Road Layout
Contract preparation

CP 120 Instructions for specifiers for CC 120 Construction of permanent traffic signs, road markings and road studs

(formerly)

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Document Code	Version number	Date of publication of relevant change	Changes made to	Type of change
CP 120	NI/LIVE_2025-01-30	Not available	Core document	Change to policy, major revision, new document development
This document supersedes Series NG 1200 (Traffic Signs) of Volume 2 - Notes for Guidance on the Specification for Highway Works - of the Manual of Contract Documents for Highway Works, which is withdrawn.				

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 CC 120 Construction of permanent traffic signs, road markings and road studs.

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 permanent traffic signs, road markings and road studs

Scope of this document for permanent traffic signs, road markings and road studs

1.1 This document shall apply to permanent traffic signs, including upright traffic signs, parallel and zebra crossing globes, refuge indicator lamps, twin amber flashing lights, bollards, marker posts, road markings and road studs, which are intended to remain in position on completion of the permanent works.

Permanent traffic signals

1.2 Permanent traffic signals shall comply with "General requirements for traffic signalling systems" in Section 1 of TC 101 [Ref 23.N].

Permanent light emitting variable message traffic signs

1.3 Permanent light-emitting variable message traffic signs shall comply with "Variable message signs and signals for roadside technology and communications" in Section 8 of TC 131 [Ref 21.N].

Electrical installations for permanent traffic signs

1.4 Electrical installations for permanent traffic signs shall comply with "General requirements for electrical work for road lighting and illuminated traffic signs" in Section 1 of TC 501 [Ref 3.N].

Foundations for permanent traffic signs

1.5 Foundations for permanent traffic signs shall comply with one of the following options: "Planted foundations for minor structures, excluding steel CCTV masts and steel high masts " in Section 13 of CC 481 [Ref 10.N], "Foundations for minor structures with flange plates " in Section 14 of CC 481 [Ref 10.N], or "Prefabricated reinforced concrete foundations for minor structures" in Section 15 of CC 481 [Ref 10.N].

Asset and product identification labels for permanent traffic signs

1.6 Where the Overseeing Organisation has determined an asset identification label is required, a unique asset identification label - i.e. the asset identification label provided in the WSR in each section of this document - shall be affixed to each permanent traffic sign, unless otherwise stated in CC 120/WSR/001.

SI.1.6 The requirement for asset identification labels for permanent traffic signs is altered as follows: [enter free text].

1.7 Product identification labels shall be affixed to permanent traffic signs as described in the referenced standards in the following sections of this document.

NI/1.8 No nationally determined requirement is provided.

1.9 For a period of not less than ten years following installation or opening to traffic, whichever is later, asset and product identification labels affixed to permanent traffic signs shall remain legible and, for adhesive labels, not become detached or curled at the edges.

Verification for permanent traffic signs

1.10 Verification shall be undertaken for each permanent traffic sign with light-emitting or mechanical components - e.g. flap signs, electromechanical variable message traffic signs, globes, flashing lights - to confirm by testing that the permanent traffic sign is operating in accordance with the applicable traffic signs regulations and the requirements of this document.

1.11 The frequency of operational testing shall be once for each permanent traffic sign with light-emitting or mechanical components unless otherwise stated in CC 120/WSR/001.

SI.1.11 The requirement for operational testing of each permanent traffic sign with light-emitting or mechanical components is altered as follows: [enter free text].

1.12 The requirements for "Verification" in Section 14 of GC 101 [Ref 8.N] shall apply to the operational testing of each permanent traffic sign with light-emitting or mechanical components.

Documentation for permanent traffic signs, road markings and road studs

1.13 The following Documentation shall be submitted for each permanent traffic sign prior to the commencement of handover into maintenance: as stated in table 1.13.

Table 1.13 Documentation for permanent traffic signs, road markings and road studs

Item	Applicability	Documentation required for each permanent traffic sign
1	All permanent traffic signs, road markings and road studs.	Dimensioned as-built drawings or digital models demonstrating

		compliance with the applicable traffic signs regulations and the requirements of this document.
2		A copy of the manufacturer's installation, operation and maintenance instructions, and certification that the permanent traffic sign, road marking or road stud has been installed in accordance with the manufacturer's instructions.
3	Permanent traffic signs with light-emitting or mechanical components - e.g. flap signs, electromechanical variable message traffic signs, globes, flashing lights.	Test results that demonstrate that the permanent traffic sign is operating in accordance with the applicable traffic signs regulations and the requirements of this document.
4	Permanent traffic signs specified in accordance with BS 8442 [Ref 11.N]	Photographic evidence of product marking in accordance with section 14 of BS 8442 [Ref 11.N].
5		Product information in accordance with section 15 of BS 8442 [Ref 11.N].
6	Permanent traffic signs except permanent location marker posts, permanent road markings and permanent road studs.	Photographic evidence that the asset identification label has been affixed in accordance with the applicable traffic signs regulations and the requirements of this document.
7		Product details for the asset identification label that has been affixed and certification that the label has the durability described in this section of this document.
8	All permanent upright traffic signs	Photographic evidence that the product information label has been affixed in accordance with the applicable traffic signs regulations and the requirements of this section of this document.
9		Product details for the product information label that has been affixed and certification that the label has the durability described in this section of this document.
10	Permanent upright traffic signs with hollow section supports.	Photographic evidence that the hollow section supports have been sealed at the top to prevent ingress of water in accordance with the requirements of section 2 of this

		document.

1.14 The requirements for "Documentation" in Section 2 of GC 101 [Ref 8.N] shall apply to the documentation stated in table 1.13.

1.15 The following Documentation shall be submitted for permanent traffic signs, road markings and road studs prior to the commencement of handover into maintenance: additional as-built records as stated in CC 120/WSR/001.

SI.1.15 Additional as-built records for permanent traffic signs, road markings and road studs shall be submitted as follows: [enter free text].

1.16 The requirements for "Documentation" in Section 2 of GC 101 [Ref 8.N] shall apply to additional as-built records for permanent traffic signs, road markings and road studs.

2. Permanent upright traffic signs

General requirements for permanent upright traffic signs

2.1 Permanent upright traffic signs shall be as described in CC 120/WSR/002.

Permanent upright traffic signs						
Unique item or identification number	**Installation location**	**Mounting arrangements**	**Drawing or model reference(s)**	**Form of permanent upright traffic sign**	**Coefficient of retroreflection (class) from BS EN 12899-1 [Ref 6.N]**	**Maximum dimension (height) of permanent upright traffic sign face including any backing board**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.
b) Enter text, to identify the location at which the permanent upright traffic sign is to be installed.

c) Enter text, to identify how the permanent upright traffic sign is to be supported (e.g. on posts or masts; on a lighting column; on a gantry; on a bollard).

d) Enter text, to identify the drawing(s) or model(s) in which details of the required permanent upright traffic sign assembly are shown.

e) Enter text, to identify the unique diagram number(s) or the relevant schedules and parts from the applicable traffic signs regulations.

f) Enter a value, from options RA1, RA2, R2, R3B-UK, R3C-UK, to identify the minimum coefficient of retroreflection of the retroreflective material to be used in the sign face.

g) Enter a number in units of mm, to identify the maximum height of the sign face (i.e. the element of the sign face with the greatest height).

