Control & Communications Technology
Contract preparation

TP 101 Instructions for specifiers for TC 101 Traffic signalling systems

(formerly Series NG 1200)

Version NI/LIVE_2025-01-31

The 'SUMMARY' field is missing from the Document Information. Please populate this field before publication.

This document incorporates specific requirements for the Department for Infrastructure Northern Ireland. Alternative versions of this document are available for other Overseeing Organisations.

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Contents

Latest release notes

Document Code	Version number	Date of publication of relevant change	Changes made to	Type of change
TP 101	NI/LIVE_2025-01-31	Not available	Core document	Change to policy, major revision, new document development
TP 101 replaces and updates part of Series NG 1200. This full document has been re-written in accordance with the new drafting rules.				

Previous versions

Document Code	Version number	Date of publication of relevant change	Changes made to	Type of change

Foreword

This document provides specifier instructions for the production of the works specific requirements for TC 101 Traffic signalling systems.

This document does not form part of the works specification.

The works specification is made up of both the Specification for Highway Works and the works specific requirements completed by the Specifier.

This document is applicable for contracts throughout the UK, complemented by the additional specification requirements and contractual changes of each Overseeing Organisation.

Users are responsible for applying all appropriate documents applicable to their contract.

Users are responsible for archiving contract documentation in accordance with the user's quality management system.

1. General requirements for traffic signalling systems

1.1 This document shall only apply to traffic signalling systems for permanent installations.

1.2 Temporary and portable traffic signalling systems shall comply with CC 130 [Ref 4.N].

Scope of works for traffic signalling systems

1.3 The scheme design for the installation of traffic signalling systems shall be as stated in TC 101/WSR/001.

The scheme design for the installation of traffic signalling systems			
Site name	**Drawing, model or document reference**	**Drawing, model or document title**	**Version**
(a)	(b)	(c)	(d)

a) Enter a unique reference, to identify the name of the site where the traffic signalling system is to be installed, e.g. 'M6 J19'.
b) Enter text, to identify the reference number for the drawing, model or document which details the design.

c) Enter text, to identify the title for the drawing, model or document which details the design.

d) Enter text, to identify the version of the drawing, model or document which details the design.

Contractor design requirements for traffic signalling systems

1.4 The items of traffic signalling systems listed in Table 1.4 shall be Contractor designed items, unless otherwise stated in TC 101/WSR/001.

Table 1.4 Contractor designed items for traffic signalling systems	
Contractor designed items	Contractor designed item description
1	Electrical design of the traffic signalling system installation, including:

	1. the sizing and capacity of power supply feeder pillars, including foundation; 2. the sizing and capacity of switchgear, including cut-outs, isolators and fuses; 3. the sizing and capacity of power distribution devices; 4. the sizing and capacity of electrical protective devices; 5. the sizing and capacity of universal power supplies; 6. internal wiring and earthing arrangements for all cabinets; 7. the cable schematic and cable core schedule, including the cable type (including number of cores), the quantity of cables for each cable route and the function of each cable core; and 8. agreement of electrical supplies with DNO, in accordance with TG 411 [Ref 8.N].
2	The fixings for attaching the traffic signal heads, traffic signal head backing boards, nearside light signals and wait indicator equipment and above-ground detector equipment to the supporting infrastructure.

SI.1.4 The requirement for Contractor designed items of traffic signalling systems is altered as follows: [enter free text].

1.5 The design of traffic signalling systems shall be in accordance with TD 101 [Ref 47.N] and BS 7671 [Ref 35.N].

1.6 The requirements for "Contractor design" in Section 17 of GC 101 [Ref 14.N] shall apply to traffic signalling systems.

Installation requirements for traffic signalling systems

1.7 The overseeing and maintenance of highways electrical equipment and supporting works for traffic signalling systems shall be carried out by organisations registered to and operating in compliance with a quality management scheme in accordance with "Quality management schemes" in Section 7 of GC 101 [Ref 14.N].

1.8 Electrical installations for traffic signalling systems shall comply with BS 7671 [Ref 35.N].

Road markings and road studs for traffic signalling systems

1.9 Road markings for traffic signalling systems shall comply with "Permanent road markings" in Section 7 of CC 120 [Ref 3.N].

1.10 Road studs for traffic signalling systems shall comply with "Permanent road studs" in Section 8 of CC 120 [Ref 3.N].

Maintenance hardstandings and hardstanding maintenance working areas for traffic signalling systems

1.11 The location and layout of maintenance hardstandings and hardstanding maintenance working areas for traffic signalling systems shall be as stated in TC 101/WSR/001.

The location and layout of maintenance hardstandings and hardstanding maintenance working areas for traffic signalling systems		
Maintenance hardstanding or hardstanding maintenance working area reference	**Site name**	**Drawing or model reference(s)**
(a)	(b)	(c)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the maintenance hardstanding or hardstanding maintenance working area is to be installed, e.g. 'M6 J19'.

c) Enter text, to identify the drawing(s) or model(s) detailing the location and layout of the maintenance hardstanding or hardstanding maintenance working area for traffic signalling systems.

1.12 Maintenance hardstandings and hardstanding maintenance working areas for traffic signalling systems shall comply with CC 207 [Ref 12.N].

Tactile paving for traffic signalling systems

1.13 Tactile paving for traffic signalling systems shall comply with CC 207 [Ref 12.N].

Asset identification labels for traffic signalling systems

1.14 An asset identification label shall be affixed to each of the traffic signalling system products: traffic signal posts, traffic signal controllers,

power supply feeder pillars and auxiliary equipment cabinets, unless otherwise stated in TC 101/WSR/001.

SI.1.14 The requirement for asset identification labels for traffic signalling systems is altered as follows: [enter free text].

1.15 Asset identification labels for traffic signalling systems and their method of fixing shall be specified for external use and be temperature resistant for a temperature range of at least -15 ^{o}C to 60 ^{o}C.

1.16 The layout, sizing, colour and position of asset identification labels affixed to traffic signalling systems shall be as stated in TC 101/WSR/001.

SI.1.16 The layout, sizing, colour and position of asset identification labels affixed to traffic signalling systems shall be [enter free text].

1.17 The following Documentation shall be submitted for asset identification labels for traffic signalling systems prior to the commencement of installation: manufacturer's data sheet specifying the product both for external use and temperature resistant for a temperature range of at least -15 ^{o}C to 60 ^{o}C.

Bar code labels for traffic signalling systems

NI/1.18 No nationally determined requirement is provided.

NI/1.19 No nationally determined requirement is provided.

NI/1.20 No nationally determined requirement is provided.

NI/1.21 No nationally determined requirement is provided.

Colour and external finish of traffic signalling systems street furniture

1.22 The colour and external finish requirements for traffic signalling systems street furniture shall be as stated in TC 101/WSR/001.

SI.1.22 The colour and external finish requirements for traffic signalling systems street furniture are: [enter free text].

Telecommunications Service Provider (TSP) interface

1.23 The TSP(s) for this scheme shall be as stated in TC 101/WSR/001.

The TSP(s) for this scheme		
TSP reference	**TSP name**	**TSP contact details**
(a)	(b)	(c)

The TSP(s) for this scheme		
TSP reference	**TSP name**	**TSP contact details**

a) Enter a unique reference.
b) Enter text, to identify the TSP name.

c) Enter text, to identify the point of contact name, address, email and telephone details for the scheme.

1.24 The connection interface with a TSP shall comply with the rules and regulations of that TSP.

1.25 The TSP rules and regulations shall be as stated in TC 101/WSR/001.

SI.1.25 The TSP rules and regulations are: [enter free text].

1.26 The connection interfaces with a TSP shall be as stated in TC 101/WSR/001.

The connection interfaces with a TSP					
Connection interface reference	**Site name**	**Drawing or model reference(s)**	**Connection interface location**	**TSP reference**	**Additional requirements**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the connection interface is to be installed, e.g. 'M6 J19'.

c) Enter text, to identify drawing(s) or model(s) detailing the connection interfaces.

d) Enter text, to identify the location of the connection interface.

e) Enter text, to identify the TSP that the connection interface is with.

f) Enter text, to identify any additional requirements relating to the connection interface.

Verification requirements for traffic signalling systems

1.27 An Inspection and Test Plan (ITP) detailing the inspection activities and tests to be undertaken to provide evidence of conformity with the requirements of this document shall be prepared for each traffic signalling system installation.

1.28 The ITP shall be prepared in accordance with BS ISO 10005 [Ref 34.N].

1.29 The ITP shall incorporate the mandatory tests defined in the 'Installation' section of BS EN 50556 [Ref 37.N].

1.30 The ITP shall incorporate factory acceptance tests and site acceptance tests.

1.31 The additional requirements for the ITP shall be as stated in TC 101/WSR/001.

SI.1.31 The additional requirements for the ITP are: [enter free text].

1.32 Verification shall be undertaken for each traffic signalling systems installation by undertaking the inspection activities and tests detailed in the ITP, with the results recorded in the ITP.

1.33 The frequency of inspection activities and tests detailed in the ITP shall be as detailed in the ITP.

1.34 The requirements for "Verification" in Section 14 of GC 101 [Ref 14.N] shall apply to the inspection activities and tests for each traffic signalling systems installation.

1.35 Verification shall be undertaken for each traffic signalling system installation by inspection and testing in accordance with BS 7671 [Ref 35.N] 'Inspection and Testing', and the result recorded in the electrical installation certificate.

1.36 The frequency of the electrical inspection and testing shall be once upon the completion of the installation of each traffic signalling system installation.

1.37 The requirements for "Verification" in Section 14 of GC 101 [Ref 14.N] shall apply to the electrical inspection and testing of traffic signalling system installations.

Documentation requirements for traffic signalling systems

1.38 The following Documentation shall be submitted for each traffic signalling systems installation prior to the commencement of handover into maintenance: completed ITP with results of inspection activities and tests.

