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Manual of Contract Documents for Highway Works

Highway Structures & Bridges
Contract Preparation

CP 481 Instructions for specifiers for CC 481 Minor structures

(formerly Series NG 1300)

Version LIVE_2026-07-24

Summary

This document gives instructions to specifiers with respect to minor highway structures including lighting columns, masts for traffic signals, speed cameras, CCTV and fixed vertical road traffic signs, and noise barriers.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated National Highways team. The online feedback form for all enquiries and feedback can be accessed at:

www.standardsforhighways.co.uk/feedback.

This is a controlled document.

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Latest release notes

Document Code	Version number	Date of publication of relevant change	Changes made to	Type of change
CP 481	LIVE_2026-07-24	Not available	Core document	Incremental change to requirements
1. Specifier instructions for noise barriers aligned with BS EN 14388:2005				

Previous versions

Document Code	Version number	Date of publication of relevant change	Changes made to	Type of change
CP 481	1.0.0	September 2025	Core document	Change to policy, major revision, new document development

Foreword

This document provides specifier instructions for the production of the works specific requirements for CC 481 Minor structures.

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 minor structures

Contractor design requirements for minor structures

1.1 Minor structures, or components of minor structures, to be Contractor design items shall be as stated in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.1

Minor structures, or components of minor structures, to be Contractor design items				
Minor structure reference	Minor structure type	Description	Components or elements to be Contractor design items	Minor structure design life ​
(a)	(b)	(c)	(d)	(e)

- a. Enter a unique reference, to provide the unique reference for the minor structure with components that are Contractor design items. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter a value, from options lighting column, wall mounted lighting bracket, steel CCTV mast, steel cantilever mast, steel high mast, noise barrier, to define the type of minor structure.
- c. Enter text, to describe the type of minor structure.
- d. Enter text, to define which elements or components of the minor structure are to be Contractor design items such as superstructure, anchorage and holding down system, attachments, wall mounted bracket, foundation or whole structure.

- e. Enter a number in units of , to define the design life of the minor structure.

Minor structures, or components of minor structures, to be Contractor design items (continued)		
Minor structure reference	Approval documentation	Additional requirements
(a)	(f)	(g)

- f. Enter text, to provide references for any approval documentation already produced such as outline Approval in Principle or design basis reports.
- g. Enter text, to define any scheme specific requirements from the technical approval authority and any scheme specific constraints on the design. Design inputs that are agreed in advance are provided in the relevant WSR for the type of minor structure.

1.2 The design of minor structures and their foundations shall be in accordance with CD 354 [Ref 5.N].

1.3 The design of post-installed anchorages shall be in accordance with CD 372 [Ref 6.N].

1.4 The requirements for Contractor design in Section 17 of GC 101 [Ref 13.N] shall apply to minor structures and their foundations.

1.5 The requirements for Technical Approval for highway structures in Section 18 of GC 101 [Ref 13.N] shall apply to minor structures and their foundations.

Components to be supplied by the Overseeing Organisation for minor structures

1.6 Minor structure components to be supplied by the Overseeing Organisation, and incorporated into the works, shall be as specified in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.6

Minor structure components to be supplied by the Overseeing Organisation, and incorporated into the works,			
Minor structure reference	Component to be supplied by the Overseeing Organisation	Action or activity required	Location of component for collection
(a)	(b)	(c)	(d)

- a. Enter a unique reference, to provide the unique reference for the minor structure where components will be supplied by the Overseeing Organisation. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter text, to define the components to be supplied by the Overseeing Organisation.
- c. Enter text, to define what action or activity the Contractor is required to undertake on the component(s) to be supplied by the Overseeing Organisation.
- d. Enter text, to define the location of the component(s) for the Contractor to collect where this activity is required. The field entry shall be 'N/A' where the Contractor is not required to collect the component(s).

Minor structure components to be supplied by the Overseeing Organisation, and incorporated into the works, (continued)	
Minor structure reference	Additional constraints or requirements
(a)	(e)

- e. Enter text, to define any additional constraints or requirements that the Contractor needs to be aware of.

Minor structures in the vicinity of overhead power lines

1.7 Minor structures in the vicinity of overhead power lines, and any requirements of the electricity authorities to be complied with, shall be as listed in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.7

Minor structures in the vicinity of overhead power lines, and any requirements of the electricity authorities to be complied with,			
Minor structure reference	Electricity authority	Description of constraints	Requirements of the electricity authority
(a)	(b)	(c)	(d)

- a. Enter a unique reference, to provide the unique reference for the minor structure in the vicinity of overhead power lines. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter text, to identify the relevant electricity authority for the area where the minor structure in the vicinity of overhead power lines is located.
- c. Enter text, to describe the constraints at the location of the minor structure in the vicinity of overhead power lines e.g. distance from overhead power lines.
- d. Enter text, to state the requirements of the electricity authority regarding minor structures in the vicinity of overhead power lines.

Minor structures in the vicinity of overhead power lines, and any requirements of the electricity authorities to be complied with, (continued)			
Minor structure reference	Verification requirements	Documentation requirements	Requirements for warning notices
(a)	(e)	(f)	(g)

- e. Enter text, to define the verification requirements to demonstrate that the constraints identified have been complied with for minor structures in the vicinity of overhead power lines.

- f. Enter text, to define the documentation requirements to provide evidence that the constraints identified have been complied with for minor structures in the vicinity of overhead power lines.
- g. Enter text, to define any requirements for warning notices on minor structures in the vicinity of overhead power lines e.g. type of warning notice, size, location, height, durability, colours, materials, mounting requirements.

1.8 Warning notices shall be permanently fixed to minor structures in the vicinity of power lines in accordance with the requirements of the Electricity Authority, unless otherwise stated in CC 481/WSR/001.

1.9 The following Documentation shall be submitted for minor structures in the vicinity of overhead power lines prior to the commencement of works to that minor structure: evidence demonstrating that the constraints identified in CC 481/WSR/001 have been complied with.

1.10 The requirements for "Documentation" in Section 2 of GC 101 [Ref 13.N] shall apply to evidence demonstrating that the constraints identified in CC 481/WSR/001 have been complied with for minor structures in the vicinity of overhead power lines.

Electrical requirements for minor structures

1.11 Electrical requirements for lighting columns and traffic signs shall be in accordance with TC 501 [Ref 8.N].

1.12 Electrical requirements for CCTV masts, cameras, traffic detectors and communications equipment shall be in accordance with TC 131 [Ref 41.N].

1.13 Electrical requirements for traffic signals shall be in accordance with TC 101 [Ref 47.N].

Passive safety requirements for minor structures

1.14 Passively safe components of minor structures shall be compliant with BS EN 12767 [Ref 32.N].

1.15 The passive safety requirements for minor structures shall be as specified in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.15

The passive safety requirements for minor structures					
Minor structure reference	Passive safety speed class	Passive safety energy absorption category	Passive safety occupant safety class	Passive safety backfill type	Passive safety collapse mode
(a)	(b)	(c)	(d)	(e)	(f)

- a. Enter a unique reference, to provide the unique reference for the minor structure with passive safety requirements. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter a value, from options 50, 70, 100, NR (No requirement), to define the passive safety speed class in accordance with BS EN 12767 [Ref 32.N].
- c. Enter a value, from options HE, LE, NE, NR (No requirement), to define the passive safety energy absorption class in accordance with BS EN 12767 [Ref 32.N].
- d. Enter a value, from options A, B, C, D, E, NR (No requirement), to define the passive safety occupant safety class in accordance with BS EN 12767 [Ref 32.N].
- e. Enter a value, from options S, X, R, NR (No requirement), to define the passive safety backfill class in accordance with BS EN 12767 [Ref 32.N].
- f. Enter a value, from options SE, NS, NR (No requirement), to define the passive safety collapse mode in accordance with BS EN 12767 [Ref 32.N].

The passive safety requirements for minor structures (continued)		
Minor structure reference	Passive safety direction class	Passive safety risk of roof indentation
(a)	(g)	(h)

g. Enter a value, from options SD, BD, MD, NR (No requirement), to define the passive safety direction class in accordance with BS EN 12767 [Ref 32.N].

h. Enter a value, from options 0, 1, NR (No requirement), to define the passive safety risk of roof indentation in accordance with BS EN 12767 [Ref 32.N].

Aesthetic requirements for minor structures

1.16 The aesthetic requirements for minor structures shall be as specified in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.16

The aesthetic requirements for minor structures			
Minor structure reference	Aesthetic requirements	Aesthetic approval requirements	Verification requirements
(a)	(b)	(c)	(d)

- Enter a unique reference, to define the structures that have specific aesthetic requirements e.g. located in a sensitive area. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- Enter text, to define the aesthetic requirements for any minor structures.
- Enter text, to define any aesthetic approval requirements for minor structures.

- d. Enter text, to define the verification requirements to demonstrate that the aesthetic requirements for minor structures have been complied with.

The aesthetic requirements for minor structures (continued)	
Minor structure reference	Documentation requirements
(a)	(e)

- e. Enter text, to define the documentation requirements to provide evidence that the aesthetic requirements for minor structures have been complied with.

Security requirements for minor structures

1.17 Security requirements for minor structures shall be compliant with CD 354 [Ref 5.N].

1.18 Additional security requirements for minor structures shall be as specified in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.18

Additional security requirements for minor structures	
Minor structure reference	Additional security measures
(a)	(b)

- a. Enter a unique reference, to provide the unique reference of the minor structure to which security measures apply, in addition to those specified in CD 354 [Ref 5.N]. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter text, to define any security requirements for minor structures, in addition to those specified in CD 354 [Ref 5.N].

Identification and location markings for minor structures

Product identification marking for minor structures

1.19 Where not provided in accordance with BS EN 40-4 [Ref 19.N], BS EN 40-5 [Ref 20.N], BS EN 40-6 [Ref 18.N], BS EN 40-7 [Ref 22.N] or BS EN 14388 2005 [Ref 40.N], minor structures shall carry unique product identification marks which state the name of the manufacturer, year of manufacture and a unique product code.

1.20 Additional information to be included in the product identification marks on minor structures shall be as specified in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.20

Additional information to be included in the product identification marks on minor structures	
Minor structure reference	Additional information for product identification marks
(a)	(b)

- a. Enter a unique reference, to define the minor structures for which information, in addition to the name of the manufacturer, year of manufacture and a unique product code, is required on the product identification marks. The requirements for lighting columns and noise barriers are covered by BS EN 40-4 [Ref 19.N], BS EN 40-5 [Ref 20.N], BS EN 40-6 [Ref 18.N], BS EN 40-7 [Ref 22.N] and BS EN 14388 2005 [Ref 40.N] and shall not be added to. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter text, to define the information, in addition to the name of the manufacturer, year of manufacture and a unique product code, that is required on the product identification marks.

1.21 The product identification marks shall be permanent, legible, clearly visible and be either:.

1. on a permanent fixed label;

2. hard stamped; or
3. formed in the material of the mast on an external face only.

1.22 The product identification marks shall be located either within the base compartments or, except in the case of hard stamping, immediately above or below the door.

1.23 The product identification marks shall be located on the main structure and all detachable elements e.g. doors.

1.24 Hard stamping shall be made only in a secondary member of the mast.

Asset identification marking for minor structures

1.25 Asset identification numbers for minor structures shall be as specified in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.25

Asset identification numbers for minor structures	
Minor structure reference	Asset identification number
(a)	(b)

- a. Enter a unique reference, to define the minor structures for which asset identification marks are required. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter a unique reference, to define the asset identification number for each minor structure.

1.26 Asset identification marks shall be Contractor design items, unless otherwise stated in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.26a The asset identification marks that are not Contractor design items are: [enter free text].

SI.1.26b The requirements for asset identification marks that are not Contractor design items are: [enter free text].

1.27 The design of asset identification marks shall be in accordance with CG 305 [Ref 17.N].

1.28 The requirements for "Contractor design" in Section 17 of GC 101 [Ref 13.N] shall apply to asset identification marks.

Attachment requirements for minor structures

1.29 Attachments to minor structures shall be Contractor design items, unless otherwise stated in CC 481/WSR/001.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.1.29a The attachments to minor structures that are not Contractor design items are: [enter free text].

SI.1.29b The details of attachments to minor structures that are not Contractor design items are: [enter free text].

1.30 The design of attachments to minor structures shall be in accordance with CD 354 [Ref 5.N] and PAS 191 [Ref 26.N].

1.31 The requirements for "Contractor design" in Section 17 of GC 101 [Ref 13.N] shall apply to attachments to minor structures.

1.32 Attachments to minor structures shall not damage the column, mast or post, its corrosion protection system or its protective coating.

Handling, transport and erection requirements for minor structures

1.33 Minor structures, except lighting columns and noise barriers, shall be manufactured and verified 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 13.N].

1.34 Minor structures shall be handled, transported and stored in such a way as to avoid any damage to the structure, its corrosion protection system or its protective coating.

1.35 Minor structures shall be handled, transported and stored in such a way that contact with cement, groundwater, soil or ash or other deleterious material is prevented.

1.36 Minor structures shall be handled, transported and stored in such a way that water does not accumulate on any surfaces or inside sections.

