the guaranteed life of the product.
12.2.9 The PECU shall be designed so that the sensitivity of the unit is unaffected by weather conditions and must not be temperature sensitive within the temperature range of -20°C to 70°C.

12.2.10 The PECU shall be hermetically sealed to IP67 against the ingress of moisture and dust and shall be contained in a strong impact resistant translucent housing, the surface of which shall be non-oxidising and impervious to discolouration by dirt or soot. The light transmission characteristics of the translucent housing shall not vary by more than 1% over the guaranteed life of the product.

12.2.11 The seal between the PECU and the NEMA socket must provide a seal of IPX4 as a minimum.

12.2.12 The switch contact load rating shall be capable of switching a maximum load of 2 x 250watt SON/T lamps.

12.2.13 All PECU’s shall be fully solid state and guaranteed for a period of 10 years which shall not be insurance based but based on testing and component mean time between failure. The supplier shall provide supportive testing records and written evidence to support life expectancy claims.

12.2.14 The PECU shall be designed and installed to be resistant to vibration in accordance with BS 2011: Vibration.

13.0 WIRING

13.1 The cables for internal wiring of equipment shall be to BS 6004: 1991, PVC insulated and PVC sheathed single core, type 6181Y, PVC insulated and sheathed Twin with earth, type 6242Y or type 3183 TQ flexible cable and shall have copper conductors. Single earth cable shall be PVC insulated (colour green/yellow) without sheath type 6491X and tri-rated for the door earth bond.

13.2 The minimum cable conductor size for the wiring between the isolator and the lantern in columns of 8, 10 and 12 metre mounting heights shall be 2.5mm² and 1.5mm² cable for 5 and 6 metre mounting height lighting columns and traffic signs.

13.3 The minimum cable conductor size for the wiring between the Distribution License Holder (DLH) cut out unit and the isolator unit will be 6mm² type 6181Y cables.
14.0 ISOLATION AND FUSES

14.1 All road lighting units and lit traffic signs shall be provided with double pole fused isolation, complete with lock-off facility and incorporating an earth terminal. The unit shall have an IP65 rating. This unit is in addition to the DLH fuse unit. 

The contractor or developer shall ensure that the DLH cut out is fitted with a fuse of suitable rating to ensure discrimination in operation.

14.2 Fused links shall comply with BS 88 category of duty 240 volt AC rating Class Q1.

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<thead>
<tr>
<th>Wattage</th>
<th>COSMOPOLIS LAMPS</th>
<th>LED LIGHTING</th>
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<td>6</td>
</tr>
<tr>
<td>Twin Lamp</td>
<td>6</td>
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</tbody>
</table>

14.3 All sub-fuses, switch fuses and switches shall be clearly marked to identify the equipment that they feed and shall be phase identified where appropriate.

15.0 NON DLH UNDERGROUND CABLE NETWORKS

15.1 With the exception of private network supplies to bollards and associated signs and signs on roundabouts, a private cable network will only be acceptable instead of Distribution Licence Holder (DLH) services, where expressly permitted in advance by the Appointed Contractor, in writing.

15.2 Should a private cable system be proposed, a full schematic diagram showing all cables, ducts, draw pits, feeder pillars, items of equipment, details of terminations, cable sizes and full design calculations to prove compliance with BS 7671 shall be provided. No work shall be commenced until the Appointed Contractors written agreement has been obtained.

The Appointed Contractors requirements are for a fully ducted system. This system shall comprise of draw-pits at each end of all road crossings and where there is a significant change in direction of the ducting. All ducts will be orange in colour; refer to Highway Works Detail Drawings (SLP502) for sizes and installation methods. NOTE: No other coloured ducting will be permitted. Any cable network shall be of the loop in/loop out type; ‘T’ joints are not permitted. All cabling must be continuous no joints will be permitted throughout the length of the system as either extension to the network or as a repair. On completion “as built” drawing shall be supplied.
The ductwork system will be constructed to ensure it forms a complete and interlocked system. Care should be taken to ensure that all access pit frames are securely fixed to the chamber and that all removable covers are secured using fixing screws/bolts that do not require specialist tools or lifting gear to remove.

15.3 Cables shall be 600/1000 volt multi core XLPE/SWA/PVC, manufactured to BS.5467: 1989 with high conductivity copper conductors.