1.39 The requirements for "Documentation" in Section 2 of GC 101 [Ref 14.N] shall apply to the completed ITP for each traffic signalling systems installation.

1.40 The following Documentation shall be submitted for electrical inspection and testing of traffic signalling system installations prior to the commencement of commissioning: electrical installation certificate in accordance with BS 7671 [Ref 35.N].

1.41 Documentation for electrical inspection and testing of traffic signalling systems shall be submitted within 10 working days of the completion of the inspection and testing of the traffic signalling system installation.

1.42 The following Documentation shall be submitted for all traffic signalling systems assets prior to the commencement of acceptance of the traffic signalling systems assets into maintenance: handover certificate in accordance with GG 182 [Ref 19.N].

1.43 The requirements for "Documentation" in Section 2 of GC 101 [Ref 14.N] shall apply to the handover certificate for all traffic signalling systems assets.

1.44 The following Documentation shall be submitted for all traffic signalling systems assets prior to the commencement of project closure: scheme maintenance handover documentation in accordance with GG 182 [Ref 19.N].

1.45 The requirements for "Documentation" in Section 2 of GC 101 [Ref 14.N] shall apply to the scheme maintenance handover documentation for all traffic signalling systems assets.

1.46 The following Documentation shall be submitted for all traffic signalling systems assets prior to the commencement of project closure: traffic signalling systems scheme maintenance handover documentation.

1.47 The requirements for "Documentation" in Section 2 of GC 101 [Ref 14.N] shall apply to the traffic signalling systems scheme maintenance handover documentation.

1.48 Traffic signalling systems scheme maintenance handover documentation shall be as stated in TC 101/WSR/001.

Traffic signalling systems scheme maintenance handover documentation			
Traffic signalling systems scheme maintenance handover document reference	**Document description**	**Document requirements**	**Document submission timescale**
(a)	(b)	(c)	(d)

a) Enter a unique reference.
b) Enter text, to to identify the traffic signalling systems scheme maintenance handover document.

c) Enter text, to identify any requirements for the traffic signalling systems scheme maintenance handover document.

d) Enter text, to identify the period during which the traffic signalling systems scheme maintenance handover document is required to be submitted, with reference to a specific activity, e.g. '10 days prior to SAT testing'.

Site records for traffic signalling systems

NI/1.49 The production and issuing of as-built record drawings for traffic signalling systems, upon completion of the works shall be in accordance with MCH 1652 [Ref 1.N].

1.50 The following information shall be recorded on the as-built record drawings for traffic signalling systems.

1. traffic signal heads: location, type and orientation;
2. nearside light units and wait indicator equipment: location, type and orientation;

3. traffic signal detectors: location and type;

4. traffic signal controllers: position and type;

5. auxiliary equipment cabinets for traffic signalling systems: location and type;

6. power supply feeder pillars for traffic signalling systems: location and type;

7. detector loop cable joint positions;

8. traffic signal posts: location and type;

9. chambers for traffic signalling systems: location, type, depth, incoming and outgoing cable ducts, cable sub-ducts, type of chamber cover and details of cable joints within;

10. cable ducts for traffic signalling systems: location, including depth on leaving and entering each chamber, offset from kerb or edge of carriageway, quantity, size and composition;

11. equipment references; and

12. phasing and staging diagram.

1.51 The recording of additional information on the as-built record drawings for traffic signalling systems shall be as stated in TC 101/WSR/001.

SI.1.51 The items of additional information to be recorded on the as-built record drawings for traffic signalling systems shall be [enter free text].

2. Traffic signal heads

2.1 Traffic signal head requirements contained within this section shall cover.

1. traffic signal heads, including traffic signal head backing boards, referred to as "background screens" in BS EN 12368 [Ref 45.N], hoods and louvres;
2. farside light signals, including pedestrian, equestrian and combined pedestrian and cycle;
3. low level cycle signals;
4. countdown timers;
5. wig-wag signals;
6. regulatory signs; and
7. secret regulatory signs.

Product requirements for traffic signal heads

2.2 Traffic signal heads shall be compliant with BS EN 12368 [Ref 45.N].

2.3 The traffic signal heads shall meet the following performance characteristics: as stated in TOPAS 2543 [Ref 30.N].

2.4 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to traffic signal heads.

2.5 Traffic signal heads shall be compliant with BS EN 12899-2 [Ref 11.N].

2.6 The traffic signal heads shall meet the following performance characteristics: Mean luminance Class L2, colour 'white'.

2.7 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to traffic signal heads.

2.8 Traffic signal heads shall be compliant with TOPAS 2543 [Ref 30.N].

2.9 The traffic signal heads shall meet the following performance characteristics: as stated in TOPAS 2543 [Ref 30.N].

2.10 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to traffic signal heads.

NI/2.11 No nationally determined requirement is provided.

2.12 Traffic signal heads shall be fitted with LED aspects.

2.13 Traffic signal head backing boards shall be black and have a white border of not less than 45 mm nor more than 55 mm wide.

2.14 The retroreflective material used for the white border on traffic signal head backing boards shall be compliant with BS EN 12899-1 [Ref 10.N].

2.15 The retroreflective material used for the white border on traffic signal head backing boards shall meet the following performance characteristics: coefficient of retroreflection: RA1.

2.16 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to the retroreflective material used for the white border on traffic signal head backing boards.

Scope of works for traffic signal heads

2.17 The installation of traffic signal heads shall be as stated in TC 101/WSR/002.

The installation of traffic signal heads						
Traffic signal head reference	**Site name**	**Traffic signal controller reference**	**Drawing or model reference(s)**	**Traffic signal design drawing reference(s)**	**Traffic signal head type**	**New or existing**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site for where the traffic signal head is to be installed, e.g. 'M6 J19'.

c) Enter a unique reference.

d) Enter text, to identify the drawing(s) or model(s) detailing the traffic signal heads.

e) Enter text, to identify the drawing(s) showing the specific traffic signal head detail.

f) Enter text, to identify the type of traffic signal head to be installed.

g) Enter a value, from options New, Existing, to identify whether the traffic signal head is new or existing.

The installation of traffic signal heads (continued)					
Traffic signal head reference	**Traffic signal post reference**	**Mounting height to underside of traffic signal head**	**Horizontal clearance from kerb edge to outside edge of traffic signal head**	**Traffic signal head alignment**	**Additional requirements**
(a)	(h)	(i)	(j)	(k)	(l)

h) Enter a unique reference, to identify the traffic signal post that the unit is to be mounted to.

i) Enter a number in units of m, to identify the mounting height to the underside of the traffic signal head.

j) Enter text, to identify the horizontal clearance from kerb edge to outside edge of traffic signal head.

k) Enter text, to describe the alignment of the traffic signal head or identify the drawing(s), model(s) or documents detailing the alignment.

l) Enter text, to identify any additional requirements relating to the traffic signal head.

Installation requirements for traffic signal heads

Mounting of traffic signal heads

2.18 Mounting of traffic signal heads on traffic signal posts and gantries shall be in accordance with the manufacturer's instructions.

Installation of traffic signal head backing boards

2.19 Traffic signal head backing boards shall be installed on all traffic signal heads.

2.20 Traffic signal head backing boards shall be installed in accordance with the manufacturer's instructions.

Covering of traffic signal heads

2.21 All traffic signal heads shall be covered when switched off and not in normal operation.

2.22 Traffic signal head covers shall be opaque, non-damaging and fully cover the traffic signal head.

2.23 Traffic signal head covers shall be securely fixed over the traffic signal head.

Documentation requirements for traffic signal heads

2.24 The following Documentation shall be submitted for traffic signal heads prior to the commencement of installation: declaration of conformity with TOPAS 2543 [Ref 30.N] and a completed technical file in accordance with TOPAS 2543 [Ref 30.N].

3. Nearside light signals and wait indicator equipment

3.1 The requirements of nearside light signals shall apply to pedestrian, equestrian, combined pedestrian and cycle, and cycle light signals.

Product requirements for nearside light signals and wait indicator equipment

3.2 Nearside light signals shall be compliant with TOPAS 2511 [Ref 28.N].

3.3 The nearside light signals shall meet the following performance characteristics: as stated in TOPAS 2511 [Ref 28.N].

3.4 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to nearside light signals.

3.5 Wait indicator equipment shall be compliant with TOPAS 2544 [Ref 41.N].

3.6 The wait indicator equipment shall meet the following performance characteristics: as stated in TOPAS 2544 [Ref 41.N].

3.7 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to wait indicator equipment.

3.8 Non-contact wait indicator equipment shall be compliant with TOPAS 2542 [Ref 29.N].

3.9 The non-contact wait indicator equipment shall meet the following performance characteristics: as stated in TOPAS 2542 [Ref 29.N].

3.10 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to non-contact wait indicator equipment.

3.11 Tactile equipment for wait indicator equipment shall be compliant with TOPAS 2508 [Ref 31.N].

3.12 The tactile equipment for wait indicator equipment shall meet the following performance characteristics: as stated in TOPAS 2508 [Ref 31.N].

3.13 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to tactile equipment for wait indicator equipment.

3.14 Audible equipment for wait indicator equipment shall be compliant with TOPAS 2509 [Ref 25.N].

3.15 The audible equipment for wait indicator equipment shall meet the following performance characteristics: as stated in TOPAS 2509 [Ref 25.N].

3.16 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to audible equipment for wait indicator equipment.

NI/3.17 No nationally determined requirement is provided.