1.37 Minor structures shall be handled, transported and stored in such a way that allows water to disperse and air to pass freely around the stored components.

1.38 All rivets, bolts, nuts, washers, screws, plates and other articles shall be handled, transported and stored in such a way that prevents exposure to moisture and water.

2. Steelwork for minor structures

2.1 The requirements of this section shall apply to steelwork in the superstructure of all minor structures except lighting columns and noise barriers.

2.2 The requirements of this section shall apply to steelwork, other than steel reinforcement in concrete, in all minor structure foundations, fixings, attachments, anchorages and holding down systems, including those for lighting columns and noise barriers.

Material requirements for steelwork for minor structures

2.3 The surface preparation and corrosion protection of minor structures and their attachments shall comply with CC 486 [Ref 38.N].

2.4 Steel sheets and steel plates used in minor structures shall be compliant with BS EN 10025-1 [Ref 16.N].

2.5 The steel sheets and steel plates used in minor structures shall meet the following performance characteristics: strength grades S275 or S355 and sub-grades JR, J0, J2 or K2.

2.6 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 13.N] shall apply to steel sheets and steel plates used in minor structures.

2.7 Steel tube used in minor structures shall be compliant with BS EN 10210-1 [Ref 15.N].

2.8 The steel tube used in minor structures shall meet the following performance characteristics: strength grades S275 or S355 and sub-grades J0H, J2H or K2H.

2.9 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 13.N] shall apply to steel tube used in minor structures.

2.10 Steel used for foundation bolts for minor structures shall be compliant with BS EN 10025-1 [Ref 16.N].

2.11 The steel used for foundation bolts for minor structures shall meet the following performance characteristics: strength grades S275 or S355 and sub-grades JR, J0, J2 or K2.

2.12 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 13.N] shall apply to steel used for foundation bolts for minor structures.

2.13 All steel fixings, doors, door hinges, chains and locks for minor structures shall be stainless steel or galvanised steel.

2.14 Stainless steel used for fixings, attachments, doors, door hinges, chains and locks for minor structures shall comply with BS EN 10088-1 [Ref 45.N], BS EN ISO 3506-1 [Ref 11.N] or BS EN ISO 3506-2 [Ref 12.N].

2.15 Steel bolts for fixings for minor structures shall comply with BS EN ISO 898-1 [Ref 23.N].

2.16 Steel nuts for fixings for minor structures shall comply with BS EN ISO 898-2 [Ref 24.N].

Welding requirements for steelwork for minor structures

2.17 Arc welding of ferritic steels shall comply with BS EN 1011-1 [Ref 49.N] and BS EN 1011-2 [Ref 50.N].

2.18 Arc welding of stainless steels shall comply with BS EN 1011-1 [Ref 49.N] and BS EN 1011-3 [Ref 51.N].

2.19 The welding consumables and procedures used shall be such that the mechanical properties of deposited weld metal are not less than the minimum specified values of the parent metal being welded.

2.20 Welding procedure specification and qualification shall be in accordance with BS EN ISO 15607 [Ref 42.N], BS EN ISO 15609-1 [Ref 43.N] and BS EN ISO 15614-1 [Ref 44.N].

2.21 Verification for welding procedures, qualification and approval, shall be undertaken by an accredited testing laboratory in compliance with "Accredited laboratory" in Section 16 of GC 101 [Ref 13.N].

2.22 Verification for welding procedures, qualification and approval, shall be undertaken by an inspection body accredited to BS EN ISO/IEC 17020 [Ref 4.N].

2.23 The following Documentation shall be submitted for welding procedures prior to the commencement of fabrication: welding procedures and evidence of qualification and approval.

2.24 The requirements for "Documentation" in Section 2 of GC 101 [Ref 13.N] shall apply to welding procedures and evidence of qualification and approval.

2.25 Welders shall be qualified to BS EN ISO 9606-1 [Ref 39.N].

2.26 Verification for welder qualification through testing shall be undertaken by an accredited testing laboratory in compliance with "Accredited laboratory" in Section 16 of GC 101 [Ref 13.N].

2.27 Verification for welder qualification through testing shall be undertaken by an inspection body accredited to BS EN ISO/IEC 17020 [Ref 4.N].

2.28 The following Documentation shall be submitted for welding personnel prior to the commencement of fabrication: evidence of welder qualifications.

2.29 The requirements for "Documentation" in Section 2 of GC 101 [Ref 13.N] shall apply to evidence of welder qualifications.

Weld verification for steelwork for minor structures

2.30 The weld inspection and testing acceptance criteria shall be in accordance with BS EN ISO 5817 [Ref 48.N] weld quality level C, unless otherwise stated in CC 481/WSR/002.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.2.30

The weld inspection and testing acceptance criteria		
Minor structure reference(s)	Description of welds	Weld quality level
(a)	(b)	(c)

- a. Enter text, to provide the unique reference(s) for the minor structure(s) where weld acceptance criteria is not weld quality level C in accordance with BS EN ISO 5817 [Ref 48.N]. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter text, to describe the welds to which the different weld inspection and testing acceptance criteria applies.
- c. Enter text, to define the weld quality level in accordance with BS EN ISO 5817 [Ref 48.N].

2.31 Welds and adjacent surfaces shall be free of slag residues, sharp edges, traces of weld spatter, arc strikes and contaminants in accordance with BS EN ISO 14713-1 [Ref 52.N].

2.32 Where the profile of a weld is dressed by burr grinding, the specified throat size and leg length shall be maintained.

2.33 Personnel conducting weld testing shall hold a level II qualification to a certification scheme complying with BS EN ISO 9712 [Ref 31.N] that covers the equipment used and the weld groups inspected.

2.34 The following Documentation shall be submitted for personnel conducting visual inspections prior to the commencement of inspections:

evidence of training and qualification for personnel conducting visual inspections.

2.35 The requirements for "Documentation" in Section 2 of GC 101 [Ref 13.N] shall apply to evidence of training and qualification for personnel conducting visual inspections.

Visual inspection for weld verification for steelwork for minor structures

2.36 Verification shall be undertaken for weld quality through visual inspection in accordance with BS EN ISO 17637 [Ref 29.N].

2.37 The frequency of visual inspection of welds shall be at least once per weld immediately after completion.

2.38 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to the visual inspection of welds.

2.39 Welds shall be visually inspected prior to supplementary Non-Destructive Testing (NDT) and galvanising or coating.

2.40 Any cracking or potential lack of fusion identified by visual inspection of welds shall be further investigated through weld testing in accordance with Production weld testing for weld verification for steelwork for minor structures in this section.

Production weld testing for weld verification for steelwork for minor structures

2.41 Verification shall be undertaken for weld quality through the following production weld tests:.

1. Magnetic Particle Inspection (MPI) in accordance with BS EN 17638 [Ref 27.N] on all welds where any of the material thickness exceeds 20 mm;
2. Liquid Penetrant Inspection in accordance with BS EN ISO 3452-1 [Ref 30.N] on all transverse welds; and

3. Ultrasonic testing in accordance with BS EN ISO 17640 [Ref 28.N] on all butt joints where the mast shaft is 8 mm thick or greater.

2.42 The frequency of production weld testing for each mast type shall be every 2nd mast for the first ten masts and every tenth mast thereafter, where mast types are defined as having differences in:

1. member cross-sectional shape;
2. joint configuration; or
3. weld type.

2.43 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to production weld testing.

2.44 Where production weld testing identifies a non-conformance, the frequency of all three production weld verification tests shall be doubled for the batch.

2.45 Where production weld testing identifies more than one non-conformance, all three production weld verification tests shall be performed on the whole batch.

Sample testing for weld verification for steelwork for minor structures

2.46 Verification shall be undertaken for weld quality through the following weld tests on samples cut from complete masts for each mast type:

1. MPI in accordance with BS EN 17638 [Ref 27.N] on all welds where any of the material thickness exceeds 20 mm;
2. Liquid Penetrant Inspection in accordance with BS EN ISO 3452-1 [Ref 30.N] on all transverse welds; and
3. Ultrasonic testing in accordance with BS EN ISO 17640 [Ref 28.N] on all butt joints where the mast shaft is 8 mm thick or greater.

2.47 The frequency of sample testing of welds shall be in accordance with Table 2.47.

Table 2.47 Frequency of sample testing for weld verification	
Order size	Frequency of sample testing for weld verification
1 - 10 masts	No requirement unless otherwise stated in CC 481/WSR/002
11 - 300 masts	1 mast
> 300 masts	2 masts

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.2.47 The frequency of sample testing of welds for order sizes of 1 - 10 masts shall be [enter free text].

2.48 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to sample testing of welds.

2.49 Verification for weld quality through sample testing shall be undertaken by an accredited testing laboratory in compliance with "Accredited laboratory" in Section 16 of GC 101 [Ref 13.N].

2.50 The sample for weld verification sample testing shall include all variations in joint geometry, material thickness, and weld size covered by the basic types, that are within the scope of this section.

2.51 The samples for weld sample testing shall be retained and be accessible for inspection for a period of 12 months from the test date.

Documentation for weld verification for steelwork for minor structures

2.52 The following Documentation for production weld testing shall be submitted as continuous records: records of inspection and production weld testing in accordance with the reporting requirements for the specified test method.

2.53 The requirements of "Records" in Section 3 of GC 101 [Ref 13.N] shall apply to inspection and testing records of production welds.

2.54 The following Documentation shall be submitted for sample testing of welds prior to the commencement of mast manufacture: records of sample testing of welds in accordance with the reporting requirements for the specified test method.

2.55 The requirements for "Documentation" in Section 2 of GC 101 [Ref 13.N] shall apply to records of sample testing of welds in accordance with the reporting requirements for the specified test method.

Work specific testing for steelwork for minor structures

2.56 Verification shall be undertaken for the performance of steelwork for minor structures through work specific testing as specified in CC 481/WSR/002.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.2.56

Verification			
Test reference	Minor structure(s) subject to testing	Steelwork performance characteristic to be verified	Description of test
(a)	(b)	(c)	(d)

- a. Enter a unique reference, to provide a unique reference for the test being undertaken on the steelwork for minor structures.
- b. Enter text, to identify the minor structure(s) subject to testing.
- c. Enter text, to define the performance characteristic of the steelwork for minor structures to be verified.
- d. Enter text, to describe the test required to verify the performance characteristic of the steelwork for minor structures.

Verification (continued)			
Test reference	Acceptance criteria	Frequency of testing	Documentation requirements
(a)	(e)	(f)	(g)

- e. Enter text, to define the acceptance criteria for the testing of the performance characteristic of the steelwork for minor structures.
- f. Enter text, to define the frequency of the testing of the performance characteristic of the steelwork for minor structures.
- g. Enter text, to define the documentation requirements for testing of the steelwork for minor structures.

Verification (continued)	
Test reference	Additional requirements
(a)	(h)

- h. Enter text, to define any additional requirements for testing of the steelwork for minor structures.

2.57 The requirements for Verification in Section 14 of GC 101 [Ref 13.N] shall apply to testing of the performance of steelwork for minor structures.

2.58 The requirements for Documentation in Section 2 of GC 101 [Ref 13.N] shall apply to the documentation specified in CC 481/WSR/002 for the testing of the performance of steelwork for minor structures.

3. Lighting columns and brackets

Product requirements for lighting columns and brackets

E/3.1 Brackets for lighting columns shall include wall mounted brackets and fixtures.

NI/3.1 Brackets for lighting columns shall include wall and wood pole mounted brackets and fixtures.

S/3.1 Brackets for lighting columns shall include wall mounted brackets and fixtures.

W/3.1 Brackets for lighting columns shall include wall mounted brackets and fixtures.

3.2 Lighting columns, brackets and their foundations shall comply with "General requirements for minor structures" in Section 1 of this document.

3.3 Lighting columns shall comply with one of the following options: "Concrete lighting columns" in Section 4 of this document, "Steel lighting columns" in Section 5 of this document, "Aluminium lighting columns" in Section 6 of this document, or "Fibre reinforced polymer composite lighting columns" in Section 7 of this document.

Lighting column and bracket schedule

3.4 Lighting columns, brackets and their foundations shall be supplied and installed as specified in CC 481/WSR/003.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.3.4

Lighting columns, brackets and their foundations				
Minor structure reference	Lighting column and bracket type reference	Lighting column and bracket design drawing / model reference(s)	Lighting column and bracket design document reference(s)	Luminaire for road lighting reference
(a)	(b)	(c)	(d)	(e)

- a. Enter a unique reference, to define the unique reference for the lighting column, or bracket for wall mounted brackets. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter a unique reference, from options as defined in SI.3.5a of this document, to specify the lighting column and bracket type to cross-reference to the lighting column and bracket type schedule.
- c. Enter text, to identify the drawing(s) / model(s) that detail the design of the lighting column and bracket superstructure. This shall be "N/A" for Contractor designed lighting columns and brackets.
- d. Enter text, to identify the document(s) that detail the design of the lighting column and bracket superstructure. This shall be "N/A" for Contractor designed lighting columns and brackets.
- e. Enter a value, from options as defined in SI.8.6a of TC 501 [Ref 8.N], to define the luminaire type to be installed on the lighting column or bracket.

