# Digital MCHW

## Training for authoring

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# Agenda

- Introduction
- Refresh of key aspects from pre-reading material
- Detailed drafting rules
- Closing remarks

# Health safety and wellbeing moment

## Starting your day

**Whether on your way to the office or turning on your laptop at home:**

- Ask yourself: How do I feel today? What are the positives in my life? What am I thankful for? Is anything making me feel down?
- Take five minutes to journal your thoughts, aspirations or goals.
- Take three big deep breaths to start your day feeling calm.

## Setting up your working day

- Set your working days and hours in your calendar, be sure to carve out specific work slots to get things done.
- Schedule your lunch breaks and protect them at all costs.
- Avoid scheduling back to back meetings and try to save five minutes at the end of each meeting for a screen rest and movement break. (Outlook tip: you can automate this)
- Fill up a glass or bottle of water.

## Throughout your day

Q: Have I spoken to anyone today?

Q: Have I taken a screen break recently?

Q: Have I moved enough today?

If you need flex during your working day then schedule you 'My Hour' – it gives you an hour each day when you make up the time earlier or later in the day.

### Wellbeing Tip

If you need someone to talk to remember the Employee Assistance Programme is there 24/7. There is also a network of over 100 Mental Health First Aiders across the business ready to take your call or email.

### Wellbeing tip

Ensure you take regular movement and screen breaks. Use these one minute exercises for inspiration.

## Supporting others

Check-in with your team and ask how they are. Why not start meetings off with a chat?

Recognise the work of your colleagues and show your appreciation for their efforts.

Delay send emails when you know your colleague is away from work or if you are working unusual hours.

## Ending your day

Set yourself a list for the next day.

**Take a moment to reflect on your day:**

Q: How are you feeling?

Q: What went well today? Consider 3 things that you are pleased with.

Q: Acknowledge one difficult thing that happened and make a plan to address it (if not already) and then let it go.

## Go 'home'

- Turn off your laptop and work phone (if you have one.)
- Clear your workspace and tidy away your belongings - whether you're in the office or at home.
- Switch your attention to home think about your hobbies and interests and how you're going to rest and recharge.

THRIVE

## Resources and more information

Check out the Thrive SharePoint hub for everything Wellbeing related.

# Introduction

# Objectives for today

- Provide training on the new approach to drafting MCHW Volumes 1 and 2, including exercises.
- Explain support that will be provided throughout the drafting process.
- Collect questions from the audience.

# Outcomes from today

- Understand the necessity for compliance with the new structure and style of Volumes 1 and 2.
- Understand the high-level principles behind the update of Volumes 1 and 2.
- Understand the specific drafting rules for Volumes 1 and 2.
- Be ready to start drafting.

# The project team

## National Highways

- Steve Davy, Project sponsor
- Gareth Smith, Project manager
- Simon Hartshorne, content specialist, EU legislation advisor
- Kate Albon, content specialist, advisor on contractual aspects
- Maurice Jones, content specialist

## WSP

- Mariapia Angelino, trainer
- Mungo Stacy, trainer
- Content reviewers

# Approach to online course delivery

- Training structured around discrete modules linked to high-level drafting rules.
- Combination of presentations and questions using Menti.
  - Please provide your answers to the questions asked during the presentation using Menti.
- Please post any questions or comments in the Teams chat box during the presentation.
- 10 min break every hour.

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# Participants

**Please go to Menti www.menti.com for testing**

**Code: 8784 3551**

# Feedback

https://survey.alchemer.eu/s3/90418976/MCHW-training-11-01-2022

# Course programme

| | |
|---|---|
| **Session 1** | **Introduction** |
| | **Refresh of key aspects from pre-reading material** |
| | **Drafting objectives and specific drafting rules** |
| | break |
| **Session 2** | **Setting clear requirements to the constructor in the SHW** |
| | break |
| **Session 3** | **Setting clear requirements to the constructor in the SHW** |
| | break |
| **Session 4** | **Setting clear instructions to the specifier in the IfS documents and links with the WSI** |
| | **Setting contract neutral requirements to the constructor in the SHW** |
| | **Present national variations clearly and consistently** |
| | **Supporting decarbonisation** |
| | **Closing remarks** |

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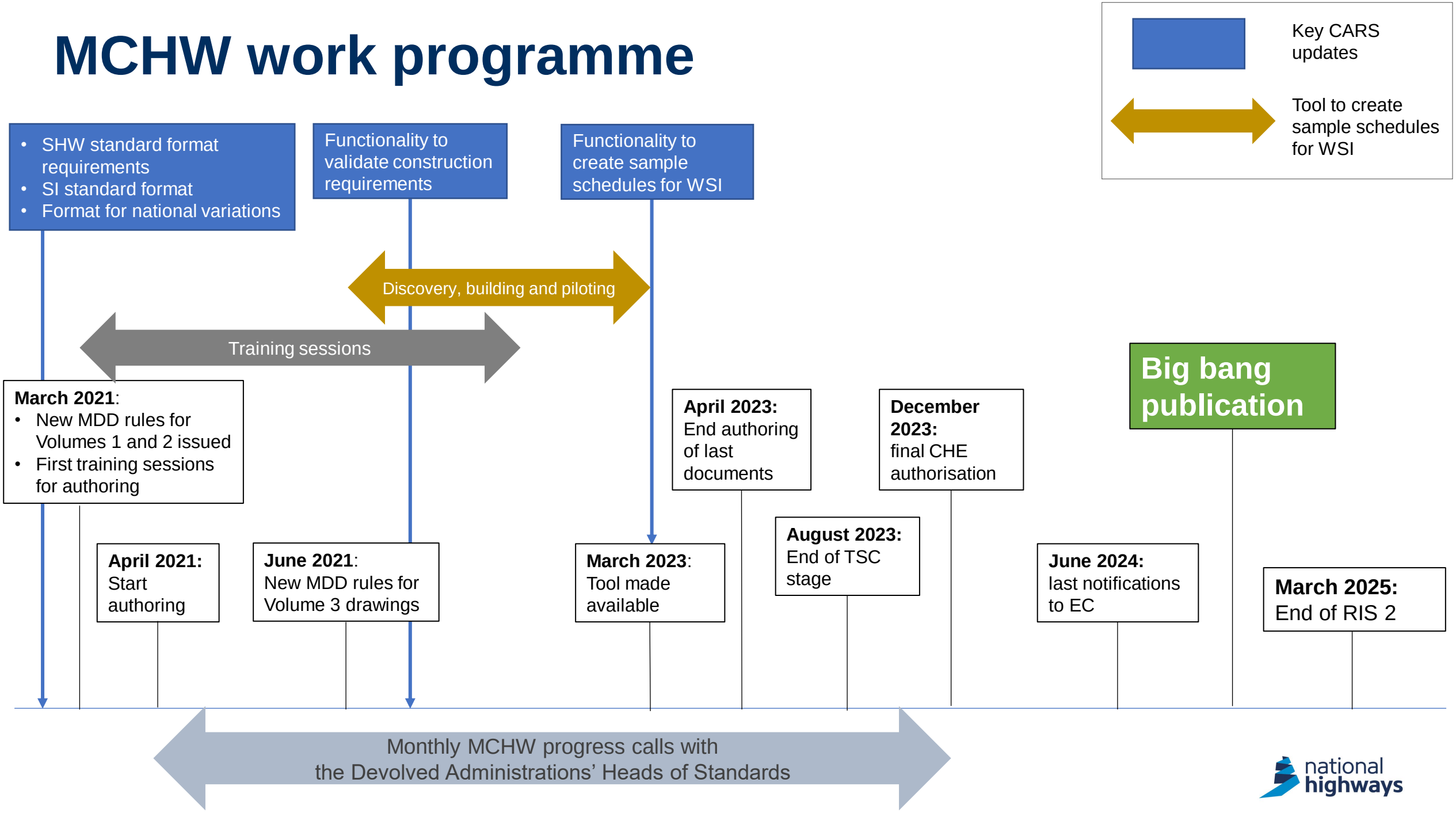
# Slides colour coding

Menti questions

Link to CARS training

Key takeaways

# MCHW work programme



# Impact on the DMRB work programme

- When updating Volumes 1 and 2, the impact on the DMRB needs to be assessed.
- The following activities will need to be undertaken:
    1. Preliminary screening / filtering exercise to categorise the content and identify content that needs to migrate to the DMRB **(by March 2022)**
    2. Updating of (about 85%) SHW and NfG and identification of further design content to be migrated to the DMRB **(by December 2022)**
    3. Development of clauses for existing DMRB documents / creation of new DMRB documents **(by April 2023)**
- We will provide more details on this matter in Session A8.

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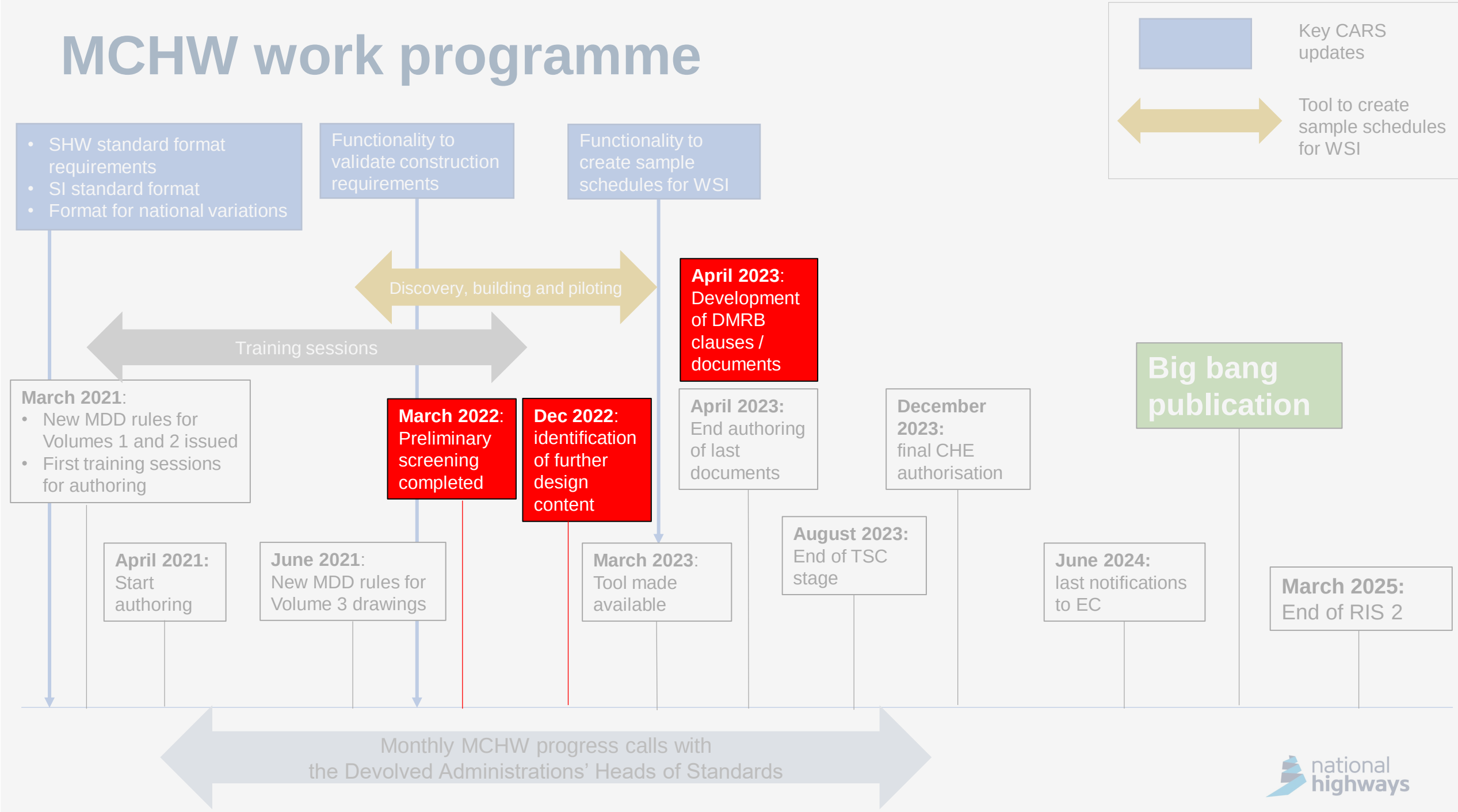
# MCHW work programme



# Refresh of key aspects from pre-reading material

# Items covered

1. Vision and recommendations guiding the future MCHW
2. Link between future MCHW and contract documents
3. Structure of the future MCHW
4. Content and presentation of the future MCHW
5. New terminology

# Vision

The future MCHW will provide
clear and unambiguous requirements and instructions,
compatible with modern contract forms and
future construction practices

# The future MCHW will…

| |
|---|
| **PURPOSE, SCOPE AND CONTENT** |
| 1. …continue to set out the requirements to be used for the United Kingdom **motorway and all-purpose trunk road network**. |
| 2. …be **compatible** with the future DMRB. |
| 3. …have content related to **conditions of contract removed**. |
| 4. …be and remain up-to-date. |
| 5. …**clearly define requirements** to be fulfilled by constructors. |
| **FORMAT** |
| 6. …will provide **clear and easier to use instruction**s to contract compilers. |
| 7. …enable **national variation** of MCHW clauses by Devolved Administrations or Highways England by introducing clauses in the main text. |
| 8. …have a **consistent style and format**, and be intuitive to use. |
| 9. …be **future-proofed** for advances in information technology. |
| **ENABLING FUTURE (LONGER TERM) EFFICIENCIES** |
| 10. …be compatible with **future asset information strategies** and digital design, construction, operation and maintenance of roads. |
| 11. …seek to implement more content developed in **partnership with others** and to refer to content published by other reputable bodies. |
| 12. …not inhibit and will seek to **support trends in construction**. |
| 13. …be **contract neutral** and compatible with conditions of contract used by Devolved Administrations and Highways England. |
| **PROGRAMME DELIVERY** |
| 14. The **timing of work** on the update of the future MCHW will not overlap work on the DMRB update, whilst seeking to achieve efficiencies available from continuity of resourcing. |
| 15. Create a community of document owners, supported by content specialists, to **strengthen collective commitment** to programme, derive efficiencies and ensure high quality drafting. |

# Structure of the future MCHW

# Current matrix of technical requirements

| | | Discipline | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **G** | **L** | **C** (Civil Engineering) | | | | | **T** (Technology) | |
| | | General Principles & Scheme Governance | Sustainability & Environment | Road Layout | Pavement | Highway Structures & Bridges | Drainage | Geotechnics | Control & Communications Technology | Road Lighting |
| **Life-cycle stage** | | 100 - 999 | 100 - 999 | 100 - 199 | 200 - 299 | 300 - 499 | 500 - 599 | 600 - 699 | 100 - 499 | 500 - 999 |
| General Information | **G** | DMRB review programme – RIS 1 | | | | | | | | |
| Appraisal | **A** | | | | | | | | | |
| Design | **D** | | | | | | | | | |
| Construction[1] | **C** | | | | | | | | | |
| Maintenance & Operation[2] | **M** | DMRB review programme – RIS 1 | | | | | | | | |
| Inspection & Assessment | **S** | | | | | | | | | |
| Disposal | **Z** | | | | | | | | | |

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# New matrix of technical requirements

| | | Discipline | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **G** | **L** | **C** (Civil Engineering) | | | | | **T** (Technology) | |
| | | General Principles & Scheme Governance | Sustainability & Environment | Road Layout | Pavement | Highway Structures & Bridges | Drainage | Geotechnics | Control & Communications Technology | Road Lighting |
| **Life-cycle stage** | | 100 - 999 | 100 - 999 | 100 - 199 | 200 - 299 | 300 - 499 | 500 - 599 | 600 - 699 | 100 - 499 | 500 - 999 |
| General Information | **G** | DMRB review programme – RIS 1 | | | | | | | | |
| Appraisal | **A** | | | | | | | | | |
| Design | **D** | | | | | | | | | |
| Contract preparation | **P** | Instruction for specifiers documents – RIS 2 | | | | | | | | |
| Construction(1) | **C** | Specification for Highways Works documents – RIS 2 | | | | | | | | |
| Maintenance & Operation(2) | **M** | DMRB review programme – RIS 1 | | | | | | | | |
| Inspection & Assessment | **S** | | | | | | | | | |
| Disposal | **Z** | | | | | | | | | |

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# Current MCHW

| Volume 0 | Volume 1 | Volume 2 | Volume 3 | Volume 4 | Volume 5 | Volume 6 |
|---|---|---|---|---|---|---|
| Manual Contract Document for Major Works and Implementation Requirements | Specification for Highways Works | Notes for guidance | Highway Construction Details | Bill of quantities | Contract Documents for Specialist Activities | Requirements and advice relating to H&S legislation |

# Current MCHW

**Volume 0**
Manual Contract Document for Major Works and Implementation Requirements

**Volume 1**
Specification for Highways Works

**Volume 2**
Notes for guidance

**Volume 3**
Highway Construction Details

**Volume 4**
Bill of quantities

**Volume 5**
Contract Documents for Specialist Activities

**Volume 6**
Requirements and advice relating to H&S legislation

**H&S documents**

**'Design' row**

**'Construction' row**

**New 'Contract preparation' row**

**Location TBC**

# Future MCHW

**Specification for Highways Works (SHW) documents**

- Introductory content
- Core Requirements
- Nationally determined requirements / sections

**Instructions for Specifier (IfS) documents**

- Introductory content
- Core Instructions
- Nationally determined requirements / sections
- Sample appendices

**Bill of quantities**

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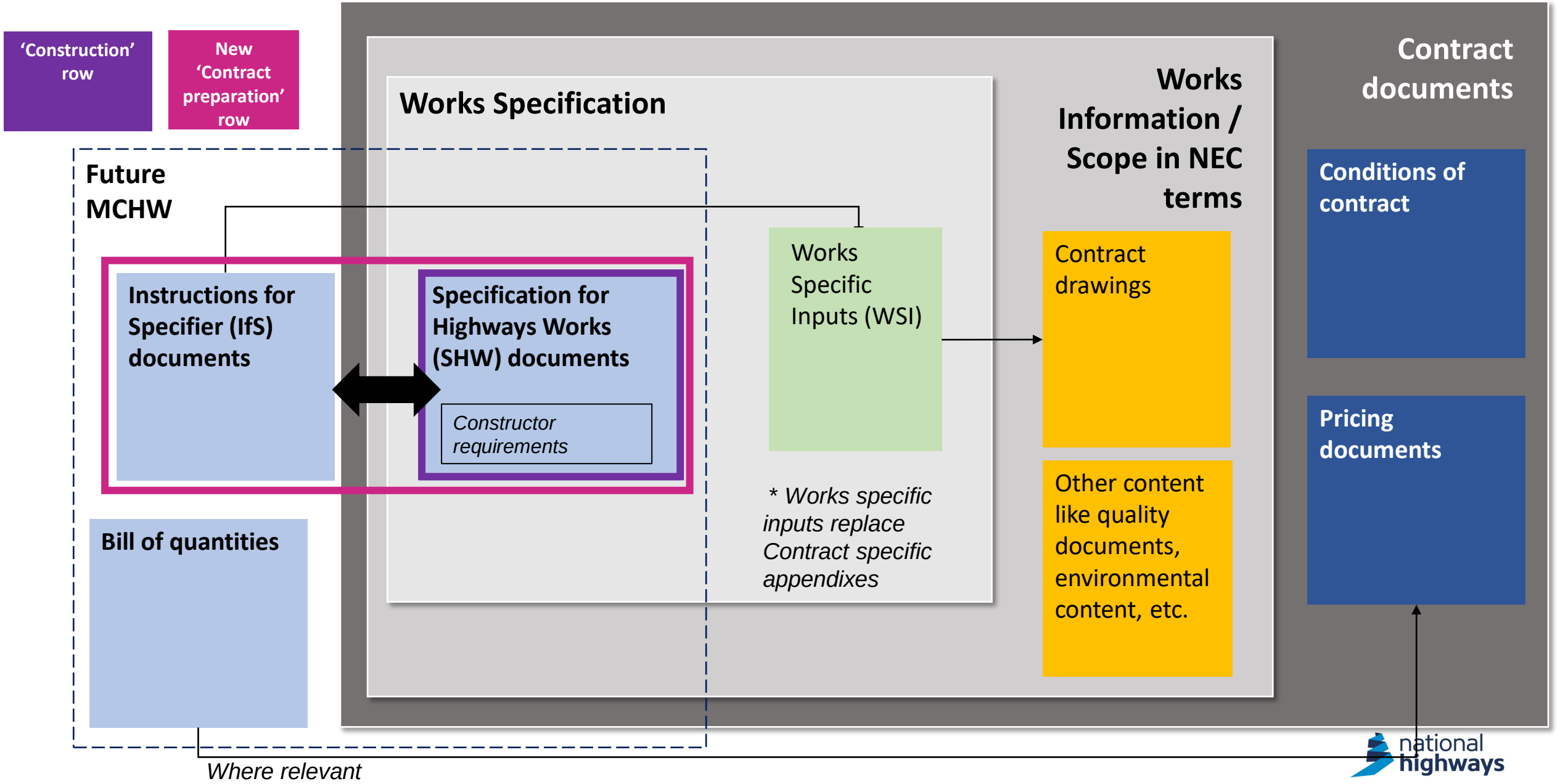
# Future MCHW and contract documents



# Content and presentation of the future MCHW

# New content and presentation of SHW

| | |
|---|---|
| 4 | Element |
| 4.1 | Elements shall be compliant with BS 2210. |
| 4.2 | The class shall be as stated in the works specific inputs. |
| 4.3 | The height of the element shall be a minimum of 500mm. |

- SHW requirements will be split out.
- SHW requirements will only cover:
  1. products;
  2. materials;
  3. activities related to products and materials

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# New content and presentation of NfG (now IfS)

| | | |
|---|---|---|
| 1 | Element | |
| 1.1 | Elements shall be compliant with BS 2210. | Constructor requirements |
| 1.2 | The class shall be as stated in the works specific inputs. | |
| SI 1.2 | Insert **X**, **Y** or **Z** to represent the class | Specifier instruction |
| 1.3 | The height of the element shall be a minimum of 500mm. | |

- For ease of use by technical authors, SIs and SHW will be authored as one document
- For ease of use by specifiers, IfS documents shall be published with both:
  - the default set of constructor requirements of the SHW and,
  - the specifier instructions on providing the required works specific inputs related to the constructor requirements.

# New content and presentation of contract specific appendices (now works specific inputs WSI)

- The works specific inputs (WSI) will replace the contract-specific appendices and will be aligned with the Specifier Instructions.

- Work will start soon in TAGG to explore features of a tool that can generate the WSI schedules automatically (called '*specifier tool*').

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# Document layout

These sections do not contain requirements, only general advisory information without the MCHW numbering layout.

| Number format | Name | Permitted Content | Type of element |
|---|---|---|---|
| Not numbered | Title Page [1] | Text | Preliminary Informative |
| Not numbered | Content page | Generated content | |
| Not numbered | Release notes [1] | Text | |
| Not numbered | Foreword | Text | |
| Not numbered | Introduction | Text | |
| Section 1, 2, 3 | <title as relevant>[2] | Text, figures, tables | Technical Normative |
| Appendix A, B etc. to SHW [TBC] | <title as relevant> | Text, Tables | Normative |
| Sample schedules for IfS | <title as relevant> | Text, Tables | Informative [TBC] |

These sections contain the clause numbering system to present requirements.

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# New terminology

| Current MCHW | Future MCHW |
|---|---|
| ‘Specification for Highway Works’ (SHW) series | ‘Specification for Highway Works’ (SHW) documents |
| Requirements for constructors (in SHW) | Constructor requirements (in SHW) |
| ‘Notes for Guidance’ (NfG) documents | ‘Instructions for Specifier’ (IfS) documents |
| Guidance for contract compiler (in NfG) | As relevant:<br>Design requirements / advice (in DMRB)<br>Specifier instructions (in IfS)<br>Constructor requirements (in SHW) |
| Contract specific appendixes (in NfG) | Works specific inputs (WSI) |

# Q1 to Q6 on Menti

# Drafting objectives and specific drafting rules

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

Contract neutral clauses

Clear distinction between product and installation requirements for each physical object …

…which in turn helps make a clear distinction between verification requirements

Clear documentation requirements

**WIDGETS**

**Product requirements**

1.1 Widgets shall be compliant with BS EN 12345.

1.2 Widgets shall meet the following performance characteristics: <performance characte

1.3 Widgets shall also meet the performance characteristics stated in schedule WSI xx.

SI.1.3a Provide unique reference for each drawing.

SI.1.3b Select widget type from permitted options (type 1, type 2, type 3).

1.4 The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of widgets.

1.5 The design of <subject of design> shall be in accordance with <design standard reference>.

**Product verification**

1.5 Certification shall be supplied to demonstrate that the widgets comply with BS EN 12345.

**Installation requirements**

1.6 Widgets shall be installed in accordance with the manufacture instruction.

1.7 Records of the alignment check for widgets shall be submitted to the Overseeing Organisation.

**Installation verification**

1.8 The alignment of widgets shall be checked within 24 hours of installation.

**Documentation requirements**

1.9 The following documentation shall be submitted for widgets prior to the commencement of <details of the works>: <detail the documentation>.