Permanent upright traffic signs (continued)								
Unique item or identification number	**Maximum dimension (width) of permanent upright traffic sign face including any backing board**	**Area of permanent upright traffic sign face including any backing board**	**Mounting height of permanent upright traffic sign face**	**Substrate material (where specified by the Overseeing Organisation)**	**Is the permanent upright traffic sign to have a dew resistant coating or overlay?**	**Is the permanent upright traffic sign to have an anti-graffiti coating or overlay?**	**Is the permanent upright traffic sign to be externally illuminated?**	**Is p u s t t**
(a)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o

h) Enter a number in units of mm, to identify the maximum width of the sign face (i.e. the element of the sign face with the greatest width).

i) Enter a number in units of m^2, to identify the area of the sign face.

j) Enter a number in units of mm, to identify the height of the lower edge of the sign face above ground level.

k) Enter text, to identify where the Overseeing Organisation requires a particular substrate material to be used to support the sign face material.

l) Enter a value, from options Yes, No, to identify whether the permanent upright traffic sign is to be provided with a dew resistant coating or overlay.

m) Enter a value, from options Yes, No, to identify whether the permanent upright traffic sign is to be provided with an anti-graffiti coating or overlay.

n) Enter a value, from options Yes, No, to identify whether the permanent upright traffic sign is to be provided with one or more external luminaires.

o) Enter a value, from options Yes, No, to identify whether the permanent upright traffic sign is to be provided with one or more internal luminaires.

Permanent upright traffic signs (continued)						
Unique item or identification number	**Method of control of illumination**	**Is the permanent upright traffic sign in an area with high background luminance?**	**Wind pressure (prior to the application of any safety or shape factors, or force coefficient)**	**Dynamic snow loads**	**Asset identification label**	**Location and orientation of the asset identification label**
(a)	(p)	(q)	(r)	(s)	(t)	(u)

p) Enter text, to identify, where a permanent upright traffic sign is to be illuminated, the method of control of the luminaire(s) (e.g. via a central management system (CMS); photo-electronic control unit (PECU)).

q) Enter a value, from options Yes, No, Not applicable, to identify, for permanent externally illuminated upright traffic signs and permanent transilluminated upright traffic signs, whether the traffic sign will be installed in an area with high background luminance so that the supplier can select the relevant performance class for mean luminance from Table 2.10a.

r) Enter a number in units of kN/m^2, to identify the wind pressure to be used by the supplier when completing the design of the permanent upright traffic sign.

s) Enter a value, from options Snow blowers and snow ploughs are not regularly used, Snow blowers are regularly used, Snow ploughs are regularly used at a ploughing speed of 40mph or less, Snow ploughs are regularly used at a ploughing speed greater than 40mph, to enable the sign supplier to select the correct physical performance class for dynamic snow loads.

t) Enter text, to identify the unique asset identification label, which is assigned by the Overseeing Organisation and recorded in the Overseeing Organisation's asset database, to be applied to the permanent upright traffic sign support or the back of the permanent upright traffic sign.

u) Enter text, to identify the location and orientation of the asset identification label on the permanent upright traffic sign assembly (e.g. on the support closest to the carriageway, facing oncoming traffic or on the back of the permanent upright traffic sign).

2.2 Permanent coverings of parts of permanent upright traffic signs shall be as described in CC 120/WSR/002.

Permanent coverings of parts of permanent upright traffic signs						
Unique item or identification number	**Installation location**	**Mounting arrangement**	**Drawing or model reference (s)**	**Material to which the permanent covering is to be applied**	**Coefficient of retroreflection (class) from BS EN 12899-1 [Ref 6.N]**	**Height of covering**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference.
b) Enter text, to identify the location of the permanent upright traffic sign which is to be modified.

c) Enter text, to identify how the permanent upright traffic sign is supported (e.g. on posts or masts; on a lighting column; on a gantry).

d) Enter text, to identify the drawing(s) or model(s) in which details of the required covering are shown.

e) Enter text, to identify the material to which the permanent covering is to be applied (e.g. the current upright traffic sign face material and its coefficient of retroreflection).

f) Enter a value, from options RA1, RA2, R2, R3B-UK, R3C-UK, to identify the minimum coefficient of retroreflection of the retroreflective material to be used in the covering.

g) Enter a number in units of mm, to identify the height of the covering.

Permanent coverings of parts of permanent upright traffic signs (continued)		
Unique item or identification number	**Width of covering**	**Area of covering**
(a)	(h)	(i)

h) Enter a number in units of mm, to identify the width of the covering.

i) Enter a number in units of m^2, to identify the area of the covering.

Design of permanent upright traffic signs

2.3 The elements of permanent upright traffic signs listed in table 2.3 shall be Contractor design items, unless otherwise stated in CC 120/WSR/002.

Table 2.3 Contractor design items for permanent upright traffic signs	
Item number	Item description (using the terms and definitions in BS EN 12899-1 [Ref 6.N])
1	The substrate to which the sign face material is affixed unless otherwise stated in CC 120/WSR/002.
2	The selection of the sign face material.
3	The sign plate which comprises the substrate, reinforcing members and fixings.
4	Sign panel butting plates or clamps for all horizontal and vertical panel interfaces of multi-panel signs.
5	The fixings for attaching the sign plate to the sign support(s).
6	The selection of materials for labels to be applied to sign supports or to the back of sign plates.

SI.2.3 The requirement for Contractor design of permanent upright traffic signs is altered as follows: [enter free text].

2.4 The design of permanent upright traffic signs shall be in accordance with CD 120 [Ref 2.N] and BS EN 12899-1 [Ref 6.N].

2.5 The requirements for "Contractor design" in Section 17 of GC 101 [Ref 8.N] shall apply to permanent upright traffic signs.

Product requirements for permanent upright traffic signs

2.6 Permanent upright traffic signs shall be compliant with BS EN 12899-1 [Ref 6.N].

2.7 The physical performance of permanent upright traffic signs shall meet the performance characteristics as stated in table 2.7.

Table 2.7 Minimum physical performance of permanent upright traffic signs

Performance characteristics, classes or values from BS EN 12899-1 [Ref 6.N]									
Wind pressure (prior to the application of any safety or shape factors, or force coefficient)		as stated in CC 120/WSR/002							
Partial safety factors		PAF1							
Partial material factors		from Table 7 of BS EN 12899-1 [Ref 6.N]							
Force coefficients (C_f) to be used in accordance with sub-clause 7.7 of BS EN 1991-1-4 [Ref 4.N]	Aspect ratio	1	1.6	3	5.5	7.5	13.5	20	30
	Force coefficient (C_f)	1.26	1.3	1.35	1.4	1.5	1.6	1.7	1.8
Point loads	Signs supported by a single circular post	PL1							
	Signs supported by more than one post or by a non-circular section	PL3							
Dynamic snow loads	If snow blowers or snow ploughs are not regularly used	DSL0							
	If snow blowers are regularly used	DSL1							
	If snow ploughs are regularly used	Ploughing speed of 40mph or less	DSL2						
		Ploughing speed greater than 40mph	DSL4						
Temporary deflection of sign plates and supports		Bending class	Torsion class						
	Sign plate	TDB4	Not applicable						
	Support - not passively safe (Class 0 in BS EN 12767 [Ref 12.N]	TDB4	TDT4						
	Support - passively safe (compliant with a performance class from BS EN 12767 [Ref 12.N]	TDB5	TDT4						

Piercing of sign face	P3
Edges of sign plates	E1
Corrosion protection	SP1 or SP2

2.8 The visual performance of permanent upright traffic signs shall meet the performance characteristics as stated in table 2.8.