15.4 Cables shall be 3 core and the third core shall be used as an earthing conductor supplementary to the steel wire armourings.

15.5 Cables shall be tested before leaving the manufacturer’s works and the developer shall supply the Appointed Contractor, on request, with the test certificate bearing the name of the manufacturer and the drum number before the cable is laid.

15.6 Trenches and duct work shall not be back filled or buried until inspected and approved by the Appointed Contractor or his representative. Trenches shall be kept as straight as possible and follow the routes described on the drawings.

15.7 Cables shall always be installed in suitable ducts, orange in colour and the developer shall clean the duct before drawing in the cable along with a spare draw rope. Marking of service duct shall be as shown on Highway Works Detail Drawings (SLP502). Spare draw ropes shall be made of polypropylene or similar long lasting material.

15.8 Cables crossing draw pits shall be adequately supported, with a maximum of 450mm between supports.

15.9 The ends of cables shall be identified at the time of installation by means of a suitable permanent marker showing the reference number of the cable or other means of identification. Cable ends shall be sealed to prevent the ingress of moisture.

15.10 Cables that are to be temporarily sealed before energisation shall be made water tight using an approved heat-shrink end cap. The developer shall display all necessary warning and danger notices.

16.0 CUT OUTS FOR PRIVATE CABLE NETWORKS

16.1 Cut outs shall be suitable for terminations as Highway Works Detail Drawing. No.'s 14.01 to 14.06. They shall be capable of accommodating 3 no. XPLE/SWA/PVC cables and glands of up to at least 25mm² cross sectional area 3 core with capacity for looping in and out. Cable glands shall be compression type made of brass.

16.2 Where circuit cables of 6.00mm² are used to feed lit signs and illuminated bollards, cut outs with reduced size terminations and cable entry boxes may be used.

16.3 Separate gland plates made of brass shall be provided for each cable and gland; they shall be fixed to the backboard with non rusting screws. Alternatively brass gland plates that are provided as an integral part of the cut out may be used.
16.4 All cut outs shall be provided with an integral earth terminal which shall be bonded to the gland plate.

16.5 The glands shall be secured to the gland plates with brass locknuts and shall be fitted with Black PVC shrouds. The general arrangement is shown in Highways Works Detail Drawings (SLP502).

16.6 Terminations using worm drive clamps or similar are not permitted under any circumstances.

17.0 FEEDER PILLARS

17.1 Feeder pillars shall be constructed from sheet steel and shall be hot dip galvanised after manufacture. The pillar shall be manufactured specifically for the purpose of providing highway power supplies and shall be provided by a recognised manufacturer. They shall comply with IP 34 of BS EN 60529: 1992: Specification for Degrees of Protection Provided by Enclosures (IP Code). They shall include a full size backboard of minimum thickness 15 mm hardwood or other substantial non-hygroscopic material. The entry for cables shall be via the root.

As an alternative pillars made of stainless steel may be provided by agreement with the Appointed Contractor.

17.2 Root protection shall be afforded in the form of a bitumen coating applied over the galvanised finish. The protection coating shall extend 250mm above the planted ground level.

17.3 The general arrangement of equipment to be provided and minimum dimensions are shown on drawings as follows:
   For up to 2 outgoing circuits, pillar shall be type D. Drawing Ref 14.40
   For up to 6 outgoing circuits, pillar shall be type C. Drawing Ref 14.43
   For over 6 outgoing circuits, pillar shall be type B. Drawing Ref 14.46

The designer shall consider the use of three phase supplies and split distribution circuits even for small installations, particularly in sensitive areas such as roundabouts and major junctions so that not all lighting is lost if one phase of the REC supply fails.

17.4 Apart from pillar type D the distribution fuse boards shall have sufficient spare capacity to accommodate at least one extra circuit (one three phase way on a three phase distribution unit and one single phase spare way on a single phase distribution unit). The distribution unit shall be manufactured from either stainless steel or powder coated steel from an industrial/commercial range having a large enough area to allow direct termination of outgoing steel wire armoured cables. There shall be at least 25% spare capacity spacing on the back board.

17.5 The feeder pillar doors shall be fitted with tamper proof locks, all locks being identical in pattern and a minimum of two sets of keys shall be provided. All hinges and locks shall be of stainless steel.

