Design Manual for Roads and Bridges

Road Lighting
Inspection & Assessment

TS 501
Road lighting inspection

(formerly TD 23/99)

Revision 0

Summary
This document contains the requirements for the inspection and assessment of new and replacement road lighting on motorways and all-purpose trunk roads.

Application by Overseeing Organisations
Any specific requirements for Overseeing Organisations alternative or supplementary to those given in this document are given in National Application Annexes to this document.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

This is a controlled document.

Contents

Release notes

Version	Date	Details of amendments
0	Mar 2020	TS 501 replaces TD 23/99. This full document has been re-written to make it compliant with the new Highways England drafting rules.

Foreword

Publishing information

This document is published by Highways England.

This document, alongside TM 501, replaces TD 23/99 Trunk Roads and Trunk Road Motorways Inspection and Maintenance of Road Lighting which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This document contains the inspection and assessment road lighting requirements of the Overseeing Organisation.

The purpose of inspection is to detect lighting failures and other defects.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 4.N] apply to this document.

Inspection of other highway systems can complement, and be carried out in conjunction with, road lighting inspections. These systems include illuminated signs, bollards, etc and can be integrated into their inspection activities..

Abbreviations

Abbreviations

Abbreviation	Definition
DNO	Distribution Network Operator

Terms and definitions

Terms

Term	Definition
Asset management system	An electronic database which contains information and data covering road lighting systems, as well as other assets, and includes data on inspections, testing, maintenance, schedules and rectification of defects, as well as identifiers.
Feeder pillar	A cabinet for electrical equipment, mounted at roadside, for controlling and distributing electrical supply to roadside assets.
Lamp	A replaceable component of the luminaire or lighting system that, when connected to electricity, produces light.
Luminaire	A complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, to position and protect the lamps, and to connect the lamps to the power supply.
Night-time lighting operational inspection	Inspection performed during the hours of darkness to determine road lighting failures. Also known as a "night outage" inspection.
Road lighting column	A standalone minor structure with the purpose of mounting a luminaire or luminaires.
Road lighting system	An installation of equipment and parts, including electrical energy, that are integrated and coordinated to create a method to illuminate the road. Road lighting systems are inclusive of but not restricted to: 1) luminaires; 2) Belisha beacons and vertical wig wag signs at school or animal crossings; 3) road lighting columns; 4) road traffic sign lighting; 5) access lighting for subways, underpasses and short tunnels (<150m in length), for motorised users, pedestrians, cyclists and horse riders; 6) the electrical and optical elements of high mast lighting systems (20m or more in height) and catenary lighting systems; 7) associated electrical supplies, including ducting, chambers, cables and feeder pillars and all switch gear, control equipment (including the photocell if fitted), monitoring equipment and heaters therein; 8) alternate energy sources for the purpose of road lighting or sign lighting; 9) energy saving equipment, e.g. dimming equipment; 10) power distribution cables downstream of the Distribution Network Operator (DNO) connection point.

Terms (continued)

Term	Definition
Safeguarding solution	A device or system fitted to columns and luminaires to prevent detachment of the luminaire from the column.
Subway lighting	A lighting system designed to illuminate a subway or underpass, excluding tunnels. Subway refers to a short section of underground passageway for either or both walkers, cyclists and horse riders, and motorised traffic.

1. Scope

Aspects covered

1.1 This document outlines road lighting system inspection requirements that shall be implemented through inspection to road lighting systems on motorways and all-purpose trunk roads with the exception of tunnel lighting.

1.2 The requirements in this document shall be implemented for columns <=18m in height with luminaires mounted on brackets and <=20m in height with post-top mounted luminaries.

1.3 All other road lighting columns, catenary systems and high masts, including associated hoists, winches and cables shall be inspected in accordance with CS 450 [Ref 3.N], SI 1998/2307 [Ref 5.N] and manufacturer's recommendations.

Implementation

1.4 This document shall be implemented forthwith on all schemes involving road lighting equipment inspection on the Overseeing Organisations' motorway and all-purpose trunk roads according to the implementation requirements of GG 101 [Ref 4.N].

Use of GG 101

1.5 The requirements contained in GG 101 [Ref 4.N] shall be followed in respect of activities covered by this document.

2. Inspection

General inspection

2.1 The inspection and testing for all electrical works shall comply with the requirements of BS 7671 [Ref 6.N].

2.2 The condition of road lighting systems and associated infrastructure, including any safeguarding solution fitted, shall be inspected for the performance and integrity of the system.

2.2.1 During road closures for maintenance or development requirements, inspection and assessment of illumination performance levels should be carried out.

2.3 During road lighting maintenance activities the road lighting system shall be inspected.

2.4 While inspecting the road lighting system, observed defects to any other equipment, assets and property shall be reported to the Overseeing Organisation.

2.5 All inspections shall be carried out according to manufacturer's inspection instructions and recommendations.

2.5.1 In the absence of manufacturer's recommendations and instructions, inspections of all types should be carried out in accordance with Overseeing Organisation requirements.