Lighting columns, brackets and their foundations (continued)				
Minor structure reference	Detector reference	Lighting column attachments	Anchorage and holding down system reference	Foundation type
(a)	(f)	(g)	(h)	(i)

- f. Enter a value, from options as defined in SI.10.10a of TC 131 [Ref 41.N], to define the traffic detector reference which links to the

traffic detector system schedule and defines the equipment and mounting to be installed on the lighting column.

- g. Enter text, to define details of any additional attachments to be accommodated on the lighting column e.g. signs, smart devices or waste paper containers.
- h. Enter a unique reference, from options as defined in SI.17.5a of this document, to define the anchorage and holding down system for flange plate mounted structures in accordance with Section 17 Anchorage and holding down systems for minor structures. The anchorage and holding down system reference is the unique identifier that is used for cross-referencing to that anchorage and holding down system throughout this document. This field is not required for planted foundations.
- i. Enter a value, from options Planted, Flange plate mounted, to define whether foundations are planted in accordance with Section 13 Planted foundations for minor structures or flange plate mounted in accordance with Section 14 Foundations for minor structures with flange plates.

Lighting columns, brackets and their foundations (continued)				
Minor structure reference	Quality of soil	Foundation reference	Drawing/model reference(s)	Door facing direction
(a)	(j)	(k)	(l)	(m)

- j. Enter a value, from options Good, Average, Poor, to define the quality of soil in accordance with PD 6547 [Ref 14.N]. This field is not required for flange plate mounted columns.
- k. Enter a unique reference, from options as defined in SI.14.2a of this document, to define the foundation reference for flange plate mounted structures in accordance with Section 14 Foundations for minor structures with flange plates. This field is not required for planted foundations.

- l. Enter text, to identify the reference(s) of the drawing(s) / model(s) that show the location of the lighting column and / or bracket.

- m. Enter text, to define the direction the door faces for a column.

Lighting columns, brackets and their foundations (continued)	
Minor structure reference	Height above ground level &ZeroWidthSpace;
(a)	(n)

- n. Enter a number in units of , to define the mounting height of the lighting column or bracket above adjacent ground level.

Lighting column and bracket type schedule

3.5 Contractor designed components of lighting columns, brackets and their foundations shall be designed for the parameters specified in the Lighting column and bracket type schedule referenced in CC 481/WSR/003.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.3.5

Contractor designed components of lighting columns, brackets and their foundations	
Lighting column and bracket type reference	Lighting column and bracket type schedule reference
(a)	(b)

- a. Enter a unique reference, to define the reference for the type of column, or bracket only for wall mounted brackets.
- b. Enter text, to define the drawing or document that contains the Lighting column and bracket type schedule that complies with the requirements of CD 354 [Ref 5.N].

3.6 Contractor designed components of lighting columns and brackets shall be capable of withstanding the forces and moments from the luminaire, fittings and attachments.

3.7 Where a cable entry slot width of 75 mm is specified, the containing diameter of the cableway from the cable entry slot to the base compartment shall not be less than 75mm.

3.8 For columns with flange plates, circumferential slotted holes shall be used instead of round holes in the flange plates in order to allow $\pm 5^\circ$ of rotational adjustment, unless otherwise stated in CC 481/WSR/003.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.3.8 Where circumferential slotted holes that allow $\pm 5^\circ$ of rotational adjustment are not to be used, the requirements for bolt holes in flange plates, and the structures to which they apply, shall be as follows: [enter free text].

Product documentation for lighting columns and brackets

3.9 The following documentation shall be submitted for each type of lighting column and bracket and foundation: completed and signed Lighting Column and Bracket Information Forms, manufacturer's technical drawings and specifications and documentation provided in accordance with "Designated standards" in Section 10 of GC 101 [Ref 13.N].

3.10 Lighting Column and Bracket Information Forms, manufacturer's technical drawings and specifications and documentation provided in accordance with Designated standards in Section 10 of GC 101 [Ref 13.N] shall be submitted six weeks prior to the commencement of installation, unless otherwise stated in CC 481/WSR/003.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.3.10 The minimum time that Lighting Column and Bracket Information Forms, manufacturer's drawings and specifications and and documentation provided in accordance with Designated standards in

Section 10 of GC 101 [Ref 13.N] shall be submitted prior to the commencement of installation shall be [enter free text].

3.11 The requirements for Documentation in Section 2 of GC 101 [Ref 13.N] shall apply to Lighting Column and Bracket Information Forms, manufacturer's technical drawings and specifications and documentation provided in accordance with Designated standards in Section 10 of GC 101 [Ref 13.N].

3.12 The following information shall be submitted and recorded on the Lighting Column and Bracket Information Forms using Contractor proforma CC 481/PRO/001:.

1. scheme reference;
2. column reference number;
3. revision number of form;
4. date of revision;
5. name of manufacturer of the proposed lighting column and bracket, product references and product description;
6. documentation references for manufacturer's technical drawings and specifications and documentation provided in accordance with Designated standards in Section 10 of GC 101 [Ref 13.N];
7. column nominal height;
8. column material;
9. column material design strength;
10. the corrosion protection system on the column when new;
11. for steel columns: additional sacrificial steel thickness, above that needed in the design, from the bottom of the column to at least 250 mm above the anticipated ground level;
12. no. of door openings with opening size (height, width);

13. cross-section of base compartment (height, width, depth);
14. acceptable positions of bracket arms relative to door position in plan (clockwise);
15. reference wind velocity $V_{ref,0}$ as defined in BS EN 40-3-1 [Ref 21.N];
16. details of signs and attachments allowed for in the design area (surface area, weight, eccentricity from the centre line of the column to the centre of area of the sign or attachment, the height above ground level to the centre of area of the sign or attachment, orientation of the sign or attachment and other requirements including holes for electrical cables, maintenance requirements, access arrangements, erection / removal procedures and connection details);
17. for columns with planted foundations: planting depth and backfill requirements (e.g. concrete surround diameter) for each soil type factor, G (630, 390, 230);
18. for columns with flange plates: bolt hole centres, bolt hole diameters, design loads per bolt, forces and moments acting at ground level, line of action of the maximum moment relative to the door position;
19. for columns with flange plates with slotted holes: dimensioned drawing or diagram of flange plate;
20. for post-top columns: limitations for compatible luminaires including diameter and length of connection, maximum weight and maximum windage areas (for terrain categories defined in BS EN 40-3-1 [Ref 21.N], as applicable);
21. for single and double arm bracket columns: limitations for compatible luminaires including diameter and length of connection, maximum weight and maximum windage areas (for terrain categories defined in BS EN 40-3-1 [Ref 21.N], as applicable) for each different type of bracket;

22. for single and double arm bracket columns: bracket projection (m), bracket reference, bracket drawing reference, bracket material including grade and design strength and luminaire fixing angle; and
23. signed and dated declaration that information given in the form has been obtained in accordance with CD 354 [Ref 5.N] and this document.

Installation requirements for lighting columns and brackets

3.13 Installation of lighting columns and brackets and their foundations shall be in accordance with the manufacturer's instructions.

4. Concrete lighting columns

Product requirements for concrete lighting columns

4.1 Concrete lighting columns shall be in accordance with the requirements within "Lighting columns and brackets" in Section 3 of this document.

4.2 The method of conformity assessment of concrete lighting columns shall be Method 2 in BS EN 40-4 [Ref 19.N].

4.3 Concrete lighting columns shall be compliant with BS EN 40-4 [Ref 19.N].

4.4 The concrete lighting columns shall meet the performance characteristics as stated in table 4.4.

Table 4.4 Minimum performance characteristics for concrete lighting columns		
BS EN 40-4 [Ref 19.N] Essential Characteristic	Characteristic	Minimum performance class
Resistance to horizontal loads	Type of design verification	C or T
	Partial load factor class (where applicable)	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Reference wind velocity	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Wind area and weight at top	As stated in CC 501/WSR/008
	Deflection Class	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Terrain Category (if different to II)	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
Performance under vehicle impact (Passive Safety) BS EN 40-5 [Ref 20.N]	Performance type	As stated in CC 481/WSR/001 under 'passive safety requirements', otherwise Class 0.
	Backfill type of testing if not standard	As stated in CC 481/WSR/001 under 'passive safety requirements', otherwise N/A.

4.5 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 13.N] shall apply to concrete lighting columns.

4.6 The durability requirements for concrete lighting columns shall be as specified in CC 481/WSR/004.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.4.6

The durability requirements for concrete lighting columns		
Lighting column and bracket type reference	Exposure class(es) for products with design life $\leq$ 30 years	Durability requirements for products with design life $>$ 30 years
(a)	(b)	(c)

- a. Enter text, to define the concrete lighting column and bracket type to which the durability requirements apply.
- b. Enter text, to define the exposure class(es) in accordance with BS EN 206 [Ref 3.N] for products with a design working life not exceeding 30 years.
- c. Enter text, to define the additional durability requirements for products with a design working life exceeding 30 years.

4.7 The finish to concrete lighting columns shall be Class F3 in accordance with CC 482 [Ref 46.N] unless otherwise stated in CC 481/WSR/004.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.4.7

The finish to concrete lighting columns	
Lighting column and bracket type reference	Concrete finish class
(a)	(b)

1. Enter text, to define the concrete lighting column and bracket type to which the concrete finish class requirements apply.
2. Enter text, to define the concrete finish class to concrete lighting columns in accordance with CC 482 [Ref 46.N], where not Class F3.

5. Steel lighting columns

Product requirements for steel lighting columns

5.1 Steel lighting columns shall be in accordance with the requirements within "Lighting columns and brackets" in Section 3 of this document.

5.2 Steel lighting columns shall be compliant with BS EN 40-5 [Ref 20.N].

5.3 The steel lighting columns shall meet the performance characteristics as stated in table 5.3.

Table 5.3 Minimum performance characteristics for steel lighting columns		
BS EN 40-5 [Ref 20.N] Essential Characteristic	Characteristic	Performance requirement
Resistance to horizontal loads	Type of design verification	C or T
	Partial load factor class (where applicable)	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Reference wind velocity	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Wind area and weight at top	As stated in CC 501/WSR/008
	Deflection Class	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Terrain Category (if different to II)	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
Performance under vehicle impact (Passive Safety)	Performance type	As stated in CC 481/WSR/001 under 'passive safety requirements', otherwise Class 0.
	Backfill type of testing if not standard	As stated in CC 481/WSR/001 under 'passive safety requirements', otherwise N/A.

5.4 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 13.N] shall apply to steel lighting columns.

5.5 The requirements for the fatigue assessment of steel lighting columns shall be as stated in CC 481/WSR/005.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.5.5 The requirements for the fatigue assessment of steel lighting columns shall be as follows: [enter free text].

5.6 The corrosion protection of steel lighting columns shall comply with "Protective systems for minor structures for protection of steelwork against corrosion" in Section 7 of CC 486 [Ref 38.N].

6. Aluminium lighting columns

Product requirements for aluminium lighting columns

6.1 Aluminium lighting columns shall be in accordance with the requirements in "Lighting columns and brackets" in Section 3 of this document.

6.2 Aluminium lighting columns shall be compliant with BS EN 40-6 [Ref 18.N].

6.3 The aluminium lighting columns shall meet the performance characteristics as stated in table 6.3.

Table 6.3 Minimum performance characteristics for aluminium lighting columns		
BS EN 40-6 [Ref 18.N] Essential Characteristic	Characteristic	Minimum performance requirement
Resistance to horizontal loads	Type of design verification	C or T
	Partial load factor class (where applicable)	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Reference wind velocity	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Wind area and weight at top	As stated in CC 501/WSR/008
	Deflection Class	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Terrain Category (if different to II)	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
Performance under vehicle impact (Passive Safety)	Performance type	As stated in CC 481/WSR/001 under 'passive safety requirements', otherwise Class 0.
	Backfill type of testing if not standard	As stated in CC 481/WSR/001 under 'passive safety requirements', otherwise N/A.

6.4 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 13.N] shall apply to aluminium lighting columns.

6.5 The requirements for the fatigue assessment of aluminium lighting columns shall be as stated in CC 481/WSR/006.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.6.5 The requirements for the fatigue assessment of aluminium lighting columns shall be as follows: [enter free text].

6.6 The recommendations for corrosion protection in BS EN 40-6 [Ref 18.N] Annex A shall be adopted for aluminium lighting columns.

7. Fibre reinforced polymer composite lighting columns

Product requirements for fibre reinforced polymer composite lighting columns

7.1 Fibre reinforced polymer composite (FRPC) lighting columns shall be in accordance with the requirements in "Lighting columns and brackets" in Section 3 of this document.

7.2 FRPC lighting columns shall be compliant with BS EN 40-7 [Ref 22.N].

7.3 The FRPC lighting columns shall meet the performance characteristics as stated in table 7.3.

Table 7.3 Minimum performance characteristics for FRPC lighting columns		
BS EN 40-7 [Ref 22.N] Essential Characteristic	Characteristic	Minimum performance requirement
Resistance to horizontal loads	Type of design verification	C or T
	Partial load factor class (where applicable)	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Reference wind velocity	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Wind area and weight at top	As stated in CC 501/WSR/008
	Deflection Class	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
	Terrain Category (if different to II)	As stated in the Lighting column and bracket type schedule referenced in CC 481/WSR/003
Performance under vehicle impact	Performance type	As stated in CC 481/WSR/001 under 'passive safety

(Passive Safety)		requirements', otherwise Class 0.
	Backfill type of testing if not standard	As stated in CC 481/WSR/001 under 'passive safety requirements', otherwise N/A.