17.6 Distribution boards shall be provided with an external earth, phase barriered and colour coded. They shall be fitted with the same number of live and neutral bus bar terminals as there are outgoing circuits.
17.7 All new feeder pillars shall be fitted with internal warning notices and labels in accordance with Highways Works Detail Drawings (SLP502) and fully in accordance with BS 7671. The circuit diagram shall be of adequate size to show all equipment and circuit details clearly and shall be enclosed in a plastic heat laminated wallet and fixed in a visible position within the pillar. An example of a suitable format is shown in the Highways Works Detail Drawings (SLP502).

17.8 The feeder pillars shall be mounted on a 150mm thick foundation of mix ST2 concrete and backfill materials shall be equivalent to an ST5 concrete mix. See relevant drawing reference detailed in 17.3 above. After completion of the cabling the feeder pillar base shall be filled to 25mm below the door with rounded aggregate, graded 14mm to 5mm, conforming with BS 882: 1992: Specification for Aggregates from Natural Sources for Concrete. Cable entry ducts entries shall be suitably sealed prior to back fill to prevent blockage by aggregates.

17.9 Where a feeder pillar is not installed entirely in a footway or other permanently surfaced area, then the concrete foundation shall be extended to 25mm above the final surface level and then shall be trowelled to form a smooth surfaced concrete collar around the pillar. The surface of the collar shall slope away from the pillar to prevent the build-up of water or debris. The collar shall extend away from the base of the pillar on all sides by 150mm. (See SLP502).

17.10 A durable warning sign indicating ‘Danger 400 volts’ or ‘Danger 230 volts’ as appropriate, shall be fixed to the front of the feeder pillar where applicable.

17.11 The position of the feeder pillars and direction of proposed door openings shall be as shown on the approved design drawings.

17.12 A suitable supply will be provided, installed and terminated in each pillar by the DLH. The developer will be responsible for the organisation and cost of this work.

17.13 Permanent galvanised metal shims may be used to align feeder pillars.

17.14 Feeder pillars shall be provided with a suitably sized level hard standing to the front of the pillar that is a minimum of 600mm depth and a minimum of full width across the front of the feeder pillar, or 600mm; whichever is the greater.

17.15 The whole of the installation shall be earthed according to the requirements of the current edition of BS 7671: 1994, BS 7430: 1991 and to the satisfaction of the DLH.

17.16 The feeder pillar main earth terminal block shall be connected to the DLH’s earth terminal. The main earthing conductor shall be according to Table 5.

17.17 All bare earth conductors shall be sleeved with green/yellow PVC sheathing. All earth connections shall be made between two brass washers.
### TABLE 5: FEEDER PILLAR EARTHING CONDUCTOR SIZES

<table>
<thead>
<tr>
<th>CSA of DLH Supply Neutral Conductor</th>
<th>Minimum CSA of corresponding protective conductor (Sp)</th>
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<tbody>
<tr>
<td>Up to 35 mm$^2$</td>
<td>10 mm$^2$</td>
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<tr>
<td>35-50 mm$^2$</td>
<td>16 mm$^2$</td>
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<tr>
<td>50-95 mm$^2$</td>
<td>25 mm$^2$</td>
</tr>
<tr>
<td>95-150 mm$^2$</td>
<td>35 mm$^2$</td>
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</table>

18.0 **INSPECTION AND TESTING**

18.1 The developer shall test the installation according to the tests prescribed in the current edition of BS 7671 and maybe required to carry out further tests specified by the local DLH.

18.2 Upon satisfactory completion of all testing, the developer shall issue a certificate complying with the current edition of BS7671, duly completed and signed by a suitably qualified person to the appointed contractor.

18.3 In the case of NON DLH Underground Cable Networks, as built drawings showing all cable runs and completed works shall be provided to the appointed contractor. This will be in addition to the circuit diagrams required as 17.7 above.

18.4 The developer will ensure that there is a minimum of 3 years remaining on any valid electrical test certificate at the time of final adoption. Any assets not meeting this requirement must be retested and a new electrical test certificate produced.