1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| **Drawing number** | **Type** |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Right balance between performance and method-based requirements

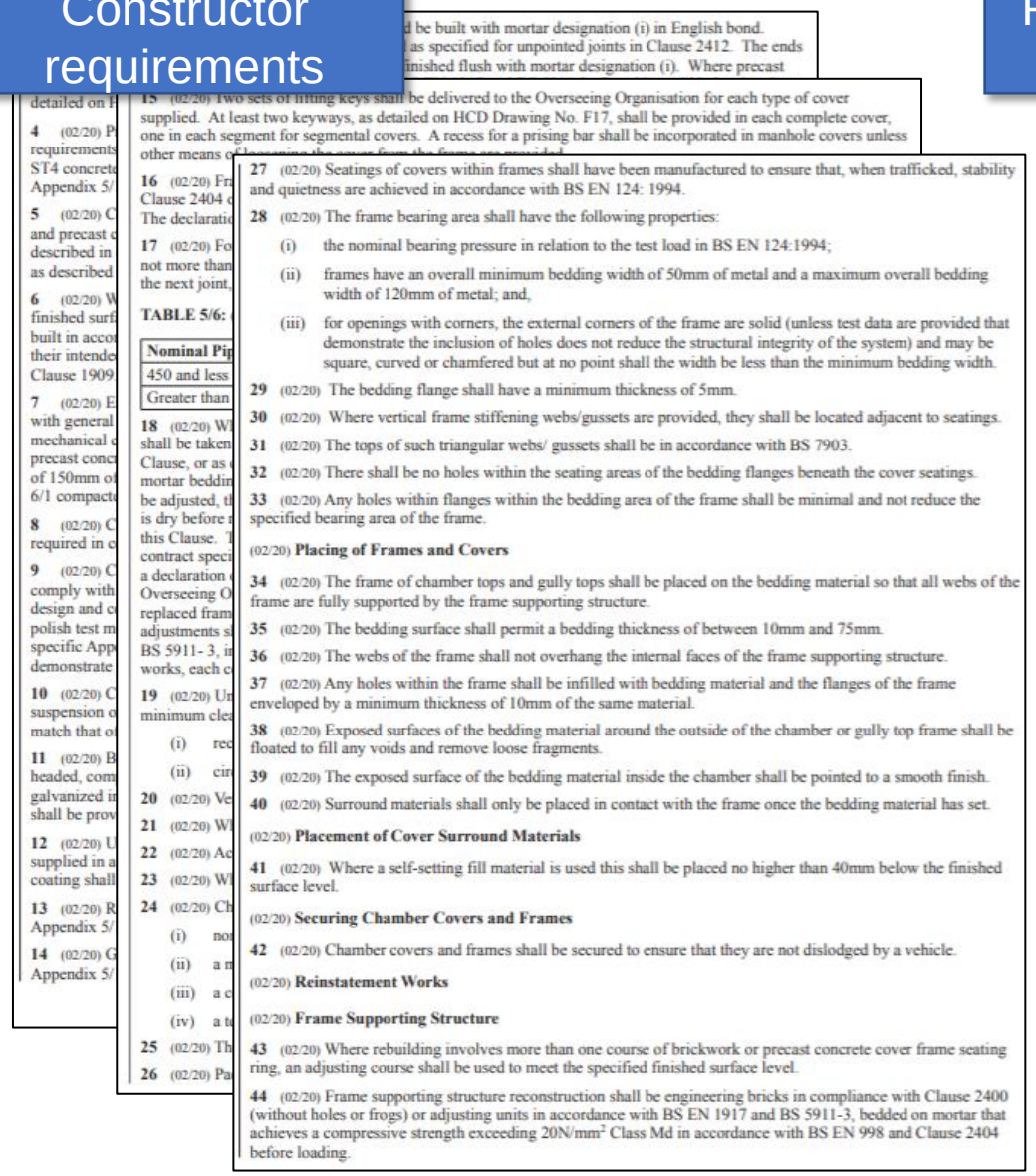
Use of standard format requirements

# Where we are now

Constructor requirements

Related notes for guidance

Related sample appendix



be built with mortar designation (i) in English bond.
as specified for unpointed joints in Clause 2412. The ends
finished flush with mortar designation (i). Where precast

15 (02/20) Two sets of lifting keys shall be delivered to the Overseeing Organisation for each type of cover supplied. At least two keyways, as detailed on HCD Drawing No. F17, shall be provided in each complete cover, one in each segment for segmental covers. A recess for a prising bar shall be incorporated in manhole covers unless other means of

16 (02/20) Fra
Clause 2404
The declaratio

17 (02/20) Fo
not more than
the next joint,

TABLE 5/6:

| Nominal Pip |
| --- |
| 450 and less |
| Greater than |

18 (02/20) W
shall be taken
Clause, or as
mortar beddi
be adjusted, t
is dry before
this Clause.
contract speci
a declaration
Overseeing O
replaced fram
adjustments s
BS 5911- 3, i
works, each c

19 (02/20) Un
minimum clea
(i) rec
(ii) cir

20 (02/20) Ve
21 (02/20) W
22 (02/20) Ac
23 (02/20) W
24 (02/20) Ch
(i) no
(ii) a
(iii) a
(iv) a

25 (02/20) Th
26 (02/20) Pa

27 (02/20) Seatings of covers within frames shall have been manufactured to ensure that, when trafficked, stability and quietness are achieved in accordance with BS EN 124: 1994.

28 (02/20) The frame bearing area shall have the following properties:

(i) the nominal bearing pressure in relation to the test load in BS EN 124:1994;

(ii) frames have an overall minimum bedding width of 50mm of metal and a maximum overall bedding width of 120mm of metal; and,

(iii) for openings with corners, the external corners of the frame are solid (unless test data are provided that demonstrate the inclusion of holes does not reduce the structural integrity of the system) and may be square, curved or chamfered but at no point shall the width be less than the minimum bedding width.

29 (02/20) The bedding flange shall have a minimum thickness of 5mm.

30 (02/20) Where vertical frame stiffening webs/gussets are provided, they shall be located adjacent to seatings.

31 (02/20) The tops of such triangular webs/ gussets shall be in accordance with BS 7903.

32 (02/20) There shall be no holes within the seating areas of the bedding flanges beneath the cover seatings.

33 (02/20) Any holes within flanges within the bedding area of the frame shall be minimal and not reduce the specified bearing area of the frame.

(02/20) **Placing of Frames and Covers**

34 (02/20) The frame of chamber tops and gully tops shall be placed on the bedding material so that all webs of the frame are fully supported by the frame supporting structure.

35 (02/20) The bedding surface shall permit a bedding thickness of between 10mm and 75mm.

36 (02/20) The webs of the frame shall not overhang the internal faces of the frame supporting structure.

37 (02/20) Any holes within the frame shall be infilled with bedding material and the flanges of the frame enveloped by a minimum thickness of 10mm of the same material.

38 (02/20) Exposed surfaces of the bedding material around the outside of the chamber or gully top frame shall be floated to fill any voids and remove loose fragments.

39 (02/20) The exposed surface of the bedding material inside the chamber shall be pointed to a smooth finish.

40 (02/20) Surround materials shall only be placed in contact with the frame once the bedding material has set.

(02/20) **Placement of Cover Surround Materials**

41 (02/20) Where a self-setting fill material is used this shall be placed no higher than 40mm below the finished surface level.

(02/20) **Securing Chamber Covers and Frames**

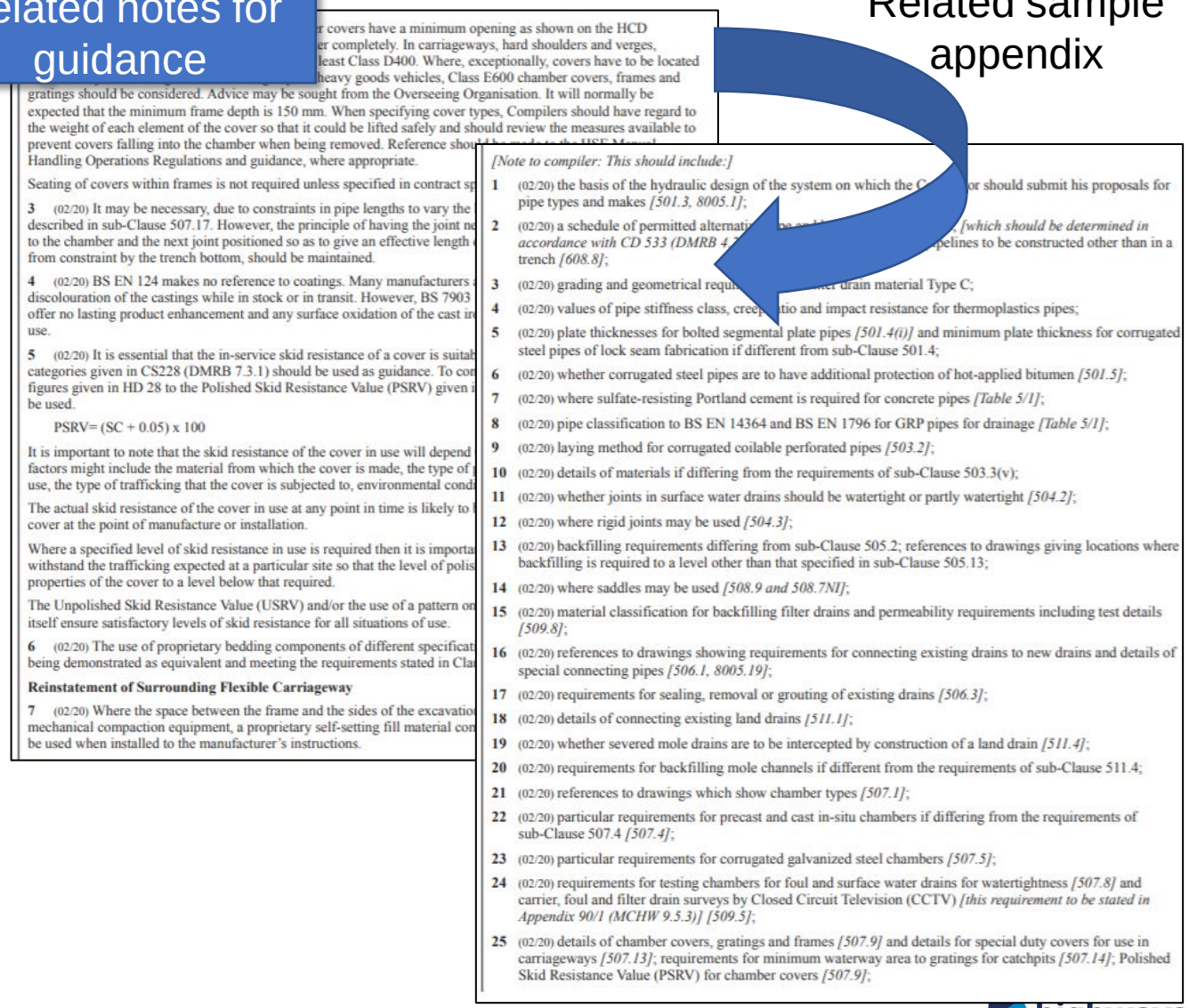
42 (02/20) Chamber covers and frames shall be secured to ensure that they are not dislodged by a vehicle.

(02/20) **Reinstatement Works**

(02/20) **Frame Supporting Structure**

43 (02/20) Where rebuilding involves more than one course of brickwork or precast concrete cover frame seating ring, an adjusting course shall be used to meet the specified finished surface level.

44 (02/20) Frame supporting structure reconstruction shall be engineering bricks in compliance with Clause 2400 (without holes or frogs) or adjusting units in accordance with BS EN 1917 and BS 5911-3, bedded on mortar that achieves a compressive strength exceeding 20N/mm² Class Md in accordance with BS EN 998 and Clause 2404 before loading.



covers have a minimum opening as shown on the HCD
er completely. In carriageways, hard shoulders and verges,
least Class D400. Where, exceptionally, covers have to be located
heavy goods vehicles, Class E600 chamber covers, frames and
gratings should be considered. Advice may be sought from the Overseeing Organisation. It will normally be expected that the minimum frame depth is 150 mm. When specifying cover types, Compilers should have regard to the weight of each element of the cover so that it could be lifted safely and should review the measures available to prevent covers falling into the chamber when being removed. Reference shou
Handling Operations Regulations and guidance, where appropriate.

Seating of covers within frames is not required unless specified in contract sp

3 (02/20) It may be necessary, due to constraints in pipe lengths to vary the
described in sub-Clause 507.17. However, the principle of having the joint ne
to the chamber and the next joint positioned so as to give an effective length
from constraint by the trench bottom, should be maintained.

4 (02/20) BS EN 124 makes no reference to coatings. Many manufacturers
discolouration of the castings while in stock or in transit. However, BS 7903
offer no lasting product enhancement and any surface oxidation of the cast ir
use.

5 (02/20) It is essential that the in-service skid resistance of a cover is suitab
categories given in CS228 (DMRB 7.3.1) should be used as guidance. To cor
figures given in HD 28 to the Polished Skid Resistance Value (PSRV) given i
be used.

PSRV= (SC + 0.05) x 100

It is important to note that the skid resistance of the cover in use will depend
factors might include the material from which the cover is made, the type of
use, the type of trafficking that the cover is subjected to, environmental condi

The actual skid resistance of the cover in use at any point in time is likely to
cover at the point of manufacture or installation.

Where a specified level of skid resistance in use is required then it is importa
withstand the trafficking expected at a particular site so that the level of polis
properties of the cover to a level below that required.

The Unpolished Skid Resistance Value (USRV) and/or the use of a pattern or
itself ensure satisfactory levels of skid resistance for all situations of use.

6 (02/20) The use of proprietary bedding components of different specificat
being demonstrated as equivalent and meeting the requirements stated in Cla

**Reinstatement of Surrounding Flexible Carriageway**

7 (02/20) Where the space between the frame and the sides of the excavatio
mechanical compaction equipment, a proprietary self-setting fill material cor
be used when installed to the manufacturer's instructions.

*[Note to compiler: This should include:]*

1 (02/20) the basis of the hydraulic design of the system on which the C or should submit his proposals for pipe types and makes *[501.3, 8005.1]*;

2 (02/20) a schedule of permitted alternati *[which should be determined in accordance with CD 533 (DMRB 4.*
pelines to be constructed other than in a trench *[608.8]*;

3 (02/20) grading and geometrical requi drain material Type C;

4 (02/20) values of pipe stiffness class, creep tio and impact resistance for thermoplastics pipes;

5 (02/20) plate thicknesses for bolted segmental plate pipes *[501.4(i)]* and minimum plate thickness for corrugated steel pipes of lock seam fabrication if different from sub-Clause 501.4;

6 (02/20) whether corrugated steel pipes are to have additional protection of hot-applied bitumen *[501.5]*;

7 (02/20) where sulfate-resisting Portland cement is required for concrete pipes *[Table 5/1]*;

8 (02/20) pipe classification to BS EN 14364 and BS EN 1796 for GRP pipes for drainage *[Table 5/1]*;

9 (02/20) laying method for corrugated coilable perforated pipes *[503.2]*;

10 (02/20) details of materials if differing from the requirements of sub-Clause 503.3(v);

11 (02/20) whether joints in surface water drains should be watertight or partly watertight *[504.2]*;

12 (02/20) where rigid joints may be used *[504.3]*;

13 (02/20) backfilling requirements differing from sub-Clause 505.2; references to drawings giving locations where backfilling is required to a level other than that specified in sub-Clause 505.13;

14 (02/20) where saddles may be used *[508.9 and 508.7NI]*;

15 (02/20) material classification for backfilling filter drains and permeability requirements including test details *[509.8]*;

16 (02/20) references to drawings showing requirements for connecting existing drains to new drains and details of special connecting pipes *[506.1, 8005.19]*;

17 (02/20) requirements for sealing, removal or grouting of existing drains *[506.3]*;

18 (02/20) details of connecting existing land drains *[511.1]*;

19 (02/20) whether severed mole drains are to be intercepted by construction of a land drain *[511.4]*;

20 (02/20) requirements for backfilling mole channels if different from the requirements of sub-Clause 511.4;

21 (02/20) references to drawings which show chamber types *[507.1]*;

22 (02/20) particular requirements for precast and cast in-situ chambers if differing from the requirements of sub-Clause 507.4 *[507.4]*;

23 (02/20) particular requirements for corrugated galvanized steel chambers *[507.5]*;

24 (02/20) requirements for testing chambers for foul and surface water drains for watertightness *[507.8]* and carrier, foul and filter drain surveys by Closed Circuit Television (CCTV) *[this requirement to be stated in Appendix 90/1 (MCHW 9.5.3)] [509.5]*;

25 (02/20) details of chamber covers, gratings and frames *[507.9]* and details for special duty covers for use in carriageways *[507.13]*; requirements for minimum waterway area to gratings for catchpits *[507.14]*; Polished Skid Resistance Value (PSRV) for chamber covers *[507.9]*;

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# High-level drafting objectives

A. Setting **clear requirements** to the constructor in the SHW, including clear links with the DMRB
B. Setting **clear instructions** to the specifier in the IfS documents and clear links with the work specific inputs (WSI)
C. Setting **contract neutral requirements** to the constructor in the SHW
D. Present **national variations** consistently for the four Overseeing Organisations
E. Supporting **decarbonisation** *(will be covered in separate training)*

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| High-level drafting objectives | Specific drafting rules | |
|---|---|---|
| Setting clear requirements to the constructor in the SHW, including clear links with the DMRB | A1: Verb forms<br>A2: Clarity of constructor requirements<br>A3: Section title and cross references<br>A4: Using standard format requirements (SFR)<br>A5: Product and installation requirements | 2 |
| | A6: Verification and documentation requirements<br>A7: Other types of constructor requirements<br>A8: Construction vs design requirements<br>A9: Performance and method requirements | 3 |
| Setting clear instructions to the specifier in the IfS documents and clear links with the WSI | B1: IfS content, presentation and format<br>B2: Establishing clear links between SHW, IfS and WSI | 4 |
| Setting contract neutral requirements to the constructor in the SHW | C1: Contract and product neutrality | |
| Present national variations clearly and consistently | D1: Nationally Determined Requirements and sections | |
| Supporting decarbonisation | *Specific rules will be provided in a separate module* | |

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Please use the ‘hand raised’ function when you are back from the break

| High-level drafting objectives | Specific drafting rules | |
|---|---|---|
| Setting clear requirements to the constructor in the SHW, including clear links with the DMRB | A1: Verb forms<br>A2: Clarity of constructor requirements<br>A3: Section title and cross references<br>A4: Using standard format requirements (SFR)<br>A5: Product and installation requirements | 2 |
| | A6: Verification and documentation requirements<br>A7: Other types of constructor requirements<br>A8: Construction vs design requirements<br>A9: Performance and method requirements | 3 |
| Setting clear instructions to the specifier in the IfS documents and clear links with the WSI | B1: IfS content, presentation and format<br>B2: Establishing clear links between SHW, IfS and WSI | 4 |
| Setting contract neutral requirements to the constructor in the SHW | C1: Contract and product neutrality | |
| Present national variations clearly and consistently | D1: Nationally Determined Requirements and sections | |
| Supporting decarbonisation | *Specific rules will be provided in a separate module* | |

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# A1 Verb forms

- Verb forms for SHW requirements
- Advice in SHW

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

Contract neutral clauses

Clear distinction between product and installation requirements for each physical object…

…which in turn helps make a clear distinction between verification requirements

Clear documentation requirements

**WIDGETS**

**Product requirements**

1.1 Widgets shall be compliant with BS EN 12345.

1.2 Widgets shall meet the following performance characteristics: <performance characte

1.3 Widgets shall also meet the performance characteristics stated in WSI xx.

SI.1.3a Provide unique reference for each drawing.

SI.1.3b Select widget type from permitted options (type 1, type 2, type 3).

1.4 The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of widgets.

1.5 The design of <subject of design> shall be in accordance with <design standard reference>.

**Product verification**

1.5 Certification shall be supplied to demonstrate that the widgets comply with BS EN 12345.

**Installation requirements**

1.6 Widgets shall be installed in accordance with the manufacture instruction.

1.7 Records of the alignment check for widgets shall be submitted to the Overseeing Organisation.

**Installation verification**

1.8 The alignment of widgets shall be checked within 24 hours of installation.

**Documentation requirements**

1.9 The following documentation shall be submitted for widgets prior to the commencement of <details of the works>: <detail the documentation>.

1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| Drawing number | Type |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Use of standard format requirements

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# Verb forms for SHW requirements

A requirement is a statement which either:

- reflects a legislative/statutory obligation which must be fulfilled in all cases;
- reflects a need of the Overseeing Organisation and requires a departure should there be a desire not to fulfil it.

| Sub-category | Verb form |
|---|---|
| **Legislative requirement**<br>Mandatory requirement set out in regulations at international / European / national level | Must |
| **Overseeing Organisations' requirements** | Shall |



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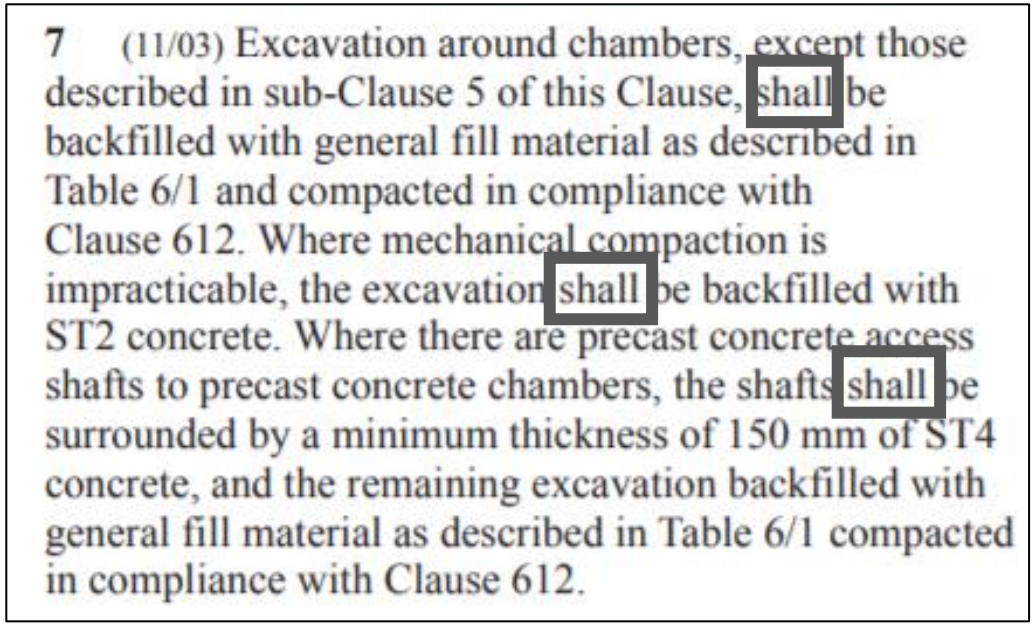
# Verb forms for SHW requirements

In most cases the use of the word "shall" is applied consistently within the SHW



7 (11/03) Excavation around chambers, except those described in sub-Clause 5 of this Clause, shall be backfilled with general fill material as described in Table 6/1 and compacted in compliance with Clause 612. Where mechanical compaction is impracticable, the excavation shall be backfilled with ST2 concrete. Where there are precast concrete access shafts to precast concrete chambers, the shafts shall be surrounded by a minimum thickness of 150 mm of ST4 concrete, and the remaining excavation backfilled with general fill material as described in Table 6/1 compacted in compliance with Clause 612.

# Advice in the SHW

- The SHW shall not provide advice, only requirements using ‘shall’ and ‘must’ as relevant, i.e. no ‘should’, ‘may’ and ‘can’ in the SHW.

- This is different from the DMRB, where advice is also allowed through ‘should’ and ‘may’ clauses to provide methods/options to fulfil a requirement and detail best practice.
  - ‘Can’ clauses are typically notes, which provide statements of facts.

# Q7 to Q9 on Menti

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# Key takeaways on verb forms in the SHW

- Set out SHW requirements on construction using:
  - “must” for legislative requirements
  - “shall” for requirements of the Overseeing Organisations
- Other verb forms to express requirements (like “is required” or similar) are not allowed.
- Do not include “should” or “may” clauses and notes in the SHW.

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# A2 Clarity of constructor requirements

- Making clauses independent
- Personnel-function approach
- Vague expressions
- Verifiable content

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

**Independent clauses, no ambiguity**

Contract neutral clauses

Clear distinction between product and installation requirements for each physical object…

…which in turn helps make a clear distinction between verification requirements

Clear documentation requirements

**WIDGETS**

**Product requirements**

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1.4 The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of widgets.

1.5 The design of <subject of design> shall be in accordance with <design standard reference>.

**Product verification**

1.5 Certification shall be supplied to demonstrate that the widgets comply with BS EN 12345.

**Installation requirements**

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1.9 The following documentation shall be submitted for widgets prior to the commencement of <details of the works>: <detail the documentation>.

1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| **Drawing number** | **Type** |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Right balance between performance and method-based requirements

Use of standard format requirements

# Making clauses independent

- **Each clause shall only contain one verb form.**
- Current clauses may need to be split. It is important to make clauses independent in order to future-proof the clauses. This means:
  - Avoid linking adverbs (such as however, yet, in addition, etc.) and demonstrative pronouns (e.g. this, that, etc.)
  - Some words may need to be repeated for clarity (e.g. the subject of a sentence)


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# Example

**Reinforcement for precast reinforced and prestressed concrete piles**

**6** (11/03) Steel reinforcement shall be as described in Appendix 16/2 and in accordance with Series 1700.

The main longitudinal reinforcing bars in piles not exceeding 12 m in length shall be in one continuous length. In piles more than 12 m long, joints will be permitted in main longitudinal bars so that the number of joints is minimised. Joints in reinforcement shall be such that the full strength of the bar is effective across the joint.

Lap or splice joints shall be provided with link bars designed to resist eccentric forces. Reinforcement shall be incorporated for lifting and handling purposes.

## POSSIBLE REDRAFT

**Reinforcement for precast reinforced and prestressed concrete piles**

3.1 Steel reinforcement shall be as described in the schedule <WSI GC 100.01> and in accordance with <Series 1700>.

3.2 In piles not exceeding 12 m in length, the main longitudinal reinforcing bars shall be in one continuous length.

3.3 In piles more than 12 m long, joints shall be minimised.

3.4 Joints in reinforcement shall be such that the full strength of the bar is effective across the joint.

3.5 Lap or splice joints shall be provided with link bars designed to resist eccentric forces.

3.6 Reinforcement shall be incorporated for lifting and handling purposes.

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# Personnel-function approach

- **Do not refer to the ‘Contractor’**
- All SHW clauses will be under the responsibility of the constructor – this will be clarified in the new front end documents.

(12/14) **Cover to Reinforcement**

**8** (12/14) The Contractor shall provide certificates of compliance with respect to cover to reinforcement and detailed records of measured covers to the Overseeing Organisation before concrete is placed.

# Vague expressions

- **Do not use qualitative and subjective terms**
  - *Adequate*
  - *As appropriate*
  - *As soon as possible*
  - *Practicable / Reasonably practical*
- **Do not use expressions that are difficult to price**
  - *To the satisfaction of the Overseeing Organisation*
- **Do not use ambiguous words**
  - *Care / account / consideration / attention / preference*
- **Do not use expressions that say what the specifier should have done rather than what the constructor should be doing**
  - *The works are detailed in the WSI → you should say: The work shall be carried out in accordance with the WSI*


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# Verifiable content

- **Do not include content that cannot be verified** – each constructor requirement needs to be capable of verification.
- Typical means for verification:
  - Documentation requirements, including certification
  - Testing
  - Inspection and test plan

# CARS functionality

- Error where not using appropriate verb form
- Error when referring to specific roles
- Warning when introducing vague expressions
- Improved Help pages: https://help.futuredmrb.co.uk/

*See separate training on CARS*

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# Q10 on Menti

# Key takeaways on clarity of constructor requirements

- Each clause shall only contain one verb form.
- Do not refer to the ‘Contractor’
- Do not use qualitative and subjective terms
- Do not use expressions that are difficult to price
- Do not use ambiguous words
- Do not use expressions that say what the specifier should have done rather than what the constructor should be doing
- Do not include content that cannot be verified
- MDD rules embedded into CARS

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# A3 Section title and cross references

- Appropriate titles to support cross referencing
- Mapping to drawings/models

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

Contract neutral clauses

Clear distinction between product and installation requirements for each physical object…

…which in turn helps make a clear distinction between verification requirements

Clear documentation requirements

**WIDGETS**

**Product requirements**

1.1 Widgets shall be compliant with BS EN 12345.

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1.3 Widgets shall also meet the performance characteristics stated in WSI xx.

SI.1.3a Provide unique reference for each drawing.

SI.1.3b Select widget type from permitted options (type 1, type 2, type 3).