Table 2.8 Minimum visual performance of permanent upright traffic signs

Characteristic	Product	Location	Performance class or value from BS EN 12899-1 [Ref 6.N]
Chromaticity	Retroreflective sign face material	All locations	CR1
	Fluorescent retroreflective sign face material	All locations	From table NA.1D of BS EN 12899-1 [Ref 6.N]
	Non-retroreflective sign face material	All locations	NR1
	Non-retroreflective transilluminated sign face material	All locations	B2
Coefficient of retroreflection ($cd.lx^{-1}.m^{-2}$)	Retroreflective sign face material	as stated in CC 120/WSR/002	
Additional requirements for permanent externally illuminated upright traffic signs			
Mean illuminance	Externally illuminated signs	Areas with high background luminance	E3
		Other areas	E2
Uniformity of luminance		For signs with an area not exceeding $1.5m^2$	UE3
		For signs with an area exceeding $1.5m^2$ with a height to width ratio less than 2:5	UE2
		For signs with an area exceeding $1.5m^2$ and a height to width ratio greater than 2:5	UE1
Additional requirements for permanent transilluminated upright traffic			

signs			
Mean illuminance (cd.m-2)	Transilluminated signs	Areas with high background luminance	L2
		Other areas	L1
Uniformity of luminance		For signs with an area not exceeding 1.5m^2	U3
		For signs with an area exceeding 1.5m^2 with a height to width ratio less than 2:5	U2
		For signs with an area exceeding 1.5m^2 and a height to width ratio greater than 2:5	U1

2.9 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 8.N] shall apply to permanent upright traffic signs.

Permanent upright traffic sign faces

2.10 Permanent upright traffic sign face materials shall be affixed in accordance with the material manufacturer's instructions.

Permanent upright traffic sign supports

2.11 Protrusion of supports for permanent upright traffic signs above the top of a permanent upright traffic sign shall be proscribed unless otherwise stated in CC 120/WSR/002.

Protrusion of supports for permanent upright traffic signs above the top of a permanent upright traffic sign			
Unique item or identification number	**Installation location**	**Extent to which the support(s) can protrude above the top of the permanent upright traffic sign**	**Reason for allowing the support(s) to protrude above the top of the permanent upright traffic sign**
(a)	(b)	(c)	(d)

a) Enter a unique reference, to identify, using the unique item or identification number in the main schedule of permanent upright traffic signs, the traffic sign being referenced in this schedule.
b) Enter text, to identify the location at which the permanent upright traffic sign is to be installed.

c) Enter text, to identify, for each relevant permanent upright traffic sign, the extent to which the support(s) can protrude above the top of the traffic sign.

d) Enter text, to identify, for each relevant permanent upright traffic sign, the reason for allowing the support(s) to protrude above the top of the traffic sign.

2.12 Hollow section supports for permanent upright traffic signs shall be sealed at the top to prevent ingress of water.

Luminaires for permanent upright traffic signs

2.13 Luminaires for the illumination of permanent upright traffic signs shall be in accordance with the requirements in Table 2.13.

Table 2.13 Requirements for luminaires for permanent upright traffic signs

Characteristic	Type or minimum performance characteristic
Type	Light emitting diode (LED)
Ingress protection	IP54

Permanent coverings of parts of permanent upright traffic signs

2.14 Methods and materials used in the permanent covering of part of an existing, permanent upright traffic sign shall be compatible with the materials used in the existing traffic sign assembly, including the sign plate, sign face materials and supports.

2.15 Where a self-adhesive traffic sign face material is being used to cover a part of an existing, permanent upright traffic sign face, the self-adhesive traffic sign face material shall be installed in accordance with the manufacturer's instructions.

2.16 Where a cover plate is being used to cover a section of an existing, permanent upright traffic sign, the fixing method shall not cause damage or staining to the existing traffic sign face beyond any bolt holes drilled to fix the plate.

Permanent upright traffic signs mounted on gantries

2.17 The requirements for permanent upright traffic signs mounted on gantries shall be as stated in CC 120/WSR/002.

SI.2.17 The requirements for permanent upright traffic signs mounted on gantries shall be: [enter free text].

Permanent upright traffic signs manufactured as flap signs

2.18 Permanent upright traffic signs that are to be manufactured as flap signs shall be compliant with BS 8442 [Ref 11.N].

Permanent upright electromechanical variable message traffic signs

2.19 The requirements for permanent upright electromechanical variable message traffic signs shall be as stated in CC 120/WSR/002.

SI.2.19 The requirements for permanent upright electromechanical variable message traffic signs are: [enter free text].

Installation requirements for permanent upright traffic signs

2.20 Installation of permanent upright traffic signs 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 8.N].

2.21 Installation of permanent upright traffic signs shall be carried out in accordance with the traffic sign manufacturer's instructions.

NI/2.22 A product information label with a maximum area of 30cm^2 and displaying all the information listed in section ZA.3 of BS EN 12899-1 [Ref 6.N], and the following, shall be affixed to the back of each permanent upright traffic sign:

1. the month and year of manufacture;
2. the overlay type (if applicable);
3. the substrate material type; and
4. the legend, "No scrap value," where a composite substrate material is in use.

NI/2.23 The legend, "Property of the Department for Infrastructure," shall be clearly and durably marked on the substrate of each permanent upright traffic sign so that the legend is legible at a reading distance of 500mm and the characters do not exceed:

1. 25mm in height, where the legend is shown in a contrasting colour; or
2. 50mm in height, where the legend is shown in the same colour.

3. Permanent parallel and zebra crossing globes and refuge indicator lamps

General requirements for permanent parallel and zebra crossing globes and refuge indicator lamps

3.1 Permanent parallel and zebra crossing globes and refuge indicator lamps shall be as described in CC 120/WSR/003.

Permanent parallel and zebra crossing globes and refuge indicator lamps							
Unique item or identification number	**Installation location**	**Installation type**	**Form of installation**	**Post or support type and dimensions**	**Post or support length**	**Unit mounting height**	**Type of protection against electric shock**
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)

a) Enter a unique reference.
b) Enter text, to identify the location at which the globe or lamp is to be installed.

c) Enter a value, from options Parallel crossing, Zebra crossing, Refuge indicator lamp, to identify the product to be installed.

d) Enter text, to identify the unique diagram number or the relevant schedule and parts from the applicable traffic signs regulations.

e) Enter text, to identify what type of post or support is to be installed, including whether the post or support is to be internally illuminated.

f) Enter a number in units of mm, to identify the total length of post or support required.

g) Enter a number in units of mm, to identify the mounting height of the globe or lamp.

h) Enter a value, from options Class 1, Class 2, to identify the level of protection against electric shock in accordance with BS EN 60598-1 [Ref 9.N].

Permanent parallel and zebra crossing globes and refuge indicator lamps (continued)		
Unique item or identification number	**Asset identification label**	**Drawing or model reference(s)**
(a)	(i)	(j)

i) Enter text, to identify the unique asset identification label, which is assigned by the Overseeing Organisation and recorded in the Overseeing Organisation's asset database, to be applied to the installation.

j) Enter text, to identify the drawing(s) or model(s) in which details of the required installation are shown.

Product requirements for permanent parallel and zebra crossing globes and refuge indicator lamps

NI/3.2 Permanent parallel and zebra crossing globes and refuge indicator lamps must comply with the Zebra, Pelican and Puffin Pedestrian Crossings Regulations (Northern Ireland) 2006 (NISR 2006/164 [Ref 22.N]).

3.3 Permanent parallel and zebra crossing globes and refuge indicator lamps shall be compliant with BS 8442 [Ref 11.N].

3.4 The permanent parallel and zebra crossing globes and refuge indicator lamps shall meet the performance characteristics as stated in table 3.4.