19.0 **INSTALLATION**

19.1 The developer's contractor shall be a Highway Electrical Registration Scheme (HERS) registered organisation and operate to an approved Quality Assurance Scheme for the Installation and Maintenance of Highway Lighting and Highway Signs. All operatives shall be registered under the HERS Competency Scheme and carry a card or certificate indicating their level of competence.

19.2 All equipment shall be installed in accordance with the manufacturer’s instructions, statutory (and other) regulations and codes of practice, and to the complete satisfaction of the Appointed Contractor.

19.3 The exact positions of **ALL** apparatus and equipment as shown on the drawings shall be agreed with the Appointed Contractor or his representative before commencing excavation. Apparatus must only be installed in land that will be under the ownership of the Highway Authority for the foreseeable future.

19.4 Each hole for columns/signs shall be dug by hand to the correct planting depth for the installation. The hole shall be of sufficient size to allow for ease of erection and a 150mm minimum surround of ST5 type mix of concrete to encircle the column completely and be freely rammed. Cable entry holes shall be free from obstruction.
19.5 Lanterns with brackets shall not normally be attached to the column until the concrete has fully hardened.

19.6 Columns shall be erected with the access door openings as per table 2.22 above, other than where positioned at the back of the footpath, the positioning of door openings should always provide maintenance operatives with the safest working position and best view of potential hazards.

19.7 Care is to be taken during erection so that the columns are set into the ground in relation to finished levels of roadwork and are clear of any existing or likely pavement crossings. In footpaths beside the carriageway and up to 2 metres wide, columns should be sited within the footpath against the face of the back edging. Columns/Signs shall be planted at the manufacturer’s depth as detailed in section 2 of this document.

19.8 Where no tarmac footpaths are to be provided, columns should be erected at a maximum of 1.8 metres from the kerb edge to the rear face of the column, this distance shall be reduced for narrow areas as appropriate, so that no equipment is installed upon private property.

19.9 The Appointed Contractor shall be given a minimum of 5 days notice of any road lighting and electrical works to be carried out on existing apparatus maintained by the Appointed Contractor.

19.10 Road lighting and electrical works shall not commence until footways and paved area formations have been prepared, and kerbs laid to final line and level.

19.11 All service ducts, draw pits and duct chambers necessary for any NON DLH Underground cable works should be installed before cable installation commences.

19.12 Bituminous bound materials and pre cast materials in footways, paved areas and top soil in verges shall not be laid over buried cables and against lighting units and feeder pillars until the cabling and installation of lighting units and feeder pillars for that particular cable layout is completed.

19.13 Appropriate measurers shall be taken to ensure that the surface protection coating on the column/sign will not be damaged during any lifting and handling operation.

20.0 DLH UNMETERED SUPPLIES

20.1 Unless specified or otherwise agreed in writing by the Authority and Appointed Contractor, all illuminated equipment must be supplied and energised prior to adoption utilising a DLH supply network.

20.2 Any work on the DLH unmetered supply network must be carried out by the DLH or his appointed contractor.

20.3 The developer will be responsible for ensuring that only persons approved under the Highway Electrical Registration Scheme are permitted to remove DLH fuse carriers.
20.4 Unmetered services to each column, sign or feeder pillar will be provided by the DLH and will be terminated in a single pole and neutral link fuse unit supplied by the DLH. The fuse unit shall be fixed to the bottom of the backboard in each column/sign or feeder pillar. The general arrangement for equipment to be provided in the base of columns, signs and feeder pillars are as detailed in Highways Works Detail Drawings (SLP502).

20.5 The developer will be responsible for liaison and placing of all orders with the DLH for the disconnection of supplies. It is the responsibility of the developer and his contractor to liaise with the DLH to ensure the disconnection/connection of supplies meet with the agreed programme of works.

20.6 Where the DLH is to be an Independent Distribution Network Operator (IDNO) any and all costs associated with the transfer of agreements from the Developer to the Authority, at the time of adoption, shall be met by the Developer.

20.7 Guidance may be obtained from the Appointed Contractor for clarification of these clauses.

21.0 TEMPORARY LIGHTING

21.1 Where existing lighting is to be removed as part of a development that may affect lighting on the adopted highway; including any extension of private network cables that may extend beyond or originate outside the boundaries of the development or works, the developer shall comply with the following:

21.2 Where existing road lighting units’ and/or lit traffic sign units are to be removed or altered as part of the development and there is a delay of more than 24 hours between the removal and disconnection and the re-erection and reconnection of the unit/s, temporary lighting shall be provided.

