

Traffic Signs Manual

CHAPTER

8

**Traffic Safety Measures and Signs for
Road Works and Temporary Situations**

Part 3: Update

2020

Traffic Signs Manual

Chapter 8

Traffic Safety Measures and Signs for Road Works and Temporary Situations Part 3 Update

Department for Transport

Department for Infrastructure (Northern Ireland)

Transport Scotland

Welsh Government

Traffic Signs Manual

Contents of Chapters 1–8

CHAPTER 1 Introduction

CHAPTER 2 Informatory Signs*

CHAPTER 3 Regulatory Signs

CHAPTER 4 Warning Signs

CHAPTER 5 Road Markings

CHAPTER 6 Traffic Control

CHAPTER 7 The Design of Traffic Signs

CHAPTER 8 Traffic Safety Measures and Signs for Road Works and Temporary Situations

* To be published at a later date

Designers should consult the Department for Transport's website www.gov.uk for confirmation of current publication dates.

Published for The Department for Transport under licence from the Controller of Her Majesty's Stationery Office

© Crown copyright 2020

All rights reserved

Copyright in the typographical arrangement rests with the Crown.

This publication, excluding logos, may be reproduced free of charge in any format or medium for non-commercial research, private study or for internal circulation within an organisation. This is subject to it being reproduced accurately and not used in a misleading context. The copyright source of the material must be acknowledged and the title of the publication specified.

ISBN 978 0 11 553510 9

Printed In the United Kingdom for TSO (The Stationery Office)
J003638650 c2 02/20

U1	INTRODUCTION	6
U1.1	Overview of Traffic Signs Manual	6
U1.2	Primary definitions in Traffic Signs Manual	6
U1.3	Responsibility	7
U1.4	References	8
U1.5	Format	8
U1.6	Overview of Chapter 8 Road works and other temporary situations	8
U1.7	Structure and scope of this Chapter	10
U1.8	Legal status	10
U1.9	Concepts and objectives	11
U1.10	Standard works and relaxations	12
U1.11	Further information	13
U2	CLARIFICATIONS AND MISCELLANEOUS UPDATES	14
U2.1	Introduction	14
U2.2	General principles of temporary traffic management design	14
U2.3	Documentation	14
U2.4	Safety – overarching requirements	15
U2.5	Risk assessment	15
U2.6	Risk sharing	16
U2.7	Designer training and competence	16
U2.8	Mounting and lighting of signs	18
U2.9	Speed limits - General	19
U2.10	Identification of relevant reduced speed limits for high speed roads	21
	Identification of relevant reduced speed limit for other roads	23
	Additional speed limit information signs	23
	Use of controlled motorways signalling for reduced speed limits at works	23
U2.11	Risk models	25
U2.12	On-road trials	26
U2.13	Programming of works	27
U2.14	Warning lights (road danger lamps)	27
U2.15	Fixed taper positions	28
	Taper positions	29
	Approach signing	30
U2.16	Sign removal and auditing	34
U2.17	Offside signs	35
U2.18	Accident and incident recording and reporting	37
U2.19	Diversions	38
U2.20	Length of works, design requirements for longer works and separation between schemes	40
U3	SIGNING PRINCIPLES – SIGNS PRESCRIBED WITHIN TSRGD	42
U3.1	Introduction	42
U3.2	Incident Management	42
U3.3	Temporary parking restrictions and police incident management	43
U3.4	Level Crossings	45
U3.5	Speed enforcement	45

U3.6	Vehicle check point	46
U3.7	Housing development	48
U3.8	Emergency vehicles	49
U3.9	Advance notification	49
U3.10	Contact information	51
U3.11	Traffic control	52
U3.12	Permanent change to road layout ahead	54
U3.13	Hazard information	54
U3.14	Lane use	55
U3.15	Temporary lane alignment and destinations	57
U3.16	Recovery vehicles	60
U3.17	Advisory speed limit	60
U4	SIGNING PRINCIPLES – VEHICLE MOUNTED SIGNS	62
U4.1	Introduction	62
U4.2	Vehicle mounted signs	62
U4.3	Vehicle conspicuity markings	65
U5	SIGNING PRINCIPLES – SIGNS PRESCRIBED BY SCHEDULE 13.9	67
U5.1	Introduction	67
U5.2	Colour coding	67
U5.3	Sign design	68
U5.4	'x' Height	69
U5.5	Temporary information and events	70
U5.6	Infected areas	71
U5.7	Incident management	71
U5.8	Vehicle check point	73
U5.9	Diversion signing	73
U5.10	Advance signing	76
U5.11	Hazard information or warning	77
U5.12	Street lighting not in use	78
U5.13	Alternative routes for pedestrians	79
U5.14	Wide load	79
U5.15	Works traffic	80
U5.16	Temporary variable message signs (VMS)	82
U6	SIGNING PRINCIPLES – EXCEPTIONAL NON-PRESCRIBED SIGNS	86
U6.1	Introduction	86
U6.2	Vehicle mounted signs	87
U7	OPERATIONAL ISSUES	89
U7.1	Introduction	89
U7.2	Diversion signing – slip road closures	89
U7.3	The use of impact protection vehicles for temporary traffic management	92
U7.4	Lane control (red 'X') signals	96
U7.5	Amendments to approach and lane-change zone signing for relaxation closures	96
U7.6	The alternative entry taper – application and use	102
U7.7	Work site signs and signals	104
U7.8	Scheme inspections	105

U8 SIGN FACE DESIGN	107
U8.1 Introduction	107
U8.2 Works traffic	107
U8.3 Non-police incident management signs	108
U8.4 The design and use of signs to diagram 7202.1	109
U8.5 The design and use of signs to diagram 7243	109
U8.6 The design and use of signs to diagrams 7244 and 7245	110
U8.7 Amendments to traffic signs in lane change layouts	111
U8.8 Installation, maintenance and removal of temporary signs	119
U8.9 Signs indicating length of road works	120
Appendix A1 Tables	121
A1.2 Sizes of Signs	122
A1.6 Delineation	133
A1.7 Approach 'wicket' signing for relaxation schemes	136
Approach 'wicket' signing – sizes, clear visibility distances and specification.	136
A1.8 Determination of a design speed for standard schemes	138
Appendix A2 Glossary	140
Amendments	140
Appendix A3 Legislation, Standard, RADs and Guidance	142
Legislation	142
Standards	143
British Standards for traffic signs	143
British Standards for road marking materials	143
Other relevant British Standards	144
Standard colours for traffic signs	144
Standard colours for road markings	145
Department for Transport: (The Stationery Office Ltd)	145
Design Manual for Roads and Bridges (DMRB)	146
HSE DOCUMENTS	146
Institute of Highway Engineers guidance	147
OTHER DOCUMENTS	147
Appendix A4 TSRGD 2016	149
INDEX	151
LIST OF FIGURES	176

U1.1 Overview of Traffic Signs Manual

U1.1.1. The Traffic Signs Manual (the Manual) offers advice to traffic authorities and their contractors, designers and managing agents in the United Kingdom, on the correct use of traffic signs and road markings on the highway network. Mandatory requirements are set out in the Traffic Signs Regulations and General Directions 2016 (as amended) (TSRGD). In Northern Ireland the relevant legislation is the Traffic Signs Regulations (Northern Ireland) 1997 (as amended). Whilst the Manual can assist with complying with the mandatory requirements, it cannot provide a definitive legal interpretation, nor can it override them. This remains the prerogative of the courts in relation to the appearance and use of specific traffic signs, road markings etc. at specific locations.

U1.1.2. The advice is given to assist authorities in the discharge of their duties under section 122 of the Road Traffic Regulation Act 1984 and Part 2 of the Traffic Management Act 2004 in England and under Part 1 of the Roads (Scotland) Act 1984. Subject to compliance with the Directions, which are mandatory (see [U1.4.2](#) and [U1.4.3](#)), it is for traffic authorities and their contractors to determine what signing is necessary to meet those duties.

U1.1.3. It includes advice on the use, siting, and illumination of traffic signs and road markings on all purpose roads and motorways, as well as temporary signs for use in connection with road works and in emergency situations. Following the advice in the Manual can also help traffic authorities reduce the amount of sign clutter on their roads.

U1.1.4. The Manual applies to the United Kingdom. References to “the national authority” should therefore be interpreted as referring to the Secretary of State for Transport, the Department for Infrastructure (Northern Ireland), the Scottish Government or the Welsh Government as appropriate. Any reference to the “Department” is a reference to the Department for Transport or the appropriate national authority for Northern Ireland, Scotland or Wales as described above.

U1.2 Primary definitions in Traffic Signs Manual

U1.2.1. In the Manual, the word “must” is used to indicate a legal requirement of the Traffic Signs Regulations and General Directions (or other legislation) that must be complied with. The word “shall” indicates an essential (or mandatory) requirement of compliance with this document, and “should” indicates a course of action that is recommended and represents good practice. The word “may” generally indicates a permissible action, or an option that requires consideration depending on the circumstances. The word ‘must’ is also used where two or more parts of a product, design option or method of operation is required to be combined to be considered as being suitable for use or adoption as part of a safe system of work.

U1.2.2. Section 64 of the Road Traffic Regulation Act 1984 defines a traffic sign as “any object or device (whether fixed or portable) for conveying to traffic on roads or any specified class of traffic, warnings, information, requirements, restrictions or prohibitions of any description ... and any line or mark on the road for so conveying such warnings, information, requirements, restrictions or prohibitions” and stipulates that these signs be “specified by regulations made by the national authority, or authorised by the national authority”. The types of signs and carriageway markings and their appropriate use are prescribed in TSRGD.

U1.2.3. “Signing” includes not only traffic signs mounted on supports (and other structures such as gantries, bridges, railings, etc) but also carriageway markings, beacons, studs, bollards, traffic signals, matrix signals and other devices prescribed in TSRGD.

U1.3 Responsibility

U1.3.1. Traffic signs are placed by the traffic authority, or their contractors, through the powers provided by the Road Traffic Regulation Act 1984, to provide warnings, information and details of restrictions to road users. The police and certain other public bodies and statutory authorities also have the right to place traffic signs, but only in the limited circumstances provided for by the relevant legislation.

U1.3.2. In order to achieve safe and efficient operation of a highway network, it is essential that all signing provided is necessary, clear and unambiguous, and gives its message to road users at the appropriate time. The message must be quickly and easily understood at the point it is needed; neither too soon that the information might be forgotten, nor too late for the safe performance of any necessary manoeuvre.

U1.3.3. Engineers who design and maintain the road network must be able to offer consistent standards that can satisfy the road user’s need for information and guidance. Traffic authorities depend on signing for the efficient control and movement of traffic, for enforcement of traffic regulations and, most importantly, as an aid to road safety. It is therefore recommended that all major traffic signing work should have been designed or checked by someone with an appropriate qualification.

U1.3.4. An example qualification would be the Institute of Highway Engineers’ Professional Certificate in Traffic Sign Design that allows applicants to demonstrate their experience and produce work to the required standard. A designer holding a Practitioner or Expert level Certificate would be likely to demonstrate the skills needed to adequately check traffic signing work. For more information please see:

www.theihe.org/professional-certificates

U1.3.5. In describing the design and use of signs, mention is made of the definitions listed in **Table 1.1**. These are all elements that must be considered during the design stage of the signing process to ensure signs are seen accurately by drivers, within the appropriate time frame and to maintain road safety.

Table 1.1 Definitions

Sign legibility	The attributes of a sign face that allows recognition of its text characters, numerals and symbols. It is affected by the choice and size of type face, the contrast between colours and the amount of light reaching the observer from the sign. It directly relates to an observer’s visual acuity.
Legibility distance	The furthest distance at which a sign is legible determines the time available for a driver to read its message, taking account of the speed at which they are travelling.
Readability	The character of a sign that leads to comprehension of its intended message. This depends on legibility, its layout and spacing, the clarity and ease of recognition of any symbology, the amount of information it contains, and the time available to read it. It is considered a subjective outcome.
Conspicuity	The capacity of a sign to stand out or be distinguishable from its surroundings and thus be readily discovered by the eye. It is improved if there is a noticeable contrast between a sign and its background. It is particularly likely to be an issue for smaller signs.
(clear) Visibility	The physical attributes of a sign and its location that allow it to be seen at a given distance, even if not yet legible.

U1.4 References

U1.4.1. Any reference to the “Regulations” or the “Directions” is a reference to the Traffic Signs Regulations and General Directions 2016, applicable to England, Scotland and Wales. Reference to a diagram number or to a Schedule is a reference to a diagram or Schedule in those Regulations.

U1.4.2. In Northern Ireland, the relevant legislation is the Traffic Signs Regulations (Northern Ireland) 1997 as amended. Diagram numbering occasionally differs in these Regulations and references to Schedules do not apply to Northern Ireland. The design of road markings, meanings and permitted variants are generally similar but can vary; where the Northern Ireland Regulations apply, the designer is advised to read them in conjunction with the Manual.

U1.4.3. Not all road markings referred to in the text are included in the Northern Ireland Regulations. References to Directions are not applicable in Northern Ireland; where these are referred to, advice should be sought from the Department for Infrastructure’s Headquarters.

U1.5 Format

U1.5.1. Any reference to a “Chapter” is a reference to a Chapter of the Traffic Signs Manual, and any reference to a “section”, unless otherwise stated, is a reference to a section within a chapter of the Manual. A reference to ‘Part’, other than in reference to TSRGD, refers to Parts 1 to 3 of Chapter 8.

U1.5.2. References to Schedules, Parts, items and paragraphs within TSRGD are shown in an abbreviated format. In this system, “Schedule” is shortened to “S” and “Part” is indicated by the second number without a prefix. The final element, variously “item” or “paragraph” is also denoted by a number without a prefix. This is illustrated in the following examples:

“Schedule 9, Part 6, item 25” becomes “S9-6-25”

“Schedule 11, Part 6, paragraph 3” becomes “S11-6-3”

“Schedule 12, Part 2” becomes “S12-2”

U1.5.3. The numbering system contained in the Manual utilises three levels comprising sections, sub-headings and numbered paragraphs. Internal references are in **bold blue**.

U1.5.4. Dimensions on the figures are in millimetres unless stated otherwise. Many markings are fully dimensioned in TSRGD. Detailed working drawings of traffic signs and road markings are available at:

www.gov.uk/government/collections/traffic-signs-signals-and-road-markings

Working drawings for Welsh and English bilingual signs are available at:

www.traffic-wales.com/traffic_signs.aspx

U1.5.5. In addition to indicating overall dimensions, TSRGD prescribes maximum heights for road markings and road studs (regulation 10).

U1.6 Overview of Chapter 8 Road works and other temporary situations

U1.6.1. In the operation and maintenance of highway networks, it is necessary from time to time to put in place temporary traffic management measures to facilitate safe road works, temporary closures or incident management, whilst keeping the traffic flowing as freely as possible. With high traffic flows on many roads, it is particularly important to plan all works

activities and temporary closures to optimise safety, road space and work efficiency, whilst minimising road user congestion, delay and inconvenience.

U1.6.2. Road works on or near a carriageway, cycle route or footway may impair the safety and free movement of vehicles, cyclists and pedestrians (particularly those with mobility and visual impairments). All reasonable steps should be taken to ensure that the effects of the works are reduced to a minimum. This Chapter sets out the effects of road works or temporary closures on all kinds of road user and recommends steps that should be taken to minimise these effects. It also emphasises the importance of following the recommended measures.

U1.6.3. The Health and Safety at Work, etc. Act 1974 and the Health and Safety at Work (NI) Order 1978 require all clients, employers and employees to establish and maintain safe systems of work. Traffic authorities, statutory undertakers and contractors must give due attention to the detailed traffic management arrangements at road works sites and incident locations in order to ensure the safety of the public and of their own employees at these obstructions. It is essential for the safety of all concerned that uniform and consistent procedures should be adopted. Chapter 8 is intended to provide a standard of good practice for the signing and marking of obstructions as well as for the temporary traffic control necessitated by such obstructions of the highway. The standard described is a minimum, which should always be achieved. At difficult sites, i.e. sites where the on-site risk assessment has shown that the level of risk is above normal, further signs and other equipment will be necessary.

U1.6.4. Under the Construction (Design and Management) Regulations 2015 (CDM) and the Construction (Design and Management) Regulations (NI) 2016, clients, co-ordinators, designers and contractors have legal duties to plan, co-ordinate and manage health and safety throughout all stages of the project. CDM goes hand in hand with the Management of Health and Safety at Work Regulations 1999 (MHSW) and the Management of Health and Safety at Work Regulations (NI) 2000. Good management of the work is essential to prevent accidents and ill health.