Table 3.4 Minimum performance requirements for permanent parallel and zebra crossing globes and refuge indicator lamps		
Performance characteristic		Minimum performance class or level
Protection against electric shock		as stated in CC 120/WSR/003
Ingress protection	Beacon globes	IP54
	Post base compartments	IP23

3.5 Protection against electric shock in permanent parallel and zebra crossing globes and refuge indicator lamps shall be compliant with BS EN 60598-1 [Ref 9.N].

3.6 The protection against electric shock in permanent parallel and zebra crossing globes and refuge indicator lamps shall meet the performance characteristics as stated in table 3.4.

3.7 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 8.N] shall apply to protection against electric shock in permanent parallel and zebra crossing globes and refuge indicator lamps.

Installation requirements for permanent parallel and zebra crossing globes and refuge indicator lamps

3.8 Permanent parallel and zebra crossing globes and refuge indicator lamps shall be installed in accordance with the manufacturer's instructions.

4. Permanent twin amber flashing lights at schools and for cattle crossings

General requirements for permanent twin amber flashing lights at schools and for cattle crossings

4.1 Permanent twin amber flashing lights at schools and for cattle crossings shall be as described in CC 120/WSR/004.

Permanent twin amber flashing lights at schools and for cattle crossings					
Unique item or identification number	**Installation location**	**Form of installation**	**Means of operation**	**Luminance requirements**	**Post or support type and dimensions**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference.
b) Enter text, to identify the location at which the permanent twin amber flashing lights are to be installed.

c) Enter text, to identify the unique diagram number from the applicable traffic signs regulations.

d) Enter text, to identify the way in which the permanent twin amber flashing lights are to be switched on and off.

e) Enter text, to identify, where required, the requirements for dimming and illuminance thresholds for ambient light conditions in accordance with paragraph 4 of BS 8442 [Ref 11.N].

f) Enter text, to identify what type of post or support is to be installed.

Permanent twin amber flashing lights at schools and for cattle crossings (continued)						
Unique item or identification number	**Post or support length**	**Unit mounting height**	**Method of securing the permanent twin amber flashing lights to a post or support**	**Type of protection against electric shock**	**Asset identification label**	**Drawing or model reference (s)**
(a)	(g)	(h)	(i)	(j)	(k)	(l)

g) Enter a number in units of mm, to identify the total length of post or support required.

h) Enter a number in units of mm, to identify the mounting height of the the permanent twin amber flashing lights.

i) Enter text, to identify the method of securing the permanent twin amber flashing lights to a post or support.

j) Enter a value, from options Class 1, Class 2, to identify the level of protection against electric shock in accordance with BS EN 60598-1 [Ref 9.N].

k) Enter text, to identify the unique asset identification label, which is assigned by the Overseeing Organisation and recorded in the Overseeing Organisation's asset database, to be applied to the installation.

l) Enter text, to identify the drawing(s) or model(s) in which details of the required installation are shown.

Product requirements for permanent twin amber flashing lights at schools and for cattle crossings

NI/4.2 Twin amber flashing lights at schools and for cattle crossings must comply with regulations 40 (at schools) and 41 (for cattle crossings) of the traffic Signs Regulations (Northern Ireland) 1997 (NISR 1997/386 (TSRNI) [Ref 24.N]).

4.3 Permanent twin amber flashing lights at schools and for cattle crossings shall be compliant with BS 8442 [Ref 11.N].

4.4 The permanent twin amber flashing lights at schools and for cattle crossings shall meet the performance characteristics as stated in table 4.4.

Table 4.4 Minimum performance requirements for twin amber flashing lights at schools and for cattle crossings		
Performance characteristic		Minimum performance class or level
Protection against electric shock		as stated in CC 120/WSR/004
Ingress protection	Post base compartments	IP23
	Twin amber flashing light units	IP54
Luminance requirements		as stated in CC 120/WSR/004

4.5 Protection against electric shock in permanent twin amber flashing lights at schools and for cattle crossings shall be compliant with BS EN 60598-1 [Ref 9.N].

4.6 The protection against electric shock in permanent twin amber flashing lights at schools and for cattle crossings shall meet the performance characteristics as stated in table 4.4.

4.7 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 8.N] shall apply to protection against electric shock in permanent twin amber flashing lights at schools and for cattle crossings.

Installation requirements for permanent twin amber flashing lights at schools and for cattle crossings

4.8 Permanent twin amber flashing lights at schools and for cattle crossings shall be installed in accordance with the manufacturer's instructions.

5. Permanent bollards

General requirements for permanent bollards

5.1 Permanent bollards shall be as described in CC 120/WSR/005.

Permanent bollards					
Unique item or identification number	**Installation location**	**Installation type**	**Upright traffic sign(s) to be mounted on the permanent bollard**	**Drawing or model reference(s)**	**Asset identification label**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference.
b) Enter text, to identify the location at which a permanent bollard is to be installed.

c) Enter a value, from options Permanent transilluminated traffic bollard (TTB) type 1, Permanent transilluminated traffic bollard (TTB) type 2, Permanent retroreflective self-righting bollard (RSRB) type A, Permanent retroreflective self-righting bollard (RSRB) type B, Permanent retroreflective self-righting bollard (RSRB) type C, Permanent retroreflective self-righting bollard (RSRB) type D, to identify the product to be installed.

d) Enter text, to identify the traffic signs that are to be mounted on the permanent bollard.

e) Enter text, to identify the drawing(s) or model(s) in which details of the required installation are shown.

f) Enter text, to identify the unique asset identification label, which is assigned by the Overseeing Organisation and recorded in the Overseeing Organisation's asset database, to be applied to the permanent bollard.

Product requirements for permanent bollards

5.2 Permanent transilluminated traffic bollards shall be compliant with BS EN 12899-2 [Ref 7.N].

5.3 The permanent transilluminated traffic bollards shall meet the performance characteristics as stated in table 5.3.

Table 5.3 Minimum performance requirements for permanent transilluminated traffic bollards		
Performance characteristic	Location on bollard	Minimum performance class or level from BS EN 12899-1 [Ref 6.N] unless otherwise stated
Chromaticity	Opaque areas	B2
	Retroreflective areas	CR1
	Transilluminated areas	B2
Mean luminance	Head surfaces facing traffic	L2
	Body	L2
Design	Body	The body is to be translucent white in accordance with Table 3 of BS EN 12899-2 [Ref 7.N], except that the rear can be opaque. The front and two sides are each to have a yellow panel, complying with Table 3 of BS EN 12899-2 [Ref 7.N], of no less than a 65,000mm^2 project area, except where the projected area of the body is less than 65,000mm^2 then the whole of the body is to be yellow.

5.4 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 8.N] shall apply to permanent transilluminated traffic bollards.

5.5 Permanent retroreflective self-righting bollards (RSRBs) shall be compliant with BS 8442 [Ref 11.N].

Installation requirements for permanent bollards

5.6 Permanent bollards shall be installed in accordance with the manufacturer's instructions.

6. Permanent marker posts

General requirements for permanent location marker posts

6.1 Permanent location marker posts shall be as described in CC 120/WSR/006.

Permanent location marker posts		
Unique item or identification number	**Installation location**	**Installation type from CD 120 [Ref 2.N]**
(a)	(b)	(c)

a) Enter a unique reference.
b) Enter text, to identify the location at which the permanent location marker post is to be installed.

c) Enter a value, from options Type A, Type B, Type C, to identify, with respect to CD 120 [Ref 2.N], the type of location marker post to be installed.