1.4 The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of widgets.

1.5 The design of <subject of design> shall be in accordance with <design standard reference>.

**Product verification**

1.5 Certification shall be supplied to demonstrate that the widgets comply with BS EN 12345.

**Installation requirements**

1.6 Widgets shall be installed in accordance with the manufacture instruction.

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1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| Drawing number | Type |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Right balance between performance and method-based requirements

Use of standard format requirements

# Section title

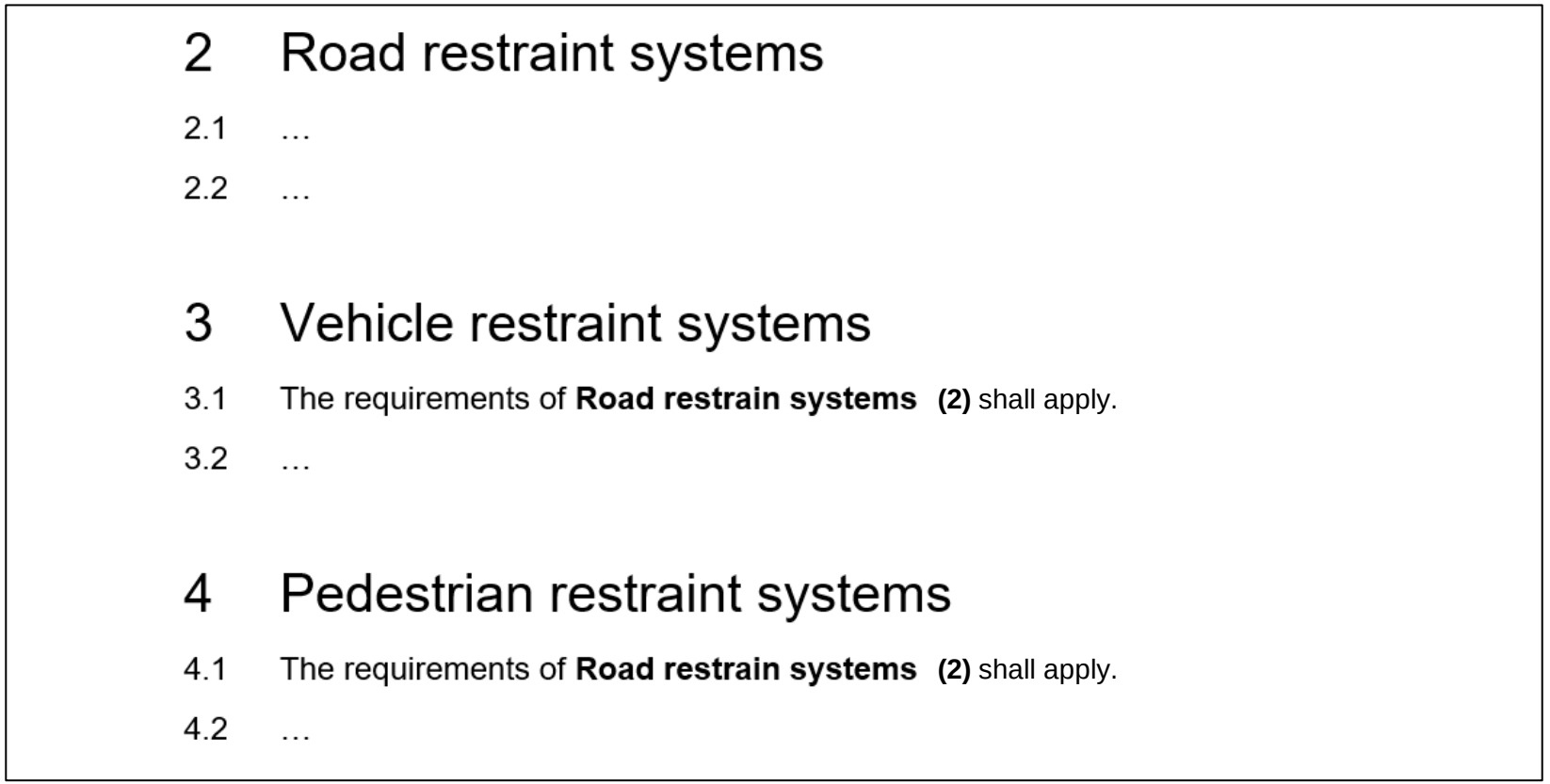
- **All requirements within a section shall apply to the physical object, material, activity or collective term that is the subject of the title.**

- The title of a section shall either refer to:
  - a physical object, material, defined area of the site or activity; or
  - a collective term for objects, materials, defined areas of the site or activities.

- Need to introduce appropriate titles to support cross referencing as well as to map to drawings / models – see following slides

# Appropriate titles to support cross referencing (1/2)

1. Set of requirements common to more than one section.



2 Road restraint systems

2.1 …

2.2 …

3 Vehicle restraint systems

3.1 The requirements of **Road restrain systems** **(2)** shall apply.

3.2 …

4 Pedestrian restraint systems

4.1 The requirements of **Road restrain systems** **(2)** shall apply.

4.2 …

# Appropriate titles to support cross referencing (2/2)

2. Set of requirements on a particular activity, material or product associated with another section

## 2 Bituminous pavement mixtures

2.1 Bituminous pavement mixture shall be placed and compacted in accordance with **Placing and compaction of bituminous mixtures (3)**.

2.2 …

## 3 Placing and compaction of bituminous pavement mixtures

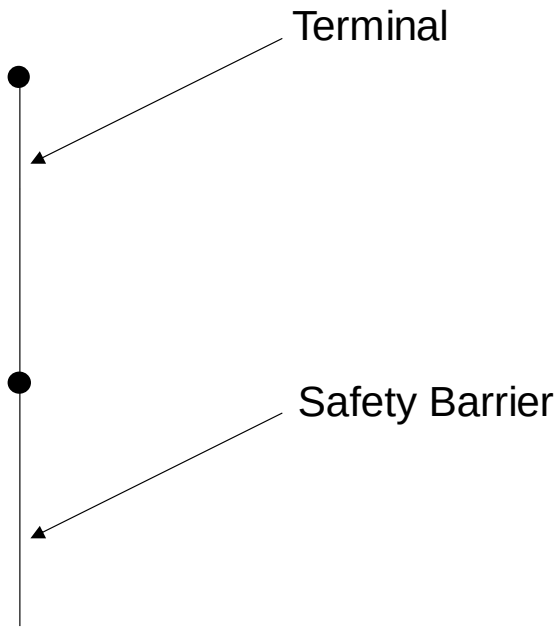
3.1 The compaction of bituminous pavement mixtures shall be in accordance with BS 594987

3.2 …

# Mapping to drawings/models

- The design drawings/models detail what materials and products have been specified and where they are to be placed.
- We want to enable direct mapping between design drawings/models and the specification.

# How the updated SHW will interact with drawings/models (1/3)

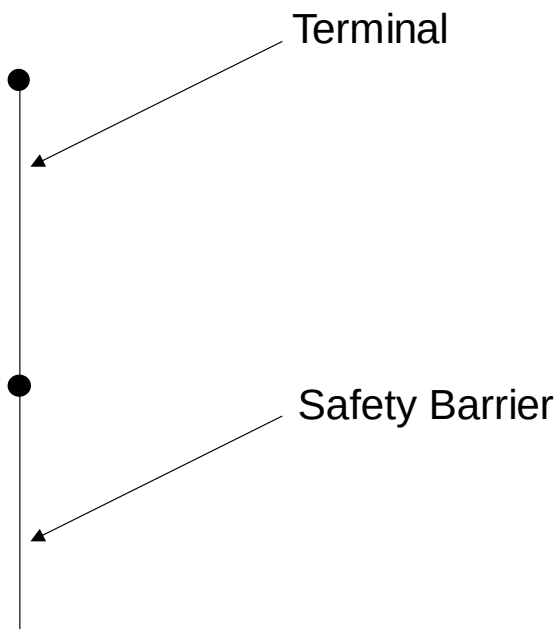



**Want to avoid this**

**SERIES 400**
**ROAD RESTRAINT SYSTEMS**
**(VEHICLE AND PEDESTRIAN)**

**Contents**

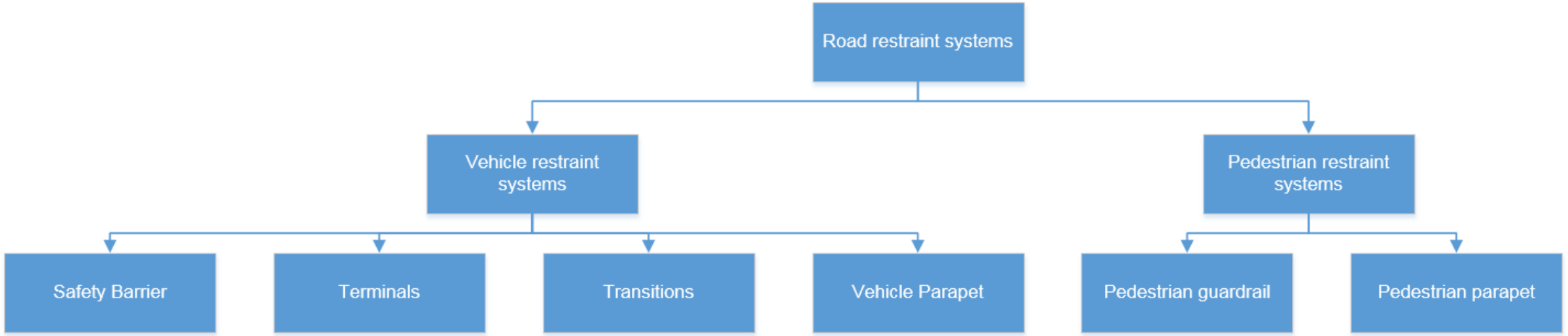
# How the updated SHW will interact with drawings/models (2/3)




**Align titles with objects and materials which are likely to be shown and referred to on a drawing/model**

**Contents**

# How the updated SHW will interact with drawings/models (3/3)




- Think about what the bottom level is
- List of all relevant materials or objects
- Consider also installation, verifications, documentation requirements as relevant

# Key takeaways on section title and cross references

- All requirements within a section shall apply to the physical object, material, activity or collective term that is the subject of the title
- Need to introduce appropriate titles to support cross referencing as well as to map to drawings / models
- When reviewing the sections in your documents, go step by step down in terms of level of detail, from systems to specific products and materials

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# A4 Using standard format requirements

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

Contract neutral clauses

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Clear documentation requirements

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Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| Drawing number | Type |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

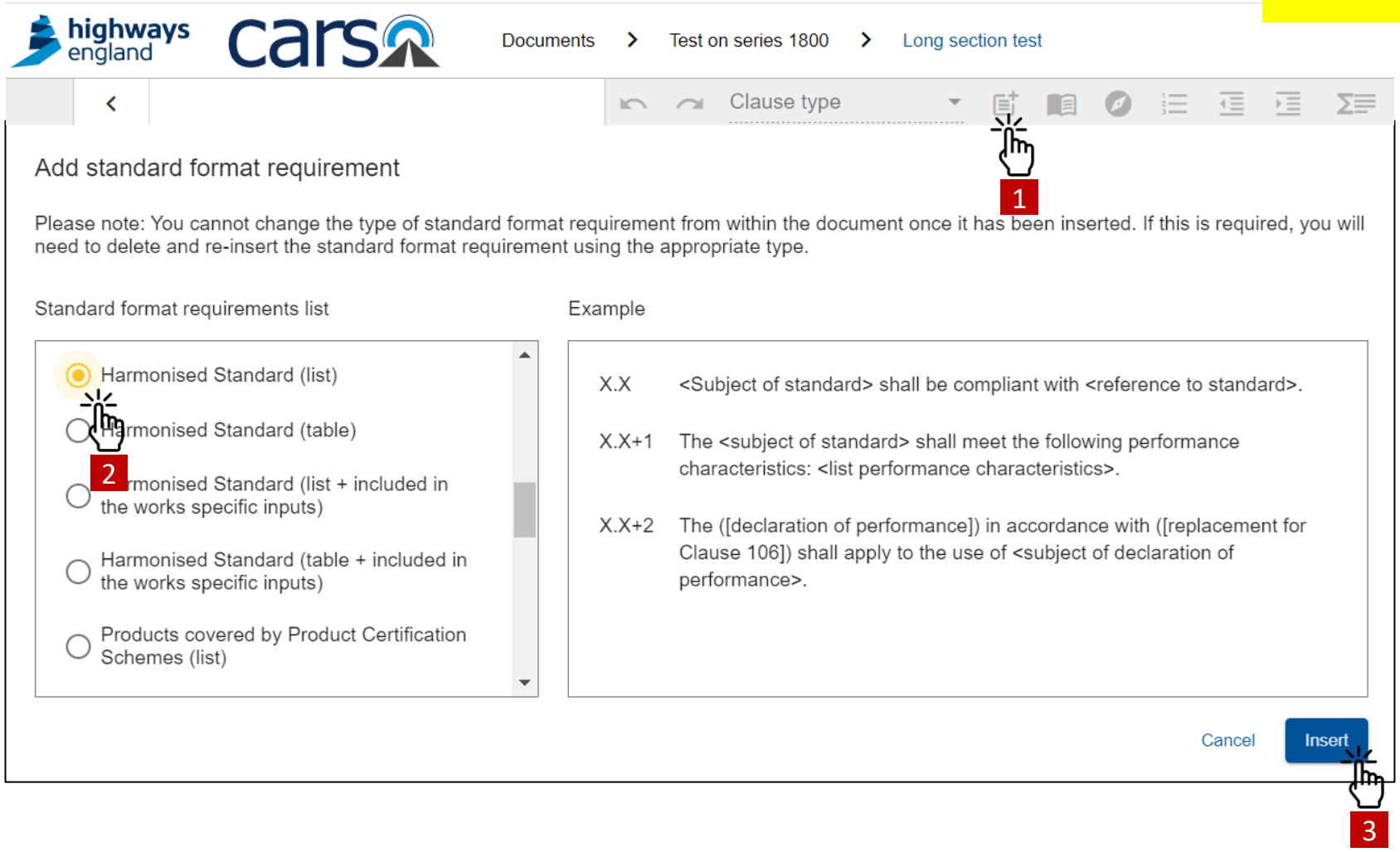
Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Right balance between performance and method-based requirements

Use of standard format requirements

# CARS functionality for SFR

Use SFR when available on CARS

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# Key takeaways on SFR (1/2)

- The following standard format requirements (SFR) shall be used to introduce the requirements contained in the SHW:
  - General requirements in SHW
  - WSI-related requirements
    - Single instruction for the WSI
    - Schedule for the WSI
    - Constructor requirement that can be changed in the WSI
  - Verification requirements
  - Documentation requirements
  - Constructor design requirements
  - Requirements on products covered by:
    - Designated / Harmonised Standards
    - Non-designated / non-harmonised standards
    - Product certification schemes
  - Requirements on products not covered by standards (Product acceptance schemes)
  - NHSS
  - Weather restrictions

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# Key takeaways on SFR (2/2)

**Please discuss with your content specialist about opportunities to develop additional SFR including the following.**

- Installation requirements
- UK / European Assessment Documents
- Temporary objects and materials
- Existing objects and materials
- Tolerances

# A5 Product and installation requirements

- Specifying product requirements
- Specifying installation requirements

# What a good spec looks like

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Consistent use of verb forms

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**Product verification**

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1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| Drawing number | Type |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Right balance between performance and method-based requirements

Use of standard format requirements

# Detangling existing clauses

**3** (02/20) Brickwork shall comply with Series 2400 and be built with mortar designation (i) in English bond. The joints of brickwork where exposed shall be finished as specified for unpointed joints in Clause 2412. The ends of all pipes shall be neatly built into the brickwork and finished flush with mortar designation (i). Where precast concrete adjusting units are used they shall conform to BS EN 1917 and BS 5911-3. Benching width for chambers detailed on HCD drawing numbers F25 to F27 shall be 300mm for branch connection.

**4** (02/20) Precast concrete chambers shall comply with BS 5911-3 and BS EN 1917 and the particular requirements described in contract specific Appendix 5/1. Cast in situ concrete chambers shall be constructed of ST4 concrete complying with Clause 2602 and the particular requirements described in contract specific Appendix 5/1.

**5** (02/20) Corrugated galvanized steel chambers shall comply with Clause 501 with in situ ST4 concrete inverts and precast concrete cover slabs complying with BS 5911-3 and BS EN 1917 and the particular requirements described in contract specific Appendix 5/1. They shall be surrounded with well graded granular material Class 6M as described in Table 6/1 compacted in accordance with Clause 612.

**6** (02/20) Where the depth of invert of chambers, excluding inspection chambers, exceeds 900mm below the finished surface of the carriageway or the adjacent ground, chamber steps complying with BS EN 13101 shall be built in accordance with relevant Series F-HCD Drawings. The steps shall have a declaration of performance for their intended use within the permanent works. Threaded components shall be galvanised in compliance with Clause 1909.

**7** (02/20) Excavation around chambers, except those described in sub-Clause 5 of this Clause, shall be backfilled with general fill material as described in Table 6/1 and compacted in compliance with Clause 612. Where mechanical compaction is impracticable, the excavation shall be backfilled with ST2 concrete. Where there are precast concrete access shafts to precast concrete chambers, the shafts shall be surrounded by a minimum thickness of 150mm of ST4 concrete, and the remaining excavation backfilled with general fill material as described in Table 6/1 compacted in compliance with Clause 612.

**8** (02/20) Chambers for foul drains shall be tested for watertightness in accordance with Clause 509 and where required in contract specific Appendix 5/1.

**9** (02/20) Chamber covers, gratings and frames shall be as described in contract specific Appendix 5/1 and shall comply with BS EN 124: 1994 and sub-Clauses 11 and 20 of this Clause. The cover shall be of suitable material, design and construction to achieve the required in-service skid resistance potential determined by the accelerated polish test method described in BS 9124. The Polished Skid Resistance Value (PSRV) shall be as stated in contract specific Appendix 5/1. The Unpolished Skid Resistance Value (USRV) is not an acceptable alternative to demonstrate in-service skid resistance.

**10** (02/20) Class D 400 units and above shall incorporate a permanent non-rock feature either triangular point suspension or machined faces. Where a cover is required to be seated in a frame the design life of the seating shall match that of the frame. The seating shall not reduce the performance characteristics of the frame and cover.

**11** (02/20) Bolts supplied for loosely coupling separate sections of covers and gratings shall be steel hexagon headed, complying with the requirements of BS EN ISO 4016, BS EN ISO 4018 and BS EN ISO 4034 and be galvanized in compliance with Clause 1909. They shall not be less than size M16 complete with hexagon nut and shall be provided with means to prevent undue tightening of unit sections.

**12** (02/20) Unless otherwise specified in contract specific Appendix 5/1, all covers, gratings and frames shall be supplied in a fine cast (uncoated) condition. Where a coating is specified in contract specific Appendix 5/1, the coating shall only be applied when the surfaces of the casting are clean, free from rust and dry.

**13** (02/20) Requirements for special duty covers for use in carriageways shall be as described in contract specific Appendix 5/1.

**14** (02/20) Gratings for catchpit chambers shall have a minimum waterway area as described in contract specific Appendix 5/1.

**15** (02/20) Two sets of lifting keys shall be delivered to the Overseeing Organisation for each type of cover supplied. At least two keyways, as detailed on HCD Drawing No. F17, shall be provided in each complete cover, one in each segment for segmental covers. A recess for a prising bar shall be incorporated in manhole covers unless other means of loosening the cover from the frame are provided.

**16** (02/20) Frames for chamber covers and gratings shall be set in cement mortar designation (i) complying with Clause 2404 or a quick setting mortar of equivalent strength with a declaration of performance for its intended use. The declaration of performance shall be submitted to the Overseeing Organisation.

**17** (02/20) For all pipelines except those constructed with corrugated pipes the nearest joint to any chamber shall be not more than 500mm from the inner face of the wall and shall not be restricted by any concrete. Between this and the next joint, the length of the articulated pipe shall be in accordance with Table 5/6.

**TABLE 5/6:** (02/20) **Length of Articulated Pipe**

| Nominal Pipe Diameter (mm) | Length of Pipe (mm) |
|---|---|
| 450 and less | 500 to 750 |
| Greater than 450 | 750 to 1000 |

**18** (02/20) Where the adjustment or replacement of existing frames and covers or gratings is required, the units shall be taken up and re-fixed or removed and replaced with new units complying with sub-Clauses 9 to 15 of this Clause, or as described in contract specific Appendix 5/1. On taking up or removal of the unit, any concrete or mortar bedding shall be broken out and the surface prepared. Where existing frames and covers or gratings are to be adjusted, the Contractor shall take up the unit and clean it so it is free from existing mortar, any debris, rust and is dry before re-use. The adjusted or replaced units shall be laid on a mortar bed complying with sub-Clause 16 of this Clause. The finished thickness of the mortar bed shall be between 10mm and 25mm. Where required in contract specific Appendix 5/1, covers and gratings shall be bedded using a quick setting high strength mortar with a declaration of performance for its intended use. The declaration of performance shall be provided to the Overseeing Organisation before use. Unless otherwise described in contract specific Appendix 5/1, adjusted or replaced frames and covers or gratings shall be set flush with the new or reinstated surface. Any additional adjustments shall be by modifying the brickwork, or adjusting units in accordance with BS EN 1917 and BS 5911- 3, in compliance with sub-Clause 507.3 or by using a frame of a suitable depth. On completion of the works, each cover shall be lifted and the frame and seating cleaned.

**19** (02/20) Unless otherwise specified in contract specific Appendix 5/1, chamber covers shall have the following minimum clear opening requirements:

(i) rectangular frame 600mm, with a minimum diagonal measurement of 700mm;

(ii) circular frame minimum diameter of 700mm.

**20** (02/20) Vents are not required in chamber covers unless otherwise stated in contract specific Appendix 5/1.

**21** (02/20) Where stated in contract specific Appendix 5/1 the sealing of a cover within the frame is required.

**22** (02/20) Access covers with a clear opening of greater than 1m shall comply with BS 9124.

**23** (02/20) Where pins or circlips are used as part of the securing device these shall be of equal cross-sectional area.

**24** (02/20) Chamber tops and gully tops shall be bedded upon material which has the following properties:

(i) non-shrinkable;

(ii) a minimum workable life of 15 minutes;

(iii) a compression strength that exceeds 30N/mm$^2$ within 3 hours of placing; and,

(iv) a tensile strength that exceeds 5N/mm$^2$ within three hours of placing.

**25** (02/20) The bedding beneath the chamber top or gully top frame shall be free of voids.

**26** (02/20) Packing materials shall not be used in the bedding of chamber tops and gully tops.

**27** (02/20) Seatings of covers within frames shall have been manufactured to ensure that, when trafficked, stability and quietness are achieved in accordance with BS EN 124: 1994.

**28** (02/20) The frame bearing area shall have the following properties:

(i) the nominal bearing pressure in relation to the test load in BS EN 124:1994;

(ii) frames have an overall minimum bedding width of 50mm of metal and a maximum overall bedding width of 120mm of metal; and,

(iii) for openings with corners, the external corners of the frame are solid (unless test data are provided that demonstrate the inclusion of holes does not reduce the structural integrity of the system) and may be square, curved or chamfered but at no point shall the width be less than the minimum bedding width.

**29** (02/20) The bedding flange shall have a minimum thickness of 5mm.

**30** (02/20) Where vertical frame stiffening webs/gussets are provided, they shall be located adjacent to seatings.

**31** (02/20) The tops of such triangular webs/ gussets shall be in accordance with BS 7903.

**32** (02/20) There shall be no holes within the seating areas of the bedding flanges beneath the cover seatings.

**33** (02/20) Any holes within flanges within the bedding area of the frame shall be minimal and not reduce the specified bearing area of the frame.

(02/20) **Placing of Frames and Covers**

**34** (02/20) The frame of chamber tops and gully tops shall be placed on the bedding material so that all webs of the frame are fully supported by the frame supporting structure.

**35** (02/20) The bedding surface shall permit a bedding thickness of between 10mm and 75mm.

**36** (02/20) The webs of the frame shall not overhang the internal faces of the frame supporting structure.

**37** (02/20) Any holes within the frame shall be infilled with bedding material and the flanges of the frame enveloped by a minimum thickness of 10mm of the same material.

**38** (02/20) Exposed surfaces of the bedding material around the outside of the chamber or gully top frame shall be floated to fill any voids and remove loose fragments.

**39** (02/20) The exposed surface of the bedding material inside the chamber shall be pointed to a smooth finish.

**40** (02/20) Surround materials shall only be placed in contact with the frame once the bedding material has set.

(02/20) **Placement of Cover Surround Materials**

**41** (02/20) Where a self-setting fill material is used this shall be placed no higher than 40mm below the finished surface level.

(02/20) **Securing Chamber Covers and Frames**

**42** (02/20) Chamber covers and frames shall be secured to ensure that they are not dislodged by a vehicle.

(02/20) **Reinstatement Works**

(02/20) **Frame Supporting Structure**

**43** (02/20) Where rebuilding involves more than one course of brickwork or precast concrete cover frame seating ring, an adjusting course shall be used to meet the specified finished surface level.

**44** (02/20) Frame supporting structure reconstruction shall be engineering bricks in compliance with Clause 2400 (without holes or frogs) or adjusting units in accordance with BS EN 1917 and BS 5911-3, bedded on mortar that achieves a compressive strength exceeding 20N/mm$^2$ Class Md in accordance with BS EN 998 and Clause 2404 before loading.



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# Product and installation requirements

- **Make a clear distinction between product and installation (workmanship) requirements.**
  - With a few exceptions, product legislation, product standards, product certification and acceptance do not apply to the installed product, only to the product as it arrives on site.
  - Making a clear distinction between installation (workmanship) and product requirements allows a clear specification of verification requirements.
- Few changes to established practice.


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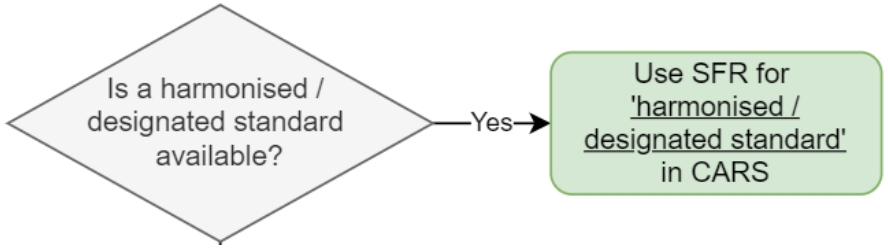
# Specifying product requirements (1/6)

- For each object and material to be specified in the SHW, **determine whether an external standard is available**.