7.4 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 13.N] shall apply to FRPC lighting columns.

7.5 The requirements for the fatigue assessment of FRPC lighting columns, if required, shall be as stated in CC 481/WSR/007.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.7.5 The requirements for the fatigue assessment of FRPC lighting columns shall be as follows [enter free text].

8. Wall mounted lighting brackets

Requirements for wall mounted lighting brackets

E/8.1 No nationally determined requirement is provided.

NI/8.1 The requirements for wall mounted lighting brackets shall also apply to wood pole mounted lighting brackets.

S/8.1 No nationally determined requirement is provided.

W/8.1 No nationally determined requirement is provided.

8.2 Requirements for wall mounted lighting brackets shall be as described in CC 481/WSR/008.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.8.2

Requirements for wall mounted lighting brackets			
Minor structure reference	Wall mounted lighting bracket description	Lighting Column and bracket type reference	Wall mounting requirements
(a)	(b)	(c)	(d)

- a. Enter a unique reference, to provide the unique reference for the wall mounted lighting bracket. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter text, to provide a description of the wall mounted lighting bracket.

- c. Enter a unique reference, from options as defined in SI.3.5a of this document, to specify the type of lighting bracket to be wall mounted.
- d. Enter text, to define the requirements for wall mounted lighting brackets.

Requirements for wall mounted lighting brackets (continued)		
Minor structure reference	Fixing requirements	Drawing/model reference(s)
(a)	(e)	(f)

- e. Enter text, to define the fixing requirements.
- f. Enter text, to define the reference(s) of the drawing(s) / model(s) showing the details of the wall mounted lighting bracket.

9. Steel CCTV masts

Product requirements for steel CCTV masts

9.1 Steel CCTV masts and their foundations shall comply with "General requirements for minor structures" in Section 1 of this document.

9.2 Steel CCTV masts and their foundations shall comply with "Steelwork for minor structures" in Section 2 of this document.

9.3 Steel CCTV masts shall not have planted foundations.

9.4 Steel CCTV masts shall be flange plate mounted in accordance with "Foundations for minor structures with flange plates " in Section 14 of this document.

Steel CCTV mast schedule

9.5 Steel CCTV masts and their foundations shall be supplied and installed as specified in CC 481/WSR/009.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.9.5

Steel CCTV masts and their foundations				
Minor structure reference	Steel CCTV mast type reference	Steel CCTV mast design drawing / model reference(s)	Steel CCTV mast design document reference(s)	Permanent traffic camera reference
(a)	(b)	(c)	(d)	(e)

- a. Enter a unique reference, to define the unique reference for the CCTV mast. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter a value, from options as defined in SI.9.6a of this document, to specify the steel CCTV mast type to cross-reference to the Steel CCTV mast type schedule.
- c. Enter text, to identify the drawing(s) / model(s) that detail the design of the steel CCTV mast superstructure. This should be "N/A" for Contractor designed steel CCTV masts.
- d. Enter text, to identify the document(s) that detail the design of the steel CCTV mast superstructure. This should be "N/A" for Contractor designed steel CCTV masts.
- e. Enter a value, from options as defined in SI.11.6a of TC 131 [Ref 41.N], to define the Permanent traffic camera reference which links to the Permanent traffic camera schedule and defines the equipment and mounting to be installed on the steel CCTV mast.

Steel CCTV masts and their foundations (continued)				
Minor structure reference	EAV camera reference	Steel CCTV mast attachments	Anchorage and holding down system reference	Foundation reference
(a)	(f)	(g)	(h)	(i)

- f. Enter a value, from options as defined in SI.12.5k of TC 131 [Ref 41.N], to define the EAV camera reference which links to the EAV camera schedule and defines the equipment and mounting to be installed on the steel CCTV mast.

- g. Enter text, to define the details of any additional attachments to be accommodated on the steel CCTV mast.
- h. Enter a unique reference, from options as defined in SI.17.5a of this document, to define the anchorage and holding down system for flange plate mounted structures in accordance with Section 17 Anchorage and holding down systems for minor structures. The anchorage and holding down system reference is the unique identifier that is used for cross-referencing to that anchorage and holding down system throughout this document.
- i. Enter a unique reference, from options as defined in SI.14.2a of this document, to define the foundation reference for flange plate mounted structures in accordance with Section 14 Foundations for minor structures with flange plates.

Steel CCTV masts and their foundations (continued)			
Minor structure reference	Drawing/model number	Door facing direction	Height above ground level &ZeroWidthSpace;
(a)	(j)	(k)	(l)

- j. Enter text, to identify the drawing/model number(s) that show the location of the steel CCTV mast.
- k. Enter text, to define the direction that the door faces.
- l. Enter a number in units of , to define the mounting height of the steel CCTV mast above adjacent ground level.

Steel CCTV mast type schedule

9.6 Contractor designed components of steel CCTV masts and their foundations shall be designed for the parameters specified in the Steel CCTV mast type schedule referenced in CC 481/WSR/009.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.9.6

Contractor designed components of steel CCTV masts and their foundations	
Steel CCTV mast type reference	Steel CCTV mast type schedule reference
(a)	(b)

- a. Enter a unique reference, to define the steel CCTV mast type reference.
- b. Enter text, to define the drawing or document that contains the Steel CCTV mast type schedule that complies with the requirements of CD 354 [Ref 5.N].

9.7 Steel CCTV masts shall be manufactured and verified 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 13.N].

Product documentation for steel CCTV masts

9.8 The following documentation shall be submitted for each type of steel CCTV mast and foundation: completed and signed Steel CCTV Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions.

9.9 Steel CCTV Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions shall be submitted six weeks prior to the commencement of installation, unless otherwise stated in CC 481/WSR/009.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.9.9 The minimum time that Steel CCTV Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions shall be submitted prior to the commencement of installation shall be [enter free text].

9.10 The requirements for Documentation in Section 2 of GC 101 [Ref 13.N] shall apply to Steel CCTV Mast Information Forms, manufacturer's

technical drawings and specifications, safety information and installation instructions.

9.11 The following information shall be submitted and recorded on the Steel CCTV Mast information Forms using Contractor proforma CC 481/PRO/002:.

1. scheme reference;
2. column reference number;
3. revision number of form;
4. date of revision;
5. name of manufacturer of the proposed steel CCTV mast;
6. documentation references for manufacturer's technical drawings and specifications, safety information, and installation instructions;
7. mast nominal height, as defined in CD 354 [Ref 5.N];
8. mast material design strength;
9. the corrosion protection system on the mast when new;
10. additional sacrificial steel thickness, above that needed in the design, from the bottom of the column to at least 250 mm above the anticipated ground level;
11. no. of door openings with opening size (height, width);
12. cross-section of base compartment (height, width, depth);
13. acceptable positions of bracket arms relative to door position in plan (clockwise);
14. 10 minute mean wind speed, $v_m(10)$, response factor () and size reduction factor ();

15. details of signs and attachments allowed for in the design area (surface area, weight, eccentricity from the centre line of the column to the centre of area of the sign or attachment, the height above ground level to the centre of area of the sign or attachment, orientation of the sign or attachment and other requirements including holes for electrical cables, maintenance requirements, access arrangements, erection / removal procedures and connection details);
16. flange plate bolt hole centres, bolt hole diameters, design loads per bolt, forces and moments acting at ground level, line of action of the maximum moment relative to the door position;
17. for masts with flange plates with slotted holes: dimensioned diagram of flange plate;
18. CCTV mounting reference and drawing reference;
19. CCTV mounting material grade and material design strength;
20. limitations for compatible CCTV cameras, housings and mountings including maximum combined weight, maximum windage area and lever arms for weight and windage area; and
21. signed and dated declaration that information given in the form has been obtained in accordance with CD 354 [Ref 5.N] and this document.

9.12 The following Documentation shall be submitted for steel CCTV masts with lifting mechanisms, prior to the commencement of operation: Operation and Maintenance Manuals, operating instructions, and maintenance and inspection requirements in accordance with ILP PLG07 [Ref 37.N].

9.13 The requirements for "Documentation" in Section 2 of GC 101 [Ref 13.N] shall apply to Operation and Maintenance Manual, operating instructions, and maintenance and inspection requirements for steel CCTV masts with lifting mechanisms.

Installation requirements for steel CCTV masts

9.14 Installation of steel CCTV masts and their foundations shall be in accordance with the manufacturer's instructions.

Installation verification for steel CCTV masts

9.15 Verification shall be undertaken for the operation of steel CCTV masts with lifting mechanisms through testing in accordance with ILP PLG07 [Ref 37.N].

9.16 The frequency of operational testing of steel CCTV masts with lifting mechanisms shall be at least once for each mast with a lifting mechanism prior to commissioning.

9.17 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to the operational testing of steel CCTV masts with lifting mechanisms.

10. Steel cantilever masts

Product requirements for steel cantilever masts

10.1 Steel cantilever masts and their foundations shall comply with "General requirements for minor structures" in Section 1 of this document.

10.2 Steel cantilever masts and their foundations shall comply with "Steelwork for minor structures" in Section 2 of this document.

Steel cantilever mast schedule

10.3 Steel cantilever masts and their foundations shall be supplied and installed as specified in CC 481/WSR/010.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.10.3

Steel cantilever masts and their foundations			
Minor structure reference	Steel cantilever mast type reference	Steel cantilever mast design drawing / model reference(s)	Steel cantilever mast design document reference(s)
(a)	(b)	(c)	(d)

- a. Enter a unique reference, to define the unique reference for the steel cantilever mast. The minor structure reference is the

unique identifier that is used for cross-referencing to that minor structure throughout this document.

- b. Enter a value, from options as defined in SI.10.4a of this document, to specify the steel cantilever mast type to cross-reference to the Steel cantilever mast type schedule.
- c. Enter text, to identify the drawing(s) / model(s) that detail the design of the steel cantilever mast superstructure. This should be "N/A" for Contractor designed steel cantilever masts.
- d. Enter text, to identify the document(s) that detail the design of the steel cantilever mast superstructure. This should be "N/A" for Contractor designed steel cantilever masts.

Steel cantilever masts and their foundations (continued)				
Minor structure reference	Steel cantilever mast equipment and mounting	Steel cantilever mast attachments	Anchorage and holding down system reference	Foundation
(a)	(e)	(f)	(g)	(h)

- e. Enter text, to describe the equipment and mounting to be installed on the steel cantilever mast.
- f. Enter text, to define the details of any additional attachments to be accommodated on the steel cantilever mast.
- g. Enter a unique reference, from options as defined in SI.17.5a of this document, to define the anchorage and holding down system for flange plate mounted structures in accordance with Section 17 Anchorage and holding down systems for minor structures. The anchorage and holding down system reference is the unique identifier that is used for cross-referencing to that anchorage and holding down system throughout this document. This field is not required for planted foundations.
- h. Enter a value, from options Planted, Flange plate mounted, to define whether foundations are planted in accordance with Section 13 Planted foundations for minor structures or flange

plate mounted in accordance with Section 14 Foundations for minor structures with flange plates.

Steel cantilever masts and their foundations (continued)				
Minor structure reference	Quality of soil	Foundation reference	Drawing/model number	Door facing direction
(a)	(i)	(j)	(k)	(l)

- i. Enter a value, from options Good, Average, Poor, to define the quality of soil in accordance with PD 6547 [Ref 14.N]. This field is not required for flange plate mounted columns.
- j. Enter a unique reference, from options as defined in SI.14.2a of this document, to define the foundation reference for flange plate mounted structures in accordance with Section 14 Foundations for minor structures with flange plates. This field is not required for planted foundations.
- k. Enter a unique reference, to identify the drawing/model number(s) that show the location of the steel cantilever mast.
- l. Enter text, to define the direction that the door faces.

Steel cantilever masts and their foundations (continued)	
Minor structure reference	Height above ground level &ZeroWidthSpace;
(a)	(m)

- m. Enter a number in units of *m* , to define the mounting height of the steel cantilever mast above adjacent ground level.

Steel cantilever mast type schedule

10.4 Contractor designed components of steel cantilever masts and their foundations shall be designed based on the parameters specified in the Steel cantilever mast type schedule referenced in CC 481/WSR/010.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.10.4

Contractor designed components of steel cantilever masts and their foundations	
Steel cantilever mast type reference	Steel cantilever mast type schedule reference
(a)	(b)

- a. Enter a unique reference, to define the steel cantilever mast type reference.
- b. Enter text, to define the drawing or document that contains the Steel cantilever mast type schedule that complies with the requirements of CD 354 [Ref 5.N].

10.5 Steel cantilever masts shall be manufactured and verified 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 13.N].