Scope of works for nearside light signals and wait indicator equipment

3.18 The installation of nearside light signals and wait indicator equipment shall be as stated in TC 101/WSR/003.

The installation of nearside light signals and wait indicator equipment							
Nearside light signal or wait indicator equipment reference	**Site name**	**Traffic signal controller reference**	**Drawing or model reference(s)**	**Unit type**	**Tactile equipment**	**Audible equipment**	**New or existing**
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the nearside light signal or wait indicator equipment is to be installed, e.g. 'M6 J19'.

c) Enter a unique reference.

d) Enter text, to identify drawing(s) or model(s) detailing the nearside light signal or wait indicator equipment.

e) Enter text, to identify the type of nearside light signal or wait indicator equipment to be installed.

f) Enter a value, from options Yes, No, N/A, to specify if tactile equipment is to be installed.

g) Enter a value, from options Yes, No, N/A, to specify if audible equipment is to be installed.

h) Enter a value, from options New, Existing, to identify if the unit to be installed is new or existing.

The installation of nearside light signals and wait indicator equipment (continued)					
Nearside light signal or wait indicator equipment reference	**Traffic signal post reference**	**Mounting height to underside of nearside light signal/wait indicator equipment**	**Horizontal angle from kerb face, edge of carriageway or edge of tactile paving**	**Nearside light signal narrow field of view**	**Additional requirements**
(a)	(i)	(j)	(k)	(l)	(m)

i) Enter a unique reference, to identify the traffic signal post that the unit is to be mounted to.

j) Enter a number in units of m, to identify the height above the ground at which the nearside light signal or wait indicator equipment is to be installed.

k) Enter a number in units of °, to identify the angle from the kerb face, edge of carriageway or edge of tactile paving that the nearside light signal or wait indicator equipment is to be installed.

l) Enter a value, from options Yes, No, N/A, to identify if narrow field of view is installed on the nearside light signals.

m) Enter text, to identify any additional requirements relating to the nearside light signal or wait indicator equipment.

Installation requirements for nearside light signals and wait indicator equipment

3.19 Nearside light signals and wait indicator equipment shall be installed in accordance with the manufacturer's instructions.

3.20 The additional installation requirements for nearside light signals and wait indicator equipment shall be as stated in TC 101/WSR/003.

SI.3.20 The additional installation requirements for nearside light signals and wait indicator equipment are: [enter free text].

Covering of nearside light signals and wait indicator equipment

3.21 All nearside light signals and wait indicator equipment shall be covered when switched off and not in normal operation.

3.22 The covers of nearside light signals and wait indicator equipment shall be opaque, non-damaging and fully cover the nearside light signal and wait indicator equipment.

3.23 The covers of nearside light signals and wait indicator equipment shall be securely fixed over the nearside light signal and wait indicator equipment.

Documentation requirements for nearside light signals and wait indicator equipment

3.24 The following Documentation shall be submitted for nearside light signals prior to the commencement of installation: declaration of conformity with TOPAS 2511 [Ref 28.N] and a completed technical file in accordance with TOPAS 2511 [Ref 28.N].

3.25 The following Documentation shall be submitted for wait indicator equipment prior to the commencement of installation: declaration of conformity with TOPAS 2544 [Ref 41.N] and a completed technical file in accordance with TOPAS 2544 [Ref 41.N].

3.26 The following Documentation shall be submitted for non-contact wait indicator equipment prior to the commencement of installation: declaration of conformity with TOPAS 2542 [Ref 29.N] and a completed technical file in accordance with TOPAS 2542 [Ref 29.N].

3.27 The following Documentation shall be submitted for tactile equipment for wait indicator equipment prior to the commencement of installation: declaration of conformity with TOPAS 2508 [Ref 31.N] and a completed technical file in accordance with TOPAS 2508 [Ref 31.N].

3.28 The following Documentation shall be submitted for audible equipment for wait indicator equipment prior to the commencement of installation: declaration of conformity with TOPAS 2509 [Ref 25.N] and a completed technical file in accordance with TOPAS 2509 [Ref 25.N].

4. Traffic signal detectors

Product requirements for traffic signal detectors

4.1 Below ground vehicle detection for traffic signalling systems shall be compliant with TOPAS 2512 [Ref 26.N].

4.2 The below ground vehicle detection for traffic signalling systems shall meet the following performance characteristics: as stated in TOPAS 2512 [Ref 26.N].

4.3 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to below ground vehicle detection for traffic signalling systems.

4.4 Above ground vehicle detectors for traffic signalling systems shall be compliant with TOPAS 2505 [Ref 24.N].

4.5 Above ground pedestrian detectors for traffic signalling systems shall be compliant with TOPAS 2506 [Ref 23.N].

4.6 Detectors for nearside light signals and wait indicator equipment shall be compliant with TOPAS 2507 [Ref 27.N].

4.7 Detector loops shall comply with "Detector loops" in Section 10 of CC 207 [Ref 12.N].

4.8 The additional product requirements for traffic signal detectors shall be as stated in TC 101/WSR/004.

SI.4.8 The additional product requirements for traffic signal detectors are: [enter free text].

Scope of works for traffic signal detectors

4.9 The installation of traffic signal detectors shall be as stated in TC 101/WSR/004.

The installation of traffic signal detectors						
Traffic signal detector reference	**Site name**	**Drawing or model reference(s)**	**Traffic signal detector type**	**Cabinet reference**	**Traffic signal detector mounting arrangement (if applicable)**	**New or existing**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the nearside light signal or wait indicator equipment are to be installed, e.g. 'M6 J19'.

c) Enter text, to identify the drawing(s) or model(s) detailing the traffic signal detectors.

d) Enter text, to to identify the type of traffic signal detector to be installed.

e) Enter a unique reference, to identify the outstation cabinet for the traffic signal detector.

f) Enter text, to identify what the traffic signal detector will be mounted on, if applicable.

g) Enter a value, from options New, Existing, to identify if the traffic signal detector is new or existing.

The installation of traffic signal detectors (continued)			
Traffic signal detector reference	**Distance to stop line (if applicable)**	**Carriageway covered**	**Lanes covered**
(a)	(h)	(i)	(j)

h) Enter a number in units of m, to identify the distance from the traffic signal detector to the stop line.

i) Enter text, to identify the carriageway that the traffic signal detector will cover.

j) Enter text, to identify the lanes for the traffic signal detector to cover.

Installation requirements for traffic signal detectors

4.10 The installation of detector loops shall be in accordance with 'Installation Requirements for Detector Loops', "Detector loops" in Section 10 of CC 207 [Ref 12.N].

4.11 The installation of detector loops shall be in accordance with MCH 1540 [Ref 42.N].

4.12 The installation of traffic signal detectors other than detector loops shall be in accordance with the manufacturer's instructions.

4.13 The additional installation requirements for traffic signal detectors shall be as stated in TC 101/WSR/004.

SI.4.13 The additional installation requirements for traffic signal detectors are: [enter free text].

Verification requirements for traffic signal detectors

4.14 Verification shall be undertaken for detector loops installed for traffic signals by performing loop tests and complete circuit tests in accordance with MCH 1540 [Ref 42.N] and recording the results in the installation test certificate.

4.15 The frequency of each detector loop test and complete circuit test shall be once upon completion of the loop installation and again during the test and commissioning of the system.

4.16 The requirements for "Verification" in Section 14 of GC 101 [Ref 14.N] shall apply to each detector loop test and complete circuit test.

4.17 Verification shall be undertaken for traffic signal detectors other than detector loops by performing tests in accordance with the manufacturer's instructions and recording the results in the ITP.

4.18 The frequency of each test shall be as stated in the manufacturer's instructions.

4.19 The requirements for "Verification" in Section 14 of GC 101 [Ref 14.N] shall apply to each test.

Documentation requirements for traffic signal detectors

Product compliance documentation for traffic signal detectors

4.20 The following Documentation shall be submitted for below ground vehicle detectors for traffic signalling systems prior to the commencement of installation: declaration of conformity with TOPAS 2512 [Ref 26.N] and a completed technical file in accordance with TOPAS 2512 [Ref 26.N].

4.21 The following Documentation shall be submitted for above ground vehicle detectors for traffic signalling systems prior to the commencement of installation: declaration of conformity with TOPAS 2505 [Ref 24.N] and a completed technical file in accordance with TOPAS 2505 [Ref 24.N].

4.22 The following Documentation shall be submitted for above ground pedestrian detectors for traffic signalling systems prior to the commencement of installation: declaration of conformity with TOPAS 2506 [Ref 23.N] and a completed technical file in accordance with TOPAS 2506 [Ref 23.N].

4.23 The following Documentation shall be submitted for detectors for nearside light signals and wait indicator equipment prior to the commencement of installation: declaration of conformity with TOPAS 2507 [Ref 27.N] and a completed technical file in accordance with TOPAS 2507 [Ref 27.N].

Test and commissioning documentation for traffic signal detectors

4.24 The following Documentation shall be submitted for traffic signal detector loops prior to the commencement of handover into maintenance: installation test certificates in accordance with MCH 1540 [Ref 42.N].

5. Traffic signal controllers

5.1 Traffic signal controller requirements contained within this section shall cover the traffic signal controller unit, the traffic signal controller cabinet and the traffic signal controller base.

Product requirements for traffic signal controllers

5.2 Traffic signal controllers shall be compliant with BS EN 50556 [Ref 37.N].

5.3 The traffic signal controllers shall meet the following performance characteristics: as stated in TOPAS 2500 [Ref 43.N].

5.4 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to traffic signal controllers.

5.5 Traffic signal controllers shall be compliant with BS EN 12675 [Ref 46.N].

5.6 The traffic signal controllers shall meet the following performance characteristics: as stated in TOPAS 2500 [Ref 43.N].

5.7 Traffic signal controllers shall be compliant with TOPAS 2500 [Ref 43.N].

5.8 The traffic signal controllers shall meet the following performance characteristics: as stated in TOPAS 2500 [Ref 43.N].

5.9 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to traffic signal controllers.

5.10 Traffic signal controllers shall be compliant with TOPAS 2130 [Ref 9.N].

5.11 The traffic signal controllers shall meet the following performance characteristics: as stated in TOPAS 2130 [Ref 9.N].

5.12 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to traffic signal controllers.