U1.6.5. Reasonable adjustments may also need to be made to works in order to comply with the Equality Act 2010 in Great Britain and the Disability Discrimination Act 2005 in Northern Ireland. Further guidance on meeting the requirements of these Acts can be found in the associated Code of Practice.

U1.6.6. In this document the terms “traffic” and “road users” shall be taken to include both motorised and non-motorised users such as pedestrians, cyclists and horse riders.

U1.6.7. In this document “road works” are defined as any works which cause partial or total obstruction of any road or highway, whether on the verge, hard shoulder, footway, cycle route, bridleway or carriageway. Examples may include highway improvement schemes, excavations, structural, inspection or maintenance works of any kind, street works or any other work executed on or near the highway together with the necessary working space, safety zones, space required for the storage of any materials, the construction of any temporary structures, and the operation of any construction plant required for the execution of such work, including associated surveys and inspections. “Temporary situations” are defined as any short term (up to six months) alterations to a road or highway which not related to a construction, inspection or maintenance activity.

U1.6.8. In this document the term ‘road worker’ is a description independent of any employment status or employer. It includes all those who may be undertaking inspection, survey, enforcement, maintenance or construction activities as well as mobile works. It would not normally cover drivers or riders who are working where the nature of the employment is not

related to the works, temporary situation or the traffic authority. It is expected that road workers undertaking similar activities should have a similar levels of risk irrespective of employment status or employer.

U1.6.9. In this document the term ‘authority’ or ‘traffic authority’ will generally indicate a highway authority, road authority, or road owner (see [U1.8.1](#)). Any reference to other authorities will be identified in the text.

U1.6.10. In this document Temporary Traffic Management (TTM) is a generic term for any sign, equipment or other product placed on a road, or mobile works vehicle. The term is independent of the purpose of the activity requiring the TTM to be used e.g. road works, events, censuses, vehicle inspections.

U1.7 Structure and scope of this Chapter

U1.7.1. Chapter 8 comprises three documents:

- Part 1: Design provides guidance for those responsible for the design of temporary traffic management arrangements which should be implemented to facilitate maintenance activities or in response to temporary situations. It contains advice relating to traffic safety measures, and the identity and location of the traffic signs needed to guide road users, including pedestrians, safely past obstructions in temporary situations. It is structured to facilitate and reflect the design process for temporary traffic management, from the initial broad brief to details of signing provision. It raises the principal issues that need to be considered in temporary traffic management design and provides advice about their resolution. The document deals with the design of temporary traffic management arrangements on single carriageway roads and dual carriageway roads separately. The design guidance is illustrated by the inclusion of sample plans;
- Part 2: Operations provides guidance for those responsible for planning, managing, and participating in operations to implement, maintain and remove temporary traffic management arrangements. It contains advice relating to good working practice spanning all aspects of temporary traffic management operations from broad management issues to issues involving the activities of individual operatives. The guidance is illustrated by the inclusion of sample plans relating to the operational guidance of particular temporary traffic management techniques; and
- This document, Part 3: Update, provides information on changes to the methods used to prescribe traffic signs in the 2016 Traffic Signs Regulations and General Directions. In most cases, the same signs will be used in the same situations as shown in Parts 1 and 2 (2009). This part provides a reference on where the requirements for individual signs in the TSRGD and design information can be found. This part introduces new options for lane control ‘wicket’ signs and guidance on how these new options should be applied to different types of schemes. While this part does not replace the design of temporary traffic management arrangements it does provide updates on relaxation schemes and on selecting safe methods of installing signs and other equipment.

U1.8 Legal status

U1.8.1. The Traffic Signs Manual is applicable in England, Northern Ireland, Scotland and Wales. This Chapter sets out a code of practice to enable the legal requirements to be met in a wide variety of circumstances although it has no statutory force, except in Northern Ireland where an authorised officer for the Department may deem it to have such force. (Article 31 of the Road Traffic Regulation (Northern Ireland) Order 1997 is the legal status that deems Chapter 8 to be a legal document for certain roads only and only for the signs and devices

used). All authorities, bodies and organisations responsible for all types of roads to which the public have access, are strongly recommended to make compliance with the requirements of Chapter 8, a condition of contract in the case of works carried out on their behalf. These roads include special toll roads, tunnels and bridges, industrial parks, retail parks, service areas, leisure parks, academic campus, hospitals, docks, railway, Ministry of Defence land, heritage, park, and similar estate roads etc.

U1.8.2. It should be noted that many of the basic principles contained in this document are also covered in the Safety at Street Works and Road Works: A Code of Practice, which has legal backing under Sections 65 and 124 of the New Roads and Street Works Act 1991 and Article 25 of the Street Works (NI) Order 1995.

U1.8.3. Section 174 of the Highways Act 1980, Section 60 of the Roads (Scotland) Act 1984 and Article 31 of the Road Traffic Regulation (NI) Order 1997 make it clear that the proper guarding, lighting and signing of the works are the responsibility of the person carrying them out.

U1.8.4. The majority of signs used in this document are prescribed in the TSRGD. This prescribes the design and conditions of use for traffic signs (which include road markings, traffic signals, pedestrian, cycle and equestrian crossings), to be lawfully placed on or near roads in England, Scotland and Wales. Other signs may be authorised by the national authority for use by individual traffic authorities; any authorised sign must only be placed on a road in a manner specified or directed in the authorisation.

U1.8.5. In Northern Ireland the equivalent legislation to the TSRGD is the Traffic Signs Regulations (Northern Ireland) 1997. Diagram and regulation numbering occasionally differs in these Regulations, and there are no General Directions. Sign layouts, meanings and permitted variants are generally similar but can vary; where the NI Regulations apply, the designer is advised to read them in conjunction with the Manual and if necessary contact the overseeing organisation for guidance.

U1.8.6. Traffic signs and other apparatus for the control of traffic must conform to the TSRGD in force at the time of the works. Any requirement for goods or materials to comply with a specified standard should be satisfied by compliance with the requirements for mutual recognition contained in clauses 104 and 105 of the Manual of Contract Documents for Highway Works (Volume 1 Specification for Highway Works).

U1.8.7. The contents of this document may be considered as representing what is reasonably practicable for the enforcement of the Health and Safety at Work etc. Act 1974, the Health and Safety at Work (NI) Order 2005, and associated regulations.

U1.8.8. Compliance with the requirements of this Chapter may assist local traffic authorities to comply with their network management duties under Section 16 of the Traffic Management Act 2004.

U1.9 Concepts and objectives

U1.9.1. Safe and efficient traffic management is founded upon the following simple principles:

- provision of clear and early warning of obstructions in the highway;
- optimisation of road space and the provision of an adequate safety zone and working space at works locations;
- clear directions relating to decisions/actions required from road users;
- minimisation of potential conflict between road users, and between road users and road workers and their operations;

- credibility of traffic signs and temporary requirements; and
- speed limits and restrictions appropriate for the temporary highway geometry and safety features.

U1.9.2. Underlying the design of temporary traffic management arrangements should be that, for both road workers and road users, exposure to unsafe, or otherwise unacceptable, conditions is minimised, if not eliminated. For road users this can be taken as the level of safety and road user comprehension expected for the same road in non-works conditions. Minimising delays to traffic and fatigue to road users passing the works are also objectives in the design of schemes

U1.9.3. Health and safety legislation imposes a duty upon designers to ensure that their temporary traffic management designs can be implemented, modified, maintained and removed safely, including where conditions change or the TTM is damaged or dislodged.

U1.10 Standard works and relaxations

U1.10.1. Temporary traffic management schemes referred to in this Chapter are “standard” schemes, “relaxation” schemes or emergency traffic management.

U1.10.2. “Standard” schemes are appropriate for works carried out in all weather, visibility and traffic conditions.

U1.10.3. “Relaxation” schemes are appropriate for certain types of works (as indicated within this Chapter) for short-term situations with good visibility and low traffic flows. In this document “short-term situations” are those that are expected to last less than 24 hours, “good visibility” means visibility extending to the full length of the desirable stopping sight distance (SSD) and “low traffic flows” means flows less than the reduced available carriageway capacity when the works are in place. “Stopping sight distance” is the distance required for a vehicle to come to a stop, taking into account the time taken to perceive, react, brake and stop safely – for full details see Table 3 of TD 9 “Highway Link Design” (DMRB 6.1.1). Individual plans state, where appropriate, what relaxations may be applied. Plans for single carriageway roads can be found in Part 1: Design, Section D5 and plans for dual carriageway roads in Part 1: Design, Section D6.

U1.10.4. When identifying suitable ‘Relaxation’ schemes the designer should identify how the relevant signing and other TTM equipment could be safely removed, enhanced or replaced if the conditions deteriorate, see Part 1: Design Paragraph D1.6.5. Where it may not be possible to easily remove or enhance signs in a particular section e.g. signs in a lane change zone, then a designer may want to provide signs and equipment in those areas more suitable for ‘Standard’ schemes and signs and equipment suitable for ‘Relaxation’ Schemes in the remaining sections of the scheme.

U1.10.5. Where the designer has identified a need for TTM closer to that required for a ‘Standard’ scheme to be used in a subsection of a ‘relaxation’ scheme, aspects which may not be relevant for short duration works e.g. removing or converting road markings and studs, may be omitted subject to a scheme specific risk assessment.

U1.10.6. Incorporating aspects for which there are no relaxations e.g. full carriageway closures, and which would preclude the removal or enhancement of the TTM will require the works to be undertaken as a ‘Standard’ scheme.

U1.11 Further information

U1.11.1. Revised chapters of the Manual are published infrequently and the current version should always be used. Reference should always be made to the latest relevant legislation, as amended, to ensure that decisions are taken in conformity with the current statutory requirements. As stated above, the requirements of legislation always take precedence.

U1.11.2. Where more detailed background information might be helpful, reference is made to Standards and Advice Notes in the Design Manual for Roads and Bridges (DMRB), available from TSO or at:

www.standardsforhighways.co.uk/dmrp

U1.11.3. Technical enquiries regarding the content of the Manual should be made directly to the Department for Transport.

U2.1 Introduction

U2.1.1. This section deals with the general design principles of temporary traffic management design. It highlights the primary objectives related to health and safety; risk assessment and risk sharing; designer training and competence; the mounting and lighting of signs; speed limit and length of works; and separation between schemes.

U2.2 General principles of temporary traffic management design

U2.2.1. The complexity of traffic management arrangements varies from scheme to scheme, but the primary objective is always:

- to maximise the safety of the workforce and the travelling public, principally by not exposing them to unsafe or otherwise unacceptable conditions (unacceptable conditions occur when it is not possible, within the resources available, to safely repair any damaged or displaced TTM or enhance the TTM if condition deteriorate).

The secondary objective is:

- to keep traffic flowing as freely as possible.

U2.2.2. Clients, project designers and traffic management designers need to be conscious of these objectives during all stages of the design process, and particularly when considering the traffic management requirements of the design brief.

U2.2.3. For planned works designers should note the requirements of [U1.9.2](#). The chosen method of working must not increase risk to road users. If it is not possible to provide an acceptable level of safety for both road users and road workers then an alternative method of working must be used. Given that the time and nature of planned works can be chosen, it is not acceptable for contractors or authorities to adopt a method of working which does not provide the required road user and road worker safety performance. It is for the authority to identify an acceptable level of disruption to the free flow of traffic. If this level is likely to be exceeded then the designer must identify whether an alternative safe method of working which meets the required capacity can be adopted. Where an alternative safe method of working is not possible then the least disruptive option which maintains the required level of safety should normally be adopted.

U2.2.4. It is vital that risk assessments are carried out at all stages of the development of the project, bearing in mind the potential hazards to the workforce and the public.

U2.3 Documentation

U2.3.1. The temporary traffic management design should be set out in clear documentation including drawings and specifications, if appropriate, which are scheme specific. The documentation should not include any standard drawings or details which are not applicable to the scheme. Site specific risk assessments should be provided on request; to enable this to be achieved any commercially sensitive information or personally identifiable information should be omitted from the assessment or included in a manner which would allow the information to be omitted, without altering the validity of the site specific risk assessment.

U2.4 Safety – overarching requirements

U2.4.1. The complexity of traffic management arrangements varies from scheme to scheme, but the primary objective is always to maximise the safety of the workforce and the travelling public. This is achieved by minimising the number of road workers and road users exposed to unsafe, or otherwise unacceptable, conditions. It is not acceptable to design schemes which would result in an increase in the number of either road workers or road users being exposed to unsafe conditions to enable a decrease in the average risk to other groups. Schemes must be designed so that if conditions deteriorate (weather, increase in traffic flow), or the TTM is damaged or displaced then the works can be enhanced, repaired, replaced or removed in a way that is safe for road workers and does not expose road users to unsafe, or unacceptable conditions.

U2.4.2. Some risk assessment processes are based on measuring average risk to specific populations or groups; as identified above there are limitations on the application of this principle to road works. When considering different populations, designers would need to consider risk to road workers undertaking construction works (plus maintenance and inspection activities) and those involved with installing, maintaining and removing the TTM. For road user populations' designers are required to consider users directly interacting with schemes and temporary situations separately from road users who may interact with infrastructure designed to be used during works periods (e.g. fixed taper points) out of works periods. Designers working to an authority's risk management policy or standard must still meet the requirements in this section.

U2.5 Risk assessment

U2.5.1. The Management of Health and Safety at Work Regulations 1999 and the Management of Health and Safety at Work Regulations (NI) 2000 require that a suitable and sufficient risk assessment, specific to the task being performed, must be carried out to provide input to the method statement as it is being drafted. Consideration must be given to ways of firstly eliminating or, if this is not possible, minimising the risk to operatives and the public. Information on formulating a risk assessment is given in the HSE free publication "Five steps to risk assessment".

U2.5.2. The guidance included in this Chapter should enable designers to design schemes which are safe and effective for the vast majority of highways and roads in the UK. As a minimum designers should assess site specific risks to identify whether there are any hazards or other parameters which may result in the guidance in this Chapter not being sufficient to achieve the minimum safety and flow requirements. In these cases designers would have to design site specific solutions which should enable relevant works activities to be undertaken.

U2.5.3. There may be design options which are not included in this Chapter. Recommended methods of working are only included where the guidance covers sufficiently common situations, and where designers can sufficiently rely on the guidance to result in the required level of safety to be achieved. Therefore, if a method of working is not included in this Chapter this should not necessarily be taken by designers to mean that it is not acceptable. If a designer can show, via a relevant and detailed site specific risk assessment, that an alternative method of working would be safe then, subject to the impact on traffic flow, this can be adopted. Designers should, however, take note of methods of working which this Chapter recommends are not used, excludes or prohibits.

U2.6 Risk sharing

U2.6.1. It is the responsibility of those undertaking the works to identify, design and implement a safe method of working as described in Part 2: Operations, Section O2. Authorities may impose restrictions and requirements on the timing and nature of planned works; in doing so they share the risk with those undertaking the works. However, these restrictions and requirements do not remove the responsibility of those undertaking the works to implement a safe method of working.

U2.6.2. Therefore, it is not possible for an authority to transfer risk to themselves or indemnify contractors for using specific methods of work (except for civil claims). Those undertaking works must assess whether methods of work identified by authorities are suitable and sufficient, and inform the authority if they are not considered to provide the required level of safety.

U2.6.3. Authorities should normally provide comments and feedback on identified methods of working in relation to the impact of traffic flow, other network impact and compliance with regulations and standards. Comments relating to safety of the identified method of working may result in the authority taking on part of the designer's liability. Where an authority prohibits the contractor from adopting a specific safe method of working, identified in this Chapter or a site specific risk assessment, (including methods of installation, maintenance and removal of the scheme), or identifies a specific method to be used, then the authority shares risk with those undertaking the works. The authority must ensure that anybody within their organisation involved with identifying a method of working to use (or not use) has the required level of knowledge and expertise, including, but not limited to, relevant highway and traffic sign design, to competently give these directions to the contractor. This requirement would also apply to any third party tasked by the authority to review or comment on the contractors proposed method of work.

U2.6.4. Where an authority identifies specific requirements on adopting a safe method of working as mentioned above then, if not specified in the relevant contract or agreement with those undertaking the work, the authority should provide sufficient extra resources to adopt this method of working if this is more expensive than a method of working identified or recommended in this Chapter.