Product documentation for steel cantilever masts

10.6 The following documentation shall be submitted for each type of steel cantilever mast and foundation: completed and signed Steel Cantilever Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions.

10.7 Steel Cantilever Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions shall be submitted six weeks prior to the commencement of installation, unless otherwise stated in CC 481/WSR/010.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.10.7 The minimum time that Steel Cantilever Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions shall be submitted prior to the commencement of installation shall be [enter free text].

10.8 The requirements for Documentation in Section 2 of GC 101 [Ref 13.N] shall apply to Steel Cantilever Mast Information Forms,

manufacturer's technical drawings and specifications, safety information and installation instructions.

10.9 The following information shall be submitted and recorded on the Steel Cantilever Mast Information Forms using Contractor proforma CC 481/PRO/003:.

1. scheme reference;
2. column reference number;
3. revision number of form;
4. date of revision;
5. name of manufacturer of the proposed steel cantilever mast;
6. documentation references for manufacturer's technical drawings and specifications, safety information, and installation instructions;
7. mast nominal height as defined in CD 354 [Ref 5.N];
8. cantilever projection as defined in CD 354 [Ref 5.N];
9. mast material design strength;
10. the corrosion protection system on the column when new;
11. additional sacrificial steel thickness, above that needed in the design, from the bottom of the column to at least 250 mm above the anticipated ground level;
12. no. of door openings with opening size (height, width);
13. cross-section of base compartment (height, width, depth);
14. acceptable positions of outreach arms relative to door position in plan (clockwise);

15. reference wind velocity $V_{ref,0}$ as defined in BS EN 40-3-1 [Ref 21.N], response factor (β) and size reduction factor (δ), exposure coefficient ($C_{e(z)}$) and topography factor (f);
16. details of signs and attachments allowed for in the design area (surface area, weight, eccentricity from the centre line of the column to the centre of area of the sign or attachment, the height above ground level to the centre of area of the sign or attachment, orientation of the sign or attachment and other requirements including holes for electrical cables, maintenance requirements, access arrangements, erection / removal procedures and connection details);
17. for masts with planted foundations: planting depth and backfill requirements (e.g. concrete surround diameter) for each soil type factor, G (630, 390, 230);
18. for masts with flange plates: bolt hole centres, bolt hole diameters, design loads per bolt, forces and moments acting at ground level, line of action of the maximum moment (relative to the door position);
19. for masts with flange plates with slotted holes: dimensioned diagram of flange plate;
20. traffic signal or speed camera mounting type reference and drawing reference;
21. traffic signal or speed camera mounting material grade and material design strength;
22. limitations for compatible traffic signal or speed cameras, housings and mountings including maximum combined weight, maximum windage area and lever arms for weight and windage area; and
23. signed and dated declaration that information given in the form has been obtained in accordance with CD 354 [Ref 5.N] and this document.

Installation requirements for steel cantilever masts

10.10 Installation of steel cantilever masts and their foundations shall be in accordance with the manufacturer's instructions.

11. Steel high masts

Product requirements for steel high masts

11.1 Steel high masts shall comply with "General requirements for minor structures" in Section 1 of this document.

11.2 Steel high masts shall comply with "Steelwork for minor structures" in Section 2 of this document.

11.3 Steel high masts shall not have planted foundations.

11.4 Steel high masts shall be flange plate mounted in accordance with "Foundations for minor structures with flange plates " in Section 14 of this document.

Steel high mast schedule

11.5 Steel high masts and their foundations shall be supplied and installed as specified in CC 481/WSR/011.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.11.5

Steel high masts and their foundations			
Minor structure reference	Steel high mast type reference	Steel high mast design drawing / model reference(s)	Steel high mast design document reference(s)
(a)	(b)	(c)	(d)

- a. Enter a unique reference, to define the unique reference for the steel high mast. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter a value, from options as defined in SI.11.5a of this document, to specify the steel high mast type to cross-reference to the steel high mast type schedule.
- c. Enter text, to identify the drawing(s) / model(s) that detail the design of the steel high mast superstructure. This should be "N/A" for Contractor designed steel high masts.
- d. Enter text, to identify the document(s) that detail the design of the steel high mast superstructure. This should be "N/A" for Contractor designed steel high masts.

Steel high masts and their foundations (continued)			
Minor structure reference	Steel high mast equipment and mounting	Steel high mast attachments	Anchorage and holding down system reference
(a)	(e)	(f)	(g)

- e. Enter text, to describe the equipment and mounting to be installed on the steel high mast.
- f. Enter text, to define the details of any additional attachments to be accommodated on the steel high mast.
- g. Enter a unique reference, from options as defined in SI.17.5a of this document, to define the anchorage and holding down system for flange plate mounted structures in accordance with Section 17 Anchorage and holding down systems for minor structures. The anchorage and holding down system reference

is the unique identifier that is used for cross-referencing to that anchorage and holding down system throughout this document.

Steel high masts and their foundations (continued)				
Minor structure reference	Steel high mast type structure description	Foundation reference	Drawing / model reference(s)	Door facing direction
(a)	(h)	(i)	(j)	(k)

- h. Enter text, to describe the steel high mast structure.
- i. Enter a unique reference, from options as defined in SI.14.2a of this document, to define the foundation reference for flange plate mounted structures in accordance with Section 14 Foundations for minor structures with flange plates.
- j. Enter a unique reference, to identify the drawing / model reference(s) that show the location of the steel high mast.
- k. Enter text, to define the direction that the door faces.

Steel high masts and their foundations (continued)	
Minor structure reference	Height above ground level m;
(a)	(l)

- l. Enter a number in units of m , to define the mounting height of the steel high mast above adjacent ground level.

Steel high mast type schedule

11.6 Contractor designed components of steel high masts and their foundations shall be designed based on the parameters specified in the Steel high mast type schedule referenced in CC 481/WSR/011.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.11.6

Contractor designed components of steel high masts and their foundations	
Steel high mast type reference	Steel high mast type schedule reference
(a)	(b)

- a. Enter a unique reference, to define the steel high mast type reference.
- b. Enter text, to define the drawing or document that contains the Steel high mast type schedule that complies with the requirements of CD 354 [Ref 5.N].

Product documentation for steel high masts

11.7 The following documentation shall be submitted for each type of steel high mast and foundation: completed and signed Steel High Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions.

11.8 Steel High Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions shall be submitted six weeks prior to the commencement of installation, unless otherwise stated in CC 481/WSR/011.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.11.8 The minimum time that Steel High Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions shall be submitted prior to the commencement of installation shall be [enter free text].

11.9 The requirements for Documentation in Section 2 of GC 101 [Ref 13.N] shall apply to Steel High Mast Information Forms, manufacturer's technical drawings and specifications, safety information and installation instructions.

11.10 The following information shall be submitted in the Steel High Mast Information Form:.

1. scheme reference;
2. column reference number;
3. revision number of form;
4. date of revision;
5. name of manufacturer of the proposed steel high mast;
6. documentation references for manufacturer's technical drawings and specifications, safety information and installation instructions;
7. mast height as defined in CD 354 [Ref 5.N];
8. mast material design strength;
9. the corrosion protection system on the column when new;
10. additional sacrificial steel thickness, above that needed in the design, from the bottom of the column to at least 250 mm above the anticipated ground level;
11. no. of door openings with opening size (height, width);
12. cross-section of base compartment (height, width, depth);
13. acceptable positions of bracket or outreach arms relative to door position in plan (clockwise);
14. 10 minute mean wind speed (v_m), response factor (β) and size reduction factor (δ);
15. details of signs and attachments allowed for in the design area (surface area, weight, eccentricity from the centre line of the column to the centre of area of the sign or attachment, the height above ground level to the centre of area of the sign or attachment, orientation of the sign or attachment and other requirements including holes for electrical cables, maintenance

requirements, access arrangements, erection / removal procedures and connection details);

16. flange plate bolt hole centres, bolt hole diameters, design loads per bolt, forces and moments acting at ground level, line of action of the maximum moment relative to the door position;
17. for masts with flange plates with slotted holes: dimensioned diagram of flange plate;
18. mast equipment mounting type reference and drawing reference;
19. mast equipment mounting material grade and material design strength;
20. limitations for compatible mast equipment mountings including maximum combined weight, maximum windage area and lever arms for weight and windage area; and
21. signed and dated declaration that information given in the form has been obtained in accordance with CD 354 [Ref 5.N] and this document.

11.11 The following Documentation shall be submitted for steel high masts with lifting mechanisms prior to the commencement of operation: Operation and Maintenance Manual, operating instructions, and maintenance and inspection requirements in accordance with ILP PLG07 [Ref 37.N].

11.12 The requirements for "Documentation" in Section 2 of GC 101 [Ref 13.N] shall apply to Operation and Maintenance Manuals, operating instructions, and maintenance and inspection requirements for steel high masts with lifting mechanisms.

Installation requirements for steel high masts

11.13 Installation of steel high masts and their foundations shall be in accordance with the manufacturer's instructions.

Installation verification for steel high masts

11.14 Verification shall be undertaken for the operation of steel high masts with lifting mechanisms in accordance with ILP PLG07 [Ref 37.N].

11.15 The frequency of operational testing of steel high masts with lifting mechanisms shall be at least once for each mast prior to commissioning.

11.16 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to the operation of steel high masts with lifting mechanisms.

12. Noise barriers

Product requirements for noise barriers

12.1 Noise barriers and their foundations shall comply with "General requirements for minor structures" in Section 1 of this document.

Noise barrier schedule

12.2 Noise barriers shall be supplied and installed as specified in CC 481/WSR/012.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.12.2

Noise barriers				
Minor structure reference	Noise barrier type	Noise barrier connections	Anchorage and holding down system reference	Foundation type
(a)	(b)	(c)	(d)	(e)

- Enter a unique reference, to define the unique reference for the noise barrier. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- Enter a value, from options absorptive or reflective, to identify whether the noise barrier is absorptive or reflective.
- Enter text, to list the references of adjacent sections of noise barrier that the noise barrier is physically connected to.

- d. Enter a unique reference, from options as defined in SI.17.5a of this document, to define the anchorage and holding down system for flange plate mounted structures in accordance with Section 17 Anchorage and holding down systems for minor structures. The anchorage and holding down system reference is the unique identifier that is used for cross-referencing to that anchorage and holding down system throughout this document. This field is not required for planted foundations.
- e. Enter a value, from options Planted, Flange plate mounted, to define whether foundations are planted in accordance with Section 13 Planted foundations for minor structures or flange plate mounted in accordance with Section 14 Foundations for minor structures with flange plates.

Noise barriers (continued)				
Minor structure reference	Quality of soil	Foundation reference	Access requirements	Setback requirements
(a)	(f)	(g)	(h)	(i)

- f. Enter a value, from options Good, Average, Poor, to define the quality of soil in accordance with PD 6547 [Ref 14.N]. This field is not required for flange plate mounted columns.
- g. Enter a unique reference, from options as defined in SI.14.2a of this document, to define the foundation reference for flange plate mounted structures in accordance with Section 14 Foundations for minor structures with flange plates. This field is not required for planted foundations.
- h. Enter text, to define any access requirements e.g. doors or gates through the noise barrier.
- i. Enter text, to define any setback requirements.

Noise barriers (continued)					
Minor structure reference	Drawing/model reference	Average noise barrier top height above ground level <i>mm</i> ;	Minimum noise barrier top height above road level <i>mm</i> ;	Minimum sound absorption category	Minimum airborne sound insulation category
(a)	(j)	(k)	(l)	(m)	(n)

j. Enter a unique reference, to identify the drawing/model reference(s) that show the location of the noise barrier.

k. Enter a number in units of *mm*, to identify the average height of the top of the noise barrier relative to ground level.

l. Enter a number in units of *mm*, to identify the minimum height of the top of the noise barrier relative to road level.

m. Enter a value, from options A1, A2 or A3, to define the minimum sound absorption category of the noise barrier.

n. Enter a value, from options B0,B1,B2 or B3, to define the minimum airborne sound insulation category of the noise barrier.

Noise barriers (continued)					
Minor structure reference	Self weight of the acoustic element	Acoustic element resistance to vertical load <i>kN/m</i> ;	Acoustic element maximum normal load <i>kN/m²</i> ;	Structural element maximum normal load <i>kN/m</i> ;	Structural element maximum resistance to bending moment (dynamic load from snow clearance) <i>kN•m</i> ;
(a)	(o)	(p)	(q)	(r)	(s)

o. Enter text, to define any limitations of the self weight of the acoustic elements under the specified conditions (wet, reduced wet or dry).

- p. Enter a number in units of **kN/m**, to define the maximum vertical load an element can withstand.
- q. Enter a number in units of **kN/m²**, to define the maximum normal (90°) load along the acoustic element that it shall be capable of withstanding (wind and static load).
- r. Enter a number in units of **kN/m**, to define the maximum normal (90°) load a structural element can withstand (wind, static load and self weight).
- s. Enter a number in units of **kN• m**, to define the maximum bending moment at ground level that the structural element shall be capable of withstanding (dynamic load from snow clearance).