5.13 The product requirements for the Outstation Transmission Units (OTUs) shall be as stated in TC 101/WSR/005.

SI.5.13 The product requirements for the OTUs are: [enter free text].

5.14 The product requirements for the Microprocessor Optimised Vehicle Actuation (MOVA) units shall be as stated in TC 101/WSR/005.

SI.5.14 The product requirements for the MOVA units are: [enter free text].

5.15 The product requirements for the Remote Monitoring System (RMS) units shall be as stated in TC 101/WSR/005.

SI.5.15 The product requirements for the RMS units are: [enter free text].

5.16 The traffic signal controllers, OTUs, MOVA and RMS units shall be fully compatible.

5.17 The product requirements for the photo cell shall be as stated in TC 101/WSR/005.

SI.5.17 The product requirements for the photo cells are: [enter free text].

5.18 The additional product requirements for traffic signal controllers shall be as stated in TC 101/WSR/005.

SI.5.18 The additional product requirements for traffic signal controllers are: [enter free text].

Scope of works for traffic signal controller

5.19 The installation of traffic signal controllers shall be as stated in TC 101/WSR/005.

The installation of traffic signal controllers					
Traffic signal controller reference	**Site name**	**Drawing or model reference(s)**	**Traffic signal controller type**	**Traffic signal controller cabinet type/size**	**Traffic signal controller cabinet orientation**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the traffic signal controllers are to be installed, e.g. 'M6 J19'.

c) Enter text, to identify the drawing(s) or model(s) detailing the traffic signal controllers.

d) Enter text, to identify the type of traffic signal controller.

e) Enter text, to identify the type and/or size of the cabinet housing the controller.

f) Enter text, to identify the orientation of the cabinet and access doors.

The installation of traffic signal controllers (continued)					
Traffic signal controller reference	**Traffic signal controller base type**	**Traffic signal controller base seal**	**New or existing**	**Asset identification label text**	**Traffic signal controller additional requirements**
(a)	(g)	(h)	(i)	(j)	(k)

g) Enter text, to identify the type of base/root for the traffic signal controller.

h) Enter text, to identify the type of seal required for the controller base.

i) Enter a value, from options New, Existing, to identify if the traffic signal controller to be installed is new or existing.

j) Enter text, to identify the text to be displayed on the traffic signal controller cabinet identification label.

k) Enter text, to identify any additional requirements for each traffic signal controller.

5.20 The installation of traffic signal controllers with compatibility with external control strategies shall be as stated in TC 101/WSR/005.

The installation of traffic signal controllers with compatibility with external control strategies			
Traffic signal controller reference	**Compatibility category**	**Additional equipment (OTU / MOVA) installed**	**Additional requirements**
(a)	(b)	(c)	(d)

a) Enter a unique reference.
b) Enter one or more values, from options UTC/MOVA interface, Integrated UTC, Integrated MOVA, None, to identify the categories of interface that the controller offers, in accordance with TOPAS 2500 [Ref 43.N].

c) Enter text, to identify if a standard OTU or separate MOVA unit are required in the traffic signal controller cabinet.

d) Enter text, to identify any additional requirements for the compatibility of each traffic signal controller with external control strategies.

5.21 The installation of photo cells to interface with the traffic signal controller shall be as stated in TC 101/WSR/005.

The installation of photo cells to interface with the traffic signal controller			
Traffic signal controller reference	**Photo cell required**	**Traffic signal post reference**	**Photo cell additional requirements**
(a)	(b)	(c)	(d)

a) Enter a unique reference.
b) Enter a value, from options Yes, No, to identify whether a photo cell is required to interface with the traffic signal controller.

c) Enter text, to identify the post on which the photo cell is installed.

d) Enter text, to identify any additional requirements for each photo cell.

Installation requirements for traffic signal controllers

5.22 Traffic signal controllers shall be installed in accordance with the manufacturer's instructions.

5.23 The traffic signal controller base seal shall be installed in accordance with the manufacturer's instructions, unless otherwise stated in TC 101/WSR/005.

SI.5.23 The requirement for the traffic signal controller base seal to be installed in accordance with the manufacturer's instructions is altered as follows: [enter free text].

Traffic signal controller configuration

5.24 The traffic signal controller shall be configured according to the traffic signal controller general specification forms for that controller.

5.25 The traffic signal controller general specification forms for each traffic signal controller shall be as stated in TC 101/WSR/005.

The traffic signal controller general specification forms for each traffic signal controller				
Traffic signal controller reference	**Site name**	**Traffic signal controller general specification forms filename**	**Traffic signal controller specification form description**	**Traffic signal controller specification form additional requirements**
(a)	(b)	(c)	(d)	(e)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the traffic signal controller is to be installed, e.g. 'M6 J19'.

c) Enter text, to identify the filename of the traffic signal controller general specification forms for that traffic signal controller.

d) Enter text, to identify the description of the traffic signal controller specification form for that traffic signal controller.

e) Enter text, to identify any additional requirements relating to the specification form for that traffic signal controller.

5.26 The additional installation requirements for traffic signal controllers shall be as stated in TC 101/WSR/005.

SI.5.26 The additional installation requirements for traffic signal controllers are: [enter free text].

Outstation Transmission Unit

5.27 OTUs shall be installed in accordance with the manufacturer's instructions.

5.28 The additional installation requirements for OTUs shall be as stated in TC 101/WSR/005.

SI.5.28 The additional installation requirements for OTUs are: [enter free text].

MOVA unit

5.29 MOVA units shall be installed in accordance with the manufacturer's instructions.

5.30 The MOVA dataset shall be installed onto the MOVA unit.

5.31 The MOVA dataset for each MOVA unit shall be as stated in TC 101/WSR/005.

The MOVA dataset for each MOVA unit				
Traffic signal controller reference	**Site name**	**MOVA dataset filename**	**MOVA dataset description**	**MOVA dataset additional requirements**
(a)	(b)	(c)	(d)	(e)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the traffic signal controller is to be installed, e.g. 'M6 J19'.

c) Enter text, to identify the filename of the MOVA dataset.

d) Enter text, to identify the description of the MOVA dataset.

e) Enter text, to identify any additional requirements relating to the MOVA dataset.

RMS unit

5.32 RMS units shall be installed in accordance with the manufacturer's instructions.

5.33 The additional installation requirements for RMS units shall be as stated in TC 101/WSR/005.

SI.5.33 The additional installation requirements for RMS units are [enter free text].

Photo cell

5.34 Photo cells shall be installed in accordance with the manufacturer's instructions.

5.35 The additional installation requirements for photo cells shall be as stated in TC 101/WSR/005.

SI.5.35 The additional installation requirements for photo cells are: [enter free text].

Verification requirements for traffic signal controllers

5.36 Verification shall be undertaken for each traffic signal controller to confirm by testing that the configuration of the traffic signal controller is

in accordance with the specification as detailed in the traffic signal controller specification form for that controller, with the results recorded in the ITP.

5.37 The frequency of testing shall be once before delivery to site (factory acceptance testing) and once following installation (site acceptance testing).

5.38 The requirements for "Verification" in Section 14 of GC 101 [Ref 14.N] shall apply to each traffic signal controller.

Documentation requirements for traffic signal controllers

5.39 The following Documentation shall be submitted for traffic signal controllers prior to the commencement of installation: declaration of conformity and a completed technical file in accordance with TOPAS 2500 [Ref 43.N].

5.40 The following Documentation shall be submitted for traffic signal controllers prior to the commencement of installation: declaration of conformity and a completed technical file in accordance with TOPAS 2130 [Ref 9.N].

6. Auxiliary equipment cabinets for traffic signalling systems

6.1 Auxiliary equipment cabinets for traffic signalling systems shall include traffic signal cable termination cabinets and any other cabinets required for traffic signalling systems, excluding traffic signal controllers and power supply feeder pillars.

Product requirements for auxiliary equipment cabinets for traffic signalling systems

6.2 Auxiliary equipment cabinets for traffic signalling systems shall be compliant with BS EN 50556 [Ref 37.N].

6.3 The auxiliary equipment cabinets for traffic signalling systems shall meet the following performance characteristics: as stated in TOPAS 2500 [Ref 43.N].

6.4 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to auxiliary equipment cabinets for traffic signalling systems.

6.5 Auxiliary equipment cabinets for traffic signalling systems shall be compliant with TOPAS 2500 [Ref 43.N] 'Environmental and EMC performance'.

6.6 The auxiliary equipment cabinets for traffic signalling systems shall meet the following performance characteristics: as stated in TOPAS 2500 [Ref 43.N] 'Environmental and EMC performance'.

6.7 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to auxiliary equipment cabinets for traffic signalling systems.

6.8 The additional product requirements for auxiliary equipment cabinets for traffic signalling systems shall be as stated in TC 101/WSR/006.

SI.6.8 The additional product requirements for auxiliary equipment cabinets for traffic signalling systems are: [enter free text].

Scope of works for auxiliary equipment cabinets for traffic signalling systems

6.9 The installation of auxiliary equipment cabinets for traffic signalling systems shall be as stated in TC 101/WSR/006.

The installation of auxiliary equipment cabinets for traffic signalling systems

Auxiliary equipment cabinet reference	Site name	Drawing or model reference(s)	Traffic signal controller reference	Auxiliary equipment cabinet purpose	Auxiliary equipment cabinet internal equipment	Auxiliary equipment cabinet size
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the auxiliary equipment cabinet is to be installed, e.g. 'M6 J19'.

c) Enter text, to identify the drawing(s) or model(s) detailing the auxiliary equipment cabinets.

d) Enter a unique reference, to identify the traffic signal controller to which the auxiliary equipment cabinet is associated.

e) Enter text, to identify the reason for installing the auxiliary equipment cabinet.

f) Enter text, to identify the equipment to be installed within the auxiliary equipment cabinet.

g) Enter text, to identify the size of the auxiliary equipment cabinet.