21.3 The appointed contractor must be notified of all proposed temporary lighting or other necessary measures to ensure that all affected Authority Lighting Equipment remains illuminated throughout the duration of the works, prior to commencement.

21.4 Where temporary lighting is provided, it shall be to a similar lighting standard as the existing lighting.

21.5 Temporary lighting shall not be removed or switched off until:

a) The permanent installation is in full operation.

b) An inspection has been carried out on the operation of the permanent installation which shall be not less than 24 hours or more than 7 days after commissioning.

c) Any adjustments, remedial work or replacements found necessary have been carried out.

21.6 Temporary overhead feeds are only to be used for short periods in exceptional circumstances and written permission must be obtained from the Appointed Contractor prior to installation and shall comply with the following requirements:
a) The system shall consist of conductor wires supported by a steel catenary wire, which under no circumstances should be tensioned so that it causes undue stress on any existing or renewed apparatus. The minimum height above ground of the span shall, according to the location, be as follows:

- 5.8m for all roads and road crossings.
- 5.2m for all other positions accessible to vehicular traffic.
- 4m in positions inaccessible to vehicular traffic.

The most onerous condition shall apply.

b) The conductor wires shall be a minimum 2.5mm$^2$ CSA and shall normally be PVC 3 core heavy duty cable. The cable shall be terminated into a cut out in the base compartment of each lighting column. No joints shall be made in the cable. The cable shall be attached to the catenary wire at intervals not exceeding 300mm, by suitable cable ties, allowance being made for expansion and contraction.

c) Catenary wires shall be galvanised mild steel 7/16 mm$^2$ stranded. (4.75mm overall diameter) minimum size.

d) Any temporary fixings to the lamp columns shall not be detrimental to the column or bracket in any way.

e) The outgoing supply for the catenary lighting system shall be fed from an RCD protected miniature circuit breaker.

22.0 PROCEDURES FOR ISOLATING NON DLH UNMETERED SUPPLIES

22.1 Where alterations of an existing NON DLH unmetered supply cable network is proposed, then the Appointed Contractors prior permission must be obtained. Under no circumstances should an existing network be left de-energised leaving other lighting units unlit during the hours of darkness.

22.2 The developer will be required to nominate and advise the Appointed Contractor, in writing, of the name and telephone number of a 24 hour contact responsible for electrical works on site.

22.3 A minimum of three working days notice shall be given to the Appointed Contractor or his representative, in writing, prior to equipment being isolated from the supply.

22.4 Where private cables are to be isolated or energised, suitable weatherproof notices, displaying the name of the person responsible must be displayed on the switch gear in the feeder pillar or other control source. When more than one person requires a cable to be isolated, each person must display a notice.

22.5 The isolation of individual circuits shall not be carried out using the MCB or fuse within the distribution board. Double pole isolation must be carried out at all times. Unless the means of isolation can be permanently locked using a unique lock and key, all the cable cores shall be physically disconnected and removed from the terminations.

22.6 It is the developers’ responsibility to identify and prove column supplies prior to isolation and work commencing.
22.7 Isolation shall not take place during hours of operation.

22.8 Re-energisation shall take place at least one hour before the required hours of operation after the circuit has been tested in accordance with BS 7671 and the notice(s) have been removed.

23.0 SUBWAY LIGHTING

23.1 Full design proposals shall be submitted and approved in writing prior to commencement of any installation.

23.2 Subway illumination shall be provided by purpose made sub way lighting units with a high vandal resistance construction using 55W PLL or equivalent LED lighting.

They shall be constructed from 2 or 3mm thick stainless steel and have concealed fixings. The units will be either cast into the underpass structure and completely flush or if surface mounted, shall be linked together with blank units made of the same material and supplied by the luminaire manufacturer.

The luminaires will have rated at IP 65 and will have a 10mm polycarbonate glazing panel complete with secondary sacrificial anti graffiti panel covering. All wiring shall be enclosed in heavy gauge galvanised steel conduit which shall be adequately fixed by means of saddles.