Noise barriers (continued)				
Minor structure reference	Acoustic element maximum resistance to normal load (dynamic load from snow clearance) kN;	Risk of Falling Debris	Light reflectivity	Limitations of release of dangerous substances
(a)	(t)	(u)	(v)	(w)

- t. Enter a number in units of kN , to define the maximum normal (90°) load on a 2m x 2m reference surface on the acoustic element that it shall be capable of withstanding (dynamic load from snow clearance).
- u. Enter a value, from options Class 1,Class 2,Class 3, Class 4, Class 5, Class 6, to define the minimum risk to falling debris.
- v. Enter text, to define the fraction of light reflected from the barrier.
- w. Enter text, to define any scheme specific limitations on the release of dangerous substances from all constituent materials of the barrier..

Noise barriers (continued)			
Minor structure reference	Acoustic durability	Non acoustic durability	Additional requirements
(a)	(x)	(y)	(z)

- x. Enter text, to define the acoustic characteristics against the required exposure classes, which determines the measured decibel losses of the barrier at 5, 10, 15 and 20 years.
- y. Enter text, to define the non acoustic characteristics of the barrier for the declared lifetime in years.
- z. Enter text, to define any additional requirements for the noise barrier e.g. combination with VRS etc.

12.3 Noise barriers shall be compliant with BS EN 14388 2005 [Ref 40.N].

12.4 The noise barriers shall meet the performance characteristics as stated in table 12.4.

Table 12.4 Minimum performance characteristics for noise barriers	
BS EN 14388 2005 [Ref 40.N] Essential Characteristic	Minimum performance class
Sound absorption	Refer to CC 481/WSR/012
Airborne sound insulation	Refer to CC 481/WSR/012
Acoustic element resistance to load: self weight	Refer to CC 481/WSR/012
Acoustic element resistance to load: maximum vertical load	Refer to CC 481/WSR/012
Acoustic element resistance to load: maximum normal load	Refer to CC 481/WSR/012
Structural element resistance to load: maximum bending moment	Refer to CC 481/WSR/012
Structural element resistance to load: maximum normal load	Refer to CC 481/WSR/012
Risk of falling debris	Refer to CC 481/WSR/012
Light reflectivity	Refer to CC 481/WSR/012
Release of dangerous substances	Refer to CC 481/WSR/012. NPD shall not be allowed.
Acoustic durability	0.25dB / year maximum loss
Non-acoustic durability	25 years

12.5 The requirements of "Designated standards" in Section 10 of GC 101 [Ref 13.N] shall apply to noise barriers.

Product documentation for noise barriers

12.6 The following documentation shall be submitted for each type of noise barrier: completed and signed Noise Barrier Information Forms, manufacturer's technical drawings and specifications and documentation provided in accordance with "Designated standards" in Section 10 of GC 101 [Ref 13.N].

12.7 Noise Barrier Information Forms, manufacturer's technical drawings and specifications and documentation provided in accordance with Designated standards in Section 10 of GC 101 [Ref 13.N] shall be submitted six weeks prior to the commencement of installation, unless otherwise stated in CC 481/WSR/012.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.12.7 The minimum time that Noise Barrier Information Forms, manufacturer's technical drawings and specifications and documentation provided in accordance with Designated standards in Section 10 of GC 101 [Ref 13.N] shall be submitted prior to the commencement of installation shall be [enter free text].

12.8 The requirements for Documentation in Section 2 of GC 101 [Ref 13.N] shall apply to Noise Barrier Information Forms, manufacturer's technical drawings and specifications and documentation provided in accordance with Designated standards in Section 10 of GC 101 [Ref 13.N].

12.9 The following information shall be submitted and recorded on the Noise Barrier Information Forms using Contractor proforma CC 481/PRO/004:.

1. scheme reference;
2. noise barrier reference number;
3. revision number of form;

4. date of revision;
5. name of manufacturer of the proposed noise barrier;
6. documentation references for manufacturer's technical drawings and specifications and documentation provided in accordance with Designated standards in Section 10 of ; GC 101 [Ref 13.N]
7. noise barrier height;
8. length of noise barrier;
9. type (absorptive or reflective);
10. noise insulation;
11. noise absorption;
12. noise barrier material;
13. noise barrier material design strength;
14. support post material, design strength, type, length, width, depth and spacing;
15. panel packer material, type and size;
16. for steel elements: the corrosion protection system on the steel elements when new;
17. no. of access door openings with opening size (height and width) and security details;
18. basic wind velocity, altitude factor, basic wind pressure and force coefficient as defined in BS EN 1991-1-4 [Ref 9.N];
19. distance from the location of the barrier to the nearest coast;
20. for supports with planted foundations: planting depth and backfill requirements (e.g. concrete surround diameter) for each soil type factor, G (630, 390, 230);

21. for supports with flange plates: bolt hole centres, bolt hole diameters, design loads per bolt, forces and moments acting at ground level, line of action of the maximum moment relative to the noise barrier;
22. for supports with flange plates with slotted holes: dimensioned diagram of flange plate; and
23. signed and dated declaration that information given in the form has been obtained in accordance with CD 354 [Ref 5.N] and this document.

Installation requirements for noise barriers

12.10 Noise barriers and their foundations shall be installed in accordance with the manufacturer's requirements.

13. Planted foundations for minor structures, excluding steel CCTV masts and steel high masts

General requirements for planted foundations for minor structures, excluding steel CCTV masts and steel high masts

13.1 The design of planted foundation for minor structures shall be in accordance with "General requirements for minor structures" in Section 1 of this document.

13.2 The quality of soil assumed in the design of planted foundations for columns, posts and masts shall be as specified in the schedules

referenced in one of the following options: "Lighting columns and brackets" in Section 3 of this document, "Steel cantilever masts" in Section 10 of this document, or "Noise barriers" in Section 12 of this document.

13.3 Planted foundations that are not Contractor design items shall be as specified in CC 481/WSR/013.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.13.3

Planted foundations that are not Contractor design items		
Minor structure reference	Drawing / model reference(s)	Planted foundation design document reference(s)
(a)	(b)	(c)

- a. Enter a unique reference, to provide the unique reference for the minor structure(s) with planted foundations that are not Contractor design items. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter text, to identify the drawing(s) / model(s) that detail the design of the planted foundations that are not Contractor design items.
- c. Enter text, to identify the document(s) that detail the design of the planted foundations that are not Contractor design items.

Installation requirements for planted foundations for minor structures, excluding steel CCTV masts and steel high masts

13.4 Planted foundations shall have a minimum 75mm thick layer of concrete placed and compacted in the bottom of the excavation up to the base of the column or mast post.

13.5 The concrete placed in the bottom of the planted foundation excavation shall be GEN3 concrete complying with CC 495 [Ref 25.N].

13.6 Ingress of concrete or filling material into cable entry slots shall be prevented during concreting and backfilling operations.

13.7 The hole into which steel, aluminium and fibre reinforced polymer composite columns, posts or masts are placed shall be backfilled with concrete, unless otherwise stated in CC 481/WSR/013.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.13.7

The hole into which steel, aluminium and fibre reinforced polymer composite columns, posts or masts are placed	
Minor structure reference(s)	Backfill material
(a)	(b)

- a. Enter text, to provide the unique reference for the steel, aluminium and fibre reinforced polymer composite minor structure(s) with planted foundations where the hole into which they are placed is not backfilled with concrete. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter text, to define the material with which the hole is backfilled with.

13.8 The hole into which concrete columns, posts or masts are placed shall be backfilled with concrete or earth fill complying with this section, unless otherwise stated in CC 481/WSR/013.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.13.8

The hole into which concrete columns, posts or masts are placed	
Minor structure reference(s)	Backfill material
(a)	(b)

- a. Enter text, to provide the unique reference for the concrete minor structure(s) with planted foundations where the hole into

which they are placed is not backfilled with concrete or earth fill complying with this section. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.

- b. Enter text, to define the material with which the hole is backfilled with.

13.9 Concrete backfill for planted foundations for minor structures shall be RC20/25 concrete complying with CC 495 [Ref 25.N].

13.10 Concrete backfill for planted foundations for minor structures shall be compacted by vibration over the full planting depth of the column, mast or post to form a solid mass free from voids.

13.11 Concrete backfill for planted foundations for minor structures shall extend from the base of the column, mast or post to ground level.

13.12 The surface of the concrete backfill for planted foundations for minor structures shall be profiled to ensure water is dispersed away from the column, mast or post face.

13.13 Earth backfill for planted foundations for minor structures shall be Class 8 material complying with CC 601 [Ref 7.N], unless otherwise stated in CC 481/WSR/013.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.13.13

Earth backfill for planted foundations for minor structures	
Minor structure reference(s)	Earth backfill requirements
(a)	(b)

- a. Enter text, to provide the unique reference for the minor structure(s) with planted foundations where the hole into which they are placed is not backfilled with Class 8 material complying with CC 601 [Ref 7.N]. The minor structure reference is the

unique identifier that is used for cross-referencing to that minor structure throughout this document.

b. Enter text, to define the earth backfill requirements.

13.14 Earth backfill for planted foundations for minor structures shall be placed in 150mm thick layers.

13.15 Earth backfill for planted foundations for minor structures shall be compacted over the full planting depth to ensure lateral support to the planting depth of the column, mast or post.

13.16 Where earth backfill for planted foundations for minor structures is temporarily removed it shall be reinstated in compliance with this section.

13.17 Ducts shall be provided through the backfill material for planted foundations and the column or mast cable entry hole.

13.18 Ducts through backfill material for planted foundations for minor structures shall comply with the requirements of TC 501 [Ref 8.N] or TC 131 [Ref 41.N].

13.19 Ducts through backfill material for planted foundations for minor structures shall be capable of retaining their cross-sectional shape during compaction of the backfill.

14. Foundations for minor structures with flange plates

General requirements for foundations for minor structures with flange plates

14.1 The design of foundations for minor structures with flange plates shall be in accordance with "General requirements for minor structures" in Section 1 of this document.

14.2 Foundations for minor structures with flange plates shall be as specified in CC 481/WSR/014.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.14.2

Foundations for minor structures with flange plates				
Foundation reference	Foundation type	Anchorage and holding down system reference(s)	Minor structure design load limitations	Foundation drawing / model reference(s)
(a)	(b)	(c)	(d)	(e)

- a. Enter a unique reference, to provide the unique reference for the foundation for minor structures with flange plates. The foundation reference is the unique identifier that is used for cross-referencing to that foundation throughout this document.
- b. Enter a value, from options In-Situ reinforced concrete, Prefabricated reinforced concrete, Concrete bridge deck, Wall, Safety barrier, Approved alternative form of foundation in accordance with CD 354 [Ref 5.N] Section 12, to define whether foundations for flange plate mounted masts or columns are in-situ reinforced concrete in accordance with this section, prefabricated reinforced concrete in accordance with Section 15 Prefabricated reinforced concrete foundations for minor structures, bridge deck mounted in accordance with Section 16 Concrete bridge deck mounted minor structures, wall mounted

in accordance with Section 8 Wall mounted lighting brackets, Safety barrier mounted in accordance with this section or have an approved alternative form of foundation in accordance with CD 354 [Ref 5.N] Section 12.

- c. Enter a unique reference, from options as defined in SI.17.5a of this document, to define the compatible anchorage and holding down systems in accordance with Section 17 Anchorage and holding down systems for minor structures. The anchorage and holding down system reference is the unique identifier that is used for cross-referencing to that anchorage and holding down system throughout this document.
- d. Enter text, to define the loading (moments and vertical or horizontal forces) from the minor structure, and any conditions of loading, for which the foundations have been designed.
- e. Enter text, to define the drawing(s) / model(s) that detail the foundation.

Foundations for minor structures with flange plates (continued)		
Foundation reference	Foundation document reference(s)	Cable ducting requirements
(a)	(f)	(g)

- f. Enter text, to define the document(s) that provide details of the foundation.
- g. Enter text, to define the requirements for cable ducting through the foundation or bridge component. This shall be consistent with the cabling requirements specified in TC 131 [Ref 41.N] and TC 501 [Ref 8.N].

14.3 Reinforced concrete for in-situ foundations for minor structures with flange plates shall be compliant with CC 482 [Ref 46.N].

14.4 Prefabricated reinforced concrete foundations for minor structures with flange plates shall comply with "Prefabricated reinforced concrete foundations for minor structures" in Section 15 of this document.

14.5 Minor structures mounted on bridge decks shall comply with "Concrete bridge deck mounted minor structures" in Section 16 of this document.

14.6 Safety barrier used as a foundation for minor structures shall comply with CC 400 [Ref 34.N] or CC 401 [Ref 33.N].

14.7 The minor structure and its anchorage and holding down system shall be compatible with the safety barrier on which the minor structure is proposed to be mounted.

14.8 The minor structure and its anchorage and holding down system shall not adversely affect the performance of the safety barrier on which the minor structure is proposed to be mounted.

Installation requirements for foundations for minor structures with flange plates

14.9 Reinforced concrete foundations for minor structures shall be installed in accordance with CC 482 [Ref 46.N].

Bedding mortar requirements for foundations for minor structures with flange plates

14.10 The bedding mortar between the underside of the column, mast or post flange plate and the top of the concrete foundation or bridge deck element shall be a Contractor design item, unless otherwise stated in CC 481/WSR/014.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.14.10a The bedding mortar between the underside of the column, mast or post flange plate and the top of the concrete foundation or bridge deck element that is not a Contractor design item is: [enter free text].