The installation of auxiliary equipment cabinets for traffic signalling systems (continued)

Auxiliary equipment cabinet reference	Auxiliary equipment cabinet orientation	Auxiliary equipment cabinet base type	Auxiliary equipment cabinet base seal	Asset identification label text	Auxiliary equipment cabinet additional requirements
(a)	(h)	(i)	(j)	(k)	(l)

h) Enter text, to identify the orientation of the auxiliary equipment cabinet and access doors.

i) Enter text, to identify the type of base/root for the auxiliary equipment cabinet.

j) Enter text, to identify the type of seal required for the auxiliary equipment cabinet base.

k) Enter text, to identify the text to be displayed on the auxiliary equipment cabinet identification label.

l) Enter text, to identify any additional requirements for each auxiliary equipment cabinet.

Installation requirements for auxiliary equipment cabinets for traffic signalling systems

6.10 Auxiliary equipment cabinets for traffic signalling systems shall be installed in accordance with the manufacturer's instructions.

6.11 The auxiliary equipment cabinet base for traffic signalling systems shall be installed in accordance with the manufacturer's instructions.

Documentation requirements for auxiliary equipment cabinets for traffic signalling systems

6.12 The following Documentation shall be submitted for auxiliary equipment cabinets for traffic signalling systems prior to the commencement of installation: declaration of conformity with TOPAS 2500 [Ref 43.N]'Environmental and EMC performance' and a completed technical file in accordance with TOPAS 2500 [Ref 43.N] 'Environmental and EMC performance'.

7. Power supply feeder pillars for traffic signalling systems

Product requirements for power supply feeder pillars for traffic signalling systems

7.1 Where non-stainless steel is used for the fabrication of power supply feeder pillars for traffic signalling systems, the steel shall be galvanised.

7.2 The galvanising of steel power supply feeder pillars for traffic signalling systems shall be compliant with BS EN ISO 1461 [Ref 16.N].

7.3 All power supply feeder pillars for traffic signalling systems shall be supplied with a plywood backboard.

7.4 The plywood backboard for power supply feeder pillars for traffic signalling systems shall have a minimum thickness of 12 mm, unless otherwise stated in TC 101/WSR/007.

SI.7.4 The requirement for the plywood backboard for power supply feeder pillars for traffic signalling systems to have a minimum thickness of 12 mm is altered as follows: [enter free text].

7.5 Plywood backboards for power supply feeder pillars for traffic signalling systems shall be compliant with BS EN 314-2 [Ref 32.N].

7.6 The plywood backboard for power supply feeder pillars for traffic signalling systems shall meet the following performance characteristics: Class 3 (exterior).

7.7 Power supply feeder pillar doors shall be lockable.

7.8 The requirements for the type of locks for power supply feeder pillar doors shall be as stated in TC 101/WSR/007.

SI.7.8 The requirements for the type of locks for power supply feeder pillar doors are: [enter free text].

7.9 The additional product requirements for power supply feeder pillars for traffic signalling systems shall be as stated in TC 101/WSR/007.

SI.7.9 The additional product requirements for power supply feeder pillars for traffic signalling systems are: [enter free text].

Scope of works for power supply feeder pillars for traffic signalling systems

7.10 The installation of power supply feeder pillars for traffic signals shall be as stated in TC 101/WSR/007.

The installation of power supply feeder pillars for traffic signals						
Power supply feeder pillar reference	**Site name**	**Drawing or model reference(s)**	**Traffic signal controller reference**	**Power supply feeder pillar size**	**Power supply feeder pillar orientation**	**Power supply feeder pillar base type**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the power supply feeder pillar is to be installed, e.g. 'M6 J19'.

c) Enter text, to identify the drawing(s) or model(s) detailing the power supply feeder pillars.

d) Enter a unique reference.

e) Enter text, to identify the size of the power supply feeder pillar needed to house the required internal equipment.

f) Enter text, to identify the orientation of the feeder pillar and access doors.

g) Enter text, to identify the type of base/root for the power supply feeder pillar.

The installation of power supply feeder pillars for traffic signals (continued)				
Power supply feeder pillar reference	**Power supply feeder pillar base seal**	**New or existing**	**Asset identification label text**	**Power supply feeder pillar additional requirements**
(a)	(h)	(i)	(j)	(k)

h) Enter text, to identify the type of seal required for the power supply feeder pillar.

i) Enter a value, from options New, Existing, to identify whether the power supply feeder pillar is new or existing.

j) Enter text, to identify the text to be displayed on the power supply feeder pillar identification label.

k) Enter text, to identify any additional requirements relating to each power supply feeder pillar.

7.11 The power supply type and details of electrical devices for power supply feeder pillars shall be as stated in TC 101/WSR/007.

The power supply type and details of electrical devices for power supply feeder pillars						
Power supply feeder pillar reference	**Primary/ secondary power supply feeder pillar**	**DNO supply earthing arrangement (if applicable)**	**DNO cut-out fuse rating (if applicable)**	**Switchgear details**	**Power distribution device details**	**Protective device details**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.
b) Enter a value, from options Primary, Secondary, to identify if the power supply feeder pillar interfaces with the Distribution Network Operator (DNO) electrical connection (primary) or not (secondary).

c) Enter a value, from options TN-C-S, TN-S, TT, to identify the type of earthing arrangement from the DNO into the power supply feeder pillar.

d) Enter text, to identify the fuse rating for the DNO cut-out.

e) Enter text, to identify surge protection devices installed in the power supply feeder pillar.

f) Enter text, to identify power distribution devices installed in the power supply feeder pillar.

g) Enter text, to identify protective devices installed in the power supply feeder pillar.

Installation requirements for power supply feeder pillars for traffic signalling systems

7.12 The installation of power supply feeder pillars for traffic signalling systems shall comply with the requirements of the Distribution Network Operator (DNO) for the supply connections.

7.13 The requirements of the DNO for any supply connections shall be as stated in TC 101/WSR/007.

SI.7.13 The requirements of the DNO for any supply connections are: [enter free text].

7.14 Power supply feeder pillars for traffic signalling systems shall be installed in accordance with the manufacturer's instructions.

7.15 The power supply feeder pillar base seal for traffic signalling systems shall be installed in accordance with the manufacturer's instructions.

7.16 The requirements for internal wiring, electrical devices and earthing for power supply feeder pillars shall be as stated in TC 101/WSR/007.

SI.7.16 The requirements for internal wiring, electrical devices and earthing for power supply feeder pillars are: [enter free text].

Documentation requirements for power supply feeder pillars for traffic signalling systems

7.17 The following Documentation shall be submitted for galvanised steel power supply feeder pillars for traffic signalling systems prior to the commencement of installation: declaration of compliance with BS EN ISO 1461 [Ref 16.N].

7.18 The following Documentation shall be submitted for plywood backboards for power supply feeder pillars for traffic signalling systems prior to the commencement of installation: manufacturer's data sheet showing compliance with BS EN 314-2 [Ref 32.N] and performance characteristic 'Class 3 (exterior)'.

8. Cables for traffic signalling systems

8.1 Cables for traffic signalling systems shall include traffic signal cables and power cables for traffic signalling systems.

Product requirements for cables for traffic signalling systems

8.2 Cables for traffic signalling systems, excluding loop feeder cables, loop detector cables and cables for controller area network (CAN) distributed cabling traffic signalling systems, shall be compliant with BS 6346 1997 [Ref 7.N] or BS 5467 [Ref 39.N].

8.3 The cables for traffic signalling systems, excluding loop feeder cables, loop detector cables and cables for controller area network (CAN) distributed cabling traffic signalling systems, shall meet the following performance characteristics: voltage rating: 600/1000 V grade.

8.4 Loop feeder cables and loop detector cables shall be compliant with TRH 2583 [Ref 13.N].

8.5 Cables for CAN distributed cabling traffic signalling systems shall be compliant with TRH 2583 [Ref 13.N], unless otherwise stated in TC 101/WSR/008.

SI.8.5 The requirement for cables for CAN distributed cabling traffic signalling systems to be compliant with TRH 2583 [Ref 13.N] is altered as follows: [enter free text].

8.6 The product requirements for the marking/tagging of cables for traffic signalling systems shall be as stated in TC 101/WSR/008.

SI.8.6 The product requirements for the marking/tagging of cables for traffic signalling systems shall be: [enter free text].

8.7 The additional product requirements for cables for traffic signalling systems shall be as stated in TC 101/WSR/008.

SI.8.7 The additional product requirements for cables for traffic signalling systems are: [enter free text].

Traffic signal cables

8.8 All traffic signal cables, including loop feeder cables but excluding loop detector cables, shall be coloured orange in accordance with NJUG 1 [Ref 44.N].

8.9 All traffic signal cables, including loop feeder cables but excluding loop detector cables, shall be embossed with the legend 'TRAFFIC SIGNALS'.

Power cables for traffic signalling systems

8.10 Power cables for traffic signalling systems shall be coloured black.

Scope of works for cables for traffic signalling systems

8.11 Cables for traffic signalling systems shall be as stated in TC 101/WSR/008.

Cables for traffic signalling systems	
Site name	**Drawing or model reference(s)**
(a)	(b)

a) Enter a unique reference, to identify the name of the site where the cables are to be installed, e.g. 'M6 J19'.
b) Enter text, to identify the drawing(s) or model(s) detailing the cables for traffic signalling systems.

8.12 The requirement for cables for traffic signalling systems to be steel wire armoured or unarmoured shall be as stated in TC 101/WSR/008.

SI.8.12a The sheathing of cables for traffic signalling systems shall be [select one from: Steel wire armoured, Unarmoured, Combination of steel wire armoured cables and unarmoured cables].

SI.8.12b Where the sheathing of cables for traffic signalling systems is a combination of steel wire armoured cables and unarmoured cables, the details of which cables are armoured and which are unarmoured are: [enter free text].