U2.6.5. Where an authority is providing equipment, vehicles or personnel to facilitate the installation, maintenance or removal of planned works, via integral or arms lengths maintenance groups, internal ISUs, traffic officers etc, the requirements in Parts 1, 2, and 3 will need to be met as though they were being carried out by the contractor. Equipment and processes used for incident management or ETM cannot be taken to be suitable for planned works; any assistance for planned works will need to be assessed as a part of the scheme specific risk assessment. However, subject to Section O7 in Part 2 the equipment and processes may be suitable to support a contractor where TTM needs to be repaired, changed or removed due to incidents, damage or unforeseen change in conditions e.g. unexpected weather or sudden increase in traffic flow.

U2.7 Designer training and competence

U2.7.1. In the case of street works, designers should be fully familiar with the current code of practice 'Safety at Street Works and Road Works'. In addition, they may wish to obtain a Street Works Qualification. This may be as a supervisor or operative in accordance with the New Roads and Street Works Act (NRSWA) 1991 and associated regulations. Modules in "Signing, Lighting and Guarding" and "Monitoring Signing, Lighting and Guarding" are the minimum qualifications. Suitable training is provided by City & Guilds, SQA and CABWI.

U2.7.2. Designers should undertake regular refresher training to ensure their knowledge and skills remain up to date. Sector schemes require designers to be reassessed and to attend refresher training as part of that re-assessment process. The Street Works (Qualifications of Supervisors and Operatives) (England) Regulations 2009 provides the necessary details in regard to street works.

U2.7.3. There are three other equivalent Statutory Instruments for Wales, Scotland and Northern Ireland. Respectively, they are:

- Statutory Instrument No. 1687 The Street Works (Qualifications of Supervisors and Operatives) Regulations 1992 (Note that this Statutory Instrument no longer applies to England);
- Statutory Instruments No. 1675 (S.162) The Road Works (Qualifications of Supervisors and Operatives) (Scotland) Regulations 1992; and
- Statutory Instruments No. 20 Street Works (Qualifications of Supervisors and Operatives) Regulations (Northern Ireland) 1998.

U2.7.4. In the case of works for authorities, designers need to be sufficiently competent in terms of knowledge and application of the principles of signing and guarding of road works and also have an adequate knowledge of the installation, maintenance and removal of temporary traffic management. There is no current, universally identified, minimum level of competence. To give those organisations undertaking design activities (including designing permanent features intended to facilitate road works) confidence that those undertaking design work for them are competent, it is recommended each organisation has, by no later than the end of June 2020, a policy on the expected technical, academic and professional competencies or qualifications of designers. The exact nature of these requirements should be clear, relevant and obtainable; setting irrelevant, unrealistic or costly requirements may preclude otherwise competent practitioners, increase costs and limit development opportunities. Given that qualifications change over time, any requirements should allow for equivalent qualifications or experience to be counted. If this is not permitted, it may unacceptably discriminate against older, or younger, practitioners.

U2.7.5. Practitioners and employers are encouraged to consider relevant professional certificates, diplomas, or third party accreditation e.g. IHE professional certificates/diplomas. These provide a benchmarked and transferrable assessment of competence. Care should be taken not to require any qualification etc which is solely based on training courses; to be suitable any qualification must enable existing competencies to be assessed. The identification of relevant qualifications would need to take into account the nature of any design work. Using the identified example, the IHE professional certificate/diploma for Traffic Sign Design would likely be suitable for those designing roads or temporary layouts, those designing advance notice signs or event signing. For those involved with the detailed design of the temporary traffic management then the IHE professional certificate/diploma for Temporary Traffic Management may be more relevant.

U2.7.6. The National Highway Sector Schemes (NHSS) 12A, 12B, 12C and 12D provide nationally recognised training and competency assessment regimes that may be considered appropriate for some authority road works traffic management design activities. Although NHSS 12D recognises the training, assessment and accreditation for street works (see New Roads and Street Works Act (NRSWA) 1991 and Traffic Management Act (TMA) 2004), it provides for training and competency assessment beyond that required by the 1991 Act, including requirements for positive temporary traffic management for activities other than those covered by the Act. However, it does not cover the design of TTM on all types of road.

U2.7.7. Other sector schemes such as NHSS 13A, also include requirements for temporary traffic management based on the training and competency assessment requirement contained in NHSS 12A to 12D. Details of all these sector schemes can be downloaded from the United Kingdom Accreditation Service (UKAS) website.

U2.7.8. Organisations engaged in traffic management operations in England, Scotland and Wales should comply fully with the requirements of the National Highway Sector Schemes (NHSS) if required by the authority. The contractor is responsible for ensuring that all designers (including any sub-contractor personnel) meet these requirements. Authorities should only include a requirement for compliance with a specific NHSS if the activities are relevant to that sector scheme e.g. only specify NHSS 12C where mobile works could be used and do not specify NHSS 12D where works only involve motorways.

U2.7.9. It is essential that the designer of any traffic management involving portable traffic signals on a public highway has a full understanding of the signing requirements and the correct operation of the signals and likely consequences if they are improperly set. Designers should therefore have attained the appropriate Street Works Qualification (in the case of street works) as set out in the Regulations or (in the case of authority road works) attend a suitable course on the use of portable traffic signal equipment and correct signing of works. Information on training and competency assessment is provided in National Highway Sector Scheme 12D.

U2.8 Mounting and lighting of signs

U2.8.1. If a sign is to be present for a considerable period, for example during a long duration scheme or a temporary layout in place for more than six months, it may be preferable for it to be mounted on permanent type posts rather than on a temporary frame. This reduces the maintenance burden over that associated with a sign mounted on a temporary frame, and also reduces operative exposure to passing traffic. The design of the posts and foundations should be the same as for a quick install permanent sign.

U2.8.2. Where a sign sheeting supplier confirms in writing that a specific type of microprismatic material performs adequately when erected at an angle off the vertical not exceeding 22.5 degrees, the recommendation to mount such material vertically as quoted in Part 2: Operations, Paragraph O3.2.17 may be waived.

U2.8.3. High performance retroreflective sheeting meeting BS EN12899-1:2015 Class R3B-UK or R3C-UK is recommended where a suitable microprismatic material is called for in Part 2: Operations, Paragraph O4.6.3. Where Part 2: Operations, Paragraph O10.7.4 calls for BS 8408 microprismatic retroreflective sheeting, Class R3B-UK sheeting is also a suitable material to use. Microprismatic retroreflective sheeting that meets the initial requirements of Class R2 or R1 in BS EN 12899-1:2015 is also available and may be used, if appropriate, in place of material to Classes RA2 and RA1 respectively.

U2.8.4. The mandatory requirement to directly light many temporary signs in areas of street lighting has been changed in TSRGD 2016. The designer is responsible for demonstrating that these signs will be readable if not lit, otherwise the temporary traffic management design must be amended, for example by lighting the sign or altering its position or design, to ensure that the sign can be read. As part of the inspection of temporary traffic management (see Part 2: Operations) the readability of all temporary signs should be checked and recorded. If following inspection a sign is found to be not readable, it is recommended that the first action is to alter the orientation or location of the sign.

U2.8.5. Where lighting is required for temporary traffic management signing, the designed lamp output should be a minimum of 180 candelas and must evenly illuminate the whole sign face.

U2.8.6. Signs in TSRGD 2016 Schedule 13 Part 6, with the exception of Diagrams 636, 636.1, 636.2, 640.1, 832.4, 2701, 7003.1, 7005 and 7006 with a yellow background, may be constructed with fluorescent yellow background material.

U2.8.7. See Part 2: Operations, Sections O4.5 and O4.6 for further details of mounting and lighting signs.

U2.9 Speed limits - General

U2.9.1. The requirements for the setting and signing of mandatory temporary speed limits are included in Part 1: Design, Section D3.7. The requirements in that section as well as those identified here indicate what is considered adequate guidance in Section 85 of the Road Traffic Regulation Act 1984. If these requirements are not met then it is unlikely that it would be possible to successfully enforce the reduced speed limit.

U2.9.2. Practitioners should note that only when implemented with physical measures (see Part 2: Operations, Paragraph O3.2.2) can a mandatory reduced speed limit (even when enforced) be considered a reliable method of providing the required protection to road workers. In all other cases the temporary traffic management should be designed to be safe for road workers at the permanent speed limit e.g. dimension of safety zones. If needed, the permanent speed limit should be enforced as described in Section D3.5. For all other situations reduced speed limits are set based on whether they are needed for road user safety. The effectiveness of speed limits in maintaining road user safety is significantly influenced by road user's confidence in the fair and competent application of a temporary limit. This covers both of the value of the limit and length over which it is applied. Stakeholders should not assume that a lower temporary limit is safer nor that a road with a poor, or lower than average, safety record in normal use justifies a lower limit during any road works than that recommended in this document.

U2.9.3. When using fixed plate signs, terminal signs should be provided on both sides of the road or carriageway. If these cannot be physically located on the road then an alternative location should be identified for the change in speed limit where signs can be placed on both sides of the road or carriageway. It is considered reasonably practicable to design roads that permit terminal signs to be placed on both sides of a road or carriageway.

U2.9.4. When using fixed plate signing, repeater signs should be provided on both sides of a carriageway at a maximum average spacing identified in [Table 2.1](#). Where it is not physically practical to provide repeater signs on both sides of a road or carriageway then an acceptable alternative is to provide a single vertical sign and (within 10m of the location of the sign) road markings to Diagram 1065 (TSRGD Schedule 10 Part 2 Item 9) in each lane. This option is normally only suitable for temporary layouts or road works where the road is to be resurfaced. Where the road surface is not to be replaced then any temporary marking material used for Diagram 1065 must be able to be removed without any visible evidence of its use.

Table 2.1 Signs for temporary speed limits

Type of road and temporary speed limit	Maximum average spacing between repeater signs	Maximum spacing between adjacent signs without the need for additional risk assessment	Maximum spacing between adjacent offside signs on dual carriageways
Dual Carriageways 50/60 mph	500m	600 m	1 km
Single Carriageways 50+ mph	450m	540 m	900 m
40 mph (all roads)	350m	420 m	700 m
30 mph (all-purpose roads with no street lighting)	250m	300 m	500 m

NOTE 1: The spacing requirements replace those in Part 1: Design, Table 3.4.

NOTE 2: The size of repeater signs may be reduced from that specified in Part 1: Design, Table 3.4 where the conditions identified in Paragraph [U2.9.6](#) apply.

NOTE 3: Except where required for signing enforcement cameras, see Part 1: Design, Paragraph D4.15.10 or where required to achieve the required clear visibility, the spacing of the repeater signs should not normally be reduced from that specified in this table where the signs are not installed, maintained or removed from works vehicles under the protection of Impact Protection Vehicles (IPVs).

U2.9.5. The recommended average spacing of fixed plate repeater signs for temporary speed limits is given in [Table 2.1](#). This replaces the requirements identified in Note 1 to Part 1: Design, Table 3.4. Recommended sign spacing and provision for temporary speed limits using variable signs is given in Paragraphs [U2.10.17](#) to [U2.10.29](#) inclusive. The spacing between adjacent signs can be varied to ensure the required clear visibility is achieved as long as the average spacing meets the requirements of [Table 2.1](#). Where the spacing between any two signs is over 20% greater than the identified average spacing, the designer should consider whether an additional sign is justified.

U2.9.6. Repeater signs, when mounted vertically and manufactured with sign face material complying to class R3, may be one size smaller.

U2.9.7. For the vast majority of schemes the provision of signs to the recommended spacing in [Table 2.1](#) is considered practicable. If the risk to road workers in installing, maintaining and removing the speed limit signs to the recommended spacing is considered to be unacceptable, and measures such as using mobile works to set out signs, the use of fixed vertical signs or variable, remote controlled signs etc., are not sufficient to reduce the risk to an acceptable level, then a mandatory reduced speed limit should not be used and the designer should consider whether an advisory limit be signed or the permanent speed limit be enforced. If the identified method of working is not considered to be adequately safe at the permanent speed limit (with or without enforcement) then an alternative method of working must be adopted.

U2.9.8. Where the permanent speed limit is signed with Diagrams 670, 671 and/or 1065 then these signs must be covered, obscured or removed. When obscuring Diagram 670 the whole sign face including the numerals and red border must be obscured. When obscuring Diagram 1065 markings, any masking material must not cover just the numerals as in some illumination conditions the numerals would be clearly readable.

U2.10 Identification of relevant reduced speed limits for high speed roads

U2.10.1. Unless accompanying physical measures to reduce road worker risk, mandatory reduced speed limits are applied to mitigate the risk to road users of the temporary layout and temporary traffic management equipment. Given that installing, maintaining and removing speed limit signs is a risk to road workers and, by extending the time that works and signs are on the network, a risk to road users, designers must identify sufficient risk to road users from the temporary traffic management design to justify their use.

U2.10.2. The changes in TSRGD 2016 in respect of lane control signs e.g. Diagrams 7243 to 7245, TSRGD Schedule 13 Part 6 (14 to 16) allows for more complex signs to be designed at sizes suitable for the National Speed Limit. Coupled with higher performance temporary road markings, studs, cones and cylinders (see [Appendix A1.6](#)) it is possible to design TTM to be adequately safe at the permanent speed limit for a significant percentage of 'Standard' Schemes. The first stage in identifying if a mandatory reduced speed limit is justified is to assess if it is possible to design the works to be suitable for the permanent speed limit. The assumption is that the permanent speed limit would be enforced, in which case signing would be as identified in Part 1: Design Section D4.15 and, where the national speed limit is in force on an unlit road, signs to Diagram 880.1, see TSRGD Schedule 11 Part 2 (65).

U2.10.3. Guidance on the risks likely to justify the application of a mandatory temporary speed limit is included in [Appendix A1.8](#) which replaces Table 3.5 in Part 1. As identified in Part 1: Design, Paragraph D3.7.29 it is not acceptable to apply a reduced speed limit on the assumption that it increases safety, mitigates a minor risk or improves traffic flow. The designer or any other organisation wishing to apply a reduced speed limit should be able to provide evidence, if requested, of the specific risks or additional hazards to justify the imposition of a speed limit.

U2.10.4. In Chapter 8 Parts 1, 2 and Part 3: 2016 the recommended reduction in speed limit for high speed roads was 20 mph. Given the changes in TSRGD 2016 and improved availability of high performance sign material and other equipment this should not now be used as the basis for setting reduced speed limit on Motorways and all-purpose trunk and primary roads. Designers should identify an initial suitable design speed for each scheme, or part of a scheme, checking if it is possible to achieve the design speed for the features listed in [Appendix A1.8](#) using either the recommended metric or any suitable alternative metric relevant to the road type. While designers may accept minor relaxations where there are pinch points, if it is not possible to meet the required safe design speed, even after enhancing the performance of the TTM as identified in [Appendix A1.6](#) then the design speed (and speed limit) may have to be reduced on some, or all, of the scheme. Authorities may provide advice on the design speeds it expects for different type of works; contractors should confirm if that is achievable or inform the authority if a higher or lower limit is achievable. It would be expected that alternative methods of undertaking works e.g. narrow lanes vs lane closures or contraflow would be considered by the contractor when assessing whether a reduced speed limit identified by an authority can be achieved.

U2.10.5. Combinations of the factors identified in [Appendix A1.8](#) within a scheme would not normally justify a design speed of more than 20 mph lower than the permanent limit. An exception would be if multiple factors are co-located and would increase the risk to road users. Where a design speed greater than 50 mph is identified the speed limit signs should for preference be installed on vertical supports to minimise maintenance requirements. In addition, the physical properties or performance classes of some, or all, of the TTM layout and equipment will require improvement as identified in [Appendix A1.6](#). The designer's risk assessment should identify which equipment requires enhancement.

U2.10.6. For other types of roads the process of identifying a set reduction in mandatory speed limit remains. The table from [Appendix A1.8](#) should be used instead of Table 3.5 in Part 1; while this still identifies a reduction of 20mph in mandatory speed limit, some hazards may require further assessment to determine if a reduction is justified.