- External standards include:
  - Harmonised / designated standards
  - Non-harmonised / non-designated standards
  - European Assessment Documents (EADs)

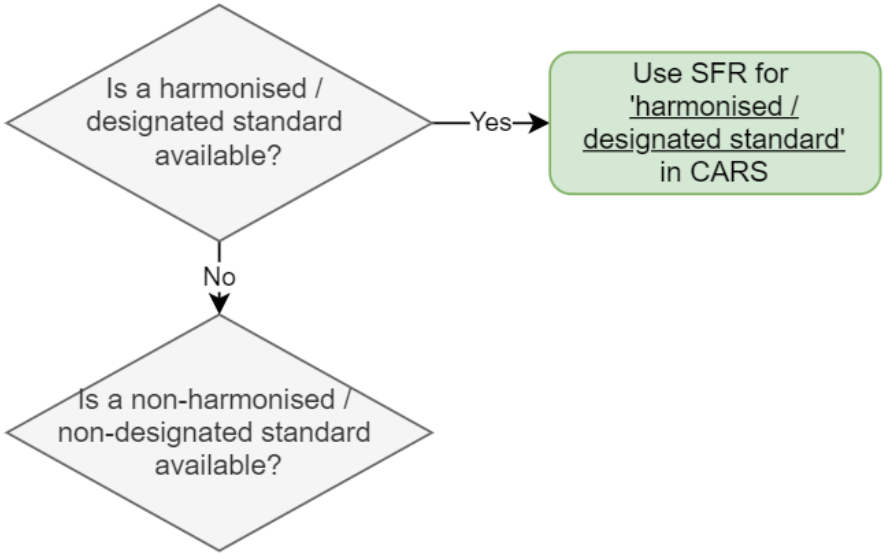
# Specifying product requirements (2/6)



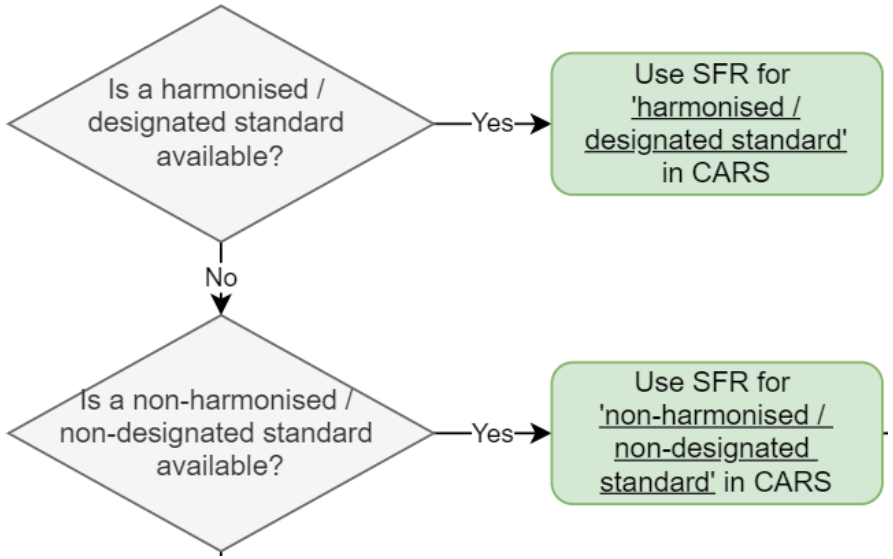
# Additional information on specifying product requirements covered by harmonised / designated standards

- **Do not specify additional requirements on the object or material beyond Annex ZA**, which covers the essential characteristics or the purchaser options permitted by the standard.

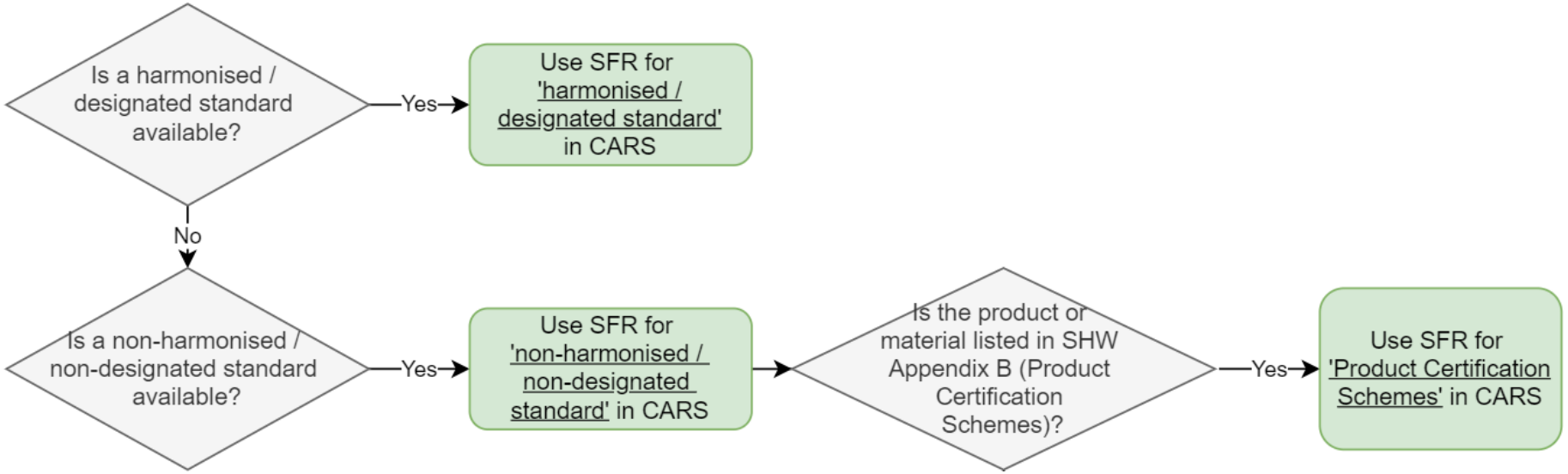
# Specifying product requirements (2/6)



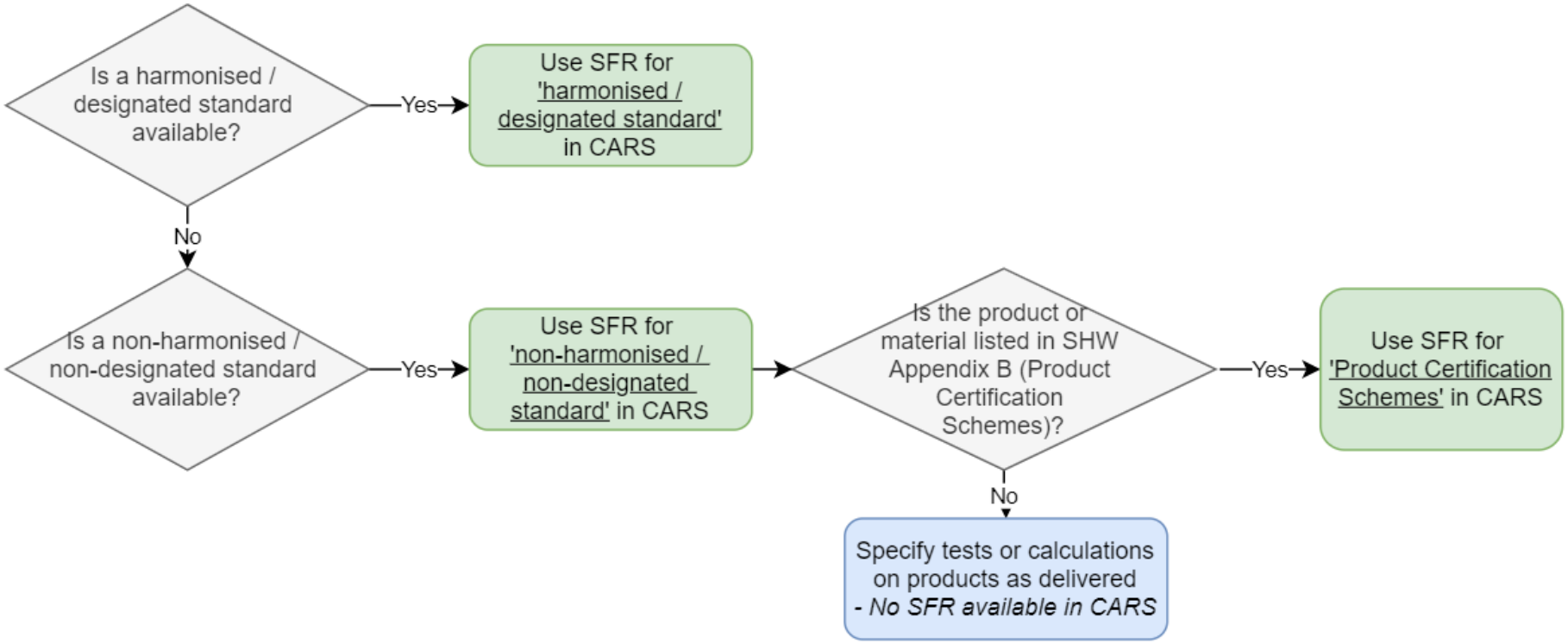
# Specifying product requirements (3/6)



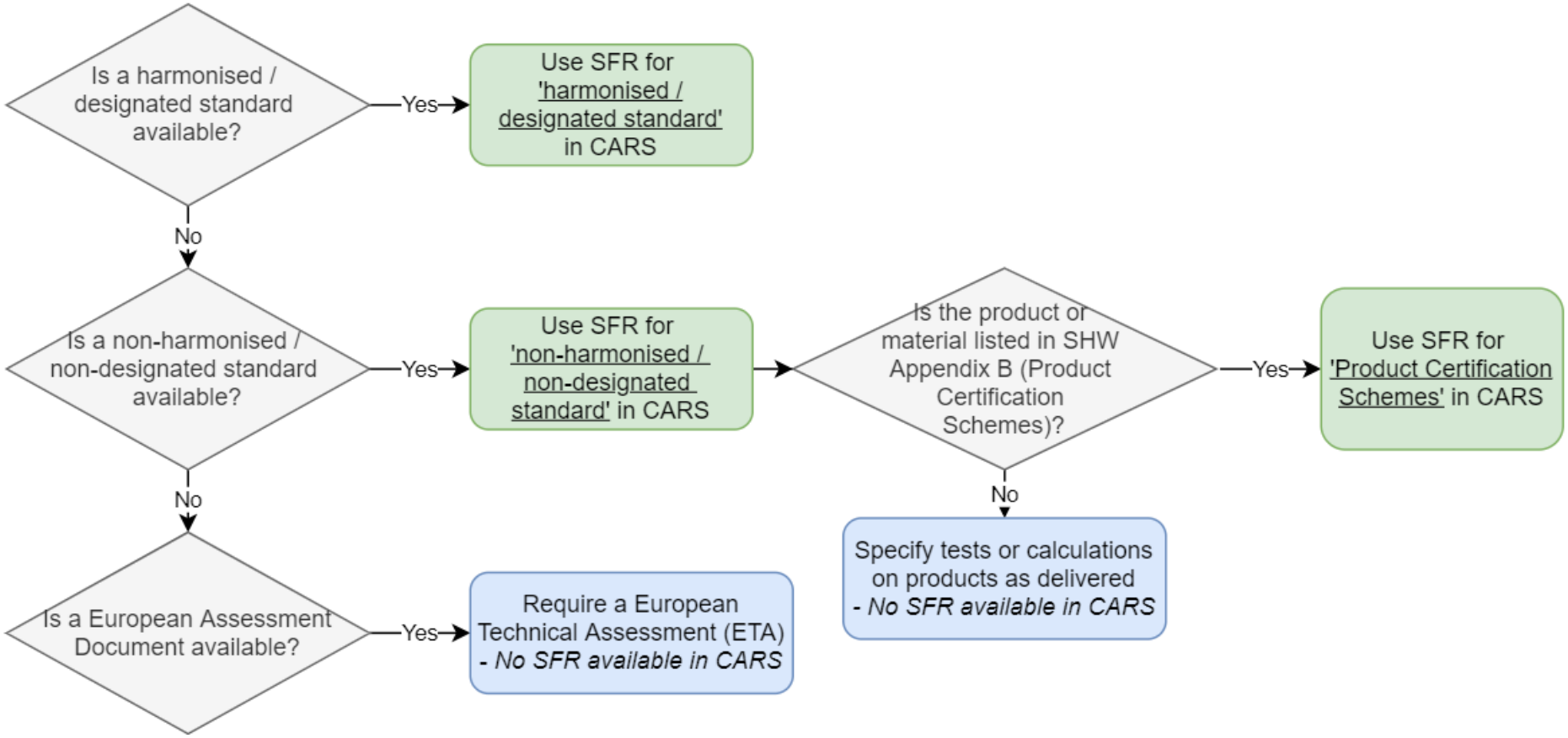
# Specifying product requirements (4/6)



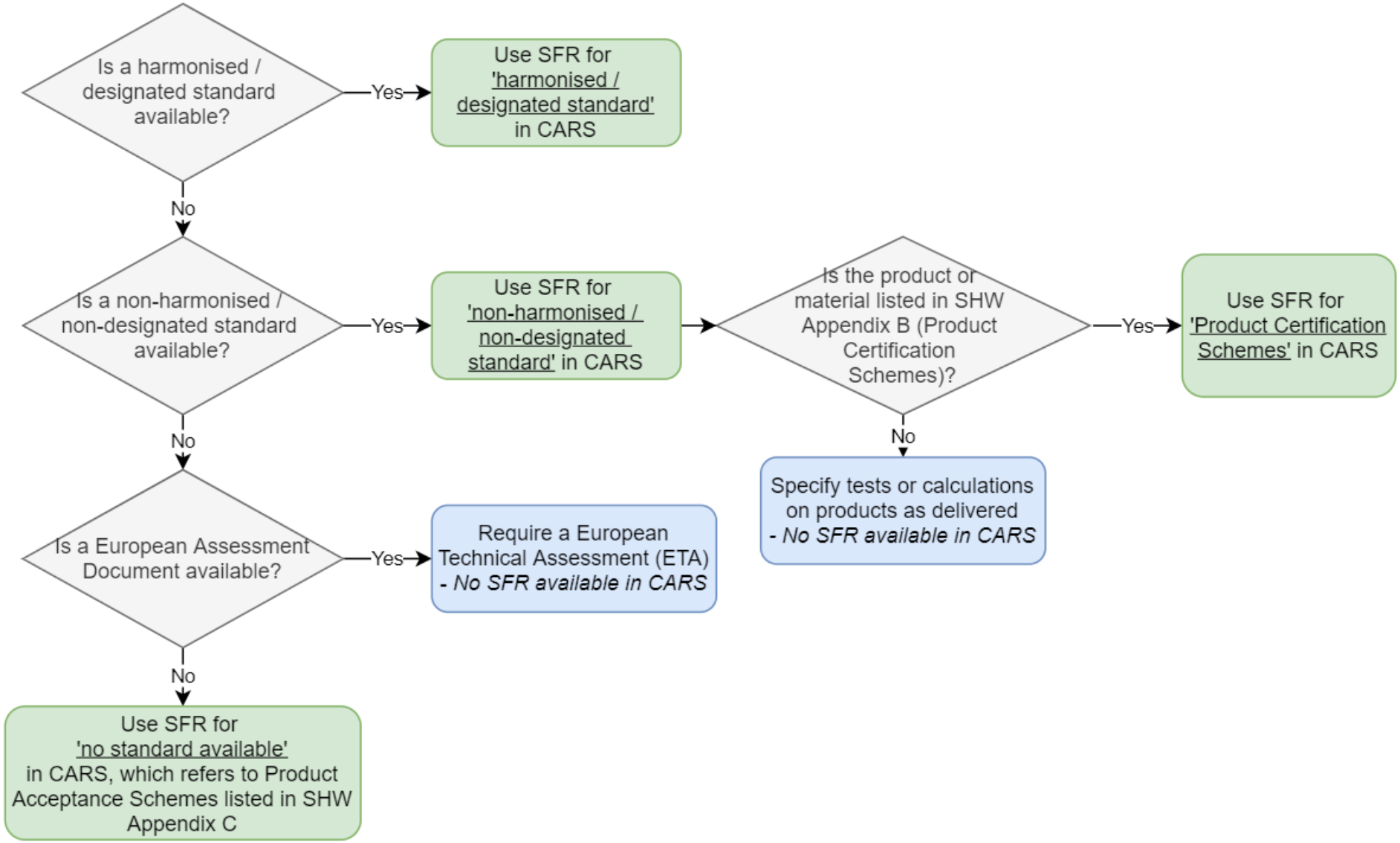
# Specifying product requirements (4/6)



# Specifying product requirements (5/6)



# Specifying product requirements (6/6)



# Additional information on specifying product requirements not covered by standards

- In the UK, the criteria for the acceptance schemes are met by the relevant British Board of Agrément Certificates, Roads and Bridges Certificates, HAPAS certificates and CARES certificate.
- Due to procurement rules it is not possible for the Overseeing Organisations to identify specific Product Acceptance Schemes. Therefore, **the phrase "HAPAS / CARES etc. or equivalent" shall not be included in the constructor requirements.** Instead, reference shall be made generically to "product acceptance schemes“ as in the SFR.

# Specifying installation requirements

- **The constructor requirements may include requirements on installation in all cases.**
- However, **such requirements shall not contradict the installation methodology** set out in:
  - any relevant product's installation information or any installation requirements in harmonised/designated standards and EADs;
  - any relevant product's and manufacturer's installation information or any installation requirements in non-designated / non-harmonised standards;
  - the relevant Product Acceptance Scheme.
- **No Standard Format Requirements (SFR) for installation** – opportunities to introduce those will be identified during drafting stage.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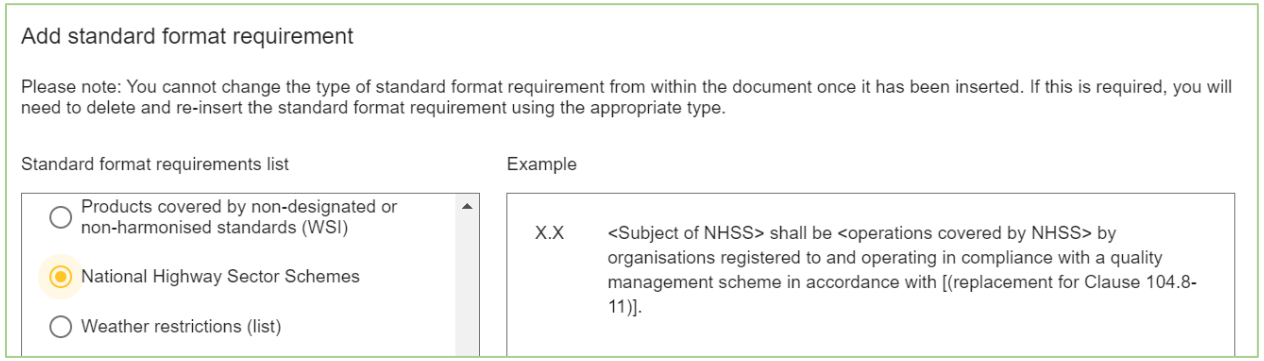
# Additional information on specifying installation requirements

- **Requirements for workmanship trials prior to the works shall be described fully**, with hold points to allow for the scrutiny by the Overseeing Organisation.

# National Highway Sector Schemes (NHSS)

- Reference to NHSS is made using a standard format requirement in CARS.




- See also current SHW Appendix A for work, goods or materials that are the subject of a quality management scheme.

**Table A/1:** (05/14) **List of Mandatory National Highways Sector Schemes**

The following NHSS are mandatory subject to the limitations given in the comments column:

| Scheme Number | Scheme Name | Comments |
|---|---|---|
| **Scheme 2A:** | **The Design and/or Supply, Installation and Repair of Fences for Infrastructure Works** (National Scheme applies) | Applies to all design, supply, installation and repair of fences excluding design and supply where these terms refer to the design or manufacture of products that fall within the scope of the Construction Products Regulation. |
| **Scheme 2B:** | **The Supply, Installation, Maintenance and Repair of Vehicle Restraint Systems** (National Scheme applies) | Applies to all supply, installation, maintenance and repair of vehicle restraint systems made from a kit of parts manufactured off site excluding supply where it refers to manufacture of products that fall within the scope of the Construction Products Regulations. |
| **Scheme 2C** | **The Design, Supply, Installation and Repair of Environmental Barriers (Structural) for Infrastructure Works** (National Scheme applies) | Applies to all design, supply, installation and repair of fences excluding design and supply where these terms refer to the design or manufacture of products that fall within the scope of the Construction Products Regulation. |

# Q11 to Q14 on Menti

# Key takeaways on product and installation requirements

- ✓ Make a clear distinction between product and installation requirements.
- ✓ Use relevant standard format requirements (SFR) for products considering whether the product is covered by harmonised / designated standards, non-harmonised / non-designated standards, European Assessment Documents, or is not covered by any standard.
- ✓ Do not refer to specific Product Acceptance Schemes.
- ✓ Inform the content specialists of any opportunity to develop SFR for installation requirements.
- ✓ Describe requirements for workmanship trials fully.
- ✓ Ensure that the constructor has enough information to clearly understand how to procure and install in accordance with the constructor requirements.

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Please use the ‘hand raised’ function when you are back from the break

| High-level drafting objectives | Specific drafting rules | |
|---|---|---|
| Setting clear requirements to the constructor in the SHW, including clear links with the DMRB | A1: Verb forms<br>A2: Clarity of constructor requirements<br>A3: Section title and cross references<br>A4: Using standard format requirements (SFR)<br>A5: Product and installation requirements | 2 |
| | A6: Verification and documentation requirements<br>A7: Other types of constructor requirements<br>A8: Construction vs design requirements<br>A9: Performance and method requirements | 3 |
| Setting clear instructions to the specifier in the IfS documents and clear links with the WSI | B1: IfS content, presentation and format<br>B2: Establishing clear links between SHW, IfS and WSI | 4 |
| Setting contract neutral requirements to the constructor in the SHW | C1: Contract and product neutrality | |
| Present national variations clearly and consistently | D1: Nationally Determined Requirements and sections | |
| Supporting decarbonisation | *Specific rules will be provided in a separate module* | |

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# A6 Verification and documentation requirements

- Specifying and organising verification requirements
- Specifying and organising documentation requirements
- Validating constructor requirements

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

Contract neutral clauses

Clear distinction between product and installation requirements for each physical object…

…which in turn helps make a clear distinction between verification requirements

Clear documentation requirements

**WIDGETS**

**Product requirements**

1.1 Widgets shall be compliant with BS EN 12345.

1.2 Widgets shall meet the following performance characteristics: <performance characte

1.3 Widgets shall also meet the performance characteristics stated in WSI xx.

SI.1.3a Provide unique reference for each drawing.

SI.1.3b Select widget type from permitted options (type 1, type 2, type 3).

1.4 The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of widgets.

1.5 The design of <subject of design> shall be in accordance with <design standard reference>.

**Product verification**

1.5 Certification shall be supplied to demonstrate that the widgets comply with BS EN 12345.

**Installation requirements**

1.6 Widgets shall be installed in accordance with the manufacture instruction.

1.7 Records of the alignment check for widgets shall be submitted to the Overseeing Organisation.

**Installation verification**

1.8 The alignment of widgets shall be checked within 24 hours of installation.

**Documentation requirements**

1.9 The following documentation shall be submitted for widgets prior to the commencement of <details of the works>: <detail the documentation>.

1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| Drawing number | Type |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

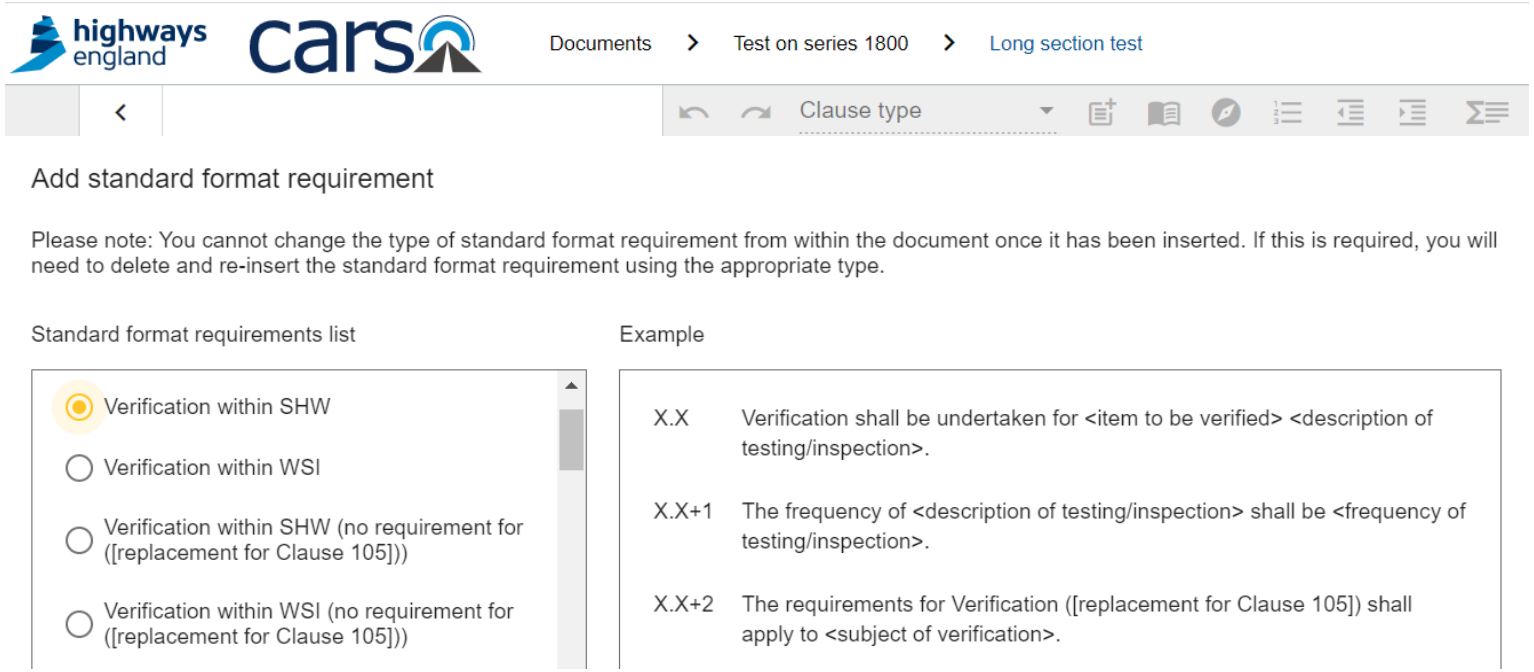
Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Right balance between performance and method-based requirements

Use of standard format requirements

# Specifying verification requirements

- **Use Standard format requirements for verification requirements in CARS**



# Organising verification requirements

Two types of acceptance criteria:

1. for products coming to site (at the gate)

- **Additional verification requirements are not allowed for products covered by harmonised / designated standards and EADs/ETAs.**
- **Additional verification requirements are allowed for other products.**

2. for works completed / products installed which require contract compliance verification

- **Verification that the works have been completed / installed correctly can be done by the Overseeing Organisations for all works.**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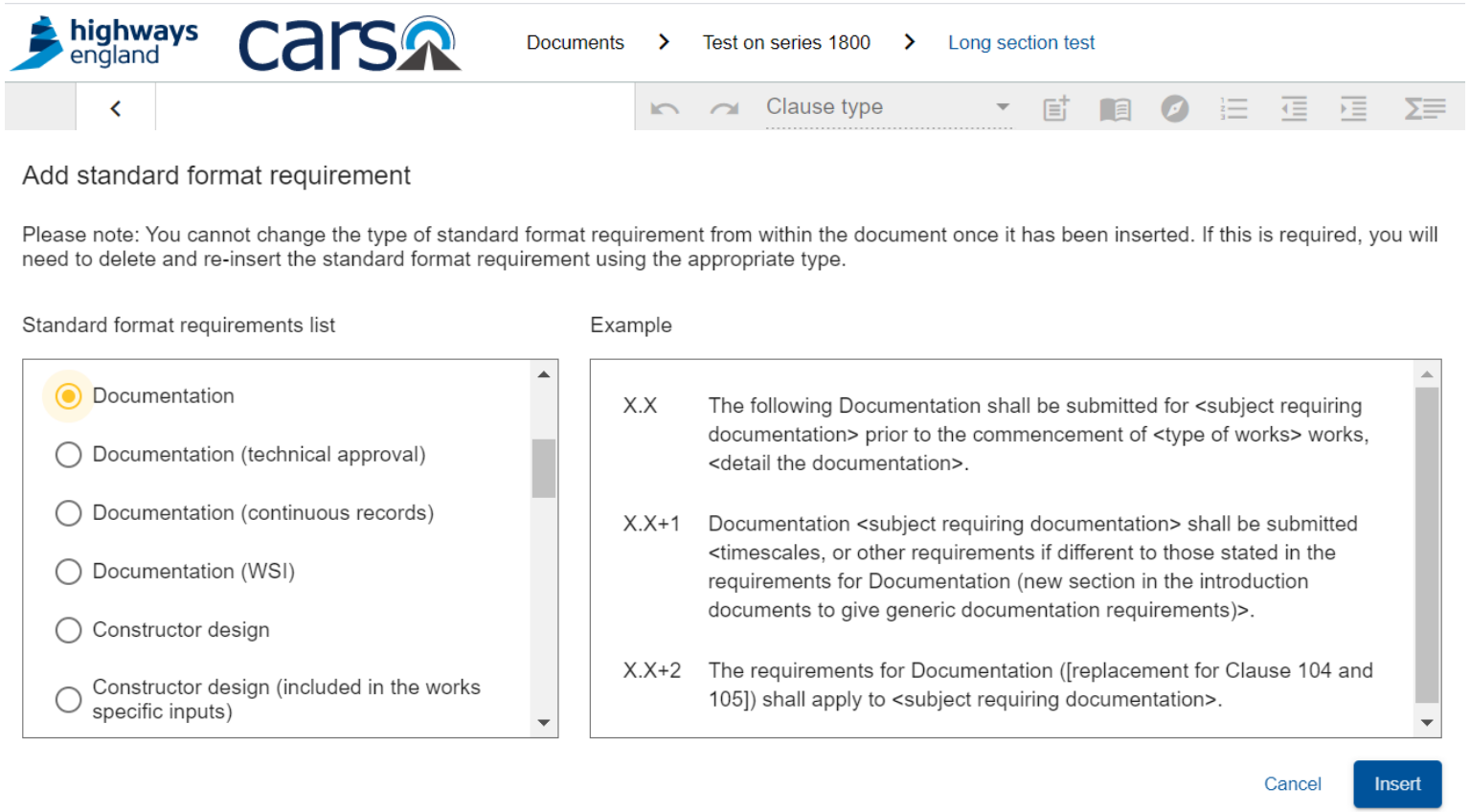
# Specifying documentation requirements

- Documentation requirements shall be introduced to prove that other requirements have been carried out.