Design requirements for permanent location marker posts

6.2 The elements of permanent location marker posts listed in table 6.2 shall be Contractor design items, unless otherwise stated in CC 120/WSR/006.

Table 6.2 Contractor design items for permanent location marker posts	
Item number	Item description
1	The permanent location marker post product.
2	The location numerals to be affixed to each permanent location marker post.
3	Determination of whether to affix a telephone symbol and arrow to each permanent location marker post and, where they are to be affixed, the direction in which the arrow points.
4	The sockets and foundations for ground fixing of permanent location marker posts.
5	The means of attaching permanent location marker posts to bridge parapets, road restraint systems, tunnel walls or other structures.

SI.6.2 The requirement for Contractor design of permanent location marker posts is altered as follows: [enter free text].

6.3 The design of permanent location marker posts shall be in accordance with CD 120 [Ref 2.N].

6.4 The requirements for "Contractor design" in Section 17 of GC 101 [Ref 8.N] shall apply to permanent location marker posts.

General requirements for permanent hazard marker posts

6.5 Permanent hazard marker posts shall be as described in CC 120/WSR/006.

Permanent hazard marker posts					
Unique item or identification number	**Installation location**	**Delineator type from BS EN 12899-3 [Ref 5.N]**	**Type and coefficient of retroreflection (R_A) of retroreflectors**	**Asset identification label**	**Drawing or model reference(s)**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference.
b) Enter text, to identify the location at which the permanent hazard marker post is to be installed.

c) Enter a value, from options D1, D2, D3, D4, to identify, with respect to BS EN 12899-3 [Ref 5.N], the delineator type applicable to the hazard marker post.

d) Enter a value, from options type R1 class RA1, type R1 class RA2, type R1 class 3, type R2 class 1, type R2 class 2, type R3, to identify, with respect to BS EN 12899-3 [Ref 5.N], the type and coefficient of retroreflection of the retroreflectors to be affixed to the hazard marker post.

e) Enter text, to identify the unique asset identification label, which is assigned by the Overseeing Organisation and recorded in the Overseeing Organisation's asset database, to be applied to the permanent hazard marker post.

f) Enter text, to identify the drawing(s) or model(s) in which details of the required installation are shown.

NI/6.6 Permanent hazard marker posts must comply with diagram 560 or diagram 561 within schedule 1 of the Traffic Signs Regulations (Northern Ireland) 1997 (NISR 1997/386 (TSRNI) [Ref 24.N]).

Design of permanent hazard marker posts

6.7 The elements of permanent hazard marker posts listed in table 6.7 shall be Contractor design items, unless otherwise stated in CC 120/WSR/006.

Table 6.7 Contractor design items for permanent hazard marker posts

Item number	Item description
1	The sockets and foundations for ground fixing of permanent hazard marker posts.
2	The means of attaching permanent hazard marker posts to bridge parapets, road restraint systems, tunnel walls or other structures.

SI.6.7 The requirement for Contractor design of permanent hazard marker posts is altered as follows: [enter free text].

6.8 The design of permanent hazard marker posts shall be in accordance with CD 120 [Ref 2.N] and BS EN 12899-3 [Ref 5.N].

6.9 The requirements for "Contractor design" in Section 17 of GC 101 [Ref 8.N] shall apply to permanent hazard marker posts.

Product requirements for permanent hazard marker posts

6.10 Permanent hazard marker posts shall be compliant with BS EN 12899-3 [Ref 5.N].

6.11 The permanent hazard marker posts shall meet the performance characteristics as stated in table 6.11.

Table 6.11 Minimum performance requirements for permanent hazard marker posts

Performance characteristic	Product	Performance class or value from BS EN 12899-3 [Ref 5.N]
Static deflection resistance	Delineator posts	WL2
Type of delineator post	Delineator posts	as stated in CC 120/WSR/06
Dynamic impact	Retroreflectors	DH2
Type of retroreflector	Retroreflectors	as stated in CC 120/WSR/06
Coefficient of retroreflection	Retroreflectors	as stated in CC 120/WSR/06

(R_A) of retroreflectors		

6.12 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 8.N] shall apply to permanent hazard marker posts.

Installation requirements for permanent location and hazard marker posts

6.13 Permanent location and hazard marker posts shall be installed in accordance with the manufacturer's instructions.

7. Permanent road markings

General requirements for permanent road markings

7.1 Permanent road markings shall be as described in CC 120/WSR/007.

Permanent road markings					
Unique item or identification number	**Installation location**	**Drawing or model reference(s)**	**Form of permanent road marking**	**Colour of permanent road marking**	**Start location**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference, to uniquely identify an individual permanent road marking or a string of permanent road markings for installation.
b) Enter text, to identify the location at which the permanent road markings are to be installed.

c) Enter text, to identify the drawing(s) or model(s) in which details of the required permanent road marking are shown.

d) Enter text, to identify the unique diagram number from the applicable traffic signs regulations.

e) Enter text, to identify the colour of the road marking, including any particular shade required.

f) Enter text, to identify the location at which the permanent road marking is to start.

Permanent road markings (continued)						
Unique item or identification number	**End location**	**Permanent road marking material**	**Road surface**	**Road type**	**Lighting status**	**Enhanced performance requirements**
(a)	(g)	(h)	(i)	(j)	(k)	(l)

g) Enter text, to identify the location at which the permanent road marking is to finish.

h) Enter text, to identify, where required, the type of permanent road marking material to be used.

i) Enter text, to identify the type of pavement or surface to which the permanent road marking is to be applied.

j) Enter a value, from options Carriageway with up to 3 lanes, Carriageway with 4 or more lanes, to identify the road type to which the permanent road marking is to be applied so that the correct BS EN 1436 [Ref 20.N] performance classes can be selected.

k) Enter a value, from options Unlit/partially lit/dimmed, Lit, to identify the lighting status of the road to which the permanent road marking is to be applied so that the correct BS EN 1436 [Ref 20.N] performance classes can be selected.

l) Enter a value, from options yes, no, to identify whether enhanced performance requirements apply to the permanent road marking and are specified in the road marking performance schedules.

Permanent road markings (continued)		
Unique item or identification number	**Permanent roads studs**	**Verification requirements - measurement of dimensions**
(a)	(m)	(n)

m) Enter a value, from options yes, no, to identify whether permanent road studs are also to be installed in accordance with CC 120/WSR/008 for permanent road studs.

n) Enter text, to identify the requirements for measuring the dimensions of the permanent road marking after installation, including the sampling frequency.

7.2 The removal of permanent road markings shall comply with "Temporary road markings" in Section 3 of CC 130 [Ref 1.N].

Performance requirements for permanent road markings

7.3 The performance of permanent road markings shall be compliant with BS EN 1436 [Ref 20.N].

Performance requirements for permanent white road markings

7.4 The performance of permanent white road markings shall be as described in table 7.4 for a period of not less than two years following

installation or opening to traffic, whichever is later, unless otherwise stated in CC 120/WSR/007.