U2.10.7. A design speed or speed limit with a reduction of greater than 20mph below the permanent speed limit may be justified at crossovers, see Part 1 Design, Paragraph D3.7.27 and at structures, see Part 1: Design, Paragraph D3.2.12. In a very limited number of situations there may be other hazards, or combination of hazards which may also justify a lower design speed. In these cases, the designer must identify and quantify on a location by location basis the nature of these hazards (e.g. a three step reduction in Stopping Sight Distance) and show that they cannot reasonably be removed by changing the identified method of working or enforcing the recommended limit. Given the need to undertake a scheme specific risk assessment, authorities or enforcement bodies should not adopt any general policy to implement a design speed lower than 20 mph below the permanent speed limit. It is not acceptable to reduce the speed limit further than that recommended to enable a method of working to be adopted which would not be considered acceptable at the recommended design speed or reduced speed limit. Therefore working widths of barrier systems adjacent to the working space cannot be taken to be less than that applicable for the recommended speed limit (As specified in Part 1 the dimensions of safety zones are based on the permanent speed limit).

U2.10.8. Unless a lower limit than that identified in [Appendix A1.8](#) is applied only to a crossover as identified in Part 1: Design Paragraph D3.7.27 then, for any scheme with a lower speed limit than that recommended in Part 1: Design, Table 3.5, enforcement should be used. If enforcement is not considered reasonably practicable then the design of the scheme should be altered so that enforcement or a higher limit can be applied. This requirement does not apply where physical measures are provided to limit speed, e.g. convoy control and traffic calming.

U2.10.9. Where a road has a permanent speed limit of at least 50mph, but which is less than the national speed limit, then the designer must identify and quantify any substandard design feature(s), or other safety issues, which justify a further reduction in speed limit. Unless the nature of the works increases the risk to road users of any existing substandard feature, then enforcing the permanent speed limit may be sufficient to reduce the risk of the temporary traffic management to road users without a further reduction in speed limit. Except at crossovers the lowest acceptable speed limit on motorways is 40 mph.

U2.10.10. While it is recommended that a single speed limit is adopted throughout the length of the works (see Paragraph D3.7.27) it is undesirable to impose a lower speed limit than would otherwise be the case for relatively long lengths. This can reduce road user confidence in the setting of speed limits through works. The minimum distance between changes in speed limit is normally 800 metres; however, this may need to be increased if there are several changes in speed limit through a set of works.

U2.10.11. The position of the start of any mandatory reduced speed limit identified in Part1: Design should be suitable for changes of up to 30mph. Stepped speed limits on the approach to works should only be used where the change is more than 30mph e.g. convoy working. The recommended position of the speed limit terminal signs allows traffic to safely change their speed in the approach and lane change zones while maintaining an acceptable capacity. Mandatory reduced speed limits should not be applied to longer lengths of the approach zone by default (other than to achieve the required sign visibility); only where there is an identified problem with either traffic speed or flow once the works are in place should moving the start of a speed limit be considered.

U2.10.12. The choice and application of any enforcement must not require speed limits to be applied for longer lengths than identified in this Part, nor require a limit to be applied that is not recommended in this Part, nor should it require the retention of a speed limit where short or medium term changes in layout would justify a change in the position or value of a reduced speed limit (see D3.7.11 in Part 1).

Identification of relevant reduced speed limit for other roads

U2.10.13. For roads with a permanent 40mph or lower speed limit the designer should consider if the identified method of working would naturally reduce the speed of traffic passing through the works. A temporary reduced speed limit may still be justified, particularly for roads with a permanent 40mph speed limit, but designers should be aware of the variability of the reduction in risk to road users provided in these situations.

U2.10.14. Where an all-purpose road with street lighting and a 40mph or higher permanent speed limit has a temporary reduction to 30mph, only the terminal signs are required; repeater signs must not be used. Designers may consider the use of Diagram 880 signs if enforcement is in use.

U2.10.15. Where works are being undertaken on a restricted road (where the presence of street lights indicates a national speed limit of 30mph), the designer should assess whether the street lighting is required to be turned off to facilitate the works. The designer should consider the provision of speed limit repeaters along with signs under Schedule 13.9 indicating that the street lighting is turned off. Given that this hazard is due to works being carried out, the sign should be black on yellow. A traffic order will also be required for the temporary speed limit.

Additional speed limit information signs

U2.10.16. Signs giving information on changes in speed limit (whether permanent or temporary speed limit changes) are not included in Schedule 13.9 and must not be used without a relevant authorisation. The use of temporary signs, other than Diagram 7032 and those which are authorised, giving information of changes in speed limit e.g. 'New speed limit in force' may affect the enforceability of any speed limit.

Use of variable signs and signals for speed limits at works

U2.10.17. Some signals can display a mandatory speed limit (either complying with TSRGD 2016 or specifically authorised) as part of a wider implementation of technology. This has variously been referred to as Controlled Motorways, Managed Motorways and Smart Motorways (although the technology is not limited to motorways).

U2.10.18. Depending on the signal technology, the method of control and the details of the order or Statutory Instrument, it may be possible to use this technology to set and enforce speed limits during short term works or to facilitate the setting up, maintenance and removal of temporary traffic management. Given that there are a variety of systems in use, the designer of any works will need to assess the capabilities of each system before identifying what use of speed limit signals, if any, can be used.

U2.10.19. There are three basic variations of the technology in use:

- Option One: only verge mounted units displaying speed limits. This replicates normal fixed signing but uses rotating plank elements, LED panels or other technology;
- Option Two: gantry mounted signals over each lane, e.g. Advanced Matrix Indicators (AMIs); and

- Option Three: high level signs which may be located on the verge or partially over the carriageway and which apply to the whole carriageway. They are often combined with other information on MS4 signals.

U2.10.20. Where Option One is provided then the same size and spacing requirements as for fixed signs will apply. The signs should preferably be under the direct control of the contractor when undertaking planned works. If the signs are under the control of a third party (e.g. a Regional Control Centre) then, in the case of power or control failure, the signs should either continue to display the lower limit (i.e. rotating plank signs or LED signs with battery backup) or works should be designed to be safe for road workers at the permanent speed limit with physical protection (see Part 1: Design, Paragraph D6.13.13).

U2.10.21. Where Option Two is provided, a speed limit roundel must only be displayed over a live lane. Where lane(s) are coned off the signals must be blank. During setting up and removal of TTM there may be occasions where a roundel has to be displayed over coned off lane. In this situation the whole width of the lane downstream of the signal is considered to be a part of the safety zone and cannot be part of the working space or works area. This applies for the whole length of the lane until the next lane signal.

U2.10.22. The positioning of any taper, changeover or crossover where lane signals are in use must result in either the full width of the lane being open or closed under any signal. Where a taper is used the designer should aim to end it no closer than 100m upstream of the lane signal, or start it no closer than 50m downstream of the lane signal. To enable this to be met it is recommended that fixed taper positions are used.

U2.10.23. For Option Three the same requirements as Option Two apply for the positioning of tapers, changeovers and crossovers. Where lanes are coned off in the works zone the speed limit roundel should be displayed on its own or with the number of lanes open shown by arrows. Lanes which are coned off must not be indicated on signs or signals in the works zone.

U2.10.24. Since the spacing of the signals, particularly for Options Two and Three, will probably not be within the values identified in [Table 2.1](#), the relevant order or Statutory Instrument must enable each signal to be considered as a terminal sign. Any enforcement must use fixed point technology integrated into the signal control equipment. Due to the variable nature of the signs, separate fixed point camera systems are not able to satisfactorily record the aspect displayed at any specific point in time. Average speed camera systems must only be used with signs at the spacing identified in [Table 2.1](#). This could include situations where Option One is in use but only where a single speed has been displayed between successive inspections. Also, where the signs are LED based rather than rotating plank, sufficient evidence is needed to show that the relevant speed is being displayed continuously between inspections.

U2.10.25. Some motorway signalling systems may only be capable of displaying either lane control information or speed limits, whereas others may be able to display both aspects simultaneously. If systems are only able to display either speed limit roundels or lane control information then normally, when used throughout the time the works are in place, it is recommended that speed limit roundels are displayed on that system and normal lane control signs (either passive or LED based) be used. Where systems can display lane control information and speed limits simultaneously then the designer should note the requirements of Part 1: Design, Paragraph D6.13.13. Where reduced speed limits are applied only during setting up, maintaining, or removing temporary traffic management then the display of speed limit aspects will need to reflect the chosen method of working. The design of any signalling scheme, including speed limit signals, should provide an equivalent level of road worker safety as a fixed sign solution if there was a signal or power failure, or an interruption of signal control.

U2.10.26. Where the control of the signals is via a control centre and not under the direct control of the contractor, the authority or other organisation controlling the setting of the signals shall provide sufficient resources to set or change signals at the request of the contractor. Where signs or signals for several sets of works may need to be set via a single control centre, the contractor may consider locating a suitably trained operative in the control centre to support the setting of any signs or signals. Where the control centre is notified of the works in advance, speed limit signals should be set or changed as soon as practicable after the contractor has made contact with the control centre operator and in all cases no later than within 10 minutes of contact being made. If during the advance planning and notification process the control centre identifies that an operator will not be able to respond to the request to set signals within a reasonable timeframe, the control centre should notify the contractor. For planned works the contractor should take into account any other works which would require the relevant control centre to set signals over approximately the same time period.

U2.10.27. Where a speed limit is applied to a section of road immediately upstream or immediately downstream of a section with variable mandatory speed limit signing, extra care is needed to ensure the signing is consistent and clear. Where the speed limit continues downstream of the section with signals, any fixed or active sign which indicates the end of variable speed limit, or a reversion to another limit, should be suppressed or covered and fixed plate signs used as identified in this Chapter. Where the speed limit is required to start upstream of the first active sign then unless additional temporary active signs are installed, the assumption would be to use fixed plate signs throughout. This would be subject to any location specific arrangements.

U2.10.28. Other than when the reduced speed limit continues to the end of the section of carriageway subject to the variable mandatory speed limit the temporary speed limit must be terminated by the display of the relevant default speed limit, normally a Diagram 671 aspect. Unless due to failure or the need to display another aspect, all signals capable of displaying a speed limit roundel between the start and end of the applied speed limit must display the relevant limit.

U2.10.29. Where signalling systems are used to implement reduced speed limits throughout the length of the works for the entire duration of the lane closure, signalling systems should allow for a speed limit to be imposed from an appropriate distance upstream of the taper point, in most cases about 850m before the taper datum.

U2.11 Risk models

U2.11.1. Where authorities adopt the principle of Globally At Least Equivalent (GALE) for the design of roads when in normal use, designers must assess the impact of the permanent design on road users and road workers during works on the principle of As Low As Reasonably Practicable (ALARP). The application of GALE principles to the risk-based design of temporary traffic management for planned road works is not acceptable. The principle of As Low As Reasonably Practicable (ALARP) must be applied in all cases to the management of risk to road users and road workers arising as a result of the use of temporary traffic management.

U2.11.2. Design standards for permanent road features may be based on the principle of ALARP but allow for the relaxation of one or more elements of the standard based on the principle of GALE. Other relaxations or departures from standard may also be permitted by the traffic authority at their discretion. The design of road works necessary to ensure risk is ALARP for both road users and road workers at a road works scheme will therefore depend on site specific conditions. Any relaxations or departures applied to the design of permanent features of the road environment may result in conditions where the use of 'relaxation' scheme

road works layouts would not result in risk that is ALARP. This may affect the ability to maintain the road environment safely and effectively, as any road works carried out at these locations would have to identify and apply alternative layouts and/or principles in order to ensure risk remains ALARP for road users and road workers. While any relaxation may have an impact on the maintainability of a section of road the two design factors which are most likely to influence the ability to maintain a road is cross section (lane widths, set-backs etc.) and Stopping Sight Distance (See TD9, Manual for Streets, TD27 and Chapter 5).

U2.11.3. Designers of permanent road features shall, where relaxations (or departures from standard) are applied, engage with the authority and maintaining organisation(s) as appropriate to confirm that the proposed relaxations (or departures) in the design of permanent road features would still result in a road design that can be maintained with risk being ALARP for road users and road workers. For features designed to be used during maintenance work (irrespective of whether it is the intended primary use of the feature) they must be designed to the principles of ALARP. Designers of works which include these features take on part of the designer responsibility for any works using the feature and therefore must have, or have access to, appropriate competency in temporary traffic management design.

U2.11.4. Relaxations applied to the final design of permanent features of the road environment must be recorded by the designer and this information provided to the authority. The authority must share information on such design features (and any departures from standard they have granted) with maintaining organisation(s) to support the preparation of effective risk-based designs for temporary traffic management. Maintaining organisations and contractors should raise any concerns about the design of permanent features to the authority, ideally at the design stage, where it is not certain if the design of relevant permanent features meets the principles of ALARP.

U2.11.5. Where roads are designed to or have elements that are designed to the principle of GALE, the benchmark for road user safety during road works is the greatest of:

- The level of safety for the road before the design, or design elements to the principle of GALE, were implemented;
- The level of safety that would be achieved by designing the road in accordance with the principle of ALARP; or
- The level of safety of the road as built, incorporating design or design elements to the principle of GALE.

U2.12 On-road trials

U2.12.1. Trials may be carried out by contractors, authorities and other bodies to support evaluation of products or processes intended to promote safety and efficiency. Trials must comply with all relevant legislation, Regulations, Directions and/or be permitted by appropriate statutory authorisation or order put in place in advance of the trial commencing. In respect of TTM signs and equipment they must comply with any relevant Traffic Signs Regulations, Directions or other statutory requirement or be authorised by the national authority. Those planning trials must ensure all equipment used in the trials is prescribed or has appropriate approval for its use within the trial for the purpose for which it will be used. Methods of working must comply with the terms of any approval, traffic sign authorisation or order granted. Any formal, or informal, agreement or licence to undertake tests cannot be taken to permit the placement of non-prescribed traffic signs or equipment on road. (see Section [U6](#)).

U2.12.2. Prior to any trial, the organisation planning it shall identify if there is a contractual or other requirements to consult with the road authority regarding suitable arrangements for the

trial, including any requirement to share trial outcome(s). Changes in material supplier, material type or performance classes consistent with guidance in this document and complying with any contractual requirement are unlikely to need to be notified to the road authority for products covered by harmonised standards.

U2.12.3. Where formal agreement from the road authority is required to carry out a trial, the road authority must ensure that those employees involved in the process have sufficient experience and competence in highway design, traffic sign design, management of TTM and/or management of health and safety to be able to assess the adequacy and relevance of any trial plan (see **U2.6.3**). When undertaking trials those designing a trial evaluation method and assessing the results should have the appropriate competence to provide an impartial assessment of the trial outcome. Organisations or individuals delivering on-road activity in support of trials should have appropriate experience, competence and authority to design and undertake the work required safely.

U2.12.4. On completion of a trial any limitations in trial evaluation or evidence shall be clearly identified. Limitations may arise from situations such as an off-road static evaluation of a product intended for on-road use, an on-road evaluation carried out at a single site, an assessment under lower traffic flows and/or a trial at a site with traffic compositions that are not typical of those experienced on the network.

U2.12.5. Any limitations within the trial that make the results unrepresentative of the wider network, or conditions where the product or process would be used, shall be reflected in any further implementation of the product or technique. If used to develop formal guidance the results should be sufficient to provide designers and/or those undertaking the works with data that can reliably support their designs, risk assessments or working practices. Providing guidance outside the boundaries of a trial shall only be acceptable if this is supported from existing data or data from other trials.

U2.13 Programming of works

U2.13.1. When undertaking maintenance work, contractors should identify any monitoring, maintenance or other activities, which could also be reasonably undertaken using the intended traffic management. The aim is to undertake works activities while minimising the number of times road works are in place. Activities should not be excluded on the basis of whether they are paid for under a lump sum arrangements or can be individually charged.

U2.13.2. It is considered reasonably practicable for authorities to draft contracts or agreements that promote the combining of activities where possible; authorities should also not draft contracts or agreements which penalise contractors for combining maintenance activities where they identify it is suitable to do so.

U2.13.3. Risk to road users and road workers can be reduced and delays and congestion reduced by designing roads and identifying construction product requirements that would reduce the number of maintenance interventions and the length of these interventions. It is therefore considered reasonably practicable to include in any value management or other appraisal process for identifying renewal activities, a method of assessing and scoring the impact of any increase or decrease in road work activities for each option being considered.

U2.14 Warning lights (road danger lamps)

U2.14.1. Warning Lamps should be used to provide adequate delineation during the hours of darkness; this not only enables road users to pass through the works but also they minimise fatigue and stress which may increase the risk of accidents downstream of the works.