2.6 Road lighting system and associated equipment defects identified through inspections or random reports shall be repaired by adopting either a category of failure approach or risk based approach.

2.7 Where a category of failure approach is in use, the response times given in Appendix A shall be used.

2.8 Where a risk based approach is in use, the Overseeing Organisation shall be contacted.

2.9 Inspections shall include an assessment of the structural, electrical and mechanical elements of the road lighting system.

2.10 All road lighting system defects identified during inspection work shall be reported and recorded, including details of any action taken or required, in accordance with the asset management system.

Self-contained emergency luminaire inspection

2.11 Self-contained emergency luminaires shall be inspected and tested in accordance with the general principles of BS 5266 [Ref 2.N].

Lighting column inspection

2.12 Road lighting columns shall be inspected for any structural or mechanical defects, in accordance with 'Asset Management Toolkit: Minor Structures AToMS' ILP GN22 [Ref 1.N].

NOTE *Examples of lighting column elements for inspection are provided in Appendix B. The categories of defect severity are to be read in accordance with ILP GN22 [Ref 1.N].*

2.13 Road lighting column reference and approved notices, not including signs, shall be inspected to ensure they are clean, legible and the fixing secure during periodic inspection and testing.

2.13.1 The mounting of any notice should be inspected for defects and damage to the column surface.

Night-time lighting operational inspections

2.14 Night-time lighting operational inspections shall be programmed to identify and record all road lighting system failures.

2.14.1 Night-time lighting operational inspections should make best use of technology as a method to carry out the inspection.

2.15 During night-time lighting operational inspections carried out by a driver and observer in a moving vehicle, the inspection shall be undertaken to ensure the driver of the vehicle is not distracted by the task of observation.

2.15.1 Night-time lighting operational inspections to detect road lighting system failures should be carried out from a moving vehicle, either containing both a driver and observer or alternative solution to provide the same outcome.

Safety inspections

2.16 Safety inspections shall be carried out in response to reports, as a result of extreme conditions or unplanned events.

NOTE *Unplanned events or extreme conditions can refer to, for example, a major road traffic collision or extreme weather.*

Feeder pillars

2.17 All switch gear, including circuit protective devices, associated with the street lighting electrical system shall be inspected and be in accordance with the requirements of BS 7671 [Ref 6.N].

2.18 All electrical components and wiring associated with feeder pillars shall be inspected and checked for compliance with BS 7671 [Ref 6.N].

2.18.1 Inspection of feeder pillars should include checking for discolouration, compression or abnormal abrasion of wiring insulation, expansion of component compounds.

Records and schedules

2.19 Records of inspection and repair shall be retained and provided as required and on termination of the agreement to the Overseeing Organisation.

2.20 The summer and winter inspection schedules shall operate according to the needs of the Overseeing Organisation.

NOTE *Summer and winter inspection schedules can be varied in accordance with regional variations.*

3. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Institute of Lighting Professionals. ILP GN22, 'Asset Management Toolkit: Minor Structures AToMS'
Ref 2.N	BSI. BS 5266, 'Emergency escape lighting systems.'
Ref 3.N	Highways England. CS 450, 'Inspection of highway structures'
Ref 4.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 5.N	The National Archives. legislation.gov.uk. SI 1998/2307, 'Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) '
Ref 6.N	BSI. BS 7671, 'Requirements for Electrical Installations, IET Regulations'

Appendix A. Category of defect response times

Table A.1 Category of defects and response times

Category of defect	Description	Maximum response time	Additional actions
Category 1	A defect which can result in a structural or electrical safety hazard to the public or maintenance personnel	24 hours	None
Category 2 (High and medium priority)	A defect which results in lighting that is below the quality intended	Urban trunk roads: 7 days Other roads: 14 days	The DNO should be notified of any supply failures within 24 hours
Category 3 (Low priority)	All other electrical defects, lighting failures and structural faults which are considered to be less critical	6 months	Repairs should be incorporated into planned works, wherever practicable. Defects identified as requiring large scale replacement in schemes which are considered to be at the end of their useful life should be reported to the Overseeing Organisation
The times quoted are the maximum response times between notification of the defect to the contractor and the repair being completed			

Appendix B. Category of lighting column defect severity

The following table provides examples of, but not limited to, road lighting column elements and potential defects that are to be inspected. The category of defect severity is in accordance with ILP GN22 [Ref 1.N].