Installation requirements for cables for traffic signalling systems

8.13 Cables for traffic signalling systems shall be installed in accordance with the manufacturer's instructions.

8.14 Each traffic signal post shall be individually cabled to the traffic signal controller or traffic signal termination cabinet, unless otherwise stated in TC 101/WSR/008.

SI.8.14 The requirements for cabling for each traffic signal post, if not individually cabled to the traffic signal controller or traffic signal termination cabinet, shall be as follows: [enter free text].

8.15 Low voltage and extra low voltage cables for traffic signalling systems shall not be installed in the same duct.

Installation of cables for traffic signalling systems in ducts

8.16 Cables for traffic signalling systems shall be installed in a fully ducted network.

8.17 Cables for traffic signalling systems shall not be damaged during installation in ducts for traffic signalling systems and cable testing.

Termination of cables for traffic signalling systems

8.18 All termination of cables for traffic signalling systems shall be carried out in accordance with the manufacturer's instructions.

8.19 All unused cores in cables for traffic signalling systems shall be cut to a minimum length, long enough to connect to the furthest working-off point within the unit.

8.20 All unused cores in cables for traffic signalling systems shall be end sealed to IPX7 in accordance with BS EN 60529 [Ref 5.N]to prevent moisture ingress.

8.21 The additional requirements for the termination of cables for traffic signalling systems shall be as stated in TC 101/WSR/008.

SI.8.21 The additional requirements for the termination of cables for traffic signalling systems are: [enter free text].

Jointing of cables for traffic signalling systems

8.22 Cable joints shall only be used for traffic signal detector loop cables, unless otherwise stated in TC 101/WSR/008.

SI.8.22 The requirement for cable joints to only be used for traffic signal detector loop cables is altered as follows: [enter free text].

8.23 Cable joints for traffic signal detector loop cables shall be in accordance with MCH 1540 [Ref 42.N].

8.24 All jointing of cables for traffic signalling systems shall be carried out in accordance with the manufacturer's instructions.

8.25 The additional requirements for the jointing of cables for traffic signalling systems shall be as stated in TC 101/WSR/008.

SI.8.25 The additional requirements for the jointing of cables for traffic signalling systems are: [enter free text].

Marking of cables for traffic signalling systems

8.26 All cables for traffic signalling systems shall be marked or tagged at the source and each termination to identify the cable destination.

8.27 The marking or tagging of low voltage and extra low voltage cables for traffic signalling systems shall be differentiated by colour.

8.28 The layout, format, colour and size of markings and tags for cables for traffic signalling systems shall be as stated in TC 101/WSR/008.

SI.8.28 The layout, format, colour and size of markings and tags for cables for traffic signalling systems shall be [enter free text].

Earthing and bonding of traffic signalling systems

8.29 All protective conductors of traffic signalling systems shall comply with BS 7671 [Ref 35.N] 'Protective conductors'.

8.30 Power supply earthing of traffic signalling systems shall comply with BS 7671 [Ref 35.N] 'Earthing arrangements'.

Documentation requirements for cables for traffic signalling systems

8.31 The following Documentation shall be submitted for cables for traffic signalling systems prior to the commencement of installation: build standard qualification certificate showing that the product conforms with the Overseeing Organisation's product requirements in accordance with RG 1110 [Ref 36.N].

8.32 The following Documentation shall be submitted for cables for traffic signalling systems prior to the commencement of installation: manufacturer's data sheet showing compliance with BS 6346 1997 [Ref 7.N] or BS 5467 [Ref 39.N].

9. Traffic signal posts

Product requirements for traffic signal posts

9.1 Traffic signal posts shall be compliant with BS EN 12899-1 [Ref 10.N].

9.2 The traffic signal posts shall meet the following performance characteristics: as stated in WSR 101/009.

9.3 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to traffic signal posts.

9.4 Hollow section traffic signal posts shall be covered at the top to prevent ingress of water.

9.5 Where an access door and base compartment for electrical equipment is housed in a traffic signal post, the access door and base compartment shall be sealed to an Ingress Protection (IP) rating of at least IP3x in accordance with BS EN 60529 [Ref 5.N], unless otherwise stated in TC 101/WSR/009.

SI.9.5 The IP rating for access doors and base compartments for traffic signal posts, where not at least IP3x in accordance with BS EN 60529 [Ref 5.N], is as follows: [enter free text].

9.6 The additional product requirements for traffic signal posts shall be as stated in TC 101/WSR/009.

SI.9.6 The additional product requirements for traffic signal posts are: [enter free text].

Scope of works for traffic signal posts

9.7 The general installation requirements for traffic signal posts shall be as stated in TC 101/WSR/009.

The general installation requirements for traffic signal posts						
Traffic signal post reference	**Site name**	**Traffic signal controller reference**	**Drawing or model reference(s)**	**Traffic signal post type**	**New or existing**	**Traffic signal post height**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.

b) Enter a unique reference, to identify the name of the site where the traffic signal post is to be installed, e.g. 'M6 J19'.

c) Enter a unique reference.

d) Enter text, to identify the drawing(s) or model(s) which specify the location and requirements for the traffic signal post.

e) Enter text, to identify the type of traffic signal post to be installed.

f) Enter a value, from options New, Existing, to identify whether the traffic signal post to be installed is new or existing.

g) Enter a number in units of m, to identify the height of the traffic signal post to be installed.

The general installation requirements for traffic signal posts (continued)					
Traffic signal post reference	**Rating of passively safe traffic signal post**	**Access door and base compartment**	**Traffic signal post ventilated pole cap**	**Asset identification label text**	**Wind loads**
(a)	(h)	(i)	(j)	(k)	(l)

h) Enter text, to identify the rating of passively safe traffic signal posts.

i) Enter a value, from options Yes, No, to identify if an access door and base compartment is to be installed on the traffic signal post.

j) Enter text, to identify whether a ventilated pole cap on the traffic signal post is required.

k) Enter text, to identify the text to be displayed on the traffic signal post identification label.

l) Enter text, to identify the physical performance class for wind loads to be used when selecting the traffic signal post.

The general installation requirements for traffic signal posts (continued)					
Traffic signal post reference	**Point loads**	**Dynamic snow loads**	**Temporary deflection sign plates and supports: Bending class**	**Temporary deflection sign plates and supports: Torsion class**	**Piercing of sign face**
(a)	(m)	(n)	(o)	(p)	(q)

The general installation requirements for traffic signal posts (continued)					
Traffic signal post reference	**Point loads**	**Dynamic snow loads**	**Temporary deflection sign plates and supports: Bending class**	**Temporary deflection sign plates and supports: Torsion class**	**Piercing of sign face**

m) Enter text, to identify the physical performance class for point loads to be used when selecting the traffic signal post.

n) Enter text, to identify the physical performance class for dynamic snow loads to be used when selecting the traffic signal post.

o) Enter text, to identify the bending class to be used when selecting the traffic signal post.

p) Enter text, to identify the torsion class to be used when selecting the traffic signal post.

q) Enter text, to identify the correct physical performance class for piercing of sign face to be used when selecting the traffic signal post.

The general installation requirements for traffic signal posts (continued)		
Traffic signal post reference	**Edges of sign plates**	**Corrosion protection**
(a)	(r)	(s)

r) Enter text, to identify the correct physical performance class for edges of sign plates to be used when selecting the traffic signal post.

s) Enter text, to identify the correct physical performance class for corrosion protection to be used when selecting the traffic signal post.

9.8 The orientation and positioning requirements for traffic signal posts shall be as stated in TC 101/WSR/009.

The orientation and positioning requirements for traffic signal posts						
Traffic signal post reference	**Site name**	**Traffic signal controller reference**	**Drawing or model reference(s)**	**Hinged post direction of fold (if applicable)**	**Access door orientation (if applicable)**	**Distance to stop line (if applicable)**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the traffic signal post is to be installed, e.g. 'M6 J19'.

c) Enter a unique reference.

d) Enter text, to identify the drawing(s) or model(s) which specify the orientation and positioning requirements for the traffic signal post.

e) Enter text, to identify the direction that the post folds down, if hinged.

f) Enter text, to identify the orientation of the access door on the traffic signal post, if provided.

g) Enter text, to identify the distance from the centre of the traffic signal post to the stop line, if applicable.

The orientation and positioning requirements for traffic signal posts (continued)		
Traffic signal post reference	**Distance from centre of post to kerb face**	**Distance from centre of post to nearest edge of tactile paving**
(a)	(h)	(i)

h) Enter a number in units of mm, to identify the distance from the centre of the traffic signal post to the kerb face.

i) Enter a number in units of mm, to identify the distance from the centre of the traffic signal post to the nearest edge of the tactile paving.

Foundations for traffic signal posts

9.9 The installation requirements for foundations for traffic signal posts shall be as stated in TC 101/WSR/009.

The installation requirements for foundations for traffic signal posts					
Traffic signal post reference	**Site name**	**Traffic signal controller reference**	**Foundation type**	**Foundation and cable ducting arrangement drawing references**	**New or existing**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site for where the traffic signal post is to be installed, e.g. 'M6 J19'.

c) Enter a unique reference.

d) Enter text, to identify the type of foundation for the traffic signal post.

e) Enter text, to identify the drawings specifying the foundation design and cable ducting arrangement.

f) Enter a value, from options New, Existing, to identify whether the traffic signal post foundation to be installed is new or existing.

9.10 Foundations for traffic signal posts shall comply with CC 481 [Ref 21.N].

Installation requirements for traffic signals posts

9.11 The vertical alignment of traffic signal posts shall be 90 degrees to the horizontal, with a tolerance of ±1 degree.

9.12 The additional installation requirements for traffic signal posts shall be as stated in TC 101/WSR/009.

SI.9.12 The additional installation requirements for traffic signal posts are: [enter free text].

10. Chambers for traffic signalling systems

10.1 Chambers for traffic signalling systems shall include traffic signal chambers, including TSP interface chambers, and traffic signal carriageway loop boxes.