Table 7.4 Minimum performance classes for permanent white road markings					
Performance characteristics from BS EN 1436 [Ref 20.N]		Carriageways with up to 3 lanes		Carriageways with 4 or more lanes	
		Unlit, partially lit or dimmed	Lit	Unlit, partially lit or dimmed	Lit
Luminance coefficient (Qd) or luminance factor (β)		Q3 (≥130) or B2 (≥0.30)		Q4 (≥160) or B3 (≥0.40)	
Retroreflection (R_L) ($mcd.m^{-2}.lx^{-1}$)	Dry road markings	R3 (≥150)	R2 (≥100)	R4 (≥200)	R3 (≥150)
	Road markings during wetness	RW3 (≥50)	RW2 (≥35)	RW3 (≥50)	
	Road markings during rain	RR0 (No value requested)			
Skid resistance (SRT)		S1 (≥45)			
Colour		the x, y coordinates for white road markings in daylight in table 6 of BS EN 1436 [Ref 20.N]			
Roll-over class as determined by a road trial in accordance with BS EN 1824 [Ref 18.N] (number of wheel passages)		P5 (1,000,000)			

The performance of permanent white road markings					
Unique item or identification number	**Luminance coefficient (Qd) or luminance factor (β)**	**Retroreflection (R_L) for dry road markings**	**Retroreflection (R_L) for road markings during wetness**	**Skid resistance**	**Roll-over class as determined by a road trial in accordance with BS EN 1824 [Ref 18.N]**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference, to identify, using the unique item or identification number in the main schedule of permanent road markings, the individual permanent road marking or string of permanent road markings that is subject to enhanced performance requirements.

b) Enter a value, from options No enhanced requirement, Q4 (≥160) or B3 (≥0.40), Q4 (≥160) or B4 (≥0.50), (Q5 (≥200) or B4 (≥0.50), to identify, where required, an enhanced performance requirement for reflection of permanent white road markings in daylight or under road lighting.

c) Enter a value, from options No enhanced requirement, R3 (≥150), R4 (≥200), R5 (≥300), to identify, where required, an enhanced performance requirement for retroreflection of dry permanent white road markings.

d) Enter a value, from options No enhanced requirement, RW3 (≥50), RW4 (≥75), RW5 (≥100), RW6 (≥150), to identify, where required, an enhanced performance requirement for retroreflection of permanent white road markings during wetness.

e) Enter a value, from options No enhanced requirement, S2 (≥50), S3 (≥55), S4 (≥60), S5 (≥65), to identify, where required, an enhanced performance for skid resistance of permanent white road markings.

f) Enter a value, from options No enhanced requirement, P5.5 (1,500,000), P6 (2,000,000), P7 (4,000,000), to identify, where required, an enhanced durability performance requirement for permanent white road markings.

Performance requirements for permanent yellow road markings

7.5 The performance of permanent yellow road markings shall be as described in table 7.5 for a period of not less than two years following installation or opening to traffic, whichever is later, unless otherwise stated in CC 120/WSR/007.

Table 7.5 Minimum performance classes for permanent yellow road markings

Performance characteristics from BS EN 1436 [Ref 20.N]		All carriageway types and all lighting conditions
Luminance coefficient (Qd) or luminance factor (β)		Q2 (≥100) or B1 (≥0.20)
Retroreflection (R_L) ($mcd.m^{-2}.lx^{-1}$)	Dry road markings	R0 (No value requested)
	Road markings during wetness	RW0 (No value requested)
	Road markings during rain	RR0 (No value requested)
Skid resistance (SRT)		S1 (≥45)
Colour		the x, y coordinates for yellow road markings class Y1 in daylight in table 6 of BS EN 1436 [Ref 20.N]

Roll-over class as determined by a road trial in accordance with BS EN 1824 [Ref 18.N] (number of wheel passages)	P5 (1,000,000)

The performance of permanent yellow road markings					
Unique item or identification number	**Luminance coefficient (Qd) or luminance factor (β)**	**Retroreflection (R_L) for dry road markings**	**Retroreflection (R_L) for road markings during wetness**	**Skid resistance**	**Roll-over class as determined by a road trial in accordance with BS EN 1824 [Ref 18.N]**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference, to identify, using the unique item or identification number in the main schedule of permanent road markings, the individual permanent road marking or string of permanent road markings that is subject to enhanced performance requirements.

b) Enter a value, from options No enhanced requirement, Q3 (≥130) or B2 (≥0.30), Q4 (≥160) or B3 (≥0.40), Q5 (≥200) or B4 (≥0.50), to identify, where required, an enhanced performance requirement for reflection of permanent yellow road markings in daylight or under road lighting.

c) Enter a value, from options No enhanced requirement, R1 (≥80), R2 (≥100), R3 (≥150), R4 (≥200), R5 (≥300), to identify, where required, an enhanced performance requirement for retroreflection of dry permanent yellow road markings.

d) Enter a value, from options No enhanced requirement, RW1 (≥25), RW2 (≥35), RW3 (≥50), RW4 (≥75), RW5 (≥100), RW6 (≥150), to identify, where required, an enhanced performance requirement for retroreflection of permanent yellow road markings during wetness.

e) Enter a value, from options No enhanced requirement, S2 (≥50), S3 (≥55), S4 (≥60), S5 (≥65), to identify, where required, an enhanced performance for skid resistance of permanent yellow road markings.

f) Enter a value, from options No enhanced requirement, P5.5 (1,500,000), P6 (2,000,000), P7 (4,000,000), to identify, where required, an enhanced durability performance requirement for permanent yellow road markings.

Performance requirements for permanent red road markings

7.6 The performance of permanent red road markings shall be , for a period of not less than two years following installation or opening to traffic, whichever is later, as described in CC 120/WSR/007.

The performance of permanent red road markings						
Unique item or identification number	**Luminance coefficient (Qd) or luminance factor (β)**	**Retroreflection (R_L) for dry road markings**	**Retroreflection (R_L) for road markings during wetness**	**Skid resistance**	**Colour - chromaticity coordinates for dry red markings or an equivalent form of colour coding**	**Roll-over class as determined by a road trial in accordance with BS EN 1824 [Ref 18.N]**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference, to identify, using the unique item or identification number in the main schedule of permanent road markings, the individual permanent red road marking or string of permanent red road markings.
b) Enter a value, from options Q2 (≥100) or B1 (≥0.20), Q3 (≥130) or B2 (≥0.30), Q4 (≥160) or B3 (≥0.40), Q5 (≥200) or B4 (≥0.50), to identify the performance requirement for reflection of permanent red road markings in daylight or under road lighting.

c) Enter a value, from options R0 (No value requested), R1 (≥80), R2 (≥100), R3 (≥150), R4 (≥200), R5 (≥300), to identify the performance requirement for retroreflection of dry permanent red road markings.

d) Enter a value, from options RW0 (No value requested), RW1 (≥25), RW2 (≥35), RW3 (≥50), RW4 (≥75), RW5 (≥100), RW6 (≥150), to identify the performance requirement for retroreflection of permanent red road markings during wetness.

e) Enter a value, from options S0 (No value requested), S1 (≥45), S2 (≥50), S3 (≥55), S4 (≥60), S5 (≥65), to identify the performance requirement for skid resistance of permanent red road markings.

f) Enter text, to identify the colour of the permanent red road markings using a formal method of defining the colour.

g) Enter a value, from options P0 (≤ 50,000), P1 (between 50,000 and 60,000), P2 (100,000), P3 (200,000), P4 (500,000), P5 (1,000,000), P5.5 (1,500,000), P6 (2,000,000), P7 (4,000,000), to identify the durability performance requirement for permanent red road markings.