Any feeder pillar installed within the underpass shall be of a purpose designed flush type with high vandal resistance, the Appointed Contractor shall be consulted in advance and his specific requirements shall be agreed before any work is carried out.

24.0 PASSIVELY SAFE LIGHTING COLUMNS AND ILLUMINATED SIGN POSTS

24.1 Should the Developer be required, through risk assessment of the scheme, to utilise any non-standard equipment that is considered to be Passively Safe, the Developer shall obtain the Appointed Contractors written agreement at an early stage before any equipment is finally selected or installed. Full design proposals shall be submitted to the Appointed Contractor and approved in writing prior to commencement of any installation.

The Appointed Contractor may require the Developer to make a financial contribution to cover the cost of any future repairs over and above the cost of replacement of standard equipment and may also request the provision of spare equipment at no cost to the Appointed Contractor.

25.0 Central Management System (CMS) and Remote Monitoring Systems (RMS)

25.1 CMS/RMS may be specified by the Authority, the Authority will decide on a site by site basis where CMS/RMS is to be used.

25.2 The Developer will be responsible for contacting the Authority for written confirmation of whether a CMS/RMS system is required or not. At that time the Authority will specify the details of which system is to be included within the final designed scheme.
25.3 Any system specified must be installed, commissioned and demonstrated prior to the initial adoption inspection, with all relevant literature and CDM information supplied at the time of the demonstration.

26.0 COMPLIANCE WITH STANDARDS, REGULATIONS AND DRAWINGS

26.1 The design, installation and equipment provided by the developer shall be in strict accordance with the latest edition of the following publications, with any amendments thereto, unless stated otherwise in the specification.

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<thead>
<tr>
<th>Available From:</th>
<th>BS 5489-1: 2003 and amendments. Road Lighting</th>
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<tr>
<td></td>
<td>The Traffic Signs Regulations and General Directions 2002</td>
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<tr>
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<td>Memorandum of Guidance on the Electricity at Work Regulations 1989 HS (R) 25</td>
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<td>BS 7671 Requirements for Electrical Installations (IEE Wiring Regulations 17th Edition) Including subsequent amendments.</td>
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<td>Institution of Lighting Professionals Code of Practice for Electrical Safety in Public Lighting.</td>
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<td>GP10 Safety During the Installation and Removal of Lighting Columns and Similar Street Furniture in Proximity to High Voltage Overhead Lines.</td>
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<td>Technical Report 26 Painting of Lighting Columns</td>
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<td>Model Code of Practice, Covering electrical safety in the planning, installation, commissioning and maintenance of public lighting and other street furniture. Engineering Recommendations G39/1</td>
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<td>Guidance Notes on Electrical Safety on the Highway to Achieve Compliance with the Electricity at Work Regulations.</td>
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<td></td>
<td>Electricity Association, 30 Millbank, London, SW1P 4RD</td>
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<tr>
<td></td>
<td>The Secretary, County Surveyors Society</td>
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</table>
26.2 The design, installation and equipment provided by the developer shall be in strict accordance with the Highway Works Detail Drawings contained within SLP502, unless stated otherwise in the specification. Should the Developer identify a situation where there is apparently a conflict between the specification and the drawings, it is the responsibility of the Developer to seek written clarification from the Appointed Contractor as to the actual requirements.

26.3 **Highway Works Detail Drawings list:**

12.52 Permanent Bollards Installation of Flexible Base Illuminated Types
12.53 Demountable central Refuge sign and illuminated bollard arrangement
12.54 Zebra Crossing on Single “Two Way” Carriageway
   Beacon and Lantern Installation Detail
12.55 Integration of centre island refuge with retention socket and access chamber
13.01 Installation of Sign Post. 5m Nominal Height, Steel Sign Post (Planted)
13.03 Installation of Lighting Columns. 6m Nominal Height, Steel Columns (Planted)
13.11 Installation of Lighting Columns. 8,10,12m Nominal Height, Steel Columns (Planted)
13.20 Detail for Build-out at street lighting column position on shared surface areas.
13.71 Notice for Road Lighting Columns
13.72 Warning Notice for Road Lighting Columns & Traffic Signs
14.01 Termination of Cables in Base Compartments Type L1
14.02 Termination of Cables in Base Compartments Type L2
14.03 Termination of Cables in Base Compartments Type L3
14.04 Termination of Cables in Base Compartments Type L4
14.05 Termination of Cables in Base Compartments Type L5
14.06 Termination of Cables in Base Compartments Type L6
14.15 Electrical Equipment & Wiring – Road Lighting Column
14.20 Arrangement of Electrical Equipment at Supply Interface for Extra Low Voltage Highway Installations
14.40 Feeder Pillars Type A & D
14.43 Feeder Pillars Type C
14.46 Feeder Pillar Type B for over 6 outgoing circuits
14.47 Notices, Numbering & Lettering. Labelling Feeder Pillars
14.51 Underground Cables & Ducts
Appendix 1