Product requirements for chambers for traffic signalling systems

10.2 Chambers shall not deform when subject to the vertical loads corresponding to the loading class of the cover and frame for the chamber as defined in BS EN 124-1 [Ref 15.N].

10.3 The maximum internal width and length of traffic signal carriageway loop boxes shall not exceed 200 mm.

10.4 Cast in situ concrete for chambers for traffic signalling systems shall comply with "Concrete for Ancillary Purposes" in Section 2 of CC 495 [Ref 22.N].

10.5 Cast in situ concrete base slabs for chambers for traffic signalling systems shall be GEN 3 concrete, unless otherwise stated in TC 101/WSR/010.

SI.10.5 The requirement for cast in situ concrete base slabs for chambers for traffic signalling systems to be GEN 3 concrete is altered as follows: [enter free text].

10.6 The bricks for chambers for traffic signalling systems shall be compliant with BS EN 771-1 [Ref 40.N].

10.7 The bricks for chambers for traffic signalling systems shall meet the following performance characteristics: Class B in accordance with BS EN 771-1 [Ref 40.N] National Annex Table NA.6.

10.8 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to bricks for chambers for traffic signalling systems.

10.9 Mortar beds for covers, frames and brickwork for chambers for traffic signalling systems shall comply with "Masonry mortar" in Section 5 of CC 491 [Ref 20.N].

10.10 The additional product requirements for chambers for traffic signalling systems shall be as stated in TC 101/WSR/010.

SI.10.10 The additional product requirements for chambers for traffic signalling system are: [enter free text].

Product requirements for covers and frames for chambers for traffic signalling systems

10.11 The covers and frames for chambers for traffic signalling systems shall be compliant with BS EN 124-1 [Ref 15.N].

10.12 The requirements for Product certification schemes in Section 11 of GC 101 [Ref 14.N] shall apply to covers and frames for chambers for traffic signalling systems.

10.13 Traffic signal chamber covers shall be embossed or engraved with the legend ‘TS’ or ‘TRAFFIC SIGNALS’ on the external surface of each chamber cover complying with the requirements of BS EN 124-1 [Ref 15.N].

Scope of works for chambers for traffic signalling systems

10.14 The installation of chambers for traffic signalling systems shall be as stated in TC 101/WSR/010.

The installation of chambers for traffic signalling systems							
Traffic signalling systems chamber reference	**Site name**	**Drawing or model reference(s)**	**Carriageway, footway or verge**	**Chamber type**	**Chamber size**	**Chamber cover loading class**	**New or existing**
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the chambers for traffic signalling systems are to be installed, e.g. 'M6 J19'.

c) Enter text, to identify the drawing(s) or model(s) detailing the chambers for traffic signalling systems.

d) Enter a value, from options Carriageway, Footway, Verge, to identify where the chamber for traffic signalling systems is to be installed.

e) Enter a value, from options Traffic signal chamber, Traffic signal carriageway loop box, to identify the type of chamber for traffic signalling systems to be installed.

f) Enter text, to identify the size of chamber for traffic signalling systems to be installed.

g) Enter a value, from options B125, C250, D400, E600, to identify the cover type for chambers for traffic signalling systems.

h) Enter a value, from options New, Existing, to identify if the chamber for traffic signalling systems is new or existing.

10.15 The requirements for securing chamber covers for chambers for traffic signalling systems shall be as stated in TC 101/WSR/010.

SI.10.15 The requirements for securing chamber covers for chambers for traffic signalling systems are: [enter free text].

10.16 The requirements for drainage solutions for chambers for traffic signalling systems shall be as stated in TC 101/WSR/010.

SI.10.16 The requirements for drainage solutions for chamber for traffic signalling systems, including any drawing(s) or model(s) which detail the drainage solution, are: [enter free text].

Installation requirements for chambers for traffic signalling systems

10.17 Chambers for traffic signalling systems, including covers and frames, shall be installed in accordance with the manufacturer's instructions.

10.18 The opening into chambers for traffic signalling systems shall not cause the chamber wall to deform.

10.19 The opening into chambers for traffic signalling systems shall not impede access to cable ducting and chamber fixing arrangements inside the chamber.

10.20 Chambers for traffic signalling systems shall be free from debris before the installation of cables.

10.21 The cover, frame and brickwork for chambers for traffic signalling systems shall be set in a 10 mm minimum thick compound in accordance with the following requirements, or set in a proprietary quick-setting mortar of equivalent strength with a declaration of performance for its intended use: "Masonry mortar" in Section 5 of CC 491 [Ref 20.N].

10.22 The additional installation requirements for chambers for traffic signalling system shall be as stated in TC 101/WSR/010.

SI.10.22 The additional installation requirements for chambers for traffic signalling system are: [enter free text].

Installation of traffic signal chambers

10.23 The traffic signal chamber base shall be constructed with a minimum 1:20 fall into the sump.

10.24 Concrete cover slabs shall be installed surrounding the top of traffic signal chambers on all sides to provide support for the traffic signal chamber covers, unless otherwise stated in TC 101/WSR/010.

SI.10.24 The requirement for concrete cover slabs to be installed surrounding the top of traffic signal chambers on all sides is altered as follows: [enter free text].

10.25 The backfill material surrounding traffic signal chambers shall be GEN 2 concrete in accordance with CC 495 [Ref 22.N] or, a Class 1, 2 or 3 earthworks material in accordance with "Acceptable earthwork material classes, properties, and testing" in Section 3 of CC 601 [Ref 6.N].

Installation of plastic traffic signal chambers

10.26 Where plastic traffic signal chambers are comprised of multiple sections, all sections shall be sealed in accordance with the manufacturer's instructions to prevent the ingress of water.

10.27 The frame for plastic traffic signal chambers shall be mechanically secured to the plastic traffic signal chamber walls in accordance with the manufacturer's instructions.

Verification requirements for chambers for traffic signalling systems

10.28 Verification shall be undertaken for each traffic signal chamber and traffic signal loop box, including cover and frame, by visual inspection to ensure they have been installed in accordance with the manufacturer’s instructions, and the result recorded in the ITP for that chamber.

10.29 The frequency of the visual inspection of each traffic signal chamber and traffic signal loop box, including cover and frame, shall be once upon the completion of installation of each chamber prior to backfill.

10.30 The requirements for "Verification" in Section 14 of GC 101 [Ref 14.N] shall apply to the visual inspection of each traffic signal chamber and traffic signal loop box, including cover and frame.

Verification testing for plastic traffic signal chambers

10.31 Verification shall be undertaken for each plastic traffic signal chamber by visual inspection to ensure they have been sealed to prevent the ingress of water, and the result recorded in the inspection and test plan for that chamber.

10.32 The frequency of the visual inspection of each plastic traffic signal chamber shall be once upon the completion of installation of each chamber prior to backfill.

10.33 The requirements for "Verification" in Section 14 of GC 101 [Ref 14.N] shall apply to the visual inspection of each traffic signal chamber.

11. Cable ducts for traffic signalling systems

11.1 Cable ducts for traffic signalling systems shall include traffic signal cable ducts and power cable ducts for traffic signalling systems.

Product requirements for cable ducts for traffic signalling systems

11.2 Cable ducts for traffic signalling systems shall be compliant with BS EN 61386-24 [Ref 2.N].

11.3 The cable ducts for traffic signalling systems shall meet the following performance characteristics: Resistance to compression: Type 450 or Type 750; Resistance to impact: Normal; Resistance to bending: Rigid or Pliable.

11.4 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 14.N] shall apply to cable ducts for traffic signalling systems.

11.5 Cable ducts for traffic signalling systems shall have a smooth internal bore.

11.6 The additional product requirements for cable ducts for traffic signalling systems shall be as stated in TC 101/WSR/011.

SI.11.6 The additional product requirements for cable ducts for traffic signalling systems are: [enter free text].

Traffic signal cable ducts

11.7 Traffic signal cable ducts shall be coloured orange in accordance with NJUG 1 [Ref 44.N].

11.8 Traffic signal cable ducts shall be embossed with the legend 'TRAFFIC SIGNALS'.

Power cable ducts

11.9 Power cable ducts for traffic signalling systems shall be coloured black.

Marker tape for traffic signalling systems

11.10 Marker tape for traffic signalling systems shall be coloured yellow with a black legend in accordance with NJUG 1 [Ref 44.N].

11.11 Marker tape for traffic signalling systems shall incorporate a detectable metallic trace wire.

11.12 Marker tape for traffic signal cable ducts shall be marked with the legend 'CAUTION TRAFFIC SIGNAL CABLE BELOW'.

11.13 The legend marked on marker tape for power cable ducts for traffic signalling systems shall be as stated in TC 101/WSR/011.

SI.11.13 The legend marked on marker tape for power cable ducts for traffic signalling systems is: [enter free text].

11.14 The additional product requirements for marker tape for traffic signalling systems shall be as stated in TC 101/WSR/011.

SI.11.14 The additional product requirements for marker tape for traffic signalling systems are: [enter free text].

Scope of works for cable ducts for traffic signalling systems

11.15 Cable ducts for traffic signalling systems shall be as stated in TC 101/WSR/011.

Cable ducts for traffic signalling systems						
Cable duct reference	**Site name**	**Drawing or model reference(s)**	**Number of cable ducts**	**Cable duct internal diameter**	**Start location**	**Cable duct cover depth start**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.
b) Enter a unique reference, to identify the name of the site where the cable duct is to be installed, e.g. 'M6 J19'.

c) Enter text, to identify the drawing(s) or model(s) detailing the cable ducts for traffic signalling systems.

d) Enter text, to identify the number of cable ducts for the associated cable duct route.

e) Enter a number in units of mm, to identify the internal diameter of the cable duct.

f) Enter text, to identify the start location of the cable duct, e.g. location or reference of traffic signal chamber, traffic signal post, traffic signal controller.

g) Enter a number in units of mm, to identify the depth of the cable duct at the start location.