Product requirements for permanent road markings

Permanent road marking materials

7.7 Permanent road markings shall be formed from paint, thermoplastic, cold plastic or preformed materials.

7.8 Paint, thermoplastic and cold plastic road marking materials shall be compliant with BS EN 1871 [Ref 19.N].

7.9 Preformed road marking materials shall be compliant with BS EN 1790 [Ref 14.N].

Reflectorisation of permanent road markings

7.10 All permanent white road markings shall be reflectorised, unless otherwise stated in CC 120/WSR/007.

SI.7.10 The following permanent white road markings shall not be reflectorised: [enter free text].

7.11 Permanent red and yellow road markings shall not be reflectorised, unless otherwise stated in CC 120/WSR/007.

SI.7.11 The following permanent red and yellow road markings shall be reflectorised: [enter free text].

Glass beads and antiskid aggregates for permanent road markings

7.12 Premix glass beads incorporated during manufacture into paint, thermoplastic and cold plastic road marking materials or applied just before the application of such materials to the road surface shall be compliant with BS EN 1424 [Ref 15.N].

7.13 Premix glass beads incorporated during manufacture into paint, thermoplastic and cold plastic road marking materials or applied just before the application of such materials to the road surface shall not contain more than 200ppm of arsenic (As), 200ppm of lead (Pb) or 200ppm of antimony (Sb).

7.14 Drop on glass beads, antiskid aggregates and mixtures of the two shall be compliant with BS EN 1423 [Ref 13.N].

7.15 The drop on glass beads, antiskid aggregates and mixtures of the two shall meet the performance characteristics as stated in table 7.15.

Table 7.15 Minimum performance requirements of drop on glass beads and antiskid aggregates		
Performance characteristics from BS EN 1423 [Ref 13.N]		Minimum performance
Glass beads		
Visibility characteristics	Refractive index	As stated in clause 4.1.2.1 of BS EN 1423 [Ref 13.N]
	Maximum weighted percentage of defective glass beads	Pass
Granulometry		As stated in clause 4.1.3 of BS EN 1423 [Ref 13.N]
Dangerous substances	Arsenic (As)	Class 1 (≤ 200 ppm)
	Lead (Pb)	Class 1 (≤ 200 ppm)
	Antimony (Sb)	Class 1 (≤ 200 ppm)
Durability	Resistance against chemicals: water, hydrochloric acid, calcium chloride and sodium sulphide	Pass
Transparent antiskid aggregates		
Granulometry		As stated in clause 4.2.2 of BS EN 1423 [Ref 13.N]
Dangerous substances	Arsenic (As)	Class 1 (≤ 200 ppm)
	Lead (Pb)	Class 1 (≤ 200 ppm)
	Antimony (Sb)	Class 1 (≤ 200 ppm)
Durability	Resistance to fragmentation (friability)	As stated in clause 4.2.4 of BS EN 1423 [Ref 13.N]
Non transparent antiskid aggregates		
Visibility characteristics	Chromaticity co-ordinates (x,y)	Pass
	Luminance factor	Pass
Granulometry		As stated in clause 4.3.3 of BS EN 1423 [Ref 13.N]
Durability	Resistance to fragmentation (friability)	As stated in clause 4.3.4 of BS EN 1423 [Ref 13.N]

7.16 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 8.N] shall apply to drop on glass beads, antiskid aggregates and mixtures of the two.

Installation requirements for permanent road markings

7.17 The application of permanent road marking materials to road surfaces 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 8.N].

7.18 Permanent road marking materials shall be compatible with the road surface to which they are being applied.

7.19 The road surface shall be prepared for the application of permanent road markings in accordance with the permanent road marking material manufacturer's instructions.

7.20 Permanent road markings shall be applied in accordance with the permanent road marking material manufacturer's instructions.

7.21 The installation of permanent road markings shall not result in any degradation in the performance of the road surface.

7.22 For each form or type of permanent road marking, the installation shall be uniform in shape and colour.

7.23 Permanent road markings shall be free from streaks and raggedness at their edges.

NI/7.24 The dimensions of permanent road markings must comply with the Traffic Signs Regulations (Northern Ireland) 1997 (NISR 1997/386 (TSRNI) [Ref 24.N]).

7.25 For permanent longitudinal road markings, the lateral tolerance shall be within ±25mm of the designed position, i.e. the position shown on the applicable drawing(s) or model(s) identified in CC 120/WSR/007.

Verification requirements for permanent road marking

7.26 Verification shall be undertaken for dimensions of permanent road markings, where stated in CC 120/WSR/007, by measurement in accordance with table 7.26.

Table 7.26 Measurement and test methods for permanent road markings

Test	Test Method
Dimensions	Recording of all dimensions of the road marking and comparison with the applicable traffic signs regulations and the requirements of this document.

7.27 The frequency of measurement of the dimensions of permanent road markings shall be as stated in CC 120/WSR/007.

7.28 The requirements for "Verification" in Section 14 of GC 101 [Ref 8.N] shall apply to measurement of the dimensions of permanent road markings.

Documentation requirements for permanent road markings

7.29 The following Documentation shall be submitted for each unique permanent road marking material to be incorporated in the works prior to the commencement of installation: a copy of the product datasheet and a copy of the individual test report from a road trial in accordance with BS EN 1824 [Ref 18.N]which demonstrates compliance with the roll-over class required by this document.

7.30 The requirements for "Documentation" in Section 2 of GC 101 [Ref 8.N] shall apply to the copy of the product datasheet and the copy of the individual road trial test report for each unique permanent road marking material to be incorporated in the works.

7.31 The following Documentation shall be submitted for premix glass beads complying with BS EN 1424 [Ref 15.N] prior to the commencement of installation of permanent road marking materials containing the premix glass beads: certification and test results to confirm that the premix glass beads in each road marking material have been tested and the test results demonstrate that the premix glass beads do not contain more than 200ppm of arsenic (As), 200ppm of lead (Pb) or 200ppm of antimony (Sb).

7.32 The requirements for "Documentation" in Section 2 of GC 101 [Ref 8.N] shall apply to the certification and test results for premix glass beads complying with BS EN 1424 [Ref 15.N].

7.33 The following Documentation shall be submitted for the measurement of permanent road markings prior to the commencement of handover into maintenance: measurements of the dimensions of permanent road markings, demonstrating compliance with the requirements of this document.

7.34 The requirements for "Documentation" in Section 2 of GC 101 [Ref 8.N] shall apply to measurements of the dimensions of permanent road markings.

8. Permanent road studs

General requirements for permanent road studs

8.1 Permanent retroreflecting road studs shall be as described in CC 120/WSR/008.

Permanent retroreflecting road studs						
Unique item or identification number	**Installation location**	**Drawing or model reference**	**Designation of permanent retroreflecting road studs by reflector (from BS EN 1463-1 [Ref 16.N])**	**Designation of permanent retroreflecting road studs by design (from BS EN 1463-1 [Ref 16.N])**	**Surface description**	**Form of road marking**
(a)	(b)	(c)	(d)	(e)	(f)	(g)

a) Enter a unique reference, to uniquely identify a string of permanent road studs for installation.
b) Enter text, to identify the location at which the permanent road studs are to be installed.

c) Enter text, to identify the drawing(s) or model(s) in which details of the required permanent retroreflecting road studs are shown.

d) Enter a value, from options Type 1 (Glass), Type 2 (Plastic), Type 3 (Plastic with abrasion resistant layer), No type selected, to identify, where required by the Overseeing Organisation, the reflector type of the permanent road studs to be installed.

e) Enter a value, from options Type A (Non depressible road stud), Type B (Depressible road stud), No type selected, to identify, where required by the Overseeing Organisation, the design type of the permanent road studs to be installed.

f) Enter text, to identify the type of pavement or surface to which the permanent retroreflecting road studs are to be applied.

g) Enter text, to identify, using the unique diagram number from the applicable traffic signs regulations, the road marking to which the permanent retroreflecting road studs relate.