Requirements for their use are given in Part 1: Design, Section D3.12 and Part 2: Operations, Section O4.7. Guidance on spacing is given in Part 1: Design, Table A1.3 (Appendix 1); where relevant higher performing warning lights are used then the spacing may be increased as long as the level of delineation is similar.

U2.14.2. The required level of delineation for relaxation schemes may be provided at night without the use of warning lamps, but this must be considered by the provider on a case by case basis. When omitting warning lamps is considered, the risk assessment must ensure that the permanent road markings and studs provide the required delineation. This may be confirmed by visual and/or machine survey data, including that taken within the preceding 12 months which is held by the maintaining organisation. Markings and studs that should provide adequate delineation are either a solid line of 150 mm or more (Diagrams 1012.2 and 1012.3) or a hazard warning line (Diagram 1004.1) 150 mm wide. Road markings to Diagram 1005.1 (which are 150 mm wide) should have at least nine out of any ten passive or active road studs working effectively, unless street lighting is present. The road markings should also not have been identified as a Category 2 (non-critical defect) as defined in TD26.

U2.14.3. Road markings should be visible for 100m (corrected for the age of the assessor using the table in TD26). When warning lamps are omitted, cones should be set-back from the road markings; the recommended minimum is 0.5m (more general guidance on set-backs can be found in Chapter 4 of TD27).

U2.14.4. Cones should be sufficiently visible. Alongside lane lines they should be class R2B to BS EN13422. Alongside edge lines R1B cones may be adequate for 200mm wide edge lines although R2B cones are recommended. All cones should be checked for cleanliness before or during installation. Where warning lamps are omitted the visibility of the markings, studs and cones should be checked as part of the drive through survey (see Part 2: Operations. Paragraph 03.6.9).

U2.14.5. When omitting warning lamps contractors should monitor and record accidents, near misses and collisions which may be related to poor or reduced delineation.

U2.15 Fixed taper positions

U2.15.1. Using fixed taper positions (FTP) may be of benefit to road workers and road users by reducing risk and reducing congestion (by speeding up installation and removal of the works). The exact nature of the identification and design of FTPs will depend on the characteristic of the road and the type of work being undertaken. They may range from simply identifying taper start points (see Part 1: Design. Paragraph D3.6.2), to the road authority providing some or all elements of the road works signing as part of the permanent design of the road.

U2.15.2. While FTPs can be used on all dual carriageways, it is assumed in this document that for carriageways with three lanes or more without a continuous place of relative safety from which to install TTM (e.g. a hard shoulder) fixed taper points would be the default option for the design and maintenance of the road.

U2.15.3. To achieve the required performance benefits of adopting FTPs there are minimum requirements which must be provided for a location to be suitable. If these requirements are not met, then an alternative location should be used where these requirements can be met. For roads where this Chapter assumes FTPs are the default, it is considered reasonably practicable to design roads that meet the requirements for providing FTPs:

- The minimum clear visibility (see D4.4 and Design Appendix Table A1.1 and A1.7) is provided to approach signing. For relaxation schemes the minimum desirable Stopping Sight Distance is also provided in all traffic lanes. The horizontal geometry shall not affect the visual effect of sequential warning lamps on the taper to approaching traffic (see [U2.15.6](#));
- All traffic lanes meet the desirable minimum lane width for the type of vehicle permitted, or required, to use it, see Part 1: Design, Section D3.3;
- Cones, signs and barriers for lane closure tapers can be safely stored to enable the taper to be quickly installed from a place of relative safety (alternatively sufficient works vehicles and IPVs are available to install the taper with mobile works as identified in Part 2: Operations);
- While risk assessment may indicate that all the signs shown in these Plans DZB4 to DZB7 may not be required for relaxation scheme works (and hence they may not all be provided as part of the permanent design) it must still be possible to place the signs on the road (of the appropriate size to be readable) if the contractor identifies from their safe system of work they may be necessary; and
- Where there is not a continuous place of relative safety, contractors must identify a safe system of work for placing warning signs on the approach to the FTP using the required number of works vehicles and IPVs needed to safely install the signs and other TTM equipment. Provision of suitable locations for works vehicles to pull off the main carriageway should be considered.

U2.15.4. The use of FTPs may speed up installation of works and reduce the need for road workers to be in the live lane. As required by Part 1: Design, Paragraph D1.6.5 if signing only suitable for relaxation conditions is provided the contractor and/or TTM provider must monitor conditions (traffic flows, weather) and have robust contingency arrangements in place to ensure that risk to road users and road workers is maintained at a level that is as low as reasonably practicable should conditions deteriorate outside of that permitted for relaxation schemes. Effective forward planning and consideration of factors such as predicted traffic flow and weather should therefore be undertaken to reduce the need to implement contingency arrangements, which may be disruptive and result in greater relative risk to road users and road workers than setting out of TTM suitable for the expected conditions.

U2.15.5. The spacing of FTPs will depend on site specific factors. Where the design of the FTP enable the approach signs and taper to be installed more quickly than would otherwise be the case, the spacing of the FTPs may be up to 6km; otherwise the maximum spacing should be 4km. Normally the maintaining organisation is likely to be best suited to identify suitable FTPs. Where FTPs are to be provided as part of the design of the road the designer must discuss their provision with the maintaining organisation; FTPs should not be incorporated into permanent works unless the maintaining organisation confirms that they would enable the required safe methods of working to be undertaken. Design organisations for permanent works should ensure that those involved with designing FTPs and other features used for undertaking maintenance works are sufficiently competent in the methods of signing and undertaking works.

Taper positions

U2.15.6. Taper start points should be selected so that approaching traffic has a clear view of the taper with limited or no obscuration from structures. If the nature of the road does not provide sufficient locations with the required visibility then locations with the highest available visibility should be chosen as long as the installation of any TTM at that location can be carried out safely. A minimum requirement is that sequential flashing taper lamps shall be visible to vehicles in any closed lane for either a nearside or offside closure and that the apparent direction of travel of the sequential flashing lamps for those approaching the taper reflects the

required direction of any change in lane i.e. a nearside taper on a left-hand bend must look to move left to right and an offside taper on right hand bend must look to move right to left.

U2.15.7. If relaxation tapers (standard or alternative, see Section [U7.6](#)) are to be used then visibility to the taper start point must be equal to or greater than the desirable minimum stopping sight distance (SSD - see [U2.15.3](#)). Where visibility is less than the desirable minimum SSD in any lane within 1.5 times the desirable minimum SSD for the proposed FTP, a relaxation taper should not be used. In such situations, if the FTP needs to be used the taper shall be designed as being suitable for standard works.

U2.15.8. If putting out cones and signs on foot then there should be sufficient storage space at locations of relative safety for the TTM to be installed without excessive manual handling (continuous hard shoulder or verge greater than 1.2m; or 0.5m for roads where the permanent speed limit is 40mph or lower). Provision of suitable locations for IPVs, TTM and works vehicles to pull off the main carriageway should be considered if there are no locations of relative safety provided as part of the permanent design. In all cases TTM must be installed using a safe system of work which assures the safety of the people and works vehicles involved with installing the cones and signs required for the number of lanes to be closed. Additional guidance is provided in Chapter 8 Part 2 and the HTMA guidance document “Temporary Traffic Management Vehicle Selection and Operation on High Speed Dual Carriageways including Motorways

U2.15.9. It is considered reasonable that those undertaking the works and/or supervising the works should be sufficiently briefed, or provided with sufficient information, to locate the start and end points of various taper options. A mark may be provided in the verge, hard shoulder or barrier as a specific reference but care must be taken that the marker could not be seen as a traffic sign. The nature of the marker should normally be determined by the maintaining organisation.

Approach signing

U2.15.10. The location of any taper start point should be chosen to enable suitable advance warning signs to be installed with the required visibility distance (see D4.4, and Appendix A1.1 and A1.7 and Chapter 1). This could simply involve identifying locations where normal fixed signs on ‘A’ frames could be installed at the sizes identified in [Appendix A1](#) (either on foot or from IPVs). Alternatively, provision could be made at these locations to facilitate easier and / or quicker installation of signs e.g. mounting brackets or sockets on barriers, maintenance hard standings. A more comprehensive option would involve the provision of remotely controlled signing.

U2.15.11. The exact nature of the provision is based on site conditions and the type of works needed to be undertaken. For roads of three lanes or less it is recommended that the choice of the sign type, their procurement and the responsibility for installing and maintaining the signs is left to the maintaining organisation. Providing signs as part of the permanent works is an option but this is not mandatory; it is only recommended that provision for installing signs is made for signs within the permanent works.

U2.15.12. This provision, as part of the works should allow the type of sign, or product manufacturer, to be varied so that the most relevant sign can be used and contractors are not limited to signs of a specific manufacturer. The design of any remote control sign would need to be suitable for its location. This would normally be either a mechanically operated sign displaying fixed plate aspects or a LED based sign. The design and size of socketed mechanical signs using retroreflective signs face material should be based on guidance in [Appendix A1](#).

U2.15.13. The design and location of long term signs for road works activities at FTP should be based on the nature of the road at the sign locations and the type of traffic likely to use the road. The relevant standard setback identified in this Chapter and Chapter 1 should normally be used. For offside signs, the vehicles permitted to use the outside lane should be considered along with the widths of the central reservation and the type of vehicle restraint system. If there is no suitable location for a FTP where the sign can be accommodated in the normal position consideration may be given for adopting a remotely operated rotation system.

U2.15.14. Maintaining organisations may decide to use different types of sign on either side of the carriageway e.g. LED on one side, rotating plank on the other. It is recommended that signs on the same side of the carriageway are of the same type. The choice of the technology and size of each sign should still enable road users in all lanes to read at least one of the signs.

U2.15.15. Where the provision of permanent signs is being considered for carriageways of four lanes or wider, the presumption should be to use LED based remote control signs. This would normally require the design of the road, including power and control systems, to accommodate them and therefore the signs would need to be provided by the authority and not the maintaining organisation. However, the authority and designer of any permanent works must consult with the maintaining organisation and must take into account their safe method of working when identifying the number, location and specification of such signs.

U2.15.16. Active signs should display warning triangles aspects at the relevant recommended sizes in [Appendix A1](#). Wicket signs Diagram 7202.1 are required to be displayed with white arrows and stalk to the 'T' bar with the top of the 'T' bar being red. This combination is not included in TSRGD 2016 and these aspects will need authorisation by the national authority.

U2.15.17. When designing road improvement schemes to accommodate LED based FTP signs, designers should assume that signs of the size equivalent to passive signs identified in [Appendix A1](#) would need to be accommodated. While the relevant national authority may be prepared to authorise smaller LED signs on a product by product basis, based on their performance characteristics, designing mounting systems and setbacks for specific products may limit the adoption of more capable and effective products in future. Designers of road improvement schemes should confirm any specific requirements with the relevant authority.

U2.15.18. Authorities and designers of permanent works should check limitations on the placement of authorised signs (normally to be placed on both sides of a carriageway or road). A direction or specification etc. in an authorisation creates a legal requirement which cannot be removed by risk assessment or an advice note from an authority.

U2.15.19. Some products may be authorised for use only on one side of the carriageway for relaxation schemes, subject to a scheme specific risk assessment. In such cases, the scheme risk assessment must provide a risk based design that considers all options, including the installation of signs on both sides of the carriageway. Any design must ensure that adequate guidance is provided to road users by the signing arrangement chosen and must result in risk that is as low as reasonably practicable for both road workers and road users. Designers of the permanent works should be aware that deteriorating conditions during relaxation scheme works (weather, traffic flows) may require contingency arrangements to manage risk to road users and road workers. Provision must be made for the maintaining organisation to implement appropriate contingency arrangements (see also paragraphs [U2.15.3](#) and [U2.15.4](#)). Designers must not assume that relaxation schemes will remain acceptable for and during every lane closure and so must consult with and take into account the safe system of work that will be used by the maintaining organisation in the event that conditions deteriorate during a relaxation scheme lane closure.

U2.15.20. Contractors should identify, via risk based design, how adequate guidance will be provided to road users without a continuous place of relative safety (e.g. a hard shoulder) and no permanent signs provided in the central reserve. Consideration must be given within the risk assessment process to installing temporary signs in the central reserve using an appropriate safe system of work, for example from works vehicles protected by IPVs. Risk based design of temporary traffic management for lane closures on such carriageways, including the method of installation, must result in risk that is as low as reasonably practicable for road users and road workers.

U2.15.21. The relevant national authority may have authorised, or be willing to authorise, signs of a smaller size, or different aspect ratio, where physical limitations may apply to one or more signs at locations which would otherwise meet the requirements of a FTP. This would be on a site specific basis; if the recommended size sign can be installed then it would be expected the larger signs would be provided. Signs covered by this paragraph would not be authorised other than when placed in pairs or in association with a full size sign. An example of two signs which meet the requirements of LED based sign in this paragraph and **U2.15.15** is shown in Table 6.1).

U2.15.22. When identifying suitable locations for signs on carriageways of four lanes or wider (with or without a hard shoulder), risk-based design must demonstrate that HGVs or other restricted vehicles will be able to move from the inside lane to the outside lane (involving three or more lane change manoeuvres) in the distance between the first wicket sign and the first cone of the taper. Where fixed signing is used they should be located in positions that are suitable for all intended lane closure permutations.

U2.15.23. The design of all active signs should maximise the readability of the signs over conspicuity. For signs covered by an authorisation any requirements relating to specifications must be met. For all other signs designers, specifiers and maintaining organisations should identify relevant characteristics and classes from the National Annex to BS EN 12966. When calculating visual performance levels from table NA1 the approach speed shall be the permanent speed limit. Not all characteristics identified in BS EN 12966 are relevant to all types of active signs; therefore, in any specification a general requirement to comply with BS EN 12966 should not be included, only the relevant characteristics and classes from normative and informative sections should be included. An example of this is light output settings for LED based signs; the informative requirements in BS EN 12899 are derived from maintaining the highest conspicuity of message signs, therefore product specific requirements may be needed. It should not be assumed that requiring a general compliance with informative sections of BS EN 12966 will result in an effective sign, or one that is in a desirable position.

U2.15.24. For characteristics outside of those identified in BS EN 12966 authorities may identify a suitable specification e.g. communication protocols or power supply characteristics. However, any requirement should be consistent with the use of these signs and not unnecessarily restrict the use of alternative products.

U2.15.25. The responsibility for the safety of schemes and displaying signs to provide road users with adequate guidance rests with the contractor. Remote control signs should usually be controlled by the on-site contractor using a suitable, reliable and secure method of operation. An alternative is to control the signs via a control centre, with control provided either by the contractor, by the highway authority or by a method of shared control. Where signs are controlled by a centralised control centre, the organisation running the control centre should dedicate sufficient resources to monitor the signs and change the signs at the request of the contractor in a timely manner (as soon as practicable after the contractor has made contact with the control centre operator and in all cases no later than within 5 minutes from contact being)

made. Where the authority may wish to use the signs for other situations another option is to control the signs from a control centre but to release control of the signs to the contractor during planned works.

U2.15.26. Remote control signs may be battery only powered, connected to an external supply with maintained power or externally connected with no maintained power. For LED based signs the preference would be to use external power supply if there is a suitable supply available. Where connected to an external supply, if the sign is of a type which ceases to display an aspect in the event of the external power supply failing e.g. LED based signs, then the sign is required be provided with a maintained power system to allow it continue to display, in the event that external power supply fails, the relevant aspect for a time sufficient for contingency arrangements to be put in place to ensure the safety of road users and road workers. The duration of this requirement needs to be confirmed with the maintaining organisation and the road authority and be such that risk to road workers and road users will be maintained at a level that is as low as reasonably practicable in the event of loss of external power. Where signs are of a type which will continue to display the last aspect set in the event of an external power failure e.g. rotating plank signs, then the need to provide a system to maintain power to the actuation systems shall be as agreed with the authority and maintaining organisation. Battery only systems should normally be provided with a capacity to enable the signs to operate for two works periods. This suggests a capacity of between 9 and 18 hours may be required depending on how long the sign may be used during daylight hours. Any battery charging system (whether for maintained power or battery only systems) should be suitable for the location and should not affect the performance of any vehicle restraint system. It is recommended that all remote control signs have the capability for remote monitoring of the power supply (and battery level if relevant) via any fixed control systems and also direct to the contractor via GPRS or similar alert systems

U2.15.27. The design of remote control signs should minimise the need for maintenance in order to limit risk to road users and road workers. The life expectancy of remote control signs should be specified by the relevant authority or maintaining organisation. A working life of between five and ten years is suggested, given the rate of development of products; specifying a longer life requirement may result in poor value for money and limit the adoption of more effective and economic products in future. Visits to remote control signs locations to deal with weather related issues e.g. snow, should be considered separately. Maintenance or replacement should be undertaken using the protection of appropriate temporary traffic management.