SI.14.10b The requirements for the bedding mortar between the underside of the column, mast or post flange plate and the top of the concrete foundation or bridge deck element that is not a Contractor design items are [enter free text].

14.11 The design of bedding mortar between the underside of the column, mast or post flange plate and the top of the concrete foundation or bridge deck element shall be in accordance with CD 354 [Ref 5.N].

14.12 The requirements for "Contractor design" in Section 17 of GC 101 [Ref 13.N] shall apply to bedding mortar between the underside of the column, mast or post flange plate and the top of the concrete foundation or bridge deck element.

14.13 The bedding mortar between the underside of the column or mast flange plate and the top of the concrete foundation or bridge deck element shall comply with "Bedding mortar" in Section 1 of CC 495 [Ref 25.N].

15. Prefabricated reinforced concrete foundations for minor structures

Product requirements for prefabricated reinforced concrete foundations for minor structures

15.1 Prefabricated reinforced concrete foundations for minor structures shall be compliant with BS EN 14991 [Ref 36.N].

15.2 The method of conformity assessment for prefabricated reinforced concrete foundations for minor structures shall be as stated in CC 481/WSR/015.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.15.2

The method of conformity assessment for prefabricated reinforced concrete foundations for minor structures	
Foundation reference	Method of conformity assessment for prefabricated reinforced concrete foundations for minor structures in accordance with BS EN 14991 [Ref 36.N]
(a)	(b)

- a. Enter text, to provide the unique reference of the prefabricated minor structure foundation. The foundation reference is the

unique identifier that is used for cross-referencing to that foundation throughout this document.

- b. Enter a value, from options Method 2, Method 3, to define the method of conformity assessment in accordance with BS EN 14991 [Ref 36.N].

15.3 Where the conformity of prefabricated reinforced concrete foundations for minor structures is assessed through declaration of product properties, Method 2, the performance characteristics shall be as specified in CC 481/WSR/015.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.15.3

Where the conformity of prefabricated reinforced concrete foundations for minor structures is assessed through declaration of product properties, Method 2, the performance characteristics					
Foundation reference	Minimum resistance to vertical force kN;	Minimum resistance to bending moment kN•m;	Minimum resistance to shear force kN;	Partial safety factor for concrete, γ_c	Partial safety factor for steel, γ_s
(a)	(b)	(c)	(d)	(e)	(f)

- a. Enter a unique reference, to provide the unique reference of the prefabricated minor structure foundation. The foundation reference is the unique identifier that is used for cross-referencing to that foundation throughout this document.
- b. Enter a number in units of kN, to define the minimum resistance to vertical force of prefabricated reinforced concrete foundations.
- c. Enter a number in units of kN•m, to define the minimum resistance to bending moment of prefabricated reinforced concrete foundations.

- d. Enter a number in units of kN, to define the minimum resistance to horizontal shear force of prefabricated reinforced concrete foundations.
- e. Enter a number, to define the partial safety factor for concrete, γ_c .
- f. Enter a number, to define the partial safety factor for steel, γ_s .

Where the conformity of prefabricated reinforced concrete foundations for minor structures is assessed through declaration of product properties, Method 2, the performance characteristics (continued)		
Foundation reference	Other Nationally Determined Parameters	Conditions for durability
(a)	(g)	(h)

- g. Enter text, to define any other Nationally Determined Parameters (NDP) for use in calculation.

- h. Enter text, to define the conditions for durability.

15.4 Where the conformity of prefabricated reinforced concrete foundations for minor structures is assessed through declaration of compliance with a given design specification, Method 3, the design specification shall be as specified in CC 481/WSR/015.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.15.4

Where the conformity of prefabricated reinforced concrete foundations for minor structures is assessed through declaration of compliance with a given design specification, Method 3, the design specification		
Foundation reference	Drawing / model reference(s) for prefabricated reinforced concrete foundations for minor structures	Document reference(s) for prefabricated reinforced concrete foundation specification
(a)	(b)	(c)

- a. Enter a unique reference, to provide the unique reference of the prefabricated minor structure foundation. The foundation reference is the unique identifier that is used for cross-referencing to that foundation throughout this document.
- b. Enter text, to define the drawing(s) / model(s) that show the design specification for the prefabricated reinforced concrete foundation.
- c. Enter text, to define the document(s) that show the design specification for the prefabricated reinforced concrete foundation.

15.5 The requirements of Designated Standards in Section 10 of GC 101 [Ref 13.N] shall apply to prefabricated reinforced concrete foundations for minor structures.

Installation requirements for prefabricated reinforced concrete foundations for minor structures

15.6 Prefabricated reinforced concrete foundations for minor structures shall be installed in accordance with the manufacturer's instructions.

16. Concrete bridge deck mounted minor structures

General requirements for concrete bridge deck mounted minor structures

16.1 Requirements for concrete bridge deck mounted minor structures shall be as described in CC 481/WSR/016.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.16.1

Requirements for concrete bridge deck mounted minor structures			
Minor structure reference	Structure reference	Bridge deck mounting requirements	Bridge loading restrictions
(a)	(b)	(c)	(d)

- a. Enter a unique reference, to provide the unique reference for the minor structures that are mounted on a concrete bridge deck. The minor structure reference is the unique identifier that is used for cross-referencing to that minor structure throughout this document.
- b. Enter a unique reference, to provide the unique reference for bridge which will have the minor structure mounted on it.
- c. Enter text, to define the requirements for bridge deck mounted minor structures.
- d. Enter text, to define any restrictions for the loading imposed by the minor structure and its anchorages on the bridge.

Requirements for concrete bridge deck mounted minor structures (continued)			
Minor structure reference	Drawing / model reference(s)	Document reference(s)	Cable ducting requirements
(a)	(e)	(f)	(g)

- e. Enter text, to identify the drawing(s) / model(s) that show details of the mounting of the minor structure on the bridge deck.
- f. Enter text, to identify the document(s) that provide details of the mounting of the minor structure on the bridge deck.

- g. Enter text, to define the requirements for cable ducting through the bridge components. This shall be consistent with the cabling requirements specified in TC 501 [Ref 8.N] and TC 131 [Ref 41.N].

Installation requirements for concrete bridge deck mounted minor structures

16.2 Installation requirements for concrete bridge deck mounted columns, masts and posts shall comply with "Foundations for minor structures with flange plates " in Section 14 of this document.

16.3 The installation of columns, masts and posts and their anchorage and holding down systems on concrete bridge decks shall not damage the bridge deck waterproofing, unless otherwise stated in CC 481/WSR/016.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.16.3a The locations where the installation of columns, masts and posts and their anchorage and holding down systems on concrete bridge decks is allowed to damage the bridge deck waterproofing are as follows: [enter free text].

SI.16.3b The reinstatement of the bridge deck waterproofing where the installation of columns, masts and posts and their anchorage and holding down systems has caused damage shall be as follows: [enter free text].

17. Anchorage and holding down systems for minor structures

17.1 This section shall apply to anchorage and holding down systems for attaching minor structures with flange plates to a foundation, concrete bridge deck or wall.

17.2 The design of anchorage and holding down systems for minor structures with flange plates shall be in accordance with "General requirements for minor structures" in Section 1 of this document.

Product requirements for anchorage and holding down systems for minor structures

17.3 Steel anchorages and holding down systems shall be used for minor structures.

17.4 Post-installed anchorages shall not be used for minor structures, unless otherwise stated in CC 481/WSR/017.

Anchorage and holding down system schedule

17.5 Anchorage and holding down systems for minor structures with flange plates shall be as specified in CC 481/WSR/017.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.17.5

Anchorage and holding down systems for minor structures with flange plates			
Anchorage and holding down system reference	Anchorage and holding down system drawing / model reference(s)	Anchorage and holding down system document reference(s)	Anchorage type
(a)	(b)	(c)	(d)

- a. Enter a unique reference, to define the anchorage and holding down system reference that links to the individual schedules for minor structures. The anchorage and holding down system reference is the unique identifier that is used for cross-referencing to that anchorage and holding down system throughout this document.
- b. Enter text, to define the drawing(s) / model(s) that detail the anchorage and holding down system.
- c. Enter text, to define the document(s) that detail the anchorage and holding down system.
- d. Enter text, to define the type of anchorage system e.g. cast in anchorage, post-installed anchorage, bolted connection.

Anchorage and holding down systems for minor structures with flange plates (continued)					
Anchorage and holding down system reference	Holding down bolt/stud diameter mm;	Minimum characteristic resistance to tension load under static and quasi-static loading (per anchor) kN;	Minimum characteristic resistance to shear load under static and quasi-static loading (per anchor) kN;	Minimum substrate concrete strength MPa;	Maximum anchor embedment depth mm;
(a)	(e)	(f)	(g)	(h)	(i)

- e. Enter a number in units of mm, to define the diameter of the holding down bolt or stud.
- f. Enter a number in units of kN, to define the minimum characteristic tension load (nominal tensile load) for the individual anchor to resist under static and quasi-static loading.
- g. Enter a number in units of kN, to define the minimum characteristic shear load for the anchor to resist under static and quasi-static loading.

- h. Enter a number in units of MPa, to define the minimum strength of the concrete substrate where this is a constraint on the anchorage design.
- i. Enter a number in units of mm, to define the maximum embedment depth of the anchorage within the substrate where this is a constraint on the anchorage design.

Anchorage and holding down systems for minor structures with flange plates (continued)			
Anchorage and holding down system reference	Anchor edge or spacing constraints	Anchor displacement requirements	Fire safety requirements for the anchorage and holding down system
(a)	(j)	(k)	(l)

- j. Enter text, to define any constraints on the anchor spacing and edge distances.
- k. Enter text, to define any constraints on the displacement of the anchor under load.
- l. Enter text, to define any additional requirements relating to safety in case of fire e.g. anchor resistance to tension or shear under fire exposure.

Anchorage and holding down systems for minor structures with flange plates (continued)		
Anchorage and holding down system reference	Durability requirements for the anchorage and holding down system	Other requirements for the anchorage and holding down system
(a)	(m)	(n)

- m. Enter text, to define the durability requirements for the anchorage and holding down system.
- n. Enter text, to define any other requirements for the anchorage and holding down system.

Product documentation for anchorage and holding down systems for minor structures

17.6 Compliance with the performance requirements for anchorage and holding down systems for minor structures shall be demonstrated either by a Declaration of Performance or inclusion of the anchorage and holding down system in the design and check certification for the associated minor structure.

17.7 Where a declaration of performance is provided, the requirements of Designated Standards in Section 10 of GC 101 [Ref 13.N] shall apply to anchorage and holding down systems for minor structures.

17.8 Where a declaration of performance is provided for anchorage and holding down systems for minor structures, the following EADs shall be acceptable: EAD 330012-00-0601 [Ref 1.N] for cast in anchors and EAD 330250-00-0601 [Ref 35.N] for post-installed anchors, unless otherwise stated in CC 481/WSR/017.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.17.8 Acceptable UKADS or EADS for anchorages and holding down systems for minor structures shall be: [enter free text].

17.9 Where the anchorage and holding down system is included on the design and check certificate for the associated minor structure, the requirements for Technical approval of highway structures in Section 18 of GC 101 [Ref 13.N] shall apply to the anchorage and holding down system.

17.10 Where the anchorage and holding down system is included on the design and check certificate for the associated minor structure, the following documentation shall be submitted prior to the commencement of installation: anchorage and holding down system manufacturer's installation instructions and safety information.

17.11 Where the anchorage and holding down system is included on the design and check certificate for the associated minor structure, the requirements for Documentation in Section 2 of GC 101 [Ref 13.N] shall apply to the anchorage and holding down system manufacturer's installation instructions and safety information.

Installation requirements for anchorage and holding down systems for minor structures

17.12 Installation of anchorage and holding down systems for minor structures shall be in accordance with the manufacturer's instructions.

17.13 For post-installed anchorages in drilled holes, the drilled hole shall be located to ensure that existing reinforcement is not damaged.

17.14 The threads of steel anchorages for minor structures shall be lined with grease having a high resistance to creep and being described on the product data sheet as being applicable for hot and cold smearing.

17.15 The grease shall provide protection to the threads of steel anchorages for minor structures for a minimum of 6 months after installation.

17.16 Holding down systems for minor structures shall be tightened to the torque specified by the manufacturer, unless otherwise stated in CC 481/WSR/017.

17.17 The tightening requirements for holding down systems for minor structures, where different to those specified by the manufacturer shall be as specified in CC 481/WSR/017.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.17.17

The tightening requirements for holding down systems for minor structures, where different to those specified by the manufacturer	
Anchorage and holding down system reference	Holding down system tightening requirements
(a)	(b)

- a. Enter a unique reference, to provide the anchorage and holding down system reference for the holding down system where the tightening requirements are different to those provided by the manufacturer. The anchorage and holding down system reference is the unique identifier that is used for cross-

referencing to that anchorage and holding down system throughout this document.

- b. Enter text, to define the tightening requirements for the holding down system.