- **Use Standard format requirements for documentation requirements in CARS.**



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# Additional information on documentation requirements

- **For products covered by harmonised / designated standards, do not require the submission of documentation in addition to the Declaration of Performance**, unless the documentation is about safety information and installation instructions.

# Organising documentation requirements

## Take a pragmatic approach to introduce documentation requirements

a. When the documentation requirements are common across multiple objects, keep the documentation requirements under a separate section which can be cross referenced as needed.

b. When the documentation requirements are specific to each object, keep the documentation requirements under the section of the relevant object.

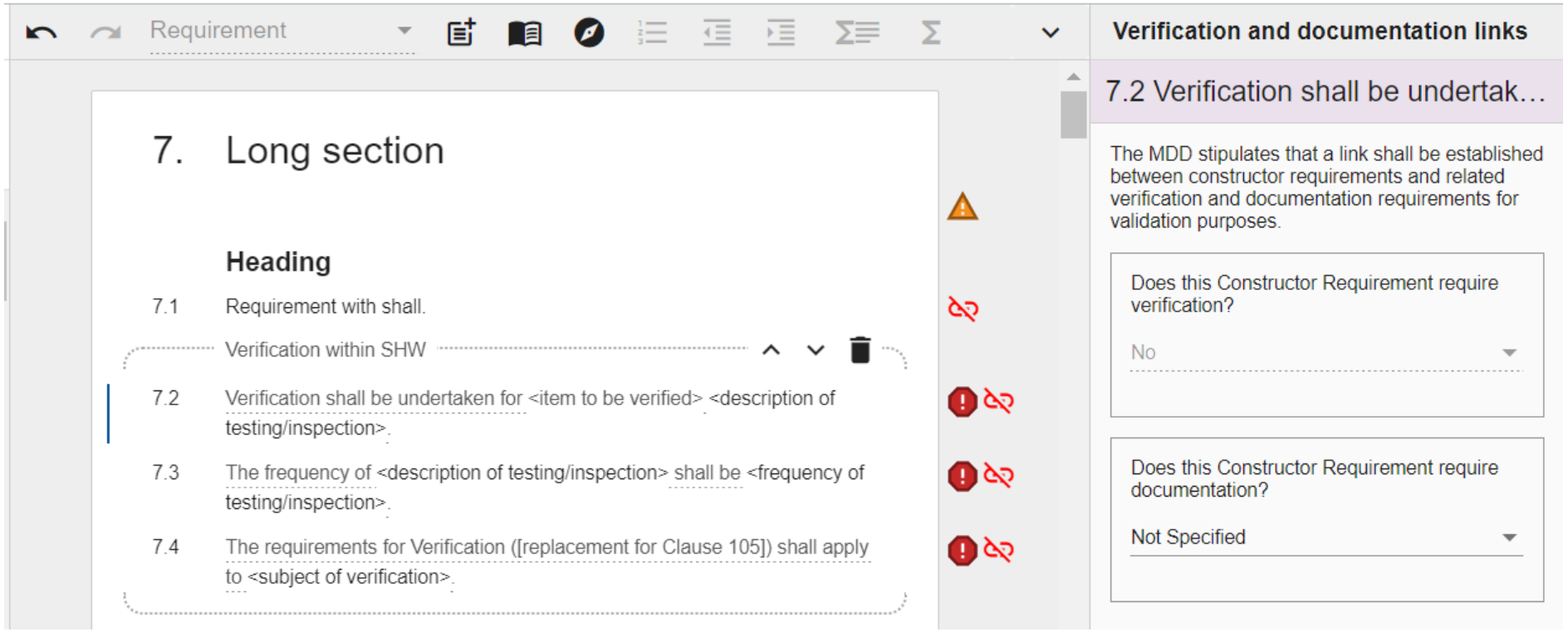
# Validating constructor requirements

A link shall be established between constructor requirements and related verification and documentation requirements for validation purposes.

- See also Verifiable content

# CARS functionality for validation

**New CARS functionality available**




*See training on CARS*

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# Q15 to Q17 on Menti

# Key takeaways on verification and documentation requirements

- ✓ Use Standard format requirements for verification and documentation requirements in CARS
- ✓ Additional verification requirements are not allowed for products covered by harmonised / designated standards and EADs/ETAs, but are allowed for other products
- ✓ Verification that the works have been completed / installed correctly can be done by the Overseeing Organisations for all works.
- ✓ For products covered by harmonised / designated standards, do not require the submission of documentation in addition to the Declaration of Performance, unless the documentation is about safety information and installation instructions
- ✓ When the documentation requirements are common across multiple objects, keep the documentation requirements under a separate section
- ✓ When the documentation requirements are specific to each object, keep the documentation requirements under the section of the relevant object.
- ✓ Validate construction requirements using CARS

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# A7 Other types of construction requirements

- New and existing objects and materials
- Temporary objects and materials
- Tolerances
- Weather restrictions

# New and existing objects and materials

- **Make a distinction between:**
  - **requirements which only apply to existing materials or physical objects, and**
  - **requirements which apply to new materials or physical objects.**
- The use of the word "existing" should be used in section titles to identify materials or physical objects which already exist in the site.
- **No SFR – Ask your content specialist for advice and for opportunities to introduce SFR.**

# Example

(05/17) **Acceptance of Proposals**

**3** (05/17) Details of the vehicle restraint systems proposed by the Contractor for both new installations or for maintenance of existing systems shall be submitted to the Overseeing Organisation at least four weeks before the commencement of vehicle restraint system work for acceptance with the following supporting information demonstrating compliance with this specification, and the requirements set out in contract specific Appendix 4/1.

**Issues:**

- New and existing systems are presented in the same sentence
- It should not be for Overseeing Organisation's acceptance

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# Example

(05/17) **Acceptance of Proposals**

**3** (05/17) Details of the vehicle restraint systems proposed by the Contractor for both new installations or for maintenance of existing systems shall be submitted to the Overseeing Organisation at least four weeks before the commencement of vehicle restraint system work for acceptance with the following supporting information demonstrating compliance with this specification, and the requirements set out in contract specific Appendix 4/1.

## Potential redraft

**New installations of vehicle restraint systems**

3.1 The following Documentation shall be submitted for **new installations of vehicle restraint systems** prior to the commencement of <type of works> works, <detail the documentation>

3.2 Documentation for **new installations of vehicle restraint systems** shall be submitted <timescales>.

3.3 The requirements for Documentation ([replacement for Clause 104 and 105]) shall apply to **new installations of vehicle restraint systems.**

**Maintenance of existing vehicle restraint systems covered by harmonised standards**

3.4. For maintenance of existing vehicle restraint systems covered by harmonised standards, the requirements for **New installations** shall apply.

**Maintenance of existing legacy vehicle restraint systems**

3.5 For maintenance of existing legacy vehicle restraint systems, <***>

| |
|---|
| The following Documentation shall be submitted for <subject requiring documentation> prior to the commencement of <type of works> works, <detail the documentation>. |
| Documentation <subject requiring documentation> shall be submitted <timescales, or other requirements if different to those stated in the requirements for Documentation (new section in the introduction documents to give generic documentation requirements)>. |
| The requirements for Documentation ([replacement for Clause 104 and 105]) shall apply to <subject requiring documentation>. |

# Temporary objects and materials

- The focus of the SHW is on permanent works.
- A differentiation between permanent and temporary works at requirement level can lead to contractual issues.
- **No SFR – Ask your content specialist for advice on this subject and for opportunities to introduce SFR.**


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# Tolerances

- Allowable tolerances for placement shall be specified for object or material where relevant.

- Tolerances may be specified by reference to an external standard.
- Tolerances may be specified by reference to the works specific inputs.

- **No SFR – Ask your content specialist for advice and for opportunities to introduce SFR.**

# Weather restrictions

- For weather restrictions, use the relevant standard format requirements.

| | | |
|---|---|---|
| Weather restrictions | For <subject of weather restrictions> the following weather-related restrictions shall apply: <list weather restrictions>. | For in situ concrete the following weather-related restrictions shall apply: the ambient air temperature shall be 3°C and rising. |
| | | |
| Weather restrictions | For <subject of weather restrictions> the weather-related restrictions stated in Table <reference to table> shall apply. | For in situ concrete the weather-related restrictions stated in Table weather restrictions for in situ concrete shall apply. |

# Key takeaways on other types of construction requirements

- ✓ Make a distinction between requirements which only apply to **existing materials or physical objects**, and requirements which apply to new materials or physical objects
- ✓ Ask your content specialist for advice on treatment of **temporary objects and materials**
- ✓ Specify allowable **tolerances** for placement for object or material where relevant
- ✓ Discuss with your content specialist about opportunities for introducing SFR covering the above items
- ✓ For **weather restrictions**, use the relevant standard format requirements

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# A8 Construction vs design requirements

- SHW, WSI and DMRB coverage
- Managing design content in the NfG
- Constructor design

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

Contract neutral clauses

Clear distinction between product and installation requirements for each physical object…

…which in turn helps make a clear distinction between verification requirements

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1.4 The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of widgets.

1.5 The design of <subject of design> shall be in accordance with <design standard reference>.

**Product verification**

1.5 Certification shall be supplied to demonstrate that the widgets comply with BS EN 12345.

**Installation requirements**

1.6 Widgets shall be installed in accordance with the manufacture instruction.

1.7 Records of the alignment check for widgets shall be submitted to the Overseeing Organisation.

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**Documentation requirements**

1.9 The following documentation shall be submitted for widgets prior to the commencement of <details of the works>: <detail the documentation>.

1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| Drawing number | Type |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Right balance between performance and method-based requirements

Use of standard format requirements

# SHW and WSI coverage

- The SHW shall set out standard requirements on construction products and materials, and groups of products and material.

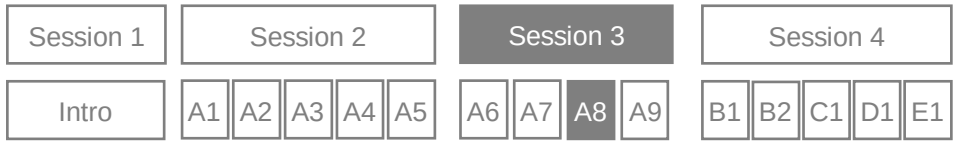
- The works specification (SHW+WSI) will set out the project-specific requirements on products, materials and groups of materials and products (i.e. ‘things to be specified’).

# DMRB coverage

- The DMRB covers design requirements.
- The design is the **process of determining what performance** the products, materials and groups of materials and products (i.e. ‘things to be specified’) need **and where they are to go**.
- (Design) Performance includes decision on:
  - Design service life
  - Maintenance considerations
  - Impact on road users
  - Interaction with other “things to be specified”

DMRB is about decision on performance

SHW is about how to achieve performance



# Q18 on Menti

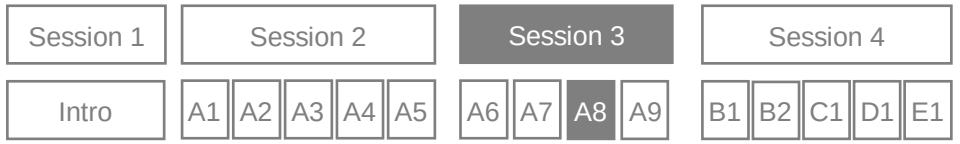
# Design content in the NfG

- The NfG documents currently contain some design information that needs to be migrated to the DMRB.
  - In some cases, NfG documents also contain constructor requirements that need to move to the SHW.
  - The SHW series also contain design requirements that need to be migrated to the DMRB (see previous slides).

# When reviewing your NfG documents…

- Ask the question: *what is that requirement / advice for?*
  - If it covers a design activity / decision, needs to move to the DMRB
  - If it covers products, materials or activities related to products and materials relevant to construction, needs to move to the SHW
  - If it covers the information that needs to be included in the work specific inputs in order to specify fully relevant objects or materials, needs to move to the IfS

- **We want the specifier instructions to present the outcome of the design into a clear format, not to give guidance on design decisions.**

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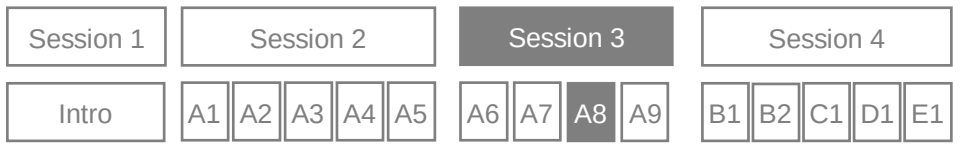
# Example


Session 1
Session 2
Session 3
Session 4
Intro
A1
A2
A3
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A5
A6
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A8
A9
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B2
C1
D1
E1

# Example

## 2404 Mortar

(05/05) **Mortar Work Other Than Unreinforced Masonry Arch Bridges**

**1** Cement mortar for brickwork, blockwork and stonework shall be mixed in the proportions given in Table 24/1 according to the mortar designation described in Appendix 24/1.

**2** (11/03) The chloride ion content of the mortar determined in accordance with BS EN 1744-1 shall not exceed 0.3% of the mass of cement for mortar made with Portland cement and 0.2% for mortar made with sulfate-resisting Portland cement. Calcium chloride or admixtures containing calcium chloride shall not be used.

**TABLE 24/1: Mortar Proportions by Volume**

| Mortar designation | Cement: lime: sand | Masonry cement: sand | Cement: sand with plasticiser |
|---|---|---|---|
| (i) | 1:0 to 1/4:3 | - | - |
| (ii) | 1:½:4 to 4½ | 1:2½ to 3½ | 1:3 to 4 |
| (iii) | 1:1:5 to 6 | 1:4½ | 1:5 to 6 |

## NG SAMPLE APPENDIX 24/1: BRICKWORK, BLOCKWORK AND STONEWORK

*[Note to compiler: This should include:]*

1. Locations where sulfate-resisting Portland cement is to be used *[2401.1]*.
2. (11/03) Mortar designations for brickwork, blockwork and stonework *[2404.1]*.
3. (05/05) Additional performance requirements for admixtures *[see Table 2 and 3 of BS EN 934-3] [2404.3]*.

## NG 2404 Mortar

(05/05) **Mortar Work Other Than Unreinforced Masonry Arch Bridges**

**1** (05/05) Table 24/1 is confined to the more durable mortars which can withstand exposure to severe weather. Further guidance is given in BS 5628-1 and BS 5628-3.

**2** An important consideration besides durability when selecting a mortar for a particular use is that increasing strength is accompanied by decreasing ability to accommodate movements such as drying shrinkage, expansion or settlement.

**3** (05/05) Generally for brickwork, blockwork or stonework, mortar designation (i) or (ii) will be appropriate except for reconstructed stone, concrete and calcium silicate bricks and blocks, when mortar designation (iii) should be specified to allow for their relatively high shrinkage. Details of the mortar required for use in the Works should be shown in Appendix 24/1.

**4** (05/05) Where a plasticiser is to be used the recommendations of the admixture manufacturer should be followed. Where previous evidence of the suitability of the mixer and time of mixing is not available trials should be conducted.

This is background information and explains the scope of Table 24/1. Is this relevant to the constructor such that they can use a less durable mortar submitting a departure? Or is this relevant to the designer?

This provides background on how to make a design choice. It points out that multiple criteria need to be considered to make a choice.

This is a recommendation for design choice.

This is relevant to the specifier and will become the specifier instruction, but it needs to be rephrased.

This needs to be entirely rethought.

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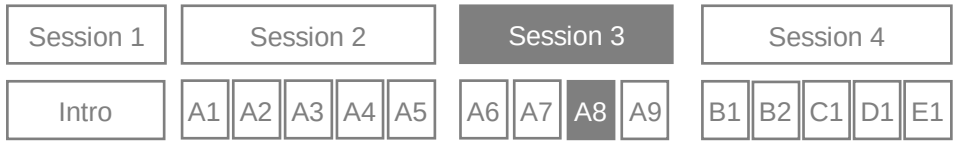
# Recommended approach to identify and move design content (1/2)

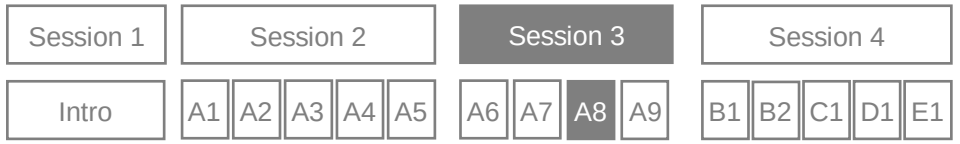
- When updating NfG (and SHW as relevant), the impact on the DMRB needs to be assessed. The following activities will need to be undertaken:

1. Preliminary screening / filtering exercise to categorise the content and identify content that needs to migrate to the DMRB **(by March 2022)**
   - Relevant to DMRB (requirements, advice, note, background commentary)
   - Relevant to SHW
   - Relevant to IfS
   - Relevant to national variations
   - Redundant, obsolete - to remove
2. Updating of (about 85%) SHW and NfG and identification of further design content to be migrated to the DMRB **(by December 2022)**
3. Development of clauses for existing DMRB documents / creation of new DMRB documents **(by April 2023)**

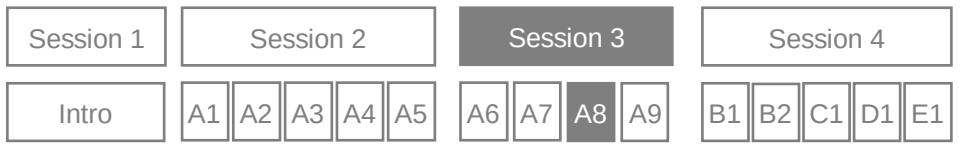


# Recommended approach to identify and move design content (2/2)

- In some cases, other documents may rely on the content provided in your own document. A spreadsheet with all relevant cross-references will be provided.
- **Please engage with other technical authors as relevant** – it is recommended they peer review your DMRB clauses / documents and are invited as ‘technical consultees’ during TSC consultation as relevant.



# Constructor design



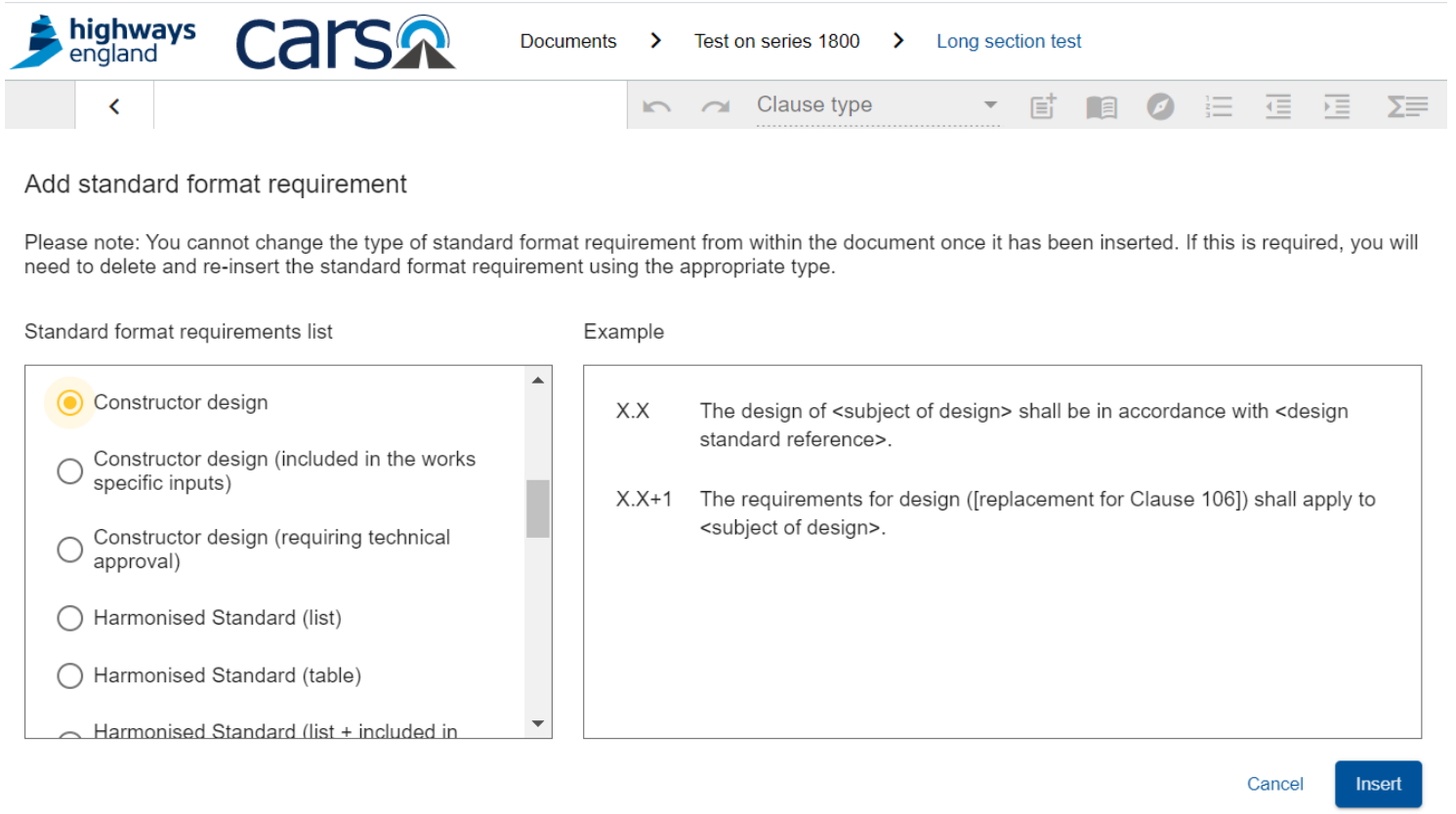
# Constructor design (1/2)

- In situations where the constructor is employed to conduct the design, reference to the DMRB and other relevant standards is to be made.

> **625** (02/16) **Crib Walling**
>
> **1** (02/16) The Contractor shall design the crib walling listed in contract specific Appendix 1/10 in accordance with the design specification and procedures in contract specific Appendix 6/10 and Design Manual for Roads and Bridges document BD 68 (DMRB 2.1.3).

# Constructor design (2/2)

- Use standard format requirements to introduce constructor design requirements

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# Q19 – Q20 on Menti

# Key takeaways on construction vs design requirements

- ✓ Remove design requirements (i.e. requirements that need design decisions) from the SHW and move them to the DMRB.
- ✓ Keep construction requirements in the SHW and instructions to specify products and materials in the IfS.
- ✓ Do not duplicate requirements between the SHW and the DMRB.
- ✓ Refer to the DMRB when the constructor is required to carry out design activities.
- ✓ Review NfG content in detail and move design information to the DMRB as relevant.
- ✓ Follow the recommended approach to identify and move design content to the DMRB presented in this section, including timeline.

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# A9 Performance and method requirements

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

Contract neutral clauses

Clear distinction between product and installation requirements for each physical object…

…which in turn helps make a clear distinction between verification requirements

Clear documentation requirements

**WIDGETS**

**Product requirements**

1.1 Widgets shall be compliant with BS EN 12345.

1.2 Widgets shall meet the following performance characteristics: <performance characte

1.3 Widgets shall also meet the performance characteristics stated in WSI xx.

SI.1.3a Provide unique reference for each drawing.

SI.1.3b Select widget type from permitted options (type 1, type 2, type 3).

1.4 The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of widgets.

1.5 The design of <subject of design> shall be in accordance with <design standard reference>.

**Product verification**

1.5 Certification shall be supplied to demonstrate that the widgets comply with BS EN 12345.

**Installation requirements**

1.6 Widgets shall be installed in accordance with the manufacture instruction.

1.7 Records of the alignment check for widgets shall be submitted to the Overseeing Organisation.

**Installation verification**

1.8 The alignment of widgets shall be checked within 24 hours of installation.

**Documentation requirements**

1.9 The following documentation shall be submitted for widgets prior to the commencement of <details of the works>: <detail the documentation>.

1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| Drawing number | Type |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Right balance between performance and method-based requirements

Use of standard format requirements

# Performance and method requirements

- Document authors shall seek to reduce the number of method-based requirements and increase the number of performance-based requirements.
- **Requirements for products shall, wherever possible, be set out as performance criteria as defined in the product standards.**
- **Requirements for installation/workmanship shall be either method or performance based depending on the case.**
  - Method based requirements are generally suitable for installation/workmanship requirements.
  - Assess the best approach and discuss with your content specialist.

# Performance-based requirements

| Advantages |
| --- |
| 1. More flexibility to select techniques and procedures to improve the quality or economy, or both, of the end product.<br>2. Promoting innovative solutions<br>3. Accelerating construction |

# Performance-based requirements

| Advantages | Disadvantages |
|---|---|
| 1. More flexibility to select techniques and procedures to improve the quality or economy, or both, of the end product.<br>2. Promoting innovative solutions<br>3. Accelerating construction | 1. The client can exert less control over the work<br>2. Opportunities for smaller, local firms may be reduced<br>3. Challenge in identifying all of the parameters critical to performance and establishing related thresholds<br>4. Increase in cost due to risk transfer<br>5. Difficult to enforce performance particularly where there are complex interfaces with split liabilities<br>6. Difficult to enforce performance particularly when dealing with long term assets<br>7. Maintenance issues<br>8. Increased industry costs to control application of performance standards |

# Example

(1) Concrete around pre-stressing strand and post-tensioning tendons and anchorages shall be removed by high-pressure water jetting. (2) A lightweight electric demolition hammer or hand tools may be used for final trimming of the area broken out.
(3) Removal of concrete around tensioned strand and strand anchorages shall comply with specified sequencing stated in contract specific Appendix 57/3.