Permanent retroreflecting road studs (continued)						
Unique item or identification number	**Location on carriageway cross-section**	**Start location**	**End location**	**Uni or bi-directional**	**Colour - direction 1**	**Colour - direction 2 (if applicable)**
(a)	(h)	(i)	(j)	(k)	(l)	(m)

h) Enter text, to identify the location on the carriageway cross-section at which the permanent retroreflecting road studs are to be installed (e.g. nearside edge, offside edge, central line between opposing traffic flows, lane line between lane [x] and lane [y]).

i) Enter text, to identify the location at which the permanent retroreflecting road studs are to start.

j) Enter text, to identify the location at which the permanent retroreflecting road studs are to finish.

k) Enter a value, from options uni-directional, bi-directional, to identify whether the permanent retroreflecting road stud is to be uni-directional or bi-directional.

l) Enter a value, from options Amber, Green, Red, White, to identify the colour of the light reflected by the permanent retroreflecting road stud in direction 1 (as shown on the relevant drawing or model).

m) Enter a value, from options Not applicable, Amber, Green, Red, White, to identify, where the stud is bi-directional, the colour of the light reflected by the permanent retroreflecting road stud in direction 2 (as shown on the relevant drawing or model).

Permanent retroreflecting road studs (continued)	
Unique item or identification number	**Height of permanent retroreflecting stud over road surface**
(a)	(n)

n) Enter a value, from options H0 (no requirement), H1 (up to 18mm), H2 (18 to 20mm), H3 (20 to 25mm), to identify the maximum height of the road stud.

8.2 Permanent non-retroreflecting road studs at signal-controlled and zebra crossings shall be as described in CC 120/WSR/008.

Permanent non-retroreflecting road studs at signal-controlled and zebra crossings					
Unique item or identification number	**Drawing or model reference**	**Surface description**	**Form of road marking**	**Start location**	**End location**
(a)	(b)	(c)	(d)	(e)	(f)

a) Enter a unique reference, to uniquely identify a string of permanent non-retroreflecting road studs for installation.
b) Enter text, to identify the drawing(s) or model(s) in which details of the required permanent non-retroreflecting road studs are shown.

c) Enter text, to identify the type of pavement or surface to which the permanent non-retroreflecting road studs are to be applied.

d) Enter text, to identify, using the unique diagram number from the applicable traffic signs regulations, the road marking to which the permanent non-retroreflecting road studs relate.

e) Enter text, to identify the location at which the permanent non-retroreflecting road studs are to start.

f) Enter text, to identify the location at which the permanent non-retroreflecting road studs are to finish.

8.3 The permanent road studs with a light source shall meet the performance characteristics stated in CC 120/WSR/008.

SI.8.3 The performance characteristics of permanent road studs with a light source shall be: [enter free text].

Product requirements for permanent road studs

NI/8.4 Permanent road studs must comply with:

1. the Traffic Signs Regulations (Northern Ireland) 1997 (NISR 1997/386 (TSRNI) [Ref 24.N]); and
2. the Zebra, Pelican and Puffin Pedestrian Crossings Regulations (Northern Ireland) 2006 (NISR 2006/164 [Ref 22.N]).

8.5 Permanent retroreflecting road studs shall be compliant with BS EN 1463-1 [Ref 16.N].

8.6 The permanent retroreflecting road studs shall meet the performance characteristics as stated in table 8.6.

Table 8.6 Performance characteristics of permanent road studs		
Performance characteristics		Class or value
Night-time visibility - retroreflectivity	Coefficient of luminous intensity (R)	as required by paragraph 4.1.2.1 of BS EN 1463-1 [Ref 16.N]
	Chromaticity coordinates (x,y)	as required by paragraph 4.1.2.2 of BS EN 1463-1 [Ref 16.N]
Durability of retroreflectivity to BS EN 1463-2 [Ref 17.N]	Coefficient of luminous intensity (R)	R1

8.7 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 8.N] shall apply to permanent retroreflecting road studs.

NI/8.8 No nationally determined requirement is provided.

Installation requirements for permanent road studs

8.9 The installation of permanent road studs 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 8.N].

8.10 Permanent road studs shall be installed in accordance with the manufacturer's instructions.

8.11 The installation of permanent road studs shall not result in any loss of structural integrity in the carriageway or any other degradation in the performance of the road surface.

8.12 The removal of existing permanent road studs - i.e. during the replacement or renewal of permanent road studs - shall not result in residue, voids, protrusions or loss of structural integrity in the carriageway.

9. 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. CC 130 'Construction of temporary traffic signs and road markings'
Ref 2.N	National Highways. CD 120, 'Design of permanent traffic signs and road markings'
Ref 3.N	National Highways. TC 501 'Electrical Work for Road Lighting and Illuminated Traffic Signs'
Ref 4.N	BSI. BS EN 1991-1-4, 'Eurocode 1: Actions on structures: General actions – Wind actions'
Ref 5.N	BSI. BS EN 12899-3, 'Fixed, vertical road traffic signs. Delineator posts and retroreflectors (Designated Standard - CPR)'
Ref 6.N	BSI. BS EN 12899-1, 'Fixed, vertical road traffic signs. Fixed signs (Designated Standard - CPR)'
Ref 7.N	BSI. BS EN 12899-2, 'Fixed, vertical road traffic signs. Transilluminated traffic bollards (TTB) (Designated Standard - CPR)'
Ref 8.N	National Highways. GC 101, 'General requirements for the Specification for Highway Works'
Ref 9.N	BSI. BS EN 60598-1, 'Luminaires. General requirements and tests (Designated Standard - LVD)'
Ref 10.N	National Highways. CC 481 'Minor Structures [Series 1300]'
Ref 11.N	BSI. BS 8442, 'Miscellaneous road traffic signs and devices - Requirements and test methods'
Ref 12.N	BSI. BS EN 12767, 'Passive safety of support structures for road equipment. Requirements, classification and test methods.'
Ref 13.N	BSI . BS EN 1423, 'Road marking materials – Drop on materials – Glass beads, antiskid aggregates and mixtures of the two (Designated Standard - CPR)'
Ref 14.N	BSI. BS EN 1790, 'Road marking materials – Preformed road markings'
Ref 15.N	BSI. BS EN 1424, 'Road marking materials – Premix glass beads '
Ref 16.N	BSI. BS EN 1463-1, 'Road marking materials – Retroreflecting road

	studs – Initial performance Requirements (Designated Standard - CPR)'
Ref 17.N	BSI. BS EN 1463-2, 'Road marking materials – Retroreflecting road studs – Road test performance specifications'
Ref 18.N	BSI. BS EN 1824, 'Road marking materials – Road trials'
Ref 19.N	BSI. BS EN 1871, 'Road marking materials. Physical properties'
Ref 20.N	BSI. BS EN 1436, 'Road marking materials. Road marking performance for road users and test methods'
Ref 21.N	National Highways. TC 131 'Roadside technology and communications'
Ref 22.N	National Archives. NISR 2006/164, 'The Zebra, Pelican and Puffin Pedestrian Crossings Regulations (Northern Ireland) 2006'
Ref 23.N	National Highways. TC 101 'Traffic signalling systems [New Series 1200]'
Ref 24.N	National Archives. NISR 1997/386 (TSRNI), 'Traffic Signs Regulations (Northern Ireland)'

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