17.18 Tightening of holding down systems for minor structures shall be in accordance with the manufacturer's instructions.

17.19 The minimum thread engagement of the anchorage and holding down systems for minor structures shall be in accordance with the manufacturer's instructions.

17.20 The minimum bolt protrusion beyond the nut face of holding down systems for minor structures shall be in accordance with BS EN 1090-2 [Ref 10.N].

17.21 Anchorages, holding down systems and flange plates for minor structures shall be filled with non-setting passive filler to prevent the collection of water.

Installation verification for anchorage and holding down systems for minor structures

17.22 Verification shall be undertaken for thread engagement of the anchorage and holding down systems for minor structures through dimensional checks.

17.23 The frequency of dimensional checks for thread engagement shall be at least once for each anchorage and holding down system for minor structures.

17.24 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to dimensional checks for thread engagement of the anchorage and holding down system for minor structures.

17.25 Verification shall be undertaken for tightening of holding down systems for minor structures through confirmation of torque in accordance with the manufacturer's instructions.

17.26 The frequency of verification of tightening of holding down systems for minor structures shall be at least once for every holding down system during installation.

17.27 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to inspection and testing of the tightening of holding down systems for minor structures.

17.28 Verification shall be undertaken for tightening of holding down systems for minor structures through measurement of final torque in accordance with BS EN 1090-2 [Ref 10.N].

17.29 The frequency of measurement of final torque shall be at least once per type of holding down system for minor structures after installation unless otherwise stated in CC 481/WSR/017.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.17.29 The frequency of measurement of final torque for holding down systems for minor structures shall be [enter free text].

17.30 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to measurement of the final torque of holding down systems for minor structures.

17.31 Verification shall be undertaken for minimum bolt protrusion beyond the nut face for holding down systems for minor structures through visual inspection.

17.32 The frequency of visual inspection of the minimum bolt protrusion beyond the nut face of holding down systems for minor structures shall be at least once for every holding down system after installation.

17.33 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to visual inspection of the minimum bolt protrusion beyond the nut face of holding down systems for minor structures.

17.34 Verification shall be undertaken for prevention of damage to reinforcement for post-installed anchorages in drilled holes by detection of reinforcement prior to drilling.

17.35 The frequency of detection of reinforcement shall be at least once for every post-installed anchorage in a drilled hole prior to drilling.

17.36 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to detection of reinforcement prior to drilling for post-installed anchorages in drilled holes.

17.37 Verification shall be undertaken for post-installed anchorages in drilled holes for resistance to pull-out in accordance with BS 8539 [Ref 2.N].

17.38 The frequency of testing of post-installed anchorages in drilled holes shall be 1 in 20, subject to a minimum of 3 unless otherwise stated in CC 481/WSR/017.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.17.38 The frequency of testing of post-installed anchorages in drilled holes shall be [enter free text].

17.39 The requirements for "Verification" in Section 14 of GC 101 [Ref 13.N] shall apply to post-installed anchorages in drilled holes.

17.40 The proof test load, N_p , used in the testing of post-installed anchorages in drilled holes for resistance to pull-out, shall be 1.1 times the nominal tensile load, unless otherwise stated in CC 481/WSR/017.

Works Specific Requirements to be provided within the WSR template where applicable are:

SI.17.40 The value of the proof test load, N_p (from BS 8539 [Ref 2.N]), used in the testing of post-installed anchorages in drilled holes for resistance to pull-out, and the anchorage and holding down system reference to which it applies is: [enter free text].

17.41 The total movement of the anchorage shall not exceed 1mm during the testing of post-installed anchorages in drilled holes.

17.42 Any evidence of slip during loading up to the proof test load, N_p , as demonstrated by a change in the gradient of the load/extension curve shall constitute failure of the post-installed anchorage in a drilled hole.

17.43 Incremental loads shall be held for not less than 30 seconds during the testing of post-installed anchorages in drilled holes.

17.44 The proof test load, N_p , shall be held for not less than 5 minutes during the testing of post-installed anchorages in drilled holes.

17.45 Where manual measurements are being taken, the movement of the post-installed anchorage in a drilled hole shall be recorded immediately after each incremental load has been applied and at the end of the hold periods stated in this section.

Installation documentation for anchorage and holding down systems for minor structures

17.46 The following Documentation for the installation of anchorage and holding down systems for minor structures shall be submitted as continuous records: site records of tightening torque verification and testing, thread engagement checks and bolt protrusion beyond the nut face, including photographic evidence.

17.47 The requirements of "Records" in Section 3 of GC 101 [Ref 13.N] shall apply to site records of tightening torque verification and testing, thread engagement checks and bolt protrusion beyond the nut face.

17.48 The following Documentation shall be submitted for the testing of post-installed anchorages in drilled holes prior to the commencement of installation of the mast, column or post: Test report in accordance with Section B4 of BS 8539 [Ref 2.N].

17.49 The requirements for "Documentation" in Section 2 of GC 101 [Ref 13.N] shall apply to test reports for anchorages in drilled holes.

18. 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
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Ref 1.N	EOTA. EAD 330012-00-0601, 'Cast in anchor with threaded internal socket [EAD & UKAD]'
Ref 2.N	BSI. BS 8539, 'Code of practice for the selection and installation of post-installed anchors in concrete and masonry'
Ref 3.N	BSI. BS EN 206, 'Concrete - specification, performance, production and conformity'
Ref 4.N	BSI. BS EN ISO/IEC 17020, 'Conformity Assessment Requirements for the operation of various types of bodies performing inspection [Designated standard - NLF]'
Ref 5.N	National Highways. CD 354, 'Design of minor structures'
Ref 6.N	National Highways. CD 372, 'Design of post-installed anchors and reinforcing bar connections in concrete'
Ref 7.N	National Highways. CC 601, 'Earthworks'
Ref 8.N	National Highways. TC 501, 'Electrical Work for Road Lighting and Traffic Signs'
Ref 9.N	BSI. BS EN 1991-1-4, 'Eurocode 1: Actions on structures: General actions – Wind actions'
Ref 10.N	BSI. BS EN 1090-2, 'Execution of steel structures and aluminium structures. Technical requirements for steel structures.'
Ref 11.N	BSI. BS EN ISO 3506-1, 'Fasteners. Mechanical properties of corrosion-resistant stainless steel fasteners. Bolts, screws and studs with specified grades and property classes.'
Ref 12.N	BSI. BS EN ISO 3506-2, 'Fasteners. Mechanical properties of corrosion-resistant stainless steel fasteners. Nuts with specified grades and property classes.'

Ref 13. N	National Highways. GC 101, 'General requirements for the Specification for Highway Works'
Ref 14. N	BSI. PD 6547, 'Guidance on the use of BS EN 40-3-1 and BS EN 40-3-3.'
Ref 15. N	BSI. BS EN 10210-1, 'Hot finished structural hollow sections of non-alloy and fine grain steels. Technical delivery requirements (Designated Standard - CPR)'
Ref 16. N	BSI. BS EN 10025-1, 'Hot rolled products of structural steels. General technical delivery conditions [Designated Standard - CPR]'
Ref 17. N	National Highways. CG 305, 'Identification marking of highway structures'
Ref 18. N	BSI. BS EN 40-6, 'Lighting columns - Requirements for aluminium lighting columns (Designated Standard - CPR)'
Ref 19. N	BSI. BS EN 40-4, 'Lighting columns - Requirements for reinforced and prestressed concrete lighting columns (Designated Standard - CPR)'
Ref 20. N	BSI. BS EN 40-5, 'Lighting columns - Requirements for steel lighting columns (Designated Standard - CPR)'
Ref 21. N	BSI. BS EN 40-3-1, 'Lighting columns. Design verification. Specification for characteristic loads '
Ref 22. N	BSI. BS EN 40-7, 'Lighting columns. Requirements for fibre reinforced polymer composite lighting columns (Designated Standard - CPR)'
Ref 23. N	BSI. BS EN ISO 898-1, 'Mechanical properties of fasteners made of carbon steel and alloy steel. Bolts, screws and studs with specified property classes. Coarse thread and fine pitch thread '
Ref 24. N	BSI. BS EN ISO 898-2, 'Mechanical properties of fasteners made of carbon steel and alloy steel. Nuts with specified property classes. Coarse thread and fine pitch thread'
Ref 25. N	National Highways. CC 495, 'Miscellaneous'

Ref 26. N	BSI. Department for Science, Innovation and Technology. PAS 191, 'Multifunctional columns. Design. Specification'
Ref 27. N	BSI. BS EN 17638, 'Non-destructive testing of welds. Magnetic particle testing'
Ref 28. N	BSI. BS EN ISO 17640, 'Non-destructive testing of welds. Ultrasonic testing. Techniques, testing levels, and assessment'
Ref 29. N	BSI. BS EN ISO 17637, 'Non-destructive testing of welds. Visual testing of fusion-welded joints'
Ref 30. N	BSI. BS EN ISO 3452-1, 'Non-destructive testing. Penetrant testing. General principles'
Ref 31. N	BSI. BS EN ISO 9712, 'Non-destructive testing. Qualification and certification of NDT personnel'
Ref 32. N	BSI. BS EN 12767, 'Passive safety of support structures for road equipment. Requirements, classification and test methods.'
Ref 33. N	National Highways. CC 401, 'Permanent legacy road restraint systems'
Ref 34. N	National Highways. CC 400, 'Permanent road restraint systems'
Ref 35. N	EOTA. EAD 330250-00-0601, 'Post-installed fasteners in concrete under fatigue cyclic loading [EAD]'
Ref 36. N	BSI. BS EN 14991, 'Precast concrete products. Foundation elements [Designated Standard - CPR]'
Ref 37. N	Institution of Lighting Professionals. ILP PLG07, 'Professional Lighting Guide 7 - High Masts for Lighting and CCTV'
Ref 38. N	National Highways. CC 486, 'Protection of steelwork against corrosion'
Ref	BSI. BS EN ISO 9606-1, 'Qualification testing of welders.'

39. N	Fusion welding. Steels'
Ref 40. N	BSI. BS EN 14388, 'Road traffic noise reducing devices. Specifications (Designated Standard - CPR)' , 2005
Ref 41. N	National Highways. TC 131, 'Roadside technology and communications'
Ref 42. N	BSI. BS EN ISO 15607, 'Specification and qualification of welding procedures for metallic materials. General rules'
Ref 43. N	BSI. BS EN ISO 15609-1, 'Specification and qualification of welding procedures for metallic materials. Welding procedure specification. Arc welding'
Ref 44. N	BSI. BS EN ISO 15614-1, 'Specification and qualification of welding procedures for metallic materials. Welding procedure test. Arc and gas welding of steels and arc welding of nickel and nickel alloys'
Ref 45. N	BSI. BS EN 10088-1, 'Stainless steels. List of stainless steels'
Ref 46. N	National Highways. CC 482, 'Structural concrete'
Ref 47. N	National Highways. TC 101, 'Traffic signalling systems'
Ref 48. N	BSI. BS EN ISO 5817, 'Welding. Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded). Quality levels for imperfections'
Ref 49. N	BSI. BS EN 1011-1, 'Welding. Recommendations for welding metallic materials. Guidance for arc welding'
Ref 50. N	BSI. BS EN 1011-2, 'Welding. Recommendations for welding of metallic materials. Arc welding of ferritic steels'
Ref 51. N	BSI. BS EN 1011-3, 'Welding. Recommendations for welding of metallic materials. Arc welding of stainless steels'
Ref	BSI. BS EN ISO 14713-1, 'Zinc coatings. Guidelines and

52. N	recommendations for the protection against corrosion of iron and steel in structures. General principles of design and corrosion resistance'
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19. Works Specific Requirements references

The following Works Specific Requirements (WSR) documents are references for this document and shall be used when defining works specific requirements that, in conjunction with the Specification for Highway Works, supplementary and alternative clauses, form the contract specification. Country specific versions of each WSR are available. Users are responsible for applying all appropriate documents applicable to their contract.

WSR Code	WSR Topic
CC 481/WSR/00 1	Minor structures - General
CC 481/WSR/00	Steel minor structures (excluding steel lighting

2	columns)
CC 481/WSR/00 3	Lighting columns and brackets
CC 481/WSR/00 4	Concrete lighting columns
CC 481/WSR/00 5	Steel lighting columns
CC 481/WSR/00 6	Aluminium lighting columns
CC 481/WSR/00 7	Fibre reinforced polymer composite lighting columns
CC 481/WSR/00 8	Wall mounted lighting brackets
CC 481/WSR/00 9	Steel CCTV masts
CC 481/WSR/01 0	Steel cantilever masts
CC 481/WSR/01 1	Steel high masts
CC 481/WSR/01 2	Noise barriers
CC 481/WSR/01 3	Planted foundations for columns, masts (excluding CCTV and high masts) and posts
CC 481/WSR/01 4	Foundations for columns, masts and posts with flange plates
CC 481/WSR/01 5	Prefabricated reinforced concrete foundations for columns, masts and posts

CC 481/WSR/01 6	Concrete bridge deck mounted columns, masts and posts
CC 481/WSR/01 7	Minor structure anchorage and attachment systems for columns and masts with flange plates

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