**What is the final outcome?**

No damage to tendons and anchorages

**Issues:**

- 1st sentence: written as the only way, are there alternatives? Important to have high degree of control for critical matters, whilst considering that H&S is responsibility of the constructor. What is the best approach: method vs performance requirements?
- 2nd sentence: methods of work are responsibility of the constructor; be careful to not include anything that has H&S implications. Please consider that if something goes wrong, it is responsibility of the Overseeing Organisations.
- 3rd sentence: need to refer to the WSI using standard phrase.

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# Q21 - Q23 on Menti

# Key takeaways on performance and method requirements

- ✓ For products, wherever possible, set out requirements as performance criteria as defined in the product standards
- ✓ For installation/workmanship, assess the best approach to be taken between method or performance based depending on the case (consider pros and cons of performance-based requirements)

Please use the ‘hand raised’ function when you are back from the break

| High-level drafting objectives | Specific drafting rules | |
|---|---|---|
| Setting clear requirements to the constructor in the SHW, including clear links with the DMRB | A1: Verb forms<br>A2: Clarity of constructor requirements<br>A3: Section title and cross references<br>A4: Using standard format requirements (SFR)<br>A5: Product and installation requirements | 2 |
| | A6: Verification and documentation requirements<br>A7: Other types of constructor requirements<br>A8: Construction vs design requirements<br>A9: Performance and method requirements | 3 |
| Setting clear instructions to the specifier in the IfS documents and clear links with the WSI | B1: IfS content, presentation and format<br>B2: Establishing clear links between SHW, IfS and WSI | 4 |
| Setting contract neutral requirements to the constructor in the SHW | C1: Contract and product neutrality | |
| Present national variations clearly and consistently | D1: Nationally Determined Requirements and sections | |
| Supporting decarbonisation | *Specific rules will be provided in a separate module* | |

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# B1 IfS content, presentation and format

- IfS content
- IfS presentation
- IfS standard format

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

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Clear distinction between product and installation requirements for each physical object…

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**Product verification**

1.5 Certification shall be supplied to demonstrate that the widgets comply with BS EN 12345.

**Installation requirements**

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1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| **Drawing number** | **Type** |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Use of standard format requirements

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# IfS content

- Specifier instructions shall be instructions to the specifier on producing the works specific inputs (WSI) and shall not include advice or guidance on making design decisions.
- **Role of the specifier will be to take designer's outputs and translate them into information that can be used by the constructor.**
- Such approach supports automation in the production of the WSI

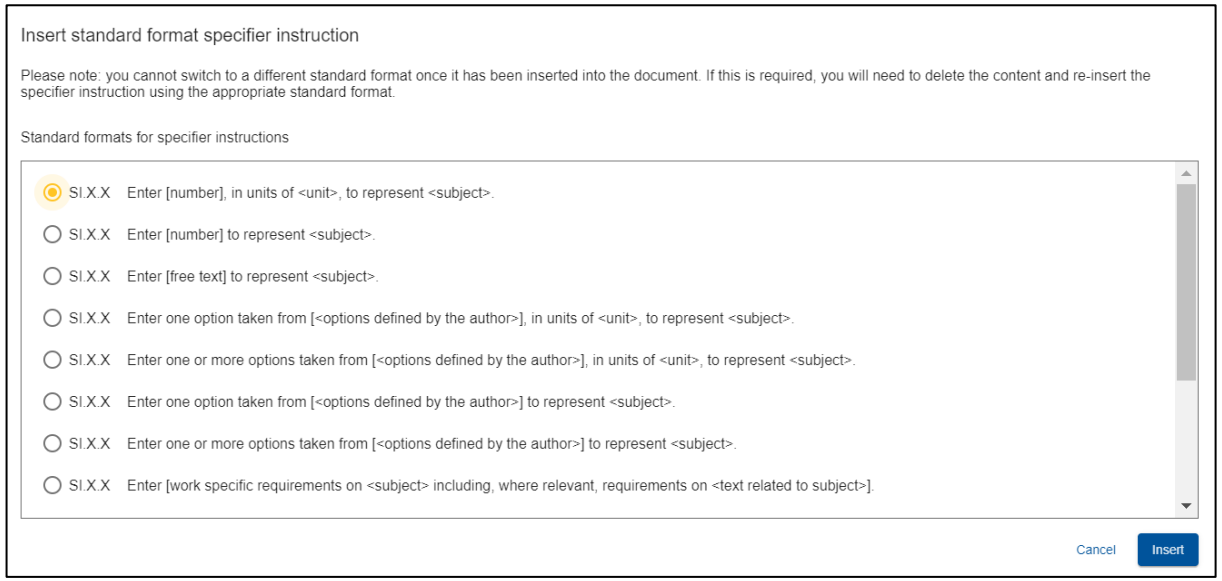
# IfS presentation

| | | |
|---|---|---|
| 1 | Element | |
| 1.1 | Elements shall be compliant with BS 2210. | Constructor requirements |
| 1.2 | The class shall be as stated in the works specific inputs. | |
| SI 1.2 | Insert **X**, **Y** or **Z** to represent the class | Specifier instruction |
| 1.3 | The height of the element shall be a minimum of 500mm. | |

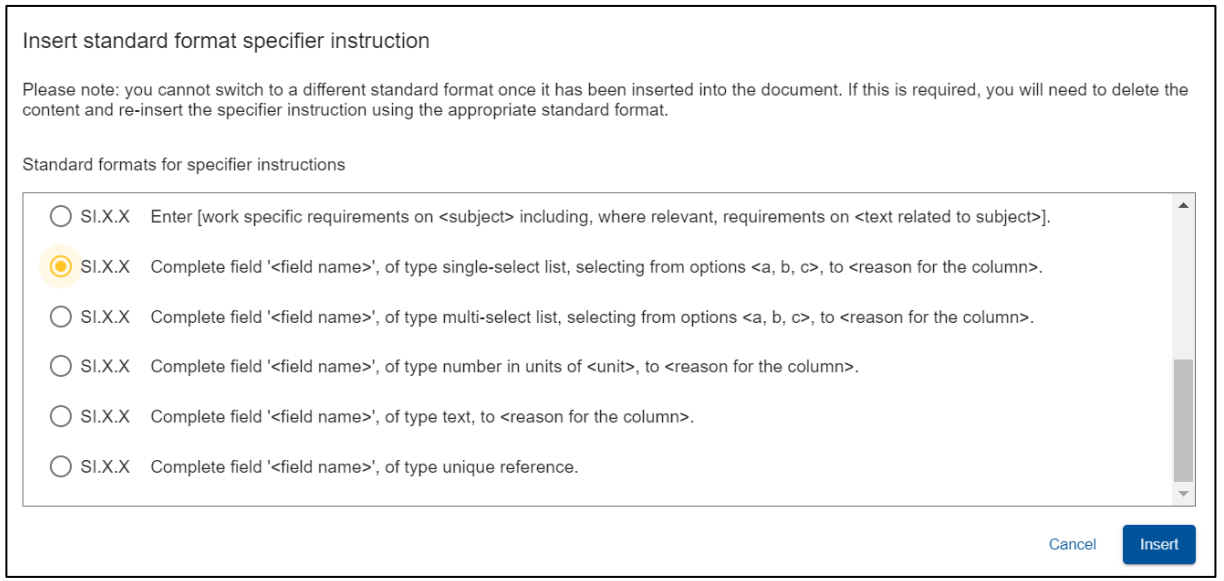
# IfS standard format

- Specifier instructions shall be drafted using the standard format provided on CARS.

## For individual instructions (not schedules)




## For schedules




| Session 1 | Session 2 | | | | | Session 3 | | | | Session 4 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intro | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | B1 | B2 | C1 | D1 | E1 |

# CARS functionality for IfS

*See training on CARS*

# B2 Establishing clear links between SHW, IfS and WSI

- Suggested authoring process
- Case 1: single instruction
- Case 2: simple schedule
- Case 3: ‘matrix’ schedule
- Support provided to draft IfS and WSI

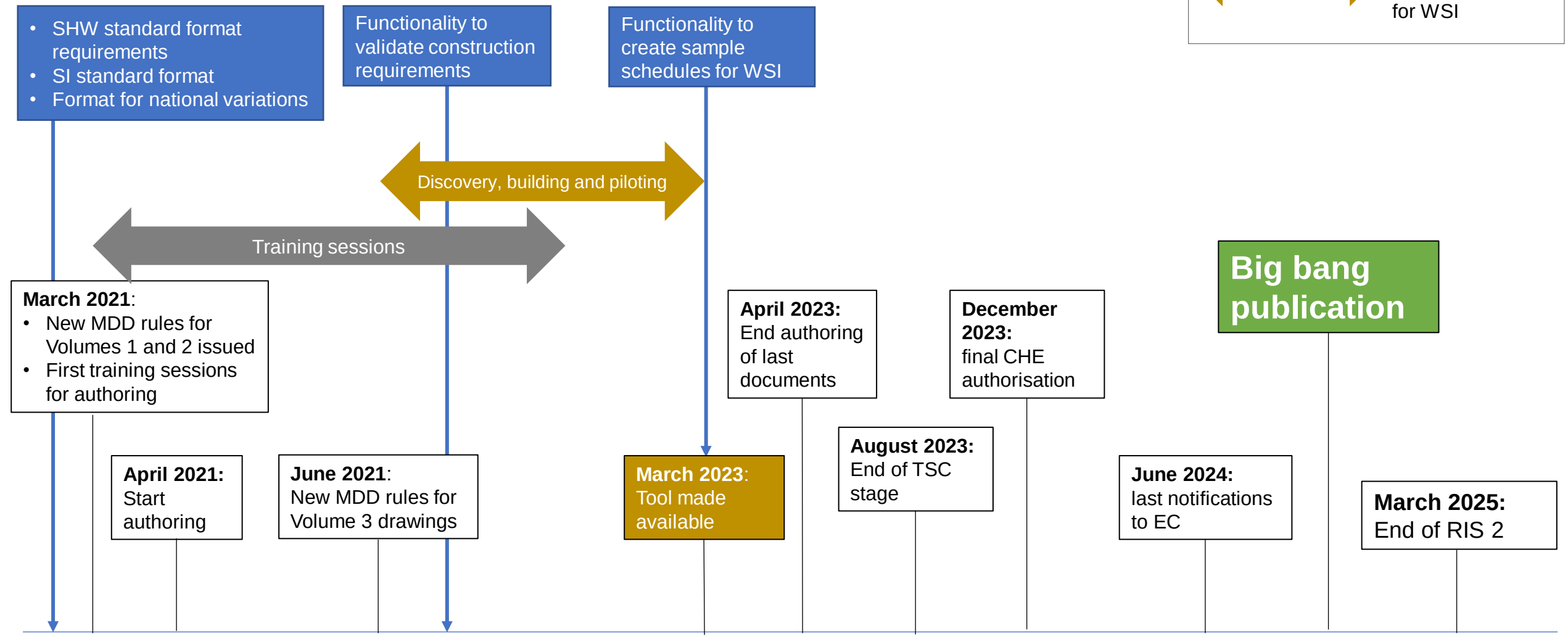
# Suggested authoring process

The authoring process should be:

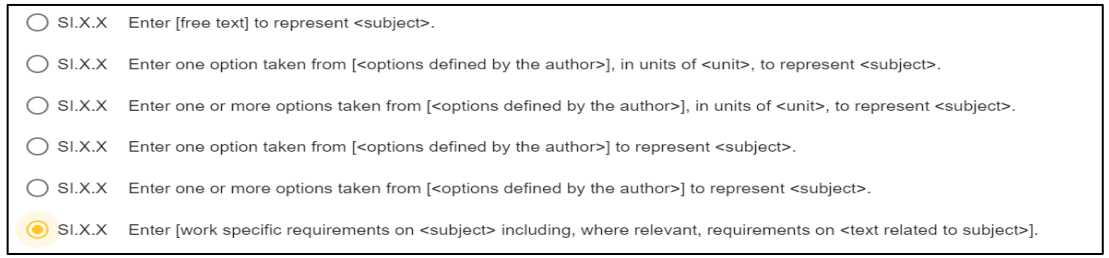
- Update of the constructor requirement(s)
- Review of the content in contract specific appendices and NfG
- Definition of content relevant to the specifier linked to specific constructor requirement(s)
- *For schedules*: development of the expected template / wireframe for the WSI
- *In all cases*: development of the associated specifier instructions

- This will help capture relevant data to be shown in the WSI.

# MCHW work programme



# Case 1: single instruction




1.6 The planned sequence and timing for driving or boring piles, or for installing wall elements, shall be submitted as stated in schedule <<Ref to WSI>>.

SI. 1.6a Enter work specific requirements on 'planned sequence and timing of driving or boring piles or installing wall elements'.

Redraft constructor requirements

Draft related specifier instructions using standard format

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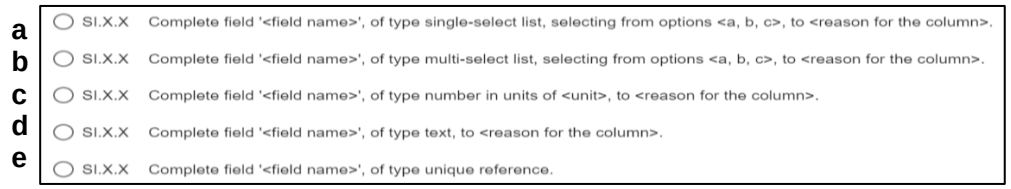
# Case 2: simple schedule




1.6 The Topsoil, grass seed and turf shall be as stated in schedule <<Ref to WSI>>.

| Drawing Number | Trench Type | Start Coordinate | End Coordinate | Treatment Type | Depth of Treatment |
|---|---|---|---|---|---|
| [Unique ref] | <trench type 1, type 2, type3> | National Grid coordinate system is OSGB36 | National Grid coordinate system is OSGB37 | <Clause 803 type 1, topsoil, grass seed, turf> | <150mm deafult> |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

SI. 1.6a Complete field 'drawing number', of type unique reference.
SI. 1.6b Complete field 'trench type', of type single-select list, selecting from options trench type 1, type 2, type3, to identify trench standard detail used.
SI. 1.6c Complete field 'start coordinate', of type number in units of National Grid coordinate system is OSGB36, to identify where the trench starts.
SI. 1.6d Complete field 'end coordinate', of type number in units of National Grid coordinate system is OSGB36>, to <identify where the trench ends.
SI. 16e Complete field 'treatment type', of type single-select list, selecting from options Clause 803 type 1, topsoil, grass seed, turf, to identify how to finish the trench at surface level.
SI. 16f Complete field 'depth of treatment', of type number in units of mm, to identify the depth of treatment if it is different to the default depth of 150mm.

Redraft constructor requirements

Sketch expected WSI schedule

Draft related specifier instructions using standard format

# Case 3: ‘matrix’ schedule

**SERIES 900**
**ROAD PAVEMENTS – BITUMINOUS BOUND MATERIALS**

**943** (05/18) **Hot Rolled Asphalt Surface Course and Binder Course (Performance-Related Design Mixtures)**

**1** (05/18) HRA Performance Related surface course shall conform to BS EN 13108-4 and follow the example from BSI PD 6691 Annex C section C.2.5.1.4, the requirements of this Clause and those specified in contract specific Appendix 7.1.

Redraft constructor requirements

Sketch expected WSI schedule

Draft related specifier instructions using standard format

# Case 3: ‘matrix’ schedule

1. Split into two sections

**SERIES 900**
**ROAD PAVEMENTS – BITUMINOUS BOUND MATERIALS**

**943** (05/18) **Hot Rolled Asphalt Surface Course and Binder Course (Performance-Related Design Mixtures)**

**1** (05/18) HRA Performance Related surface course shall conform to BS EN 13108-4 and follow the example from BSI PD 6691 Annex C section C.2.5.1.4, the requirements of this Clause and those specified in contract specific Appendix 7.1.

2. Rephrase using relevant SFR

| | | |
|---|---|---|
| Harmonised Standard (list + included in the works specific inputs) | <Subject of standard> shall be compliant with <reference to standard>. | Combined kerb-drainage shall be compliant with BS EN 1433. |
| | The <subject of standard> shall meet the following performance characteristics: <list performance characteristics>. | The combined kerb-drainage shall meet the following performance characteristics: weather resistance Type R+. |
| | The <subject of standard> shall also meet the performance characteristics stated in <<Ref to WSI>>. | The combined kerb-drainage shall also meet the performance characteristics stated in <<WSI GC 100/1.1>>. |
| | The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of <subject of declaration of performance>. | The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of combined kerb-drainage. |

3. Capture information for WSI

4. Draft related specifier instruction(s)

**Schedule 1A: Permitted Pavement Options**

| Drawing ref. | Area | | | Design traffic for 40 years (msa) | Design traffic (cv/ lane/day) | Site Category | Investigatory Level | Min PSV/ Max AAV | Permitted pavement option |
|---|---|---|---|---|---|---|---|---|---|
| | Description [eg Mainline] | Chainage From | Chainage To | Lane (Direction) | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**Schedule 3: Permitted Construction Materials**

| | Pavement Option [eg A1] | | Pavement Option [eg A2] | |
|---|---|---|---|---|
| Pavement Layer | Material Ref. | Thickness (mm) | Material Ref. | Thickness (mm) |
| Surface Treatment | STA1** | | | |
| Surface Course | SCA1** | | SCA2** | |
| Binder Course | BCA1** | | BCA2** | |
| Base | BA1** | | | |
| Upper base | | | UBA2** | |
| Lower base | | | LBA2** | |
| Subbase | SBA1** | | SBA2** | |
| [Other – eg regulating] | RA1** | | | |
| Total Thickness | | | | |
| Capping is not required/is required* as described in contract specific Appendix 6/7. *[*Compiler to indicate as appropriate]* | | | | |

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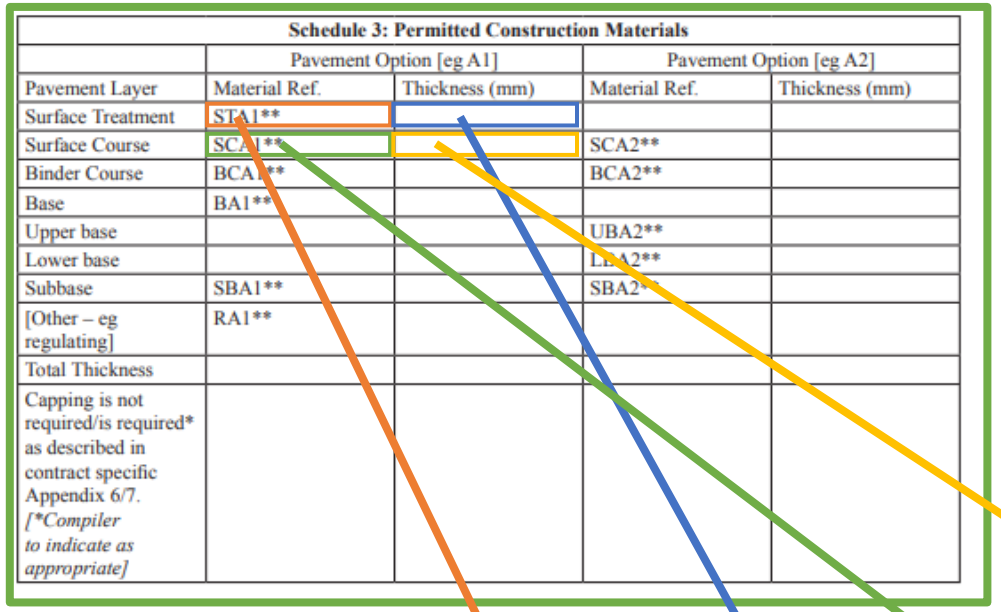
# Case 3: ‘matrix’ schedule



| Schedule 3: Permitted Construction Materials | | | | |
|---|---|---|---|---|
| | Pavement Option [eg A1] | | Pavement Option [eg A2] | |
| Pavement Layer | Material Ref. | Thickness (mm) | Material Ref. | Thickness (mm) |
| Surface Treatment | STA1** | | | |
| Surface Course | SCA1** | | SCA2** | |
| Binder Course | BCA1** | | BCA2** | |
| Base | BA1** | | | |
| Upper base | | | UBA2** | |
| Lower base | | | LBA2** | |
| Subbase | SBA1** | | SBA2** | |
| [Other – eg regulating] | RA1** | | | |
| Total Thickness | | | | |
| Capping is not required/is required* as described in contract specific Appendix 6/7. *[*Compiler to indicate as appropriate]* | | | | |

2.5 The HRA performance related surface course shall be as stated in schedule <<Ref to WSI>>.

SI. 2.5a Complete field ‘pavement option', of type unique reference.

SI. 2.5b Complete field 'surface treatment material ref', of type unique reference.

SI. 2.5c Complete field 'surface treatment thickness’, of type number in units of <mm>.

SI. 2.5d Complete field 'surface course material ref', of type unique reference.

SI. 2.5e Complete field 'surface course thickness’, of type number in units of <mm>.

| Fields → | Pavement option | Surface treatment material ref | Surface treatment thickness | Surface course material ref | Surface course thickness | Binder course material ref | Etc. |
|---|---|---|---|---|---|---|---|
| Pavement option A1 → | [Unique ref] | [Unique ref] | [mm] | [Unique ref] | [mm] | [Unique ref] | [mm] |
| Pavement option A2 → | | | | | | | |
| Etc. | | | | | | | |

# Support provided to draft IfS and WSI

- Gareth Smith will continue to run workshops and provide support in conjunction with relevant content specialists.
- Please be in touch for any queries.
- Training material and MDD rules may also be updated to incorporate recurrent themes emerging from the workshops.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# Q24 on Menti

# Key takeaways on setting clear instructions to the specifier in the IfS documents

- ✓ Do not include advice or guidance in the specifier instructions
- ✓ Interpretation will no longer be needed to use the Specifier instructions to build the WSI
- ✓ Role of the specifier will be to take designer's outputs and translate them into information that can be used by the constructor
- ✓ Use standard formats for individual instructions (not schedules) and for schedules
- ✓ Update the constructor requirements first, then see the NgG appendices, develop the expected template / wireframe for the WSI (for schedules), in all cases develop the associated specifier instructions
- ✓ Workshops available to discuss this matter

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| High-level drafting objectives | Specific drafting rules | |
|---|---|---|
| Setting clear requirements to the constructor in the SHW, including clear links with the DMRB | A1: Verb forms<br>A2: Clarity of constructor requirements<br>A3: Section title and cross references<br>A4: Using standard format requirements (SFR)<br>A5: Product and installation requirements | 2 |
| | A6: Verification and documentation requirements<br>A7: Other types of constructor requirements<br>A8: Construction vs design requirements<br>A9: Performance and method requirements | 3 |
| Setting clear instructions to the specifier in the IfS documents and clear links with the WSI | B1: IfS content, presentation and format<br>B2: Establishing clear links between SHW, IfS and WSI | 4 |
| Setting contract neutral requirements to the constructor in the SHW | C1: Contract and product neutrality | |
| Present national variations clearly and consistently | D1: Nationally Determined Requirements and sections | |
| Supporting decarbonisation | *Specific rules will be provided in a separate module* | |

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# C1 Contract and product neutrality

- Why contract neutrality is important
- Things / expressions to avoid
- Product neutrality

# What a good spec looks like

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

**Contract neutral clauses**

Clear distinction between product and installation requirements for each physical object…

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1.5 The design of <subject of design> shall be in accordance with <design standard reference>.

**Product verification**

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**Installation requirements**

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**Installation verification**

1.8 The alignment of widgets shall be checked within 24 hours of installation.

**Documentation requirements**

1.9 The following documentation shall be submitted for widgets prior to the commencement of <details of the works>: <detail the documentation>.

1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| Drawing number | Type |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Use of standard format requirements

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# Why contract neutrality is important

- The MCHW needs to work with a variety of different contract types and procurement routes
- In each of these situations the interaction between the Overseeing Organisation and the constructor may be defined differently.
- Contract neutrality is therefore essential.

# Approval by the Overseeing Organisations

- **Don’t set out obligations on the Overseeing Organisations, nor require approval from them**

- Instead, the Overseeing Organisation should be notified and should require the submission of documentation/information at an appropriate time.

# Example

(1) The Contractor and, as appropriate, the Overseeing Organisation or Telecommunications Services Provider shall agree the exact location of these items before commencement of any associated works, including groundworks.

**Possible redraft**

The exact location of <relevant items> shall be specified before commencement of any associated works, including groundworks.

**Aspects to consider**

Is there a statutory obligation to get an agreement with third parties? Any form to be signed off?

# Reference to the departure process

- **Do not refer to the use of departures.**

  - For example the phrase "unless a departure has been sought" is not permitted.
  - Referencing departures can risk contradictions between the departure process and the contractual change control process.

# Example

In accordance with the provisions of CD 374, the use of recycled concrete aggregates (RCA) as a replacement for natural coarse aggregate is allowed within specific limitations and for particular applications; however its specification would require submission and approval through the Overseeing Organisation's departures process.

**Issues / aspects to consider**

- This should be a design issue, not a specification issue, wrong place to provide this information. It is here to inform the constructor, but it is not a requirement for constructors
- Need to review the purpose of this clause

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# Design drawings or models

- **Do not refer to the design drawings or the design model.**
  - Referencing design drawings or models can risk contradicting the delivery model for the particular scheme.

# Obligations on other parties

- **Do not place obligation onto any party other than the constructor, such as the ‘designer’ or ‘sub-contractors’.**

  - Requirements for third parties (sub-contractors) have to be put in terms of obligations on the Constructor because policing / enforcement of these requirements is the responsibility of the Constructor.
  - Failure to comply by the third parties will result in the Constructor being held accountable.

# Conflict with contract content

- **Do not introduce requirements which can conflict with other parts of contract or which attempt to rewrite parts of a contract.**

  - Specifications containing the constructor requirements are likely to act as the "Works Information" or "Scope" of a contract.
  - Requirements which conflict with other parts of a contract can cause contractual risk to the Overseeing Organisation.

# Example

The Contractor shall submit a fully detailed quality plan and method statement for the application of surface protection systems to the Overseeing Organisation for approval at least four weeks prior to commencement of the works.

**Issues / aspects to consider**

- All works will require a method statement to be submitted. If this is different for surface protection systems, then the relevant requirement for its content should be introduced, not a general requirement for submission.
- This may also cut across the general requirements for quality management and contractual arrangements for commencement and document submission.
- There might not be four weeks between contract award and start of works. The time period might not be appropriate for design and build contracts.
- Other issues: reference to the contractor; approval by the Overseeing Organisation.

# When things go wrong

- **Minimise statements about what to do when things go wrong**

  - Requirements such as "*the minimum length of carriageway to be rectified shall be XX m*" can be appropriate, but going into any depth on requirements might limit the site team's options for contractual non-compliances.

# Example

Shall any damage occur to a cable during installation, however slight, the Contractor shall identify and record the damage and report it to the Overseeing Organisation. The damage shall be repaired with cable accessories meeting BS EN 50393 in accordance with the manufacturer's instructions and at the Contractor's expense.

**Issues / aspects to consider**

- Reporting non conformances should be covered by standard terms – front end documents?
- This cuts across the conditions of contract regarding the correction of defects and makes it difficult for the site team to be able to insist on complete replacement of damaged materials.