U2.15.28. For signs other than wicket signs, which give general warnings of road works e.g. Diagram 7001 with '1 mile' and 'End' plates, consideration can be given to placing these aspects on suitable high mounted gantry and verge matrix signs (7m and above) as an alternative to having lower mounted fixed or matrix signs. These signs only need to be located at approximately the correct locations as identified in this Chapter; however, the procedure for setting these signs must not result in an increase in time between the first sign being displayed and the completion of the installation of the taper. Where there is not a suitable high mounted sign or signal to display the 'road works end' aspect, it is assumed the aspect will be displayed on a sign provided for the next downstream FTP. If a sign is not provided at this location, a single road works end fixed plate sign (near or offside) can be provided as long as no temporary mandatory reduced speed limit is applied, otherwise signs should be provided, with Diagram 671 roundels on both sides of the carriageway.

U2.15.29. As an alternative to the standard verge mounted signs (whether provided on one or both sides of a carriageway) the authority can provide signs on the approach to FTPs to display Diagram 6008.2 (and any prescribed variations) in association with the relevant distance aspect.

If these are mounted in the verge (and/or gantry mounted) at a height so that 4.5m high HGVs do not obscure the sign, then they may be considered to be suitable for signing both Standard and Relaxation schemes. Signs which do not include the distance would not be acceptable for planned works.

U2.15.30. Depending on the clear visibility distance and readability of signs displaying Diagram 6008.2 and associated distance text the number of signs on the approach may be reduced to three signs. The spacing of these would have to be decided on site specific factors but if the signs are only used for road works signs the recommended positions would be 200m, 500m and 800m. If these signals are used for other purposes e.g. incident management, then the locations may be dictated by the other uses of the signals. However, in this case it is recommended that the signal immediately upstream of the taper is in the zone between 200m and 400m upstream of the first cone. Whether signs displaying Diagram 6008.2 are only used for road works or combined with other uses, the first of these signs sign should be no more than 1.6km (1 Mile) from start of the taper to be seen as a suitable alternative to standard verge signs. Unless required to maintain the conspicuity of incident management legends in poor weather conditions, preference should be given to using white LED systems to display arrows and text rather than yellow LED systems (as this improves the distance at which the aspect can be read).

U2.15.31. To be normally considered to be an acceptable alternative to verge mounted signs the same power, and power resilience, options and requirements in **U2.15.26** are required to be provided (during works periods if not permanently) for these signals. An option to provide independent (non-grid connected) power to the gantry signals during the works may be sufficient. Control and reporting requirements identified in the rest of this section in respect of the TTM provider would also apply for these signs.

U2.15.32. While not recommend for use other than for short term or mobile works, signals not meeting the requirements in **U2.15.26** may be used as approach signing if the physical protection identified in D6.13.13 is provided. At least one IPV with operating light arrow, within the taper safety zone, would be required to be part of this physical protection to provide alternative warning and information to road users.

U2.16 Sign removal and auditing

U2.16.1. Sign clutter should be minimised, not only because of the negative environmental effect but due to the impact on the ability of road users to read and comprehend the various permanent and temporary signs. Therefore, in areas with high driver work load (particularly the lane-change and lead-in zones) non-safety critical signs should be minimised. Signs indicating the nature of the works, journey time information, safety messages and tactical and strategic diversions should be located away from the high work load areas and where the desirable clear visibility can not be provided.

U2.16.2. Where TTM signs and equipment are only in use during off peak periods they should be removed from site or stored where they are not a potential distraction to road users and not where they would increase the risk to road users if vehicles leave the carriageway.

U2.16.3. Where it is expected that road works might stop for a number of days such as over a weekend, the contractor must assess whether it is reasonably practicable to remove the TTM equipment. If this is not practicable then the contractor shall use his best endeavours to continue working through the period in question, subject to any local restrictions.

U2.16.4. Where TTM equipment is to be removed between off-peak works, all associated signs e.g. advance signs and speed limit signs must be taken down. If this requirement would

unacceptably increase risk or congestion then an alternative safe method of working must be chosen; it is not acceptable to leave signing and TTM in a part-installed state. Where the length of works are reduced off-peak, rather than fully removed, then the approach signing, speed limit signs and signs with distances may need to be changed. Contractors should design schemes so that when the lengths of schemes are changed, signing can be changed without the need to retain redundant, misleading or incorrect signs on the road.

U2.16.5. For temporary signs not installed as part of works activities e.g. event signs and 'new road layout ahead' signs, it is considered reasonably practicable for the organisation installing the signs to record the dates of installation and removal of these signs and provide this information to third parties if requested. Regular audits should be undertaken to identify signs which need to be removed where they are no longer required, or are approaching or past the maximum permitted time they can lawfully be placed on a road.

U2.16.6. Signs to Diagram 7014 (TSRGD 2016, Schedule 13 Part 6 (35)) must have, on the back of the sign, a date by which the person placing the sign reasonably believes the sign will have been removed. This date must be no later than 3 months after the sign is placed on, or near a road. A removal date should also be placed on the back of temporary signs prescribed by Schedule 13.9. This date must be no later than the last date permitted by TSRGD 2016 Schedule 13, Part 9 (12) for the retention of the sign.

U2.16.7. Temporary signs and equipment relating to works activities may be placed on a road, as needed, during the length of time works are in place. They must be removed when works are complete; an exception is Diagram 7007.1 (TSRGD 2016 Schedule 13, Part 9 (2)) which may be kept in place for three months after works have been completed.

U2.16.8. Temporary signs prescribed by Schedule 13.9 can only be placed on a road for a limited amount of time. They must be removed prior to the end of this period even if the works they are associated with are in place for a longer period. It is considered practicable for all organisations placing signs not related to emergency situations to have sufficient resources to remove the sign within the maximum permitted time a sign can be placed on a road or when the need for the sign has ended if sooner.

U2.16.9. Where signs are needed to be in place for more than six months, e.g. medium term changes to layouts, then the signs and markings should be designed to the same requirements as for permanent signs and markings.

U2.17 Offside signs

U2.17.1. For both temporary and permanent situations, installation of signs on both sides of the carriageway reduces the likelihood of obscuration for road users, particularly as traffic flow increases. Where signs are used in pairs, the presence of a second sign on the opposite side of the carriageway may provide a greater length of time to replace or reposition a sign that is damaged or displaced. Where signs are only used on one side of the carriageway the effect of displacement or damage is clearly greater.

U2.17.2. The purpose of providing temporary signs is to ensure road users are given adequate guidance of the presence and safe path past the road works ahead. Recommended traffic signs sizes in this Parts 1 and Parts 2 of this Chapter (including any reduction in sign size for relaxation schemes) assume that signs will be provided on both sides of the carriageway. The design for temporary signing at road works must consider all available options for advance signing and not default to use of signs on one side of the carriageway only. Risk assessments must also demonstrate that signs provide adequate guidance for the road user, clearly

communicate the relevant warning, requirement or message and will be readable (see also [U2.8.4](#) and [Appendix A1.7](#)).

U2.17.3. Unless specifically highlighted, the recommended traffic signs sizes in this Part (including any reduction in sign size for relaxation schemes) are based on providing signs on both sides of the carriageway. The sizes of signs prescribed in the TSRGD may not be sufficient for nearside only signs to be sufficiently readable, particularly for carriageways wider than three lanes. Where the recommended size is larger than the maximum prescribed size, for short term use larger signs may be used under the provision of Schedule 13 Part 9. However, the use of signs complying with Schedule 13 Part 9 may impose additional requirements or limitations, particularly when used at fixed taper positions. See Section [U5](#). Risk assessments must identify the minimum size of sign and the clear visibility distance which ensures that the signs are readable and clearly communicate the relevant warning, requirement or message to road users (see also [U2.8.4](#)).

U2.17.4. The practice of placing offside signs on dual carriageway roads by carrying out carriageway crossings from a nearside place of relative safety was historically considered the most practicable method of working. Unless managed to conform to the guidance in HSE document CIS53, this approach can result in considerable risk exposure from crossing live carriageways while carrying TTM equipment. Even when working within the guidance of CIS53, traffic conditions may result in significantly increased installation and removal times for TTM. In many situations it may not now be considered that it is reasonably practicable to install signs manually. The option to place offside signs using works vehicles protected by IPVs is available but may increase the time required to install the lane closure. Therefore site specific risk based design must be used and must consider all potential alternatives for advance signing to ensure risk to road users and road workers is reduced to a level that is as low as reasonably practicable. The risk assessment must consider the use of offside signing installed from works vehicles under the protection of IPVs in addition to any option to omit signs. It is unacceptable to select a design that reduces risk to one party (e.g. road workers) at the expense of increased risk to another (e.g. road users). Where site-specific risk assessment suggests that suitable conditions exist, reducing the number of signs on the approach to lane closure can, by reducing the time to set up and remove works, be a safety benefit to both road users and road workers without increasing the risk of road users being presented with insufficient information. Guidance on where this would be acceptable is given in Section [U7.5](#). Omitting signs from relaxation scheme road works raises the importance of each sign within the works zone. This requires an assessment of the conditions when the works are installed and throughout the time the works are in place. Robust contingency plans must be in place for all relaxation scheme works such that if conditions deteriorate timely action can be taken to ensure risk to road users and road workers remains as low as reasonably practicable.

U2.17.5. The principle of nearside only signing on wider carriageways of five or more lanes is covered in Part 1: Design, Section D6.13. This principle can be extended to relaxation scheme lane closures on all carriageways, subject to risk based design (see [U2.17.3](#)). Adequate guidance must be provided to road users in lanes to be closed. Signs should therefore be sufficiently readable in all lanes to be closed and in the first open lane adjacent to those closed. For a four lane carriageway with the inside two lanes closed a nearside sign would need to be readable in lanes one to three. Readability requirements for some situations are included in [Appendix A1.7](#); or can be calculated for individual situations by treating each arrow/'T' bar and distance text as one item of information or assuming reading time of four seconds.

U2.17.6. The assessment of obscuration as part of the design process needs to consider the relative obscuration for a sign only provided on one side of a carriageway compared to that

for two signs of the size recommend in this Chapter. Traffic flow values given in Part 1: Design Table 3.2 provide information to support this estimate, which depends on the percentage of HGVs within the traffic flow. The percentage of HGVs (and those over 4.5m in height) within the traffic flow may be estimated if data are not readily available. The competency and training requirements identified in **U2.7.4** would normally be set so that designers can make an effective assessment of obscuration.

U2.17.7. Planned construction or maintenance activities should not require maintenance or construction workers to be in the live lane. Work activities should be undertaken within a works area or working space protected by fixed TTM, an Impact Protection Vehicle (see Part 2: Operations, Section O5.9.5) or other mobile works (see Part 2: Operations, Section O10 and Plan MLC4). It is not normally possible for TTM equipment to be installed while maintenance or construction workers are in adjacent work areas or working space. If possible installation, maintenance and removal of TTM should be undertaken from an existing safety zone.

U2.17.8. Where a risk assessment indicates that the safest system of work to access the place of relative safety in the central reservation of a dual carriageway is crossing of the carriageway, this should be undertaken in line with guidance on the methods of operation, training and supervision given in the HSE document CIS 53. Assessment of the risk associated with this method of working must take into account the time taken to safely cross the carriageway with all the required TTM equipment and its impact on the installation or removal time for the works, the available working window and road user risk.

U2.17.9. In order to ensure adequate guidance is given to road users signs should be placed on both the nearside and offside unless, based on a site specific risk assessment, it is determined that signs on one side can be omitted without negatively impacting on road user safety. Offside signs should be installed in the central reserve using an appropriate safe system of work, for example from works vehicles protected by IPVs. Risk based planning may identify locations on some dual carriageways where it is not practicable to fit two works vehicles, with associated safety zones, into the available space and with acceptable risk to road users. In these cases contractors will have to identify a safe method of work, for example by using one vehicle. For roads where traffic flows and/or traffic speeds are low, if risk assessment demonstrates that manual installation of offside signing reduces risk to a level that is as low as reasonably practicable (ALARP), contractors may consider installing offside signs manually.

U2.17.10. When omitting signs from one side of the carriageway contractors or Service Providers should record any taper strikes and any maintenance of the TTM to reset clipped cones in the taper and adjacent areas. Also any lane changes within 100m of the first cone from a lane being closed should be recorded if identified by personnel on site or from CCTV (if present). Any comments from road users (either direct or via the authority) should also be recorded. When responding to road users who may not have seen any or all signs, it is immaterial that other road users were able to see signs; contractors should identify the conditions prevailing at the time to identify why the signs were not clearly visible (see Section **U2.18**).

U2.17.11. Contractors or Service Providers will need to review this data to identify if their risk assessment for the omission of signs is still providing the minimum requirements for road user safety and road user comprehension.

U2.18 Accident and incident recording and reporting

U2.18.1. In addition to any statutory recording of accidents, incidents or dangerous occurrences that must be carried out, authorities, road owners, statutory undertakers, contractors or any

organisations with employees working on or near a road shall record any of the following occurrences:

- Any collisions with an entry taper, crossover or changeover, resulting in requirement for maintenance of the TTM equipment in these zones.
- Any instance of a vehicle which is not a works vehicle or other permitted vehicle (e.g. emergency services, traffic officer or recovery vehicle) entering the works area, working space or safety zones. All such incursions and any breaches of the TTM should be recorded, including unauthorised use of works accesses
- All injuries sustained by road workers when in either the safety zone or on a live carriageway;
- All collisions with works vehicles (including IPVs) when in a live lane or on a hard shoulder; and
- Any comments or complaints received relating to the TTM and any personal data relating to the above should only be kept for as long as it is needed to ensure the records of any occurrences are accurate. Records, with personal data removed, should be kept for at least seven years.

U2.18.2. The continuing improvement of road worker safety, road user safety and road works safety performance depends on accurate incident information. It is considered reasonable to provide to the Secretary of State for Transport or the relevant minister (or anybody acting on their behalf), copies of any record relating to a statutory report of an accident or a record relating to an occurrence identified in this section within 14 days of it being requested.

U2.18.3. This data should be made available for organisation's own designers to use in future general and scheme specific risk assessments.

U2.19 Diversions

U2.19.1. Diversions for planned works or temporary layouts normally increase both journey distance and time, and for non-urban roads often require the use of routes with higher accident rates than the closed road. Guidance on diversions is given in D3.15 in Part 1. The designer should consult the police and the authorities for both the road intended to be closed and any diversion route. For diversions from primary routes, trunk roads and any non-trunk motorways designers should include in the consultation any expected increase in mileage travelled (based on expected flows), environmental impact and any change in road user risk (which may be due to increased distance travelled or use of routes with a higher accident or casualty rates).

U2.19.2. Diversions from motorway and dual carriageways trunk roads and primary routes are likely to result in the greatest increase in road user risk as the diversion would normally be longer and often be over roads with a higher accident rate. As identified in D3.15.1 the presumption for these roads is to use lane closures rather than complete carriageway closures. In any justification provided to the authority for a request for a carriageway closure a risk assessment, which includes the impact on road users, including any increase in risk exposure by using the diversion route, will be required. Although a limited number of work activities e.g. some lane line marking and road stud maintenance, bridge replacement, can sometimes only be undertaken under a full carriageway closure most maintenance work can be undertaken using lane closures only. It is not acceptable to implement a carriageway closure on the sole basis of convenience for the contractor. For a carriageway closure to normally be considered acceptable it would need to either enable multiple maintenance activities to be undertaken, to reduce the number of closures, or enable the works to be undertaken more quickly. The reduction in time would need to result in no net increase in road user risk of using a longer and/or less safe route.

U2.19.3. The choice of any diversion route shall enable all users of the closed road to use the diversion. In urban areas it is important to provide a suitable alternative for non-motorised users and particularly those who have limited mobility. For motorised road users the requirement is that the diversion route shall not have any extra restrictions (including weight, height, width, emissions, or vehicle type) or pass through any additional tolls or charge zone. The diversion of traffic from the all-purpose network via a motorway is not acceptable.