Cable ducts for traffic signalling systems (continued)				
Cable duct reference	**End location**	**Cable duct cover depth end**	**Minimum cable duct route cover depth**	**Carriageway crossing**
(a)	(h)	(i)	(j)	(k)

h) Enter text, to identify the end location of the cable duct, e.g. location or reference of traffic signal chamber, traffic signal post, traffic signal controller.

i) Enter a number in units of mm, to identify the depth of the cable duct at the end location.

j) Enter a number in units of mm, to identify the minimum depth of the cable duct over the full cable duct route.

k) Enter a value, from options Yes, No, to identify if the cable duct route incorporates a carriageway crossing.

Installation requirements for cable ducts for traffic signalling systems

11.16 Cable ducts for traffic signalling systems shall not be bent or undulated to an internal radius less than the minimum bend radius of the cables to be housed within the cable duct.

11.17 Cable ducts for traffic signalling systems shall have no burrs or sharp edges that constitute a hazard.

11.18 Cable ducts for traffic signalling systems shall be free from debris before the installation of cables.

11.19 Cable ducts for traffic signalling systems between traffic signal chambers and traffic signal loop boxes shall be free from joints.

11.20 The requirements for sealing of cable ducts for traffic signalling systems shall be as stated in TC 101/WSR/011.

SI.11.20 The requirements for sealing of cable ducts for traffic signalling systems are: [enter free text].

11.21 Cable ducts for traffic signalling systems that are laid across or within 500 mm of filter drains shall be surrounded with 50 mm of GEN2 concrete in accordance with "Concrete for Ancillary Purposes" in Section 2 of CC 495 [Ref 22.N].

Cable ducts into traffic signal chambers

11.22 Cable ducts for traffic signalling systems terminated at traffic signal chambers shall extend between 25 mm to 50 mm into the chamber to protect the seal of the cable ducts in the case of cable duct shrinkage.

11.23 The draw cord requirements for cable ducts for traffic signalling systems shall comply with the 'Draw cords' requirements of "Ducts for roadside technology and communications" in Section 15 of TC 131 [Ref 38.N].

Cable sub-ducts for traffic signalling systems

11.24 The installation requirements for cable sub-ducts for traffic signalling systems shall be as stated in TC 101/WSR/011.

SI.11.24 The installation requirements for cable sub-ducts for traffic signalling systems are: [enter free text].

Marker tape for traffic signalling systems

11.25 Marker tape for traffic signalling systems shall be installed at a depth 150 mm below the finished ground level, unless otherwise stated in TC 101/WSR/011.

SI.11.25 The requirement for marker tape for traffic signalling systems to be installed at a depth 150 mm below the finished ground level is altered as follows: [enter free text].

Backfilling to cable duct trenches for traffic signalling systems

11.26 Compaction of earthworks fill used to backfill cable duct trenches for traffic signalling systems shall comply with "Compaction of earthworks fill" in Section 6 of CC 601 [Ref 6.N].

11.27 The backfill material used for cable duct trenches for traffic signalling systems shall be Class 1, 2 or 3 material in accordance with "Acceptable earthwork material classes, properties, and testing" in Section 3 of CC 601 [Ref 6.N].

11.28 Backfilling shall be undertaken immediately after the laying of the cable ducts for traffic signalling systems has been completed.

11.29 The additional requirements for backfilling to cable duct trenches for traffic signalling systems shall be as stated in TC 101/WSR/011.

SI.11.29 The additional requirements for backfilling to cable duct trenches for traffic signalling systems are: [enter free text].

Reinstatement of existing surfaces

11.30 Cable ducts for traffic signalling systems in flexible pavements or concrete pavements shall be reinstated in compliance with one of the following options: "Excavation and reinstatement of trenches in flexible pavements" in Section 2 of CC 205 [Ref 18.N] or "Excavation and reinstatement of trenches in concrete pavements" in Section 1 of CC 206 [Ref 17.N].

Additional requirements for cable ducts for traffic signalling systems

11.31 The additional installation requirements for cable ducts for traffic signalling systems shall be as stated in TC 101/WSR/011.

SI.11.31 The additional installation requirements for cable ducts for traffic signalling systems are: [enter free text].

Verification requirements for cable ducts for traffic signalling systems

11.32 The requirements for proving cable ducts for traffic signalling systems shall be as stated in TC 101/WSR/011.

SI.11.32 The requirements for proving cable ducts for traffic signalling systems are: [enter free text].

Documentation requirements for cable ducts for traffic signalling systems

11.33 The Documentation for proving cable ducts for traffic signalling systems shall be Cable duct survey records as stated in TC 101/WSR/011.

12. 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.	**Document**
Ref 1.N	National Highways. OTSL. MCH 1652, 'Communications Records Drawings - Computer Aided Drawings Standard'
Ref 2.N	BSI. BS EN 61386-24, 'Conduit systems for cable management. Particular requirements. Conduit systems buried underground (Designated Standard - LVD)'
Ref 3.N	National Highways. CC 120 'Construction of permanent traffic signs, road markings and road studs'
Ref 4.N	National Highways. CC 130, 'Construction of temporary traffic signs and road markings'
Ref 5.N	BSI. BS EN 60529, 'Degrees of protection provided by enclosures (IP code). (Designated Standard - LVD)'
Ref 6.N	National Highways. CC 601 'Earthworks (Series 600)'
Ref 7.N	BSI. BS 6346, 'Electric cables – PVC insulated, armoured cables for voltages, of 600 / 1000 V and 1900 / 3300 V ' , 1997
Ref 8.N	National Highways. TG 411, 'Electricity supply connections'
Ref 9.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2130, 'Environmental Tests for Road Traffic Control Equipment'
Ref 10.N	BSI. BS EN 12899-1, 'Fixed, vertical road traffic signs. Fixed signs (Designated Standard - CPR)'
Ref 11.N	BSI. BS EN 12899-2, 'Fixed, vertical road traffic signs. Transilluminated traffic bollards (TTB) (Designated Standard - CPR)'
Ref 12.N	National HIghways. CC 207, 'Footway, cycle track, paved area, kerb unit and access step construction'
Ref 13.N	National Highways. OTSL. TRH 2583, 'General Regulation Highways Agency Cables'
Ref 14.N	National Highways. GC 101, 'General requirements for the Specification for Highway Works'
Ref 15.N	BSI. BS EN 124-1, 'Gully tops and manhole tops for vehicular and pedestrian areas. Definitions, classification, general principles of design, performance requirements and test

	methods'
Ref 16.N	BSI. BS EN ISO 1461, 'Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods'
Ref 17.N	National Highways. CC 206 'Maintenance of concrete pavement layers'
Ref 18.N	National Highways. CC 205 'Maintenance of pavements with an asphalt surfacing'
Ref 19.N	National Highways. GG 182, 'Major schemes: Enabling handover into operation and maintenance'
Ref 20.N	National Highways. CC 491 'Masonry [Series 2400]'
Ref 21.N	National Highways. CC 481, 'Minor Structures'
Ref 22.N	National Highways. CC 495, 'Miscellaneous'
Ref 23.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2506, 'Performance Specification for Above Ground On-Crossing Pedestrian Detection Systems'
Ref 24.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2505, 'Performance Specification for Above Ground Vehicle Detector Systems for use at Permanent Traffic Signal Installations'
Ref 25.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2509, 'Performance Specification for Audible Equipment for use at Pedestrian Crossings'
Ref 26.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2512, 'Performance Specification for Below Ground Vehicle Detection Equipment'
Ref 27.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2507, 'Performance Specification for Kerbside Detection Systems for use with Nearside Signals and Demand Units'
Ref 28.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2511, 'Performance Specification for Nearside Signal and Demand Unit'
Ref 29.N	Traffic Open Products and Specifications (TOPAS) Ltd. TOPAS 2542, 'Performance Specification for non-contact pedestrian signal demand equipment'

Ref 30.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2543, 'Performance Specification for Signal Heads'
Ref 31.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2508, 'Performance Specification for Tactile Equipment for use at Pedestrian Crossings'
Ref 32.N	BSI. BS EN 314-2, 'Plywood. Bonding quality. Requirements'
Ref 33.N	National Highways. OTSL. PL 1166, 'Process for Installing Asset Bar Code Labels'
Ref 34.N	BSI. BS ISO 10005, 'Quality management. Guidelines for quality plans'
Ref 35.N	BSI. BS 7671, 'Requirements for Electrical Installations. IET Regulations'
Ref 36.N	National Highways. OTSL. RG 1110, 'Requirements for Roadside Technology Products'
Ref 37.N	BSI. BS EN 50556, 'Road traffic signal systems (Designated Standard - LVD)'
Ref 38.N	National Highways. TC 131 'Roadside technology and communications'
Ref 39.N	BSI. BS 5467, 'Specification for armoured electric cables having thermosetting insulation 600/1000 V and 1900/3300 V'
Ref 40.N	BSI. BS EN 771-1, 'Specification for masonry units. Clay masonry units (Designated Standard - CPR)'
Ref 41.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2544, 'Specification for Pedestrian Wait Indicator Equipment'
Ref 42.N	National Highways. OTSL. MCH 1540, 'Specification for the Installation of Detector Loops on Motorways and all Purpose Trunk Roads'
Ref 43.N	Traffic Products and Open Specifications (TOPAS) Ltd. TOPAS 2500, 'Specification for Traffic Signal Controller'
Ref 44.N	National Joint Utilities Group . NJUG 1, 'Street Works UK Guidance on the Positioning and Colour Coding of Underground Utilities’ Apparatus'
Ref 45.N	BSI. BS EN 12368, 'Traffic control equipment. Signal heads (Designated Standard - CPR)'
Ref 46.N	BSI. BS EN 12675, 'Traffic signal controllers. Functional safety requirements'

Ref 47.N	National Highways. TD 101, 'Traffic signalling systems (design)'