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# Conditional expressions

- **Minimise the use of conditional expressions, i.e. the use of requirements that are conditional on something else happening.**

  - It can be common to ask for actions that depend on other factors. E.g. *if the ground conditions allow X then carry out X, if not then carry out Y*.
  - This type of instruction can lead to ambiguity and contractual issues.
  - Such cases can be dealt with WSI.

# Constructor’s duties

- **Do not tell the contractor how to do the work.**
  - Instead, instruct what the outcomes should be and leave the constructor to decide how to get to those outcomes.
- **Do not transfer H&S liability onto the Overseeing Organisation.**
  - Leave the constructor to establish their own safe systems of work.


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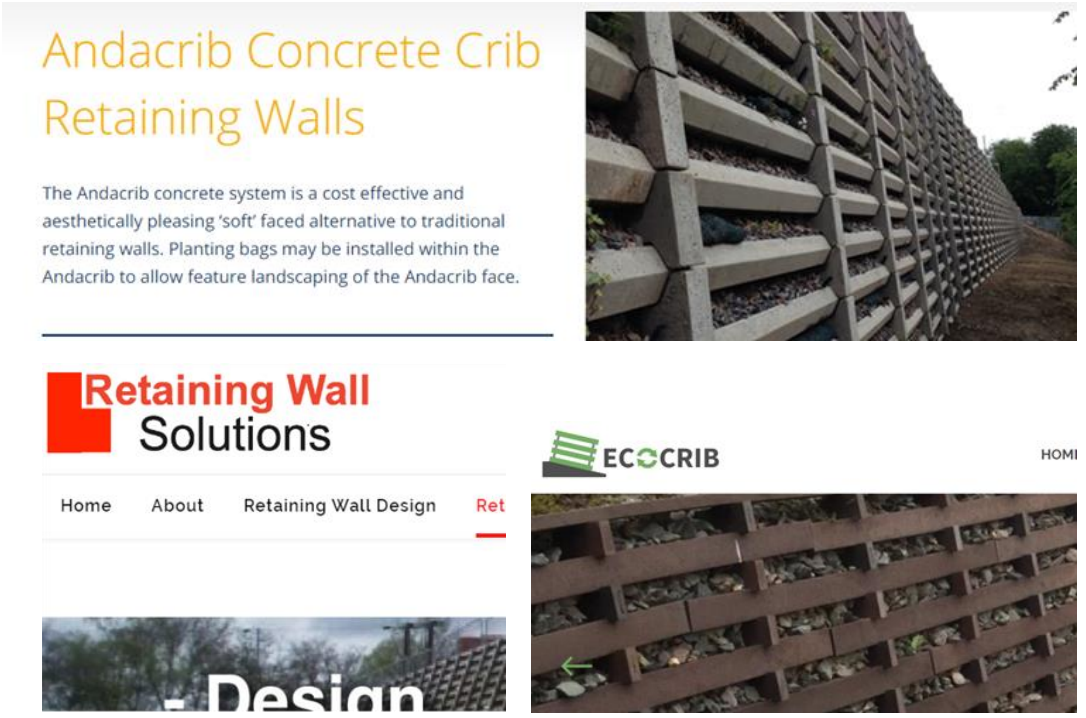
# Product/Vendor Neutrality

- **Do not specify particular products or Product Acceptance Schemes.**
  - Not allowed by procurement rules because this could be anticompetitive.
  - By not specifying particular products we can increase competition and encourage innovation.



# Key takeaways on contract and product neutrality

- ✓ Do not set out obligations on the Overseeing Organisation
- ✓ Require the submission of documents/information at an appropriate time.
- ✓ Do not refer to the use of departures.
- ✓ Do not refer to the design drawings or the design model.
- ✓ Do not place obligation onto any party other than the constructor, such as the ‘designer’ or ‘sub-contractors’.
- ✓ Do not introduce requirements which can conflict with other parts of contract or which attempt to rewrite parts of a contract.
- ✓ Minimise statements about what to do when things go wrong.
- ✓ Minimise the use of conditional expressions.
- ✓ Do not tell the contractor how to do the work.
- ✓ Do not transfer H&S liability onto the Overseeing Organisation.
- ✓ Don’t specify particular products or Product Acceptance Schemes.

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| High-level drafting objectives | Specific drafting rules | |
|---|---|---|
| Setting clear requirements to the constructor in the SHW, including clear links with the DMRB | A1: Verb forms<br>A2: Clarity of constructor requirements<br>A3: Section title and cross references<br>A4: Using standard format requirements (SFR)<br>A5: Product and installation requirements | 2 |
| | A6: Verification and documentation requirements<br>A7: Other types of constructor requirements<br>A8: Construction vs design requirements<br>A9: Performance and method requirements | 3 |
| Setting clear instructions to the specifier in the IfS documents and clear links with the WSI | B1: IfS content, presentation and format<br>B2: Establishing clear links between SHW, IfS and WSI | 4 |
| Setting contract neutral requirements to the constructor in the SHW | C1: Contract and product neutrality | |
| Present national variations clearly and consistently | D1: Nationally Determined Requirements and sections | |
| Supporting decarbonisation | *Specific rules will be provided in a separate module* | |

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# D1 Nationally Determined Requirements and Sections

- Examples of national variations
- Approach to review current national variations
- Nationally Determined Requirements
- Nationally Determined Sections

# Example of national variations

Different regulation

## HE (main text)

**3** (02/16) Unacceptable material Class U2 shall be:

(i) hazardous waste (as defined in the Hazardous Waste (England and Wales) Regulations 2005) and radioactive waste (as defined in the Radioactive Substances Act 1993).

**4** (02/16) Where required in contract specific Appendix 6/1, unacceptable material (other than Class U2) shall be processed by mechanical, chemical or other means to render the material acceptable for use in the permanent works in accordance with the requirements of Table 6/1 and contract specific Appendix 6/1.

(02/16) **Definitions**

**5** (02/16) Where source codes are referred to these shall be for materials from the sources listed in Table 6/7.

**6** (02/16) Chalk shall mean:

(i) any porous material of natural origin composed essentially of calcium carbonate and identified as chalk on the maps produced by the British Geological Survey;

(ii) material designated as Class 3 in contract specific Appendix 6/1.

**7** (02/16) Argillaceous rock shall mean shales mudstones siltstones slates and micaceous schists composed of particles of clay and silt and mica. It shall include unburnt colliery spoil. Where argillaceous rock is imported onto the site, it shall be aggregate complying with BS EN 13242 from source codes P (natural aggregates described as shale, siltstone or slate), or G2 (refuse from hard coal mining (black coal shale)).

**8** (02/16) Pulverised-fuel ash shall mean solid material extracted by electrostatic and mechanical means from the flue gases of furnaces fired with pulverised bituminous coal. It shall have a maximum particle size of 3 mm. Where pulverised-fuel ash is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code C1 (coal fly ash).

**9** (02/16) Furnace bottom ash shall mean agglomerated pulverised-fuel ash obtained from the bottom of the power station furnace and having particle size no larger than 10 mm. Where furnace bottom ash is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code C4 (coal bottom ash).

**10** (02/16) Formation shall be the top surface of capping. Where no capping is required formation shall be the top surface of earthworks at the underside of sub-base, unless otherwise shown on the drawings.

**11** (02/16) Sub-formation shall be the top surface of earthworks at the underside of capping.

**12** (02/16) Stabilisation shall mean the spreading of cement or lime or both on a layer of deposited or intact granular or cohesive material, and the subsequent process of pulverising and mixing followed by appropriate compaction to form the whole or a constituent layer of a capping.

**13** (02/16) Where 'recycled aggregate' is used in this Series, the material shall be aggregate resulting from the processing of inorganic or mineral material previously used in construction and shall have been tested in accordance with Clause 710. It shall not contain more than 1% other materials (Class X), not more than 50% in Class Ra (bituminous materials) and not more than 25% in Class Rg (crushed glass). Where 'recycled aggregate' is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code A (construction and demolition recycling industries).

Where 'recycled aggregate except recycled asphalt' is used in this Series, the aggregate shall have been tested in accordance with Clause 710. It shall not contain more than 1% other materials (Class X), not more than 1% in Class Ra (bituminous materials) and not more than 5% in Class Rg (crushed glass). Where 'recycled aggregate except recycled asphalt' is imported onto the site, it shall be aggregate complying with BS EN 13242 from source codes A2 (crushed concrete) and/or A3 (crushed bricks, masonry).

**14** (02/16) 'As dug' shall mean material that has been excavated, transported and placed without any processing. Where imported material undergoes any processing, including cleaning and sorting, it will not be deemed 'as dug' and thus shall be aggregate complying with BS EN 13242.

## TS

**3** (02/16) Unacceptable material Class U2 shall be:

(i) special waste (as defined in the Special Waste Scotland (Amendment) Regulations 2004) and radioactive waste (as defined in the Radioactive Substances Act 1993).

**4** (02/16) Where required in contract specific Appendix 6/1, unacceptable material (other than Class U2) shall be processed by mechanical, chemical or other means to render the material acceptable for use in the permanent works in accordance with the requirements of Table 6/1 and contract specific Appendix 6/1.

(02/16) **Definitions**

**5** (02/16) Where source codes are referred to these shall be for materials from the sources listed in Table 6/7.

**6** (02/16) Chalk shall mean:

(i) any porous material of natural origin composed essentially of calcium carbonate and identified as chalk on the maps produced by the British Geological Survey;

(ii) material designated as Class 3 in contract specific Appendix 6/1.

**7** (02/16) Argillaceous rock shall mean shales mudstones siltstones slates and micaceous schists composed of particles of clay and silt and mica. It shall include unburnt colliery spoil. Where argillaceous rock is imported onto the site, it shall be aggregate complying with BS EN 13242 from source codes P (natural aggregates described as shale, siltstone or slate), or G2 (refuse from hard coal mining (black coal shale)).

**8** (02/16) Pulverised-fuel ash shall mean solid material extracted by electrostatic and mechanical means from the flue gases of furnaces fired with pulverised bituminous coal. It shall have a maximum particle size of 3 mm. Where pulverised-fuel ash is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code C1 (coal fly ash).

**9** (02/16) Furnace bottom ash shall mean agglomerated pulverised-fuel ash obtained from the bottom of the power station furnace and having particle size no larger than 10 mm. Where furnace bottom ash is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code C4 (coal bottom ash).

**10** (02/16) Formation shall be the top surface of capping. Where no capping is required formation shall be the top surface of earthworks at the underside of sub-base, unless otherwise shown on the drawings.

**11** (02/16) Sub-formation shall be the top surface of earthworks at the underside of capping.

**12** (02/16) Stabilisation shall mean the spreading of cement or lime or both on a layer of deposited or intact granular or cohesive material, and the subsequent process of pulverising and mixing followed by appropriate compaction to form the whole or a constituent layer of a capping.

**13** (02/16) Where 'recycled aggregate' is used in this Series, the material shall be aggregate resulting from the processing of inorganic or mineral material previously used in construction and shall have been tested in accordance with Clause 710. It shall not contain more than 1% other materials (Class X), not more than 50% in Class Ra (bituminous materials) and not more than 25% in Class Rg (crushed glass). Where 'recycled aggregate' is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code A (construction and demolition recycling industries).

Where 'recycled aggregate except recycled asphalt' is used in this Series, the aggregate shall have been tested in accordance with Clause 710. It shall not contain more than 1% other materials (Class X), not more than 1% in Class Ra (bituminous materials) and not more than 5% in Class Rg (crushed glass). Where 'recycled aggregate except recycled asphalt' is imported onto the site, it shall be aggregate complying with BS EN 13242 from source codes A2 (crushed concrete) and/or A3 (crushed bricks, masonry).

**14** (02/16) 'As dug' shall mean material that has been excavated, transported and placed without any processing. Where imported material undergoes any processing, including cleaning and sorting, it will not be deemed 'as dug' and thus shall be aggregate complying with BS EN 13242.

## WG

**3** (02/16) Unacceptable material Class U2 shall be:

(i) hazardous waste (as defined in the Hazardous Waste (England and Wales) Regulations 2005) and radioactive waste (as defined in the Radioactive Substances Act 1993).

**4** (02/16) Where required in contract specific Appendix 6/1, unacceptable material (other than Class U2) shall be processed by mechanical, chemical or other means to render the material acceptable for use in the permanent works in accordance with the requirements of Table 6/1 and contract specific Appendix 6/1.

(02/16) **Definitions**

**5** (02/16) Where source codes are referred to these shall be for materials from the sources listed in Table 6/7.

**6** (02/16) Chalk shall mean:

(i) any porous material of natural origin composed essentially of calcium carbonate and identified as chalk on the maps produced by the British Geological Survey;

(ii) material designated as Class 3 in contract specific Appendix 6/1.

**7** (02/16) Argillaceous rock shall mean shales mudstones siltstones slates and micaceous schists composed of particles of clay silt and mica. It shall include unburnt colliery spoil. Where argillaceous rock is imported onto the site, it shall be aggregate complying with BS EN 13242 from source codes P (natural aggregates described as shale, siltstone or slate), or G2 (refuse from hard coal mining (black coal shale)). See sub-Clause 21.

**8** (02/16) Pulverised-fuel ash shall mean solid material extracted by electrostatic and mechanical means from the flue gases of furnaces fired with pulverised bituminous coal. It shall have a maximum particle size of 3 mm. Where pulverised-fuel ash is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code C1 (coal fly ash).

**9** (02/16) Furnace bottom ash shall mean agglomerated pulverised-fuel ash obtained from the bottom of the power station furnace and having particle size no larger than 10 mm. Where furnace bottom ash is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code C4 (coal bottom ash).

**10** (02/16) Formation shall be the top surface of capping. Where no capping is required formation shall be the top surface of earthworks at the underside of sub-base, unless otherwise shown on the drawings.

**11** (02/16) Sub-formation shall be the top surface of earthworks at the underside of capping.

**12** (02/16) Stabilisation shall mean the spreading of cement or lime or both on a layer of deposited or intact granular or cohesive material, and the subsequent process of pulverising and mixing followed by appropriate compaction to form the whole or a constituent layer of a capping.

**13** (02/16) Where 'recycled aggregate' is used in this Series, the material shall be aggregate resulting from the processing of inorganic or mineral material previously used in construction and shall have been tested in accordance with Clause 710. It shall not contain more than 1% other materials (Class X), not more than 50% in Class Ra (bituminous materials) and not more than 25% in Class Rg (crushed glass). Where 'recycled aggregate' is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code A (construction and demolition recycling industries).

Where 'recycled aggregate except recycled asphalt' is used in this Series, the aggregate shall have been tested in accordance with Clause 710. It shall not contain more than 1% other materials (Class X), not more than 1% in Class Ra (bituminous materials) and not more than 5% in Class Rg (crushed glass). Where 'recycled aggregate except recycled asphalt' is imported onto the site, it shall be aggregate complying with BS EN 13242 from source codes A2 (crushed concrete) and/or A3 (crushed bricks, masonry).

**14** (02/16) 'As dug' shall mean material that has been excavated, transported and placed without any processing. Where imported material undergoes any processing, including cleaning and sorting, it will not be deemed 'as dug' and thus shall be aggregate complying with BS EN 13242.

## NI

**3** (02/16) Unacceptable material Class U2 shall be:

(i) hazardous waste (as defined in the Hazardous Waste Regulations (Northern Ireland) 2005) and radioactive waste (as defined in the Radioactive Substances Act 1993).

**4** (02/16) Where required in contract specific Appendix 6/1 unacceptable material (other than Class U2) shall be processed by mechanical, chemical or other means to render the material acceptable for use in the permanent works in accordance with the requirements of Table 6/1 and the contract specific Appendix 6/1.

(02/16) **Definitions**

**5** (02/16) Where source codes are referred to these shall be for materials from the sources listed in Table 6/7.

**6** (02/16) Chalk shall mean:

(i) any porous material of natural origin composed essentially of calcium carbonate and identified as chalk on the maps produced by the Geological Survey of Northern Ireland;

(ii) material designated as Class 3 in contract specific Appendix 6/1.

**7** (02/16) Argillaceous rock shall mean shales mudstones siltstones slates and micaceous schists composed of particles of clay silt and mica. It shall include unburnt colliery spoil. Where argillaceous rock is imported onto the site, it shall be aggregate complying with BS EN 13242 from source codes P (natural aggregates described as shale, siltstone or slate), or G2 (refuse from hard coal mining (black coal shale)).

**8** (02/16) Pulverised-fuel ash shall mean solid material extracted by electrostatic and mechanical means from the flue gases of furnaces fired with pulverised bituminous coal. It shall have a maximum particle size of 3 mm. Where pulverised-fuel ash is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code C1 (coal fly ash).

**9** (02/16) Furnace bottom ash shall mean agglomerated pulverised-fuel ash obtained from the bottom of the power station furnace and having particle size no larger than 10 mm. Where furnace bottom ash is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code C4 (coal bottom ash).

**10** (02/16) Formation shall be the top surface of capping.

Where no capping is required formation shall be the top surface of earthworks at the underside of sub-base, unless otherwise shown on the drawings.

**11** (02/16) Sub-formation shall be the top surface of earthworks at the underside of capping.

**12** (02/16) Stabilisation shall mean the spreading of cement or lime or both on a layer of deposited or intact granular or cohesive material, and the subsequent process of pulverising and mixing followed by appropriate compaction to form the whole or a constituent layer of a capping.

**13** (02/16) Where 'recycled aggregate' is used in this Series, the material shall be aggregate resulting from the processing of inorganic or mineral material previously used in construction and shall have been tested in accordance with Clause 710. It shall not contain more than 1% other materials (Class X), not more than 50% in Class Ra (bituminous materials) and not more than 25% in Class Rg (crushed glass). Where 'recycled aggregate' is imported onto the site, it shall be aggregate complying with BS EN 13242 from source code A (construction and demolition recycling industries).

Where 'recycled aggregate except recycled asphalt' is used in this Series, the aggregate shall have been tested in accordance with Clause 710. It shall not contain more than 1% other materials (Class X), not more than 1% in Class Ra (bituminous materials) and not more than 5% in Class Rg (crushed glass). Where 'recycled aggregate except recycled asphalt' is imported onto the site, it shall be aggregate complying with BS EN 13242 from source codes A2 (crushed concrete) and/or A3 (crushed bricks, masonry).

**14** (02/16) 'As dug' shall mean material that has been excavated, transported and placed without any processing. Where imported material undergoes any processing, including cleaning and sorting, it will not be deemed 'as dug' and thus shall be aggregate complying with BS EN 13242.

| Session 1 | Session 2 | | | | | Session 3 | | | | Session 4 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Intro | A1 | A2 | A3 | A4 | A5 | A6 | A7 | A8 | A9 | B1 | B2 | C1 | D1 | E1 |

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# Example of national variations

Additional requirement

## HE (main text)

(02/16) **Use of Fill Materials**

**15** (02/16) In addition to any grading requirements the maximum particle size of any fill material shall be no more than two-thirds of the compacted layer thickness except that cobbles having an equivalent diameter of more than 150 mm shall not be deposited beneath verges or central reserves within 1.30 m of the finished surface.

**16** (02/16) Materials placed within 500 mm, or any other distances described in the contract specific Appendix 6/3, of concrete, cement bound materials, other cementitious mixtures or stabilised capping forming part of the permanent works shall conform to, as appropriate, the following requirements:

(i) Materials shall conform to the following criteria:

(a) Water-soluble sulfate (WS) content determined in accordance with BS EN 1744-1 clause 10 shall not exceed 1500 mg of sulfate (as $SO_4$) per litre;

(b) Total sulfur (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) shall not exceed 1% for aggregates other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

(ii) Materials shall conform to at least one of the following options:

(a) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant

or

(b) The sulfide content of the material determined in accordance with BS EN 1744-1 Clause 13 is less than 0.5% (as $SO_4$).

When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This shall also apply if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values.

**17** (02/16) Material placed within 500mm, or any other distances described in the contract specific Appendix 6/3, of metallic structural elements forming part of the permanent works shall conform, as appropriate, to the following requirements:

(i) Materials shall conform to the following criteria:

(a) Water-soluble sulfate (WS) content determined in accordance with BS EN 1744-1 clause 10 shall not exceed 300 mg of sulfate (as $SO_4$) per litre; and

(b) Total sulfur (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) shall not exceed 1% for aggregates other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

(ii) Materials shall conform to at least one of the following options:

(a) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant;

or

(b) The sulfide content of the material determined in accordance with BS EN 1744-1 Clause 13 is less than 0.06% (as $SO_4$).

When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This shall also apply if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values.

The requirements in (i) and (ii) above shall not apply to metallic items protected by concrete or ancillary metallic items such as the tops of chambers and gullies.

**18** (02/16) Unburnt colliery spoil may be used as general fill provided it is compacted in compliance with Clause 612 and complies with the requirements of contract specific Appendix 6/1.

**19** (02/16) Pulverised-fuel ash shall not be placed within the dimension described in contract specific Appendix 6/3, below sub-formation or formation.

**20** (02/16) Where pulverised-fuel ash is used, the Contractor shall for each consignment, make available to the Overseeing Organisation a record of the type and source from which it was obtained and a certificate of results of tests showing that the material complies with the requirements of Table 6/1.

## TS

(02/16) **Use of Fill Materials**

**15** (02/16) In addition to any grading requirements the maximum particle size of any fill material shall be no more than two-thirds of the compacted layer thickness except that cobbles having an equivalent diameter of more than 150 mm shall not be deposited beneath verges or central reserves within 1.30 m of the finished surface.

**16** (02/16) Material placed within 500 mm, or any other distances described in contract specific Appendix 6/3, of concrete, cement bound materials, other cementitious materials or stabilised capping forming part of the permanent works shall conform to, as appropriate, the following requirements.

(i) Materials shall conform to the following criteria:

(a) Water-soluble sulfate (WS) content determined in accordance with BS EN 1744-1 clause 10 shall not exceed 1500 mg of sulfate (as $SO_4$) per litre;

(b) Total sulfur (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) shall not exceed 1% for aggregates other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

(ii) Materials shall conform to at least one of the following options:

(a) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant

or

(b) The sulfide content of the mixture determined in accordance with BS EN 1744-1 Clause 13 is less than 0.5% (as $SO_4$).

When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This shall also apply if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values.

**17** (02/16) Material placed within 500 mm, or any other distances described in contract specific Appendix 6/3, of metallic structural elements forming part of the permanent works shall conform, as appropriate, to the following requirements.

(i) Materials shall conform to the following criteria:

(a) Water-soluble sulfate (WS) content determined in accordance with BS EN 1744-1 clause 10 shall not exceed 300 mg of sulfate (as $SO_4$) per litre; and

(b) Total sulfur (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) shall not exceed 1% for aggregates other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

(ii) Materials shall conform to at least one of the following options:

(a) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant;

or

(b) The sulfide content of the mixture determined in accordance with BS EN 1744-1 Clause 13 is less than 0.06% (as $SO_4$).

When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This shall also applies apply if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values.

The requirements in (i) and (ii) above shall not apply to metallic elements protected by concrete or ancillary metallic items such as the tops of chambers and gullies.

**18** (02/16) Unburnt colliery spoil may be used as general fill provided it is compacted in compliance with Clause 612 and complies with the requirements of contract specific Appendix 6/1.

**19** (02/16) Pulverised-fuel ash shall not be placed within the dimension described in contract specific Appendix 6/3, below sub-formation or formation.

**20** (02/16) Where pulverised-fuel ash is used, the Contractor shall for each consignment, make available to the Overseeing Organisation a record of the type and source from which it was obtained and a certificate of results of tests showing that the material complies with the requirements of Table 6/1.

## WG

(02/16) **Use of Fill Materials**

**15** (02/16) In addition to any grading requirements the maximum particle size of any fill material shall be no more than two-thirds of the compacted layer thickness except that cobbles having an equivalent diameter of more than 150 mm shall not be deposited beneath verges or central reserves within 1.30 m of the finished surface.

**16** (02/16) Materials placed within 500 mm, or any other distances described in the contract specific Appendix 6/3, of concrete, cement bound materials, other cementitious mixtures or stabilised capping forming part of the permanent works shall conform to, as appropriate, the following requirements:

(i) Materials shall conform to the following criteria:

(a) Water-soluble sulfate (WS) content determined in accordance with BS EN 1744-1 clause 10 shall not exceed 1500 mg of sulfate (as $SO_4$) per litre;

(b) Total sulfur (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) shall not exceed 1% for aggregates other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

(ii) Materials shall conform to at least one of the following options:

(a) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant

or

(b) The sulfide content of the material determined in accordance with BS EN 1744-1 Clause 13 is less than 0.5% (as $SO_4$).

When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This shall also apply if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values.

**17** (02/16) Material placed within 500mm, or any other distances described in the contract specific Appendix 6/3, of metallic structural elements forming part of the permanent works shall conform, as appropriate, to the following requirements:

(i) Materials shall conform to the following criteria:

(a) Water-soluble sulfate (WS) content determined in accordance with BS EN 1744-1 clause 10 shall not exceed 300 mg of sulfate (as $SO_4$) per litre; and

(b) Total sulfur (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) shall not exceed 1% for aggregates other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

(ii) Materials shall conform to at least one of the following options:

(a) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant;

or

(b) The sulfide content of the material determined in accordance with BS EN 1744-1 Clause 13 is less than 0.06% (as $SO_4$).

When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This shall also apply if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values.

The requirements in (i) and (ii) above shall not apply to metallic items protected by concrete or ancillary metallic items such as the tops of chambers and gullies.

**18** (02/16) Unburnt colliery spoil may be used as general fill provided it is compacted in compliance with Clause 612 and complies with the requirements of contract specific Appendix 6/1.

**19** (02/16) Pulverised-fuel ash shall not be placed within the dimension described in contract specific Appendix 6/3, below sub-formation or formation.

**20** (02/16) Where pulverised-fuel ash is used, the Contractor shall for each consignment, make available to the Overseeing Organisation a record of the type and source from which it was obtained and a certificate of results of tests showing that the material complies with the requirements of Table 6/1.

**21** (02/16) Where stated in contract specific Appendix 6/1 permissible options for fill materials shall include slate or other argillaceous rock materials as stated.

## NI

(02/16) **Use of Fill Materials**

**15** (02/16) In addition to any grading requirements the maximum particle size of any fill material shall be no more than two-thirds of the compacted layer thickness except that cobbles having an equivalent diameter of more than 150 mm shall not be deposited beneath verges or central reserves within 1.30 m of the finished surface.

**16** (02/16) Materials placed within 500 mm, or any other distances described in contract specific Appendix 6/3, of concrete, cement bound materials, other cementitious materials or stabilised capping forming part of the permanent works shall conform to, as appropriate, the following requirements:

(i) Materials shall conform to the following criteria:

(a) Water-soluble sulfate (WS) content determined in accordance with BS EN 1744-1 clause 10 shall not exceed 1500 mg of sulfate (as $SO_4$) per litre;

(b) Total sulfur (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) shall not exceed 1% for aggregates other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

(ii) Marerials shall conform to at least one of the following options:

(a) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant

or

(b) The sulfide content of the mixture determined in accordance with BS EN 1744-1 Clause 13 is less than 0.5% (as $SO_4$).

When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This shall also apply if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values.

**17** (02/16) Material placed within 500 mm, or any other distances described in contract specific Appendix 6/3, of metallic structural elements forming part of the permanent works shall conform, as appropriate, to the following requirements.