Street Lighting Column and Sign Post, Door Orientation

The following pictures show examples of good and poor practice for column or sign door orientated in relationship to the highway. Further details are provided within section 2.23 of this document.

Column situated at the front of the path.
Column situated at the front of the verge.
Column situated at the rear of the path.
Appendix 2

Typical layout of electrical equipment within base compartment of street lighting column or sign.
Appendix 3

Process Requirements for Design, Construction and Adoption of a Lighting Scheme.

The following process charts indicate the minimum requirements for consideration and action by the Developer throughout the design, construction and adoption phase of any development that incorporates a new or revised lighting scheme.

During each phase of any development, the Developer will make all necessary arrangements to comply with the requirements of this and any other associated specification document including all requirements associated with Construction Design Management (CDM) obligations.

Specific attention is drawn to the requirements for consideration of how any future maintenance or replacement of the assets will be undertaken. All considerations detailed within this specification will be undertaken and included within any design notes or documents provided as part of the final CDM documentation hand over. Each location should be considered separately as part of the design and construction process and any other special requirements whether specifically detailed within this specification, associated documents or not; should be incorporated into the works with full details provided at each stage of the process.

The Authority and/or Appointed Contractor may require evidence at any time of the specific considerations made in respect of the design and construction process in meeting these requirements and may also impose additional requirements into the scheme in the event that these requirements have not been met or properly considered.
Developer:
Submits PRE BUILD details to Authority for future accrual consideration. Details MUST include:

1. The Relevant Action (the S38/278 /111 works Notice or detail.
2. The contractor/developer or other parties involved.
3. Full details of the location and extent of site.
4. The Design Brief including Lighting classes proposed /required for the development.
5. Any other special requirements.
6. A copy of the design scheme is to be built to.
7. Details of type and location of proposed apparatus.
8. Written confirmation from the developer that the design meets the specification.

DESIGN STAGE

Authority: Undertake review of design to satisfy that it complies with the requirements.

Authority: Design does not comply

Authority: Design Complies

Authority: Issue written Notice that the Design does not comply and sufficient detail as to why.

Authority: Issue Design Approval
Developer:
Obtains where necessary the 
MPAN agreement 
from the 
relevant DNO for all Lighting 
equipment to be incorporated into 
the scheme.

Developer:
Ensures that the following is 
considered and actioned at the 
appropriate time before 
commencing the installation:

1. Ensure that the specification 
used at design stage is still 
current prior to installation.
2. All Authority Lighting 
Equipment within the boundaries 
of the site (including any 
electrical network cables that 
extend beyond the site) have 
been inspected and identified.
3. Any deviations from the 
Specification have been agreed 
in writing prior to installation.
4. All necessary consents and 
authorisations have been 
obtained.

PRE CONSTRUCTION STAGE

Developer:
Requests in writing 
confirmation of the current 
specification prior to 
installation (Note: The 
Developer is responsible for 
ensuring that installations 
comply with the latest 
Specification documents)

Authority/Appointed 
Contractor:
Confirms current 
specification

Developer:
Where the Specification has been superseded the 
Developer should make any necessary amendments 
and confirm to the Authority /Service Provider that all 
such amendments have been incorporated into the 
scheme.

Developer:
Where the Specification remains unchanged from the 
Design Stage the Developer may proceed.

Developer:
Notifies Authority/Appointed Contractor 
in writing of planned commencement 
date including a complete schedule of 
Authority Lighting Equipment and 
electrical network to be affected. This 
must include detailed proposals of how 
the Developer intends to maintain all 
Authority Lighting Equipment in light 
during the works (including those items 
of equipment outside the boundaries of 
the works that may be affected).