Table B.1 Category of lighting column defect severity

Column element	Inspection criteria	Potential defect
Base compartment	Visual inspection	Corrosion staining
		Corrosion scaling
Bracket joint	Visual inspection and test	Corrosion staining
		Weld cracking
		Deformation of bracket
		Incorrect torque adjustment of bolts and screws
Door aperture	Visual inspection	Cracking at corners
		Deformation of edges to misfitting door or external impact
		Cracking of edge reinforcement
		Corrosion staining at edge reinforcement
Door hinge and lock	Visual inspection	Lack of lubrication of hinges and locks
Elbow	Visual inspection	Corrosion staining
		Corrosion scaling
		Abnormal angle
		Material cracking
Flange bolts	Visual and detailed Inspection	Incorrect torque adjustment of bolts/studs
		Cracking of bolts/studs
		Corrosion staining
		Deformation or distortion of bolts
		Defective anti corrosion protection
Flange plate	Visual and detailed Inspection	Corrosion staining
		Deformation or distortion of fixing holes
		Weld cracking
		Defective grouting
Foundation	Visual inspection	Cracking of foundation material
		Deformation and decay

Table B.1 Category of lighting column defect severity (continued)

Column element	Inspection criteria	Potential defect
Protection system	Visual inspection	Poor overall condition of paintwork/galvanising
		Flaking of paint/galvanising
Root	Visual and detailed inspection	Corrosion staining
		Weld cracking
		Insufficient metal thickness at ground level - measure
		Abnormal damage to paintwork
Safeguarding solution	Visual inspection	Corrosion staining
		Deformation or distortion of components/fixing
		Incorrect torque adjustment
		Cracking of base materials
Shaft steps	Visual inspection	Corrosion staining
		Corrosion scaling
		Weld cracking
		Abnormal paint damage at or about the weld
Shoulder	Visual inspection	Corrosion staining
		Corrosion scaling
		Weld cracking
		Abnormal paint damage at or about the weld
Spigot	Visual inspection	Corrosion staining
		Abnormal lantern tilt

Road Lighting
Inspection & Assessment

TS 501
England National Application Annex to TS 501 Road lighting inspection

(formerly TD 23/99)

Revision 0

Summary
This National Application Annex gives the Highways England requirements related to road lighting inspection.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

This is a controlled document.

Contents

Release notes

Version	Date	Details of amendments
0	Mar 2020	Highways England National Application Annex to TS 501.

Foreword

Publishing information

This document is published by Highways England.

This document supersedes TD 23/99, which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex gives the Highways England requirements related to road lighting inspection.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 2.N] apply to this document.

E/1. Risk based approach requirements

E/1.1 Where road lighting system and associated equipment defects identified through inspections or random reports are identified and a risk based approach is being used, the defects shall be repaired in accordance with the asset delivery asset inspection requirements in GS 801 [Ref 1.N].

E/2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GS 801, 'Asset delivery asset inspection requirements'
Ref 2.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'

Department for Infrastructure
An Roinn Bonneagair

Road Lighting
Inspection & Assessment

TS 501
Northern Ireland National Application Annex to TS 501 Road lighting inspection

(formerly TD 23/99)

Revision 0

Summary
This National Application Annex gives the Department for Infrastructure Northern Ireland requirements related to road lighting inspection.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated team in the Department for Infrastructure, Northern Ireland. The email address for all enquiries and feedback is: dcu@infrastructure-ni.gov.uk

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Contents

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Version	Date	Details of amendments
0	Mar 2020	Department for Infrastructure Northern Ireland National Application Annex to TS 501.

Foreword

Publishing information

This document is published by Highways England on behalf of Department for Infrastructure, Northern Ireland.

This document supersedes TD 23/99, which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex gives the Department for Infrastructure Northern Ireland requirements related to road lighting inspection.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

NI/1. Risk based approach requirements

NI/1.1 Department for Infrastructure, Northern Ireland shall be contacted for further details related to risk based approach requirements.

NI/2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'

Road Lighting
Inspection & Assessment

TS 501
Scotland National Application Annex to TS 501 Road lighting inspection

(formerly TD 23/99)

Revision 0

Summary
This National Application Annex gives the Transport Scotland requirements related to road lighting inspection.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Transport Scotland team. The email address for all enquiries and feedback is: TSStandardsBranch@transport.gov.scot

This is a controlled document.

Contents

Release notes

Version	Date	Details of amendments
0	Mar 2020	Transport Scotland National Application Annex to TS 501

Foreword

Publishing information

This document is published by Highways England on behalf of Transport Scotland.

This document supersedes TD 23/99, which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex gives the Transport Scotland requirements related to road lighting inspection.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

S/1. Risk based approach requirements

S/1.1 Transport Scotland shall be contacted for further details related to risk based approach requirements.

S/2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'

Llywodraeth Cymru
Welsh Government

Road Lighting
Inspection & Assessment

TS 501
Wales National Application Annex to TS 501 Road lighting inspection

(formerly TD 23/99)

Revision 0

Summary
This National Application Annex gives the Welsh Government requirements related to road lighting inspection.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Welsh Government team. The email address for all enquiries and feedback is: Standards_Feedback_and_Enquiries@gov.wales

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Contents

Release notes

Version	Date	Details of amendments
0	Mar 2020	Welsh Government National Application Annex to TS 501.

Foreword

Publishing information

This document is published by Highways England on behalf of Welsh Government.

This document supersedes TD 23/99, which is withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

Introduction

Background

This National Application Annex gives the Welsh Government requirements related to road lighting inspection.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

W/1. Risk based approach requirements

W/1.1 Welsh Government shall be contacted for further details related to risk based approach requirements.

W/2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'