(i) Materials shall conform to the following criteria:

(a) Water-soluble sulfate (WS) content determined in accordance with BS EN 1744-1 clause 10 shall not exceed 300 mg of sulfate (as $SO_4$) per litre; and

(b) Total sulfur (TS) content determined in accordance with BS EN 1744-1 clause 11 expressed as (S) shall not exceed 1% for aggregates other than air cooled blast furnace slag or 2% for air cooled blast furnace slag.

(ii) Materials shall conform to at least one of the following options:

(a) When described in accordance with BS EN 932-3 and BS EN 13242 Annex A, limestone, chalk, dolomite, blast furnace slag, steel slag or crushed concrete are predominant;

or

(b) The sulfide content of the mixture determined in accordance with BS EN 1744-1 Clause 13 is less than 0.06% (as $SO_4$).

When determining WS, TS or sulfide content, at least five samples of each material shall be tested. The mean of the highest two values shall be used for comparison with the limiting values. This shall also applies apply if six to nine results are available. If ten or more results are available, the mean of the highest 20% of the results shall be used for comparison with the limiting values.

The requirements in (i) and (ii) above shall not apply to metallic elements protected by concrete or ancillary metallic items such as the tops of chambers and gullies.

**18** (02/16) Unburnt colliery spoil may be used as general fill provided it is compacted in compliance with Clause 612 and complies with the requirements of contract specific Appendix 6/1.

**19** (02/16) Pulverised-fuel ash shall not be placed within the dimension described in contract specific Appendix 6/3, below sub-formation or formation.

**20** (02/16) Where pulverised-fuel ash is used, the Contractor shall for each consignment make available to the Overseeing Organisation a record of the type and source from which it was obtained and a certificate of results of tests showing that the material complies with the requirements of Table 6/1.

national highways

# Example of national variations

Different regulations

## HE (main text)

### #1212 (05/01) Road Markings

**General**

1 (08/03) Road markings shall be white or yellow (Classes Y1 and Y2) complying with BS EN 1436 Table 6, as appropriate except where an alternative shade has been specified in Appendix 12/3. The markings shall consist of continuous or intermittent lines, letters, figures, arrows or symbols and comply with sub-Clauses 2 to 12 of this Clause.

Statutory requirements controlling road markings are contained in The Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113) and subsequent amending Regulations.

**Permanent Road Markings**

2 (11/07) Permanent road markings shall be one of the following materials and comply with the colour, location and material type requirements described in Appendix 12/3:

(i) thermoplastic road marking material or paint in accordance with BS EN 1871;

(ii) permanent preformed road markings in accordance with BS EN 1790;

(iii) other materials as described in Appendix 12/3.

They shall be also tested in road trials to the Roll-over class P5 in accordance with the procedure stated in BS EN 1824 to demonstrate compliance with the performance requirements as stated in sub-Clauses 3 to 6. The test report shall give particulars of the quality and quantity of the material, including drop on glass beads laid at the test site for future reference and comparison purposes should such a need arise.

3 Road markings shall have the following road performance as defined in BS EN 1436 for the period of the functional life starting from the date of application or when the road is trafficked, whichever is later. The materials to be used shall be to the same mix, material

| Property | BS EN 1436 Reference | Requirement | Value |
|---|---|---|---|
| Colour | Table 6 | 1. White<br>2. Yellow Class Y1, Y2 | x, y co-ordinates given<br>x, y co-ordinates given |
| Luminance Factor | Table 5 | 1. Class B2<br>2. Class B1 | 0.3<br>0.2 |
| Skid Resistance | Table 7 | 1. Class S1<br>2. Class S1 | 45<br>45 |
| Retroreflect-ivity | Table 2 Class of RL for dry markings | 1. Class R2<br>2. Class R1 | 100<br>80 |

* Note: 1 = White, 2 = Yellow

4 (11/07) The width tolerances and thickness for screed, spray, preformed and extruded white or yellow lines shall be in accordance with The Traffic Signs Regulations and General Direction 2002. With the exception of the road markings listed in Regulation 32 (2) of The Traffic Signs Regulations and General Directions, in no case shall any materials be laid more than 6 mm thick. Unless specified, all white markings shall be reflectorised with glass beads in accordance with BS EN 1423 and BS EN 1424 by incorporation (apart from preformed markings) into the road marking mixture and to the wet surface of the marking. The glass beads shall not have more than 1,000 ppm of Arsenic Trioxide, 200 ppm of Lead and 1,000 ppm of Antimony. The Contractor shall supply test certificates showing compliance with these requirements.

5 Where there is requirement for improved visibility in wet conditions at night, products showing the following performance in addition to that stated in sub-Clause 3 shall be used.

| Property | BS EN 1436 Reference | Requirement | Value |
|---|---|---|---|
| Retroreflect-ivity | Table 3 | Class RW3 | 50 |

6 Where there is a requirement for improved skid resistance as referred to in Appendix 12/3 products showing the following performance in addition to that stated in sub-Clause 3 shall be used.

| Property | BS EN 1436 Reference | Requirement | Value |
|---|---|---|---|
| Skid | Table 7 | Class S3 | 55 |

7 The pavement shall be prepared in accordance with the following:

(i) Where the marking is to be applied on concrete carriageways, the transverse texturing shall be freed from all traces of curing compound by wire brushing or other approved means. Prior to the application of the thermoplastic material a tack coat compatible with the road surface and the marking material shall be applied in accordance with the manufacturer's instructions.

(ii) On surface dressed carriageways, all loose chippings where the marking is to be applied shall be removed prior to application.

8 The application of permanent road markings shall be in accordance with the Sector Scheme described in Appendix A. Road marking materials shall only be applied to surfaces which are clean and dry. Markings shall be free from raggedness at their edges and shall be uniform and free from streaks. Longitudinal road markings shall be laid to a regular alignment.

**Raised Rib Road Markings**

9 Raised Rib Road Markings shall only be used on motorways with full width hardshoulders or all-purpose roads (both single and dual carriageway) with at least 1 metre wide hardstrips. They shall comply with sub-Clauses 1, 2(i), 3, 5, 6, 7 and 8 of this Clause.

10 Raised Rib Road Markings shall be white lines which are continuous over the sections where they are specified in Appendix 12/3. Where specified in Appendix 12/3 gaps shall be provided for drainage purposes.

11 (08/03) Raised Rib Road Markings shall be in accordance with The Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113), Diagrams 1012.2 and 1012.3, as appropriate. Spacing of the transverse raised ribs shall be 500 mm or 250 mm as specified in Appendix 12/3.

12 Raised Rib Road Markings shall not be used adjacent to hatched areas or central reserve crossings except as prescribed for use with diagrams 1040.3, 1040.5 and 1042.

**Temporary Road Markings**

13 Temporary road markings shall only be adopted with the prior approval of the Overseeing Organisation. They shall comply with sub-Clauses 1 to 8 of this Clause or if required to be removable, be constructed

## TS / WG

### 1212NI (05/01) Road Markings

**General**

1 Road markings shall be white or yellow (Classes Y1 and Y2) complying with BS EN 1436 Table 6, as appropriate except where an alternative shade has been specified in Appendix 12/3. The markings shall consist of continuous or intermittent lines, letters, figures, arrows or symbols and comply with sub-Clauses 2 to 12 of this Clause.

Statutory requirements controlling road markings are contained in The Traffic Signs Regulations (Northern Ireland) 1997 and subsequent amending Regulations.

**Permanent Road Markings**

2 (11/07) Permanent road markings shall be one of the following materials and comply with the colour, location and material type requirements described in Appendix 12/3:

(i) thermoplastic road marking material or paint in accordance with BS EN 1871;

(ii) permanent preformed road markings in accordance with BS EN 1790;

(iii) other materials as described in Appendix 12/3.

They shall be also tested in road trials to the Roll-over class of P5 in accordance with procedure stated in BS EN 1824 to demonstrate compliance with the performance requirements as stated in sub-Clauses 3 to 6. The test report shall give particulars of the quality and quantity of the material, including drop on glass beads laid at the test site for future reference and comparison purposes should such a need arise.

3 Road marking shall have the following road performance as defined in BS EN 1436 for the period of the functional life starting from the date of application or when the road is trafficked, whichever is later. The materials to be used shall be to the same mix, material quality, quantity and rate of application as used on the test site.

| Property | BS EN 1436 Reference | Requirement* | Value |
|---|---|---|---|
| Colour | Table 6 | 1. White<br>2. Yellow Class Y1, Y2 | x, y co-ordinates given<br>x, y co-ordinates given |
| Luminance Factor | Table 5 | 1. Class B2<br>2. Class B1 | 0.3<br>0.2 |
| Skid Resistance | Table 7 | 1. Class S1<br>2. Class S1 | 45<br>45 |
| Retroreflect-ivity | Table 2 Class of $R_L$ for dry markings | 1. Class R2<br>2. Class R1 | 100<br>80 |

* Note: 1 = White, 2 = Yellow

4 (11/07) The width tolerances and thickness for screed, spray, preformed and extrusion white or yellow lines shall be in accordance with the Traffic Signs Regulations (Northern Ireland) 1997. With the exception of the road markings listed in Regulation 29 (2) of The Traffic Signs Regulations (Northern Ireland), in no case shall any materials be laid more than 5 mm thick. Unless otherwise specified, all white markings shall be reflectorised with glass beads in accordance with BS EN 1423 and BS EN 1424 by incorporation (apart from preformed markings) into the road marking mixture and to the wet surface of the marking. The glass beads shall not have more than 1,000 ppm of Arsenic Trioxide, 200 ppm of Lead and 1,000 ppm of Antimony. The Contractor shall supply test certificates showing compliance with these requirements.

5 Where there is requirement for improved visibility in wet conditions at night, products showing the following performance in addition to that stated in sub-Clause 3 shall be used.

| Property | BS EN 1436 Reference | Requirement | Value |
|---|---|---|---|
| Retroreflect-ivity | Table 3 | Class RW3 | 50 |

6 Where there is a requirement for improved skid resistance as referred to in Appendix 12/3, products showing the following performance in addition to that stated in sub clause 3 shall be used.

| Property | BS EN 1436 Reference | Requirement | Value |
|---|---|---|---|
| Skid Resistance | Table 7 | Class S3 | 55 |

7 The pavement shall be prepared in accordance with the following:

(i) where the marking is to be applied on concrete carriageways, the transverse texturing shall be freed from all traces of curing compound by wire brushing or other approved means. Prior to the application of the thermoplastic material a tack coat compatible with the road surface and the marking material shall be applied in accordance with the manufacturer's instructions;

(ii) on surface dressed carriageways, all loose chippings where the marking is to be applied shall be removed prior to application.

8 The application of permanent road markings shall be in accordance with the Sector Scheme described in Appendix A. Road marking materials shall only be applied to surfaces which are clean and dry. Markings shall be free from raggedness at their edges and shall be uniform and free from streaks. Longitudinal road markings shall be laid to a regular alignment.

**Raised Rib Road Markings**

9 Raised Rib Road Markings shall only be used on motorways with full width hardshoulders or all-purpose roads (both single and dual carriageway) with at least 1 metre wide hardstrips. They shall comply with sub-Clauses 1, 2(i), 3, 5, 6, 7 and 8 of this Clause.

10 Raised Rib Road Markings shall be white lines which are continuous over the sections where they are specified in Appendix 12/3. Where specified in Appendix 12/3 gaps shall be provided for drainage purposes.

11 Raised Rib Road Markings shall be in accordance with The Traffic Signs Regulations (Northern Ireland) 1997, Diagrams 1012.2 and 1012.3, as appropriate. Spacing of the transverse raised ribs shall be 500 mm or 250 mm as specified in Appendix 12/3.

12 Raised Rib Road Markings shall not be used adjacent to hatched areas or central reserve crossings

national highways

# Example of national variations

Different regulations

Modification to a requirement contained in the main text

## HE (main text)

14 When temporary road markings are used on surfaces that will continue to be used by public traffic after their removal, any shadow trace remaining after their removal shall be permanently obliterated. Preformed materials shall not be used for this obliteration.

15 Temporary road markings constructed from a proprietary preformed road marking material shall only be adopted in locations and on types of road surface as described in Appendix 12/3 and shall comply with any other requirement therein. The marking material shall be new and together with any primer shall be stored and installed in accordance with the manufacturer's instructions and within the recommended shelf life.

16 Temporary preformed road markings shall only be applied to surfaces that are clean and dry. Upon removal they shall be disposed of off Site and if any making good is necessary to the road surface it shall be satisfactorily carried out before the road is opened to traffic.

**Road Markings on Porous Asphalt Surfacing**

17 Spray paint, thermoplastic applied by machine screed, spray or extrusion or preformed road markings shall be used for carriageway markings on porous asphalt surfacing. Manual screeding shall not be permitted except for directional arrows and similar markings.

**Removal of Road Markings**

18 (05/08) The removal of road markings on surfaces that will continue to be used by traffic shall be undertaken in a manner that will avoid damage to the surface.

The removal of temporary road markings shall comply with sub-Clauses 14 and 15 of this Clause.

For bituminous running surfaces, the removal of permanent road markings shall be by mechanical means or forced air abrasive (shot blasting) only. Hot Compressed Air (HCA) lance shall be permitted on other types of running surfaces. In all cases the Contractor shall submit details of the proposed method for the Overseeing Organisation's consent.

**Masking of Road Markings**

19 (11/07) When black masking materials are required to cover existing permanent road markings, they shall comply with BS 7962. The total thickness of original and masking materials shall not exceed 6 mm.

(05/04) **Longitudinal Road Markings Lateral Tolerances**

20 (05/04) For longitudinal road markings, the lateral tolerance shall be within ± 25mm from the designed position. Any discontinuities between road markings shall be replaced with a smooth taper from one road marking to the other. The length of the transition shall be derived from table below. All road markings shall comply with the dimensions, angles and proportions stated in the Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No.3113 and any subsequent amending Regulations.

| Speed Limit (mph) | Taper |
|---|---|
| 30 | 1 in 40 |
| 40 | 1 in 40 |
| 50 | 1 in 45 |
| 60 | 1 in 50 |
| 70 | 1 in 55 |

## TS / WG

14 When temporary road markings are used on surfaces that will continue to be used by public traffic after their removal, any shadow trace remaining after their removal shall be permanently obliterated. Preformed materials shall not be used for this obliteration.

15 Temporary road markings constructed from a proprietary preformed road marking material shall only be adopted in locations and on types of road surface as described in Appendix 12/3 and shall comply with any other requirement therein. The marking material shall be new and together with any primer shall be stored and installed in accordance with the manufacturer's instructions and within the recommended shelf life.

16 Temporary preformed road markings shall only be applied to surfaces that are clean and dry. Upon removal they shall be disposed of off Site and if any making good is necessary to the road surface it shall be satisfactorily carried out before the road is opened to traffic.

**Road Markings on Porous Asphalt Surfacing**

17 Spray paint, thermoplastic applied by machine screed, spray or extrusion. or preformed road markings shall be used for carriageway markings on porous asphalt surfacing. Manual screeding shall not be permitted except for directional arrows and similar markings.

**Removal of Road Markings**

18 The removal of road markings on surfaces that will continue to be used by traffic shall be undertaken in a manner that will avoid damage to the surface.

The removal of temporary road markings shall comply with sub-Clauses 14 and 15 of this Clause.

The removal of permanent road markings shall be by mechanical means only. The Contractor shall submit details of the system he proposes to use to the Overseeing Organisation for approval.

**Masking of Road Markings**

19 (11/07) When black masking materials are required to cover existing permanent road markings, they shall comply with BS 7962. The total thickness of original and masking materials shall not exceed 6 mm.

(05/04) **Longitudinal Road Markings Lateral Tolerances**

20 (05/04) For longitudinal road markings, the lateral tolerance shall be within ± 25 mm from the designed position. Any discontinuities between road markings shall be replaced with a smooth taper from one road

be derived from table below. All road markings shall comply with the dimensions, angles and proportions stated in the Traffic Signs Regulations (Northern Ireland) 1997 and any subsequent amending Regulations.

| Speed Limit (mph) | Taper |
|---|---|
| 30 | 1 in 40 |
| 40 | 1 in 40 |
| 50 | 1 in 45 |
| 60 | 1 in 50 |
| 70 | 1 in 55 |

national highways

# Approach to review current national variations

- Identify current national variations and check those that are needed (e.g. for different legislative rules) and those that could be removed.
- **Please start discussing with our counterparts in the Devolved Administrations and agree whether national variations can be removed or should be retained.**

# Nationally Determined Requirements and Sections

- **In the future MCHW, national variations will be called “Nationally Determined Requirements” (NDR) or “Nationally Determined Sections” (NDS).**
- General rules for constructor requirements and specifier instructions apply to NDR and NDS.

# Nationally Determined Requirements (NDR)

- Where needed, NDRs shall be created for each Overseeing Organisation, authored ‘in-line’ and kept together with core requirements in CARS.

- If an Overseeing Organisation does not have country-specific content, the NDR shall be as follows:

  ‘*No nationally determined requirements are provided*’

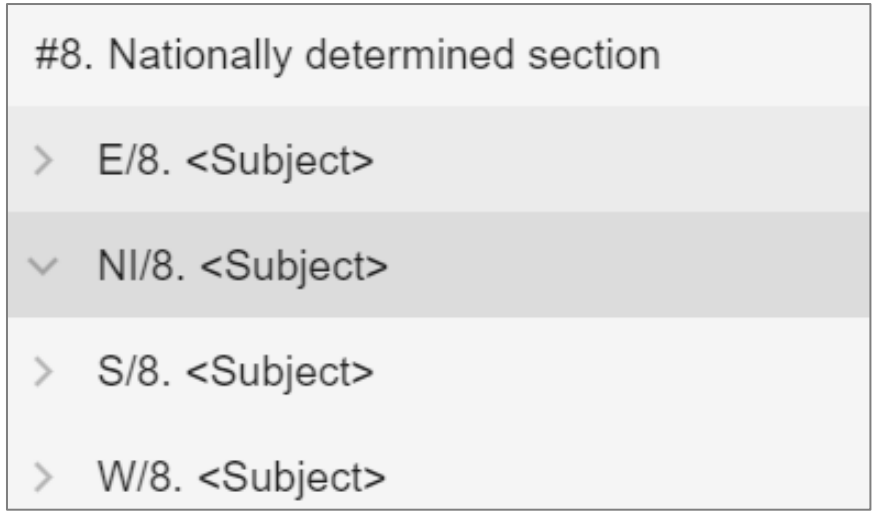
| | | |
|---|---|---|
| 5.12 | REQUIREMENT |
| #5.13 | Nationally Determined Requirement |
| E/5.13 | This requirement shall be followed. |
| NI/5.13 | No nationally determined requirement is provided. |
| S/5.13 | This requirement shall be followed. |
| W/5.13 | No nationally determined requirement is provided. |

# Nationally Determined Sections (NDS)

- Where needed, NDSs shall be created for each Overseeing Organisation.

- If an Overseeing Organisation does not have content for the NDS, the NDR shall only contain the following sentence:

  '*No nationally determined requirements are provided*'



# Presentation of NDR and NDS in the published documents

- The style of published MCHW documents is under discussion and will be confirmed in due course. No impact on drafting rules.
  - Metadata shall be associated with NDRs.
  - This gives the options to publish NDRs either in NAAs or within the main text thus publishing country-specific documents.

- For any queries, please contact TAGG.

# CARS functionality for national variations

*see training on CARS*

# Key takeaways on national variations

- ✓ Identify current national variations and check those that are needed (e.g. for different legislative rules) and those that could be removed
- ✓ Start engagement with our counterparts in the Devolved Administrations and agree whether national variations can be removed or should be retained
- ✓ MCHW national variations will be called “Nationally Determined Requirements” (NDR) or “Nationally Determined Sections” (NDS)
- ✓ Use CARS functionality to introduce NDRs and NDSs
- ✓ The style of published MCHW documents is under discussion and will be confirmed in due course

national highways

| High-level drafting objectives | Specific drafting rules | |
|---|---|---|
| Setting clear requirements to the constructor in the SHW, including clear links with the DMRB | A1: Verb forms<br>A2: Clarity of constructor requirements<br>A3: Section title and cross references<br>A4: Using standard format requirements (SFR)<br>A5: Product and installation requirements | 2 |
| | A6: Verification and documentation requirements<br>A7: Other types of constructor requirements<br>A8: Construction vs design requirements<br>A9: Performance and method requirements | 3 |
| Setting clear instructions to the specifier in the IfS documents and clear links with the WSI | B1: IfS content, presentation and format<br>B2: Establishing clear links between SHW, IfS and WSI | 4 |
| Setting contract neutral requirements to the constructor in the SHW | C1: Contract and product neutrality | |
| Present national variations clearly and consistently | D1: Nationally Determined Requirements and sections | |
| Supporting decarbonisation | *Specific rules will be provided in a separate module* | |

national highways

# Decarbonisation: general principles

- Decarbonisation is one of the top priorities in the UK construction industry.
- Section 14 in MDD Part 3 has been updated with high-level drafting principles including:
  - Technical authors shall consider how RADs can promote (or at least not inhibit) the adoption of zero carbon materials for construction and maintenance;
  - Technical authors shall consider how RADs can promote the carbon management hierarchy, which is part of the concept of ‘circular economy’: *build nothing, building less, build clever, build efficiently.*
- **Specific training will be provided.**

# Key takeaways on decarbonisation

- ✓ Review the high-level drafting principles given in Section 14 in MDD Part 3
- ✓ Consider how RADs can promote (or at least not inhibit) the adoption of zero carbon materials for construction and maintenance
- ✓ Consider how RADs can promote the carbon management hierarchy
- ✓ Attend specific training covering decarbonisation aspects when available

national highways

# Closing remarks

# Objectives for today

- Provide training on the new approach to drafting MCHW Volumes 1 and 2, including exercises.
- Explain support that will be provided throughout the drafting process.
- Collect questions from the audience.

| High-level drafting objectives | Specific drafting rules |
|---|---|
| Setting clear requirements to the constructor in the SHW, including clear links with the | A1: Verb forms<br>A2: Clarity of constructor requirements<br>A3: Section title and cross references<br>A4: Using standard format requirements (SFR)<br>A8: Construction vs design requirements |
| Setting clear instructions to the sp documents and clear links with the | |
| Setting contract neutral requireme constructor in the SHW | |
| Present national variations clearly | |
| Supporting decarbonisation | |

# Start from first principles

Each section applies to a physical object

Consistent use of verb forms

Independent clauses, no ambiguity

Contract neutral clauses

Clear distinction between product and installation requirements for each physical object …

…which in turn helps make a clear distinction between verification requirements

Clear documentation requirements

**WIDGETS**

**Product requirements**

1.1 Widgets shall be compliant with BS EN 12345.

1.2 Widgets shall meet the following performance characteristics: <performance characte

1.3 Widgets shall also meet the performance characteristics stated in schedule WSI xx.

SI.1.3a Provide unique reference for each drawing.

SI.1.3b Select widget type from permitted options (type 1, type 2, type 3).

1.4 The ([declaration of performance]) in accordance with ([replacement for Clause 106]) shall apply to the use of widgets.

1.5 The design of <subject of design> shall be in accordance with <design standard reference>.

**Product verification**

1.5 Certification shall be supplied to demonstrate that the widgets comply with BS EN 12345.

**Installation requirements**

1.6 Widgets shall be installed in accordance with the manufacture instruction.

1.7 Records of the alignment check for widgets shall be submitted to the Overseeing Organisation.

**Installation verification**

1.8 The alignment of widgets shall be checked within 24 hours of installation.

**Documentation requirements**

1.9 The following documentation shall be submitted for widgets prior to the commencement of <details of the works>: <detail the documentation>.

1.10 Documentation for widgets shall be submitted at least four weeks prior to the commencement of <details of the works>.

1.11 The requirements for documentation ([replacement for Clause 104 and 105]) shall apply to widgets.

Clear instructions for the specifier directly linked with the relevant constructor requirement and easy to convert into WSI

| Schedule A | |
|---|---|
| **Drawing number** | **Type** |
| [Unique reference] | [Type 1, Type 2, Type 3] |
| | |
| | |
| | |

Clear distinction between design and construction requirements (with constructor design undertaken according to the DMRB as relevant)

Right balance between performance and method-based requirements

Use of standard format requirements

# Key activities

- When updating Volumes 1 and 2, the impact on the DMRB needs to be assessed.
- The following activities will need to be undertaken:

1. Preliminary screening / filtering exercise to categorise the content and identify content that needs to migrate to the DMRB **(by March 2022)**
2. Updating of (about 85%) SHW and NfG and identification of further design content to be migrated to the DMRB **(by December 2022)**
3. Development of clauses for existing DMRB documents / creation of new DMRB documents **(by April 2023)**

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# Deliverables

i. Draft **SHW document and associated instructions for specifiers**, **sample appendices for works specific inputs** (*i.e. WSI wireframe*), associated changes to **Volume 3 drawings** (*Volume 3 drafting rules will be covered in separate training*), and all other amendments required to implement the specification following the MDD (*specific rules on decarbonisation will be added soon*)

ii. Draft **Nationally Determined Requirements or Sections**, if needed

iii. Draft new **DMRB document**(s) or new / updated clauses for existing DMRB documents to provide design information currently within the Notes for Guidance and SHW, if needed

**iv. ‘Document development plan’, ‘change log’ and ‘clause change summary’** (see Help pages)

**v. Validation** of constructor requirements

vi. Other deliverables as required from the MDD (governance deliverables) and from the work package (for the supply chain)

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# Engagement

## Engagement with content specialists

- It is highly recommended to meet the two intermediate milestones indicated below:
  - **Submission of the first two sections** of the document (CARS link) to the Content Specialist to receive immediate feedback.
  - Submission of the document (CARS link) to the Content Specialist when roughly **25% to 50%** is complete to receive progressive assurance.

## Engagement with the Devolved Administrations

- At the start of the drafting process to give them enough time to provide their input and develop their NAAs, and throughout the drafting work.

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# Effective ways of working

Based on lessons learnt in RIS 1


1. **Effective planning** (document development plan carefully drafted at the start and checked throughout)
2. **Individual commitment** and accountability
3. **Effective engagement** with team member (e.g. short phone calls once/ twice a week, that covers for each team member: (1) What they have done, (2) What their plans are, (3) Anything that is blocking them).
4. Active **review of progress made and any blockers** (e.g. retrospectives every 2/3 weeks to improve the process)

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# Support provided

- Training slides and recorded video covering drafting rules
  - Summary slides have also been extracted as a check-list for your use
- CARS functionality released on 22 March 2021, training slides and recorded video available, Help pages refreshed
- MDD rules issued on 22 March 2021
- Content specialists available (with supporting content reviewers):
  - Kate Albon Kathleen.Albon@highwaysengland.co.uk
  - Simon Hartshorne Simon.Hartshorne2@highwaysengland.co.uk
  - Maurice Jones Maurice.Jones@highwaysengland.co.uk

- For any queries, please contact PM Gareth Smith Gareth.Smith@highwaysengland.co.uk
  - Weekly drop-in sessions are available to ask queries and have in-depth discussions

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# Outcomes from today

- Understand the necessity for compliance with the new structure and style of Volumes 1 and 2.
- Understand the high-level principles behind the update of Volumes 1 and 2.
- Understand the specific drafting rules for Volumes 1 and 2.
- Be ready to start drafting.

# Feedback on this training:

https://survey.alchemer.eu/s3/90418976/MCHW-training-11-01-2022

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# Thank you