U2.19.4. In some cases a universally usable diversion may increase delay, congestion and risk. Therefore, if there is a shorter, less disruptive and/or safer route which is suitable for at least half of the diverted traffic without extra charge then it's acceptable to sign two diversion routes as long as it is possible to provide clear and effective signing at the decision point so that all users understand which routes they can take.

U2.19.5. Where diversionary route symbols (S12-11-13) are provided on permanent signs as part of an emergency diversion route these may be suitable for use as a basis for planned diversions. This cannot be assumed as there may be factors which would not be acceptable except in an emergency (e.g. signalised junctions where there is insufficient capacity and it is not possible to adjust timings). If the route includes roads of another authority then the designer must check the acceptability of using the emergency diversion route for planned works with all authorities on the predefined route. It is not acceptable to solely rely on the symbols; additional signs will be required, as a minimum additional signs where turning movements for diverted traffic would be needed. These would normally need to show either the destination being signed (e.g. The NORTH, Leeds) or the route from which traffic is diverted (e.g. M6 North) in addition to the diversion symbol.

U2.19.6. Designers should note that for diversions over roads of a different authority the contractor must obtain permission (under Section 65 of the Road Traffic Regulation Act 1984) to place signs on these roads. Sufficient advance notice must be given to these authorities to obtain this permission. Any agreement relating to the placing of diversion symbols on directional signs, or agreement for placing of additional signs for emergency traffic management reasons (see O7 in Part 2), is not relevant to gaining permission for placing signs for planned works.

U2.19.7. For short and simple diversions the use of signs to working drawings 2702, 2703 and 2704 (Diversion, Diverted traffic, Diversion ENDS) is likely to be sufficient. For short diversions where there may be more than one diversion route or signing for both directions may be visible then the addition of a diversion symbol should be used. For longer diversions, multiple diversions for different vehicle types or more complicated diversions where there may be several turning movements, it is considered reasonable to include destinations in the signing (using Diagram 2705 from TSRGD 2002), either a location or, if relevant, a motorway junction number, or the route which the traffic is diverted (e.g. M1 South). To ensure continuity in the signing the destination or route to be followed will need to be included as the alternative route in the Diagram 2716 sign placed on the approach to the closure (or signalling system if appropriate). At any closure point signs indicating an alternative route to use will be required; this applies even if through traffic is diverted upstream of the closure point.

U2.19.8. Diversion routes will need to be checked before they are brought into use to ensure they are still suitable and that there is no conflicting signing, including other temporary road or street works signs. In situations where diversion routes of two or more different works interacting (either crossing or sharing some of the same route) then both sets of signs should include the destination or route being signed. While signs along the diversion route may be placed on the road before a closure is initiated, resources should be provided to the limit this time. Signs indicating that a road or carriageway is physically closed should only be displayed immediately before the closure is initiated. Where traffic is diverted upstream of the closure point the relevant

signs should not be placed on the road while the traffic could reasonably be still able to traverse the section of road before it is closed. Also this must not be before the time indicated on any signs for the start of a closure, nor the time identified in the relevant order.

U2.20 Length of works, design requirements for longer works and separation between schemes

U2.20.1. The requirements for identifying the acceptable length and spacing of road works are included in Part 1: Design, Section D3.5. In general the recommended maximum length of works is 4 km. Where fixed taper points are used to ease the installation and removal of works, the recommended length of works can be increased to 6km.

U2.20.2. The adoption of longer works is permissible if agreed by the authority as not having an unacceptable impact on the network or road users. Designers and authorities should note that recommended layouts and methods of working are based on a maximum length of 4 km. Where a longer length of works is proposed a site specific risk assessment must be carried out to identify a safe maximum length.

U2.20.3. The recommended maximum length of 4 km is based on the increased driver work load and reduced delineation provided by commonly used temporary traffic management products (compared to normal road markings and studs) and the regular application of reduced setbacks to barriers, equipment and signs. This not only has the potential to increase the likelihood of an accident through the works it will increase stress and fatigue for drivers and riders for a considerable distance downstream of the works. The design of the works should be reviewed to eliminate, or minimise, any increase in risk.

U2.20.4. Works over 4km in length will need to be subject to a more detailed design and scheme specific risk assessment by the organisation carrying out the works. As authorities are required to confirm that longer works are acceptable (except for relaxation schemes where fixed taper positions are in place where distance is 6 km or less) they need to be aware that in permitting longer lengths it may result in them sharing designer's risk. It is considered practicable for authorities to fund any additional cost of improving delineation (see [U2.20.7](#)) if the responsibility for funding this is not specified in the relevant contract or agreement with those undertaking the works.

U2.20.5. Only where there would be a shortening of the construction period would it be considered acceptable to undertake works in sections longer than 6 km. A reduction in construction cost, or for the convenience for the contractor are not sufficient grounds to justify the use of longer sections. Longer works increases the risk exposure of those maintaining the TTM, those managing the road e.g. Traffic Officers, as well as potentially increasing road user risk. This must be mitigated by a reduction in construction time.

U2.20.6. An example of the level of reduction in construction time needed to justify longer works would be a 12 km scheme, which would take 24 months to do in two 6 km sections. This would need to be completed in no longer than 18 months to justify undertaking the works with a single 12 km set of traffic management. It is therefore unlikely that it would be possible to reduce the construction period sufficiently to justify schemes with a length of over about 10 miles. For works over 6 km the contractor should identify the difference in cost and time of undertaking the works as planned and for completing the scheme in sections of no more than 6 km. This should be provided to third parties upon request,

U2.20.7. It is considered practicable for contractors to fund any additional cost of enabling the works to be accelerated when an authority has agreed to sections longer than 6 km (unless the responsibility for funding any additional resources is specified in the relevant contract or

agreement with those undertaking the works). Authorities are recommended not agree to works longer than 6 km if it is expected that work activities would not normally be visible over the majority of the length of the scheme; road user confidence in the justification for any works and the compliance with restrictions within works (particularly long term works) is reduced where there is a high proportion of the scheme with no visible activity.

U2.20.8. Where the works are longer than 6 km for relaxation schemes where fixed taper positions are in use, and 4 km for other situations, the delineation of the works should be improved by using higher performance cones, barriers, warning lamps, temporary road markings and/or temporary road studs as appropriate (see [Appendix A1.6](#)). Designers should also consider if setbacks etc., could be increased without negatively affecting the ability to undertake the works.

U2.20.9. Specifically, where narrow lanes are in use for over 4 km the relevant road users safety requirements are unlikely to be met without some of the enhancements identified in [Appendix A1.6](#) being adopted. Unless there are other hazards (see Section 2.9 and [Appendix A1.6](#)) narrow lanes of at least the desirable minimum width may be acceptable for a continuous length of 6 km and, with the use of 150 mm lanes lines, up to a design speed of 60 mph. While lane widths between the desirable minimum and absolute minimum may be acceptable at pinch points within this 6 km, narrow lanes of less than the desirable minimum should not be adopted for lengths of more than 4 km.

U2.20.10. While, it is recommended that narrow lanes are limited to a maximum continuous length of 6 km it may be acceptable to have multiple lengths of narrow lanes within a longer length of works. It is recommended that the minimum separation should be at least equal to length of the first section of narrow lanes.

U2.20.11. The recommended minimum distance between works is given in Part 1: Design, Table 3.3. Where works would be closer together, the temporary traffic management between them should be linked, subject to the maximum length of works identified in this section.

U2.20.12. The spacing requirements in Table 3.3 are for schemes with lane closures only. Carriageway or road closures are not covered by this table. Carriageway and road closures are not relaxation schemes; therefore the minimum spacing between the start and end of a diversion route and the next adjacent works can be taken as the distance in Table 3.3 for standard schemes. The criteria for halving of the minimum spacing identified in Part 1 D3.53 does not apply if one scheme is a road or carriageway closure. It would be not normally be acceptable to have two independently signed road or carriageway closures in close proximity; if there is a justification for two closely spaced closures they should be signed and managed as a single scheme. This would apply even if the closures were on different authority's roads; see Section 2.19 for information and guidance on diversions.

U3 SIGNING PRINCIPLES – SIGNS PRESCRIBED WITHIN TSRGD

U3.1 Introduction

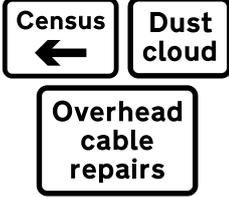
U3.1.1. This section outlines the signing principles associated with signs which are prescribed within TSRGD 2016, and should be read in conjunction with that document as appropriate. Sign types covered in this section are for incident management; parking and police signs; level crossings; speed enforcement; vehicle check point; housing developments; emergency vehicles; advance notification; contact information; temporary and permanent change to road layouts.

U3.1.2. NB This section does not include all temporary signs prescribed in TSRGD. Refer to [Appendix A1](#).

U3.2 Incident Management

U3.2.1. Guidance on the use of signs for incident management is provided in Part 2: Operations, Section O7. For other situations, the Diagram 562 sign may be used with appropriate supplementary plates. The triangle must not be used without a supplementary plate. See Working Drawings P562 and P563; and [Table 3.1](#).

Table 3.1 Incident management

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P562	Other danger ahead		N/A	TSRGD 2016 S13-2-7 Part 1: Design, Paragraph D4.8.8
This sign is to be used in conjunction with Working Drawing P563.				
P563	Supplementary Plate		 <p>See description below</p>	TSRGD 2016 S13-2-7
<p>A word or phrase below; A word or phrase below followed by a distance; or the legend above with an arrow pointing to the left or to the right. The words and phrases are — Accident; Census; Dust cloud; Fallen tree; Frost damage; Overhead cable repairs; Runners in road; Smoke; or Walkers in road.</p>				

U3.2.2. Diagram 554 variants “Flood” and “No smoking” may also be appropriate for incident management purposes. See Working Drawing P554A and P554D; and [Table 3.2](#).

Table 3.2 Worded warning signs

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P554A	Worded warning sign (Flood)		N/A	TSRGD 2016 S13-2-2 Part 1: Design, Paragraph D4.8.20
P554D	Worded warning sign (No smoking)		N/A	TSRGD 2016 S13-2-3
A distance with or without an arrow pointing to the left or to the right; or an arrow pointing to the left or to the right.				

U3.2.3. Diagram 554.2, with or without a supplementary plate, may be used for winter incident management purposes. See Working Drawings P554.2 and P554.3; and [Table 3.3](#).

Table 3.3 Winter incident management

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P554.2	Risk of ice or packed snow ahead		N/A	TSRGD 2016 S13-2-4 Part 1: Design, Paragraph D4.8.21
The sign must not be placed unless in combination with its first associated plate Working Drawing 554.3.				
P554.3	Plate legend Ice or snowdrifts		 See description below	
Plate legend Ice may be varied to “Ice for” and a distance; “Snowdrifts”; or “Snowdrifts for” and a distance.				

U3.3 Temporary parking restrictions and police incident management

U3.3.1. Police incident management signing should be designed in accordance with Working Drawings P636, P636.1, P829.1, P829.2, P829.3, P829.4 and [Table 3.4](#).

U3.3.2. Upright signs must be provided for temporary parking and loading restrictions. Traffic cones and cylinders (Diagrams 7101.1, 7102 and 7103) do not indicate any restriction on waiting or loading. Where no existing waiting restrictions apply, Diagram 636 will prohibit all waiting including those normally exempt from waiting restrictions e.g. blue badge holders. Where pre-existing parking restrictions apply and there is a need to prohibit all waiting or loading then a combination of diagrams 636 and 636.1 should be used, see [Table 3.4](#). Diagrams 636 and 636.1 must only be placed on a flat surface.

U3.3.3. Where parking, especially for residential use is to be prohibited or curtailed, whether for street works, road works or events, the time the restrictions apply should be kept to a minimum. For residential parking it is considered practicable to provide an alternative safe location at no additional cost where vehicles can be parked during the time relevant restrictions apply. The location of the parking must take into account any mobility limitations of anybody affected by the restrictions, whether residents or visitors. Given that alternative parking may be some distance from relevant residential properties this consideration must not be limited only to those with blue badges but to anybody who identifies to the authority, contractor, utility company or event organiser that they would have difficulty accessing properties. This guidance is also applicable to parking for public facilities e.g. hospitals, railway stations; in these cases any off-road parking for staff, pre booked users etc would need to be taken into account when considering an alternative provision when curtailing parking for the public. If it is not possible to locate parking close enough to properties to take into account any identified mobility limitations, contractors or event organisers would need to provide transport to and from any parking location.

Table 3.4 Police incident management

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P633	Vehicular traffic must not proceed beyond the sign where displayed by a constable in uniform or by a traffic warden		A red or transparent protective strip, with a visible width not exceeding 6mm, may be applied to the perimeter of the sign	TSRGD 2016 S13-6-17 Part 2: Operations, Paragraph O7.1.6
P636	Temporary prohibition of waiting except for loading and unloading		The name of the police force or traffic authority, or the word "Police" or "POLICE" may be added above or below the roundel; An arrow pointing to the left or to the right may be added	TSRGD 2016 S13-6-19
P636.1	Temporary prohibition of loading and unloading		The legend may be on one line	TSRGD 2016 S13-6-20
P829.1	Potential danger temporarily ahead and consequent need to proceed with caution		N/A	TSRGD 2016 S13-6-23 Part 2: Operations, Paragraph O7.1.6
P829.2	Accident ahead and consequent need to proceed with caution		N/A	TSRGD 2016 S13-6-24 Part 2 Operations, Paragraph O7.1.6
P829.3	Traffic should use the hard shoulder in an emergency		N/A	TSRGD 2016 S13-6-25

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P829.4	End of temporary permission for traffic to use the hard shoulder		N/A	TSRGD 2016 S13-6-26

U3.3.4. Signs to Working Drawings P829.1, P829.2, P829.3 and P829.4 may optionally be attached to the front or rear of police vehicles.

U3.3.5. A sign to Diagram 633.1 may be used to stop vehicular traffic at cycle events but must be authorised for use by the Police.

U3.3.6. The design of the sign should be in accordance with Working Drawing P633.1 and [Table 3.5](#). The part of the sign coloured yellow may be fluorescent yellow. This sign should be used in accordance with the British Cycling Federation protocol.

Table 3.5 Stop cyclists

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P633.1	Vehicular traffic must not proceed beyond the sign		N/A	TSRGD 2016 S13-6-18 Part 3: Update, Paragraph U3.3.6

U3.4 Level Crossings

U3.4.1. Temporary signing to new level crossings should follow standard design rules, using Transport Medium text. Signing should have a red background and be designed in accordance with Working Drawing P790 and [Table 3.6](#).

Table 3.6 Level crossing

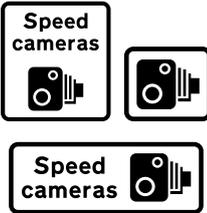
Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P790	New method of controlling traffic at a railway or tramway level crossing ahead		The word "CONTROL" may be omitted 	TSRGD 2016 S14-2-67 Chapter 4

U3.5 Speed enforcement

U3.5.1. Temporary speed enforcement signs should follow standard design rules and guidance given in Part 1: Design, Section D4.15.

U3.5.2. Speed enforcement signing should be designed in accordance with Working Drawings P829.5, P878, P880, P880.1 and [Table 3.7](#).

Table 3.7 Speed enforcement signing

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P829.5	Area where police carry out checks on the speed of vehicles		N/A	TSRGD 2016 S11-2-25 Part 1: Design, Paragraph D4.15.11
P878	Area in which enforcement cameras are in use		 See description below	TSRGD 2016 S11-2-63 Part 1: Design, Paragraphs D4.15.8-D4.15.10
The legend may be omitted or varied to “Speed cameras”, “Average speed check”, “Traffic signal and speed cameras”, “Traffic enforcement cameras”, “Police cameras”, “Police enforcement cameras” or “Bus lane cameras”. The legend may include, or a legend may be added for, the name, and logo, of the enforcement authority.				
P880	Speed camera ahead on lit road and reminder of 30mph speed limit		N/A	TSRGD 2016 S11-2-64
P880.1	Speed camera ahead on an unlit road and reminder that the national speed limit applies		N/A	TSRGD 2016 S11-2-68

U3.5.3. Refer to TSM Chapter 7, Figure 14-13 for design details of mounting the repeater sign (878) on a grey or yellow backing board with a speed limit sign to Diagram 670.