Developer:
Obtains where necessary the 
MPAN agreement from the 
relevant DNO for all Lighting 
equipment to be incorporated into 
the scheme.
CONSTRUCTION STAGE

Developer: Manages all aspects of the works to comply with the requirements of the Specification

Developer: Ensures that the extent of the highway remains adequately illuminated throughout the duration of the works.

Developer: Ensures that all energy consumption of the existing and replacement equipment is paid for for the duration of the works and until adoption.

Developer: Provides satisfactory protection of all Authority Lighting Equipment, that will not be replaced, throughout the duration of the works.

Developer: Seeks written guidance and/or authorisation in the event of any deviation from the design or planned works that was not foreseen during the planning stage.

Developer: Ensures all duct installations are offered for inspection prior to burial.

Developer: Notifies the Authority/Appointed Contractor in writing prior to any works that may affect existing equipment outside the scope of the development including any temporary disconnection of electrical services.
Developer: Submits details to Authority of completed site for adoption inspection. Details MUST include:

1. Extent and description of works to be inspected.
2. Full details of any private cable network (PCN)
3. Valid electrical test certificates for ALL apparatus and PCN's
4. A copy of the revision of the specification the scheme was built to including the standards and Design Brief.
5. Written confirmation from the developer that the installation is complete and meets the specification.
6. Other docs - i.e. CDM file.

POST CONSTRUCTION STAGE

Authority/Appointed Contractor: Undertake inspection to satisfy that the installation complies with the specification

Authority/Appointed Contractor: Site Compiles

Authority/Appointed Contractor: Site does not comply

Authority/Appointed Contractor: Issue written Notice that site does not comply and sufficient detail as to why.

Authority: Issue Adoption Approval

Authority: Issues Accrual/De-Accrual Notice to Service Provider

Developer: Completes all noted defects and resubmits scheme for approval along with £250* Inspection fee (See Note Below).

Authority/Appointed Contractor: Update AMS with new equipment

Authority/Appointed Contractor: Update Monthly Service Payment & Energy Forecast

Appointed Contractor: Update AMS with new equipment

Inspection Fee

The inspection fee noted is applicable as at 1st April 2015 for all schemes up to including 20 items of apparatus to be adopted, schemes with apparatus in excess of 20 assets will be subject to an additional charge of £10 per asset irrespective of the number of items failing previous inspections. Charges will be subject to increase by RPIX on the 1st April each subsequent year. The developer should obtain confirmation of the fee payable prior to making payment and reapplication for inspection.
Appendix 4

Documentation for Final Handover

The following list of documents is provided for informational purposes only and other documentation may be required for any particular development. The Developer should provide two full copies of the following along with the application for initial adoption inspection.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Completed ‘as built’ drawings including layouts of all private cable networks, ducts and chambers.</td>
</tr>
<tr>
<td>2</td>
<td>Schedule of all equipment including manufacturer details and any associated literature, lantern matrix and lamp position settings, dimming regimes etc.</td>
</tr>
<tr>
<td>3</td>
<td>Full design drawings and details for any specialist or heavy duty columns including fully dimensioned drawings of cranked roots and the like.</td>
</tr>
<tr>
<td>4</td>
<td>Electrical test certificates for all parts of the installation.</td>
</tr>
<tr>
<td>5</td>
<td>Fully detailed electrical schematic diagrams of private network cable systems.</td>
</tr>
<tr>
<td>6</td>
<td>Written confirmation of the Specification reference and revision the scheme is designed and constructed to, including confirmation that all parts of the design and installation comply.</td>
</tr>
<tr>
<td>7</td>
<td>Copies of any Authority/Appointed Contractor approved design variations or deviances.</td>
</tr>
<tr>
<td>8</td>
<td>Details of the electrical Distribution Network Operator (DNO) or Independent Distribution Network Operator (IDNO) to which the installation is connected.</td>
</tr>
<tr>
<td>9</td>
<td>Details of the erection date for all lighting columns and signs.</td>
</tr>
<tr>
<td>10</td>
<td>Details of the electrical connection date for all lighting columns, signs or other apparatus as appropriate.</td>
</tr>
</tbody>
</table>