U3.6 Vehicle check point

U3.6.1. Guidance on the use of vehicle check point signing should be followed. The deployment of vehicle check point signing should follow the principles shown in TA11 and in Part 1: Design, Section D3.27.

U3.6.2. Temporary signing should be designed in accordance with the prescribed Working Drawing P830.1, P830.2, P830.3, P831.2 and P832.1A and [Table 3.8](#).

Table 3.8 Temporary vehicle check point

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P830.1	Signs indicating that a traffic survey is being undertaken		“CENSUS” may be varied to “CYCLISTS”, “WEIGHT CHECK” or “VEHICLE CHECK”; The entire legend may be varied to “STOP AT CENSUS POINT”, “SLOW CENSUS POINT”, “CENSUS POINT”; “WEIGHT CHECK” or “CHECK POINT”	TSRGD 2016 S13-6-46 Part 1: Design, Paragraph D3.26.10
P830.2	Goods vehicles may be directed to stop ahead by a constable in uniform for the purposes of sections 67, 68 or 78 of the Road Traffic Act 1988		N/A	TSRGD 2016 S13-6-47 Part 1: Design, Paragraph D3.27.2
P830.3	Vehicles should stay in lane for the purposes of a traffic survey, or a weight or vehicle check ahead		“STAY” may be varied to “GET” 	TSRGD 2016 S13-6-48 Part 1: Design, Paragraph D3.26.17
P831.2	Checks being made in relation to vehicle excise licences (or emissions) ahead		“EXCISE LICENCE” may be varied to “EMISSIONS” 	TSRGD 2016 S13-6-49 Part 1: Design, Paragraph D3.27.2
P832.1B	Check point ahead		“DVSA” may be varied to “GOODS VEHICLE” or the name of a successor organisation to the DVSA. “CHECK POINT AHEAD” may be varied to “VEHICLE CONDITION INSPECTION”	TSRGD 2016 S13-6-50 Part 1: Design, Paragraph D3.27.2

U3.6.3. For further details of permanently sited vehicle check point signs, refer to Working Drawings P832.4 and P832.7. See [Table 3.9](#).

Table 3.9 Permanent vehicle check point

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P832.4	Instructions in relation to goods vehicles for a check point ahead		The legend may be varied to “Enter Check Point”, “Keep to left lane” or “Leave m’way if directed”; The bus symbol may be added below or substituted for the lorry symbol	TSRGD 2016 S13-6-50 Part 1: Design, Paragraph D3.27.2
P832.7	Goods vehicles or public service vehicles (PSV) should get into the left hand lane of a carriageway on the approach to a goods vehicle or PSV check point ahead		See description below	TSRGD 2016 S13-6-27 Part 1: Design, Paragraph D3.27.2
<p>“GET IN LANE” may be varied to “STAY IN LANE”; The number and position of lanes may be varied; The bus symbol shown in the sign table at item 4 of Part 3 of Schedule 5 with a red diagonal bar through it, may be added below, or substituted for, the lorry symbol (ignoring the requirements as to size at item 4); The legend “Any vehicle” may be varied to “Other vehicles” with the lorry and bus symbols shown without the red bar; “Goods vehicle” may be varied to “Goods vehicle and PSV” or “PSV”; and The distance may be varied to “1 m”, “2/3m” or “1/3m”.</p>				

U3.7 Housing development

U3.7.1. Directional signing to new housing developments should follow standard design rules using Transport Heavy text and the house symbol (S53). Signs should have a yellow background. Where the route for lorries to the development is different to that for other traffic, the lorry symbol (S32) pointing to the left or right as appropriate may be added to the sign.

U3.7.2. Housing development signing should be designed in accordance with Working Drawings P2701, P2701.1 and [Table 3.10](#).

Table 3.10 Housing development

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P2701	Direction to a new housing development		N/A	TSRGD 2016 S13-6-28
P2701.1	Advance direction to a new housing development		 See description below	TSRGD 2016 S13-6-28

The sign shown by diagram 2701 may point to the left with the symbol placed to the right of the legend;
The direction in which the arrow points in diagram 2701.1 may be varied;
When the arrow in diagram 2701.1 points to the left it must be placed on the left hand side of the sign with the symbol placed to the right of the legend;
When the arrow in diagram 2701.1 points ahead it may be placed on the left or right hand side of the sign with the symbol placed at the opposite end of the sign;
The arrow in diagram 2701.1 may be omitted and the U-turn arrow shown in column 3 of the sign table in Part 5 of Schedule 12 at item 2, placed to the right of the legend;
The name of the housing development may be varied or omitted;
A distance to the destination may be shown (and the sign treated for the purposes of Part 3 of Schedule 18 as if it were in Schedule 12);
The lorry symbol shown at item 5 of the sign table in Part 1 of Schedule 5 may be added (ignoring the requirements as to size at item 5) and reversed where appropriate.

U3.8 Emergency vehicles

U3.8.1. Emergency vehicle route signs should be designed to emergency service provider's protocols.

U3.8.2. Where signing is required to direct emergency vehicles, signing complying with Working Drawing P2708 should be used; see [Table 3.11](#).

Table 3.11 Emergency vehicles

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P2708	Junction ahead leading to route for emergency vehicles to a temporary incident control point		"EMERGENCY VEHICLES" may be varied to "INCIDENT CONTROL" The direction in which the arrow or arrows point may be varied	TSRGD 2016 S13-6-45

U3.9 Advance notification

U3.9.1. Advance notification signs should follow standard design rules and guidance, as given in Part 1: Design, Sections D4.12 and D4.13.

U3.9.2. This signing should be designed in accordance with Working Drawings P7003.1, P7005, P7006 and P7007.1 and [Table 3.12](#).

U3.9.3. Designers should carefully consider whether or not signs giving notice of road closures taking place at some point in the future should include specific times on them. The inclusion of times gives drivers clear information and allows journeys to be planned with more certainty where diversions are in place. Where the exact timings of a closure can vary by half an hour or more within a general timeframe, references should be limited to such phrases as “overnight”, “off-peak hours”, “daytime”, “next weekend” and the like. See also Paragraph **U5.3.4.**

Table 3.12 Advance notification

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7003.1	Starting date and duration of road works		  <p>See description below</p>	TSRGD 2016 S13-6-42 Part 1: Design, Paragraph D4.12.2
<p>The Highways England logo may be varied to another logo used by Highways England or replaced by “Highways England”; The Highways England logo may be varied to the name or logo of another traffic authority; The date and duration of the work may be varied; “until” and a date may be substituted for “for 3 weeks”; The top or bottom panel, or both, may be omitted; The triangular road works symbol may be omitted.</p>				
P7005	Information for drivers in respect of road works		      <p>See description below</p>	TSRGD 2016 S13-6-43 Part 1: Design, Paragraphs D4.13.4 and D4.13.5
<p>The date may be varied; “until” and the date may be omitted; “Delays possible until” and the date may be varied to a short description of the work in progress or explanation of why work is suspended. The distance may be varied, may be preceded by “For” and may be on two lines; The triangular road works symbol and distance plate may be omitted.</p>				

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7006	End of road works and of any associated temporary statutory restrictions		See description below	TSRGD 2016 S13-6-44 Part 1: Design, Paragraph D4.14.5
<p>The Highways England logo may be varied to another logo used by Highways England or replaced by “Highways England”; The Highways England logo may be varied to the name or logo of another traffic authority; The Highways England panel and the horizontal line below “delay” may be omitted.</p>				
P7007.1	Relevant particulars of major construction or improvement scheme being carried out on road ahead		 <p>See description below</p>	TSRGD 2016 S13-6-2 Part 1: Design, Paragraph D4.15.1
<p>The Highways England logo may be varied to another logo used by Highways England or replaced by “Highways England”; The Highways England or Department for Transport logo (or both) may be replaced by one or two of the following (provided that in total no more than two names or logos are shown)— (a) “Welsh Government” or a logo used by the Welsh Government; (b) “Scottish Government” or a logo used by the Scottish Government; (c) the name or logo of that part of the Scottish or Welsh Government that is, by virtue of the organisation of the government, responsible for the maintenance or improvement of the road; (d) the name or logo of another traffic authority; The Department for Transport logo may be varied to another logo used by the Department or replaced by “Department for Transport” The Department for Transport logo may be varied to the name or logo of another Department of Her Majesty’s Government; Either or both logos may be omitted; The particulars of the construction or improvement scheme may be varied. The Department for Transport logo may be varied to another logo used by the Department or replaced by “Department for Transport” The Department for Transport logo may be varied to the name or logo of another Department of Her Majesty’s Government; Either or both logos may be omitted; The particulars of the construction or improvement scheme may be varied.</p>				

U3.9.4. A photograph may only be added to a sign to diagram 7007.1 when the sign is located on a Highways England road, as a national authorisation is in place to allow this.

U3.10 Contact information

U3.10.1. Temporary contact information signs should follow standard design rules and guidance as given in Part 1: Design, Sections D4.14 and D4.15.

U3.10.2. This signing should be designed in accordance with Working Drawings P7006.1 and P7008; and [Table 3.13](#).

Table 3.13 Contact information

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7006.1	Information on telephone number to be used for enquiries about road works		See description below	TSRGD 2016 S13-6-1 Part 1: Design, Paragraph D4.14.8
<p>The Highways England logo may be varied to another logo used by Highways England or replaced by “Highways England”; The logo may be varied to the name or logo of that part of the Scottish or Welsh Government that is, by virtue of the organisation of the government, responsible for the maintenance or improvement of the road; The logo may be varied to the name or logo of another traffic authority; The telephone number may be varied. The logo may be varied to “Scottish Government”, “Welsh Government” or a logo of the Scottish or Welsh Government.</p>				
P7008	Nature of street works, giving names of undertaker and contractor, emergency telephone number, and apology for inconvenience (Sign for pedestrians)		See description below	TSRGD 2016 S13-6-3 Part 1: Design, Paragraph D4.15.5
<p>The name of the undertaker (and logo) and contractor, the nature of the works, the completion date and telephone number may be varied; Each line of lettering may have a different x-height which must be smaller than the telephone number;</p> <p>Each line of lettering may have a different x-height which must be smaller than the telephone number; The description of the works, the completion date and the name of the contractor may be omitted;</p> <p>The top and bottom panels may be in any colour and style of lettering;</p> <p>A logo indicating membership of a national street works good practice scheme may be added to the top or bottom panel;</p> <p>The bottom panel may be omitted; The top panel may be omitted provided the undertaker’s name is shown on the red panel.</p>				

U3.11 Traffic control

U3.11.1. Temporary signing to road layout under temporary traffic signal control should follow standard design rules as given in Part 1: Design, Section D5.4. Signing should have a red background and be designed in accordance with Working Drawings P7011, P7011.1, P7011.2, P7019, P7021, P7022, P7023, P7024, P7031, P7032 and [Table 3.14](#).

Table 3.14 Traffic Control

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7011	Point beyond which vehicular traffic must not proceed when required to stop		See description below	TSRGD 2016 S14-2-58 TSM Chapter 4
The legend may be varied as follows— (a) “WHEN STOP SIGN SHOWS WAIT HERE”; (b) “WHEN RED LIGHT SHOWS WAIT HERE FOR CONVOY VEHICLE”; (c) “WHEN STOP SIGN SHOWS WAIT HERE FOR CONVOY VEHICLE”; (d) “WHEN GREEN LIGHT SHOWS FOLLOW CONVOY VEHICLE”; (e) “AT TRAFFIC CONTROL FOLLOW CONVOY VEHICLE”.				
P7011.1	Point beyond which vehicular traffic must not proceed when required to stop, where there is a road junction		‘3-WAY’ may be varied to ‘4-WAY’	TSRGD 2016 S14-2-59
P7011.2	Instruction to vehicular traffic at a portable signal-controlled pedestrian facility		N/A	TSRGD 2016 S14-2-60
P7019	Traffic light signals not in use		N/A	TSRGD 2016 S14-2-61
P7021	Traffic on road ahead is being controlled by portable light signals (indication to traffic joining that road)		N/A	TSRGD 2016 S14-2-62
P7022	Traffic joining a length of road being controlled by portable light signals is not controlled by such signals		N/A	TSRGD 2016 S14-2-63
P7023	Vehicular traffic must not proceed into a length of road where one-way working is temporarily necessary		N/A	TSRGD 2016 S14-2-64

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7024	Vehicular traffic may proceed into a length of road where one-way working is temporarily necessary		N/A	TSRGD 2016 S14-2-65
P7031	Vehicular traffic must not proceed beyond the sign when displayed for a short period during works on or near an all-purpose road		A red or transparent protective strip, with a visible width not exceeding 6mm, may be applied to the perimeter of the sign	TSRGD 2016 S14-2-66
P7032	Commencement point of a newly imposed 30mph speed limit which is contiguous to an existing 30mph speed limit		N/A	TSRGD 2016 S13-6-38 TSM Chapter 4, Section 14.33

U3.12 Permanent change to road layout ahead

U3.12.1. Temporary signing should follow standard design rules as given in Traffic Signs Manual Chapter 4, using Transport Medium text. Signing should have a red background and be designed in accordance with Working Drawing P7014 and [Table 3.15](#). These signs are not used on motorways.

Table 3.15 Permanent change to road layout

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7014	Permanent change in road layout ahead		 See description below	TSRGD 2016 S13-6-37 TSM Chapter 4
<p>“NEW ROUNDABOUT” may be varied to— (a) “CHANGED PRIORITIES”; (b) “GAP CLOSED”; (c) “NEW ONE WAY SYSTEM”; (d) “NEW ROAD LAYOUT”; (e) “NEW TRAFFIC ISLANDS”; (f) “NEW TRAFFIC SIGNALS”; (g) “NEW ZEBRA CROSSING”; (h) CHANGED”; or (i) “SIGNAL TIMING CHANGED”; A distance in yards to the nearest 10 yards may be substituted for, or added before, the word “AHEAD”, on a separate line where necessary, and must be expressed as “yards” or “yds”.</p>				

U3.13 Hazard information

U3.13.1. Temporary information signing should follow standard design rules and guidance as given in Traffic Signs Manual Chapter 4, and for convoy working signs Part 1: Design, Section D7. This signing should be designed in accordance with Working Drawings P7014.1, P7020, P7025, P7026 and [Table 3.16](#).

Table 3.16 Hazard information

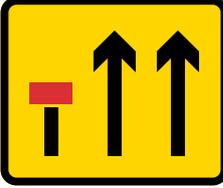
Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7014.1	Temporary or permanent reduction in bridge headroom ahead		The numerals may be varied	TSRGD 2016 S13-6-37 TSM Chapter 4
P7020	Variable message sign ahead not in use or being tested		“SIGN” may be varied to “SIGNAL”. “NOT IN USE” may be varied to “UNDER TEST”. The legend may be on three lines 	TSRGD 2016 S13-6-52
P7025	Vehicles to be escorted in convoys through road works ahead		N/A	TSRGD 2016 S13-6-34 Part 1: Design, Paragraph D7.5.5
P7026	Explanation of reason for escorting vehicles in convoys through road works		N/A	TSRGD 2016 S13-6-35 Part 1: Design, Paragraph D7.6.1

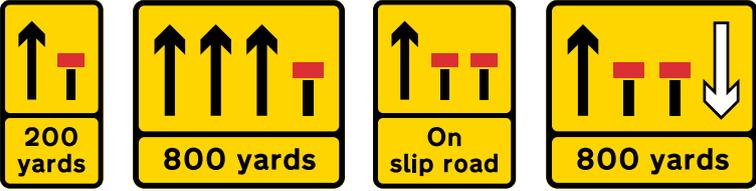
U3.14 Lane use

U3.14.1. This section covers the design of signs indicating lane use on motorways, all-purpose dual carriageway roads and other roads.

U3.14.2. These signs should be designed in accordance with Working Drawings P7202.1, P7243, P7244 and [Table 3.17](#). Typical examples of signs indicating lane use are shown in [Table 3.17](#).

Table 3.17 Lane use

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7202.1 (Previously P7202 or P7206)	Temporary lane availability		See description below	TSRGD 2016 S13-6-13 Section U8.4
<p>The number of arrows and symbols indicating the number of lanes and those which are open or closed to traffic may be varied; Where the sign has a bottom panel, the legend may be varied to another distance or to “On slip road”, provided the legend appears on no more than three lines. See below for typical variants for Diagram 7202.1.</p>				

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
				
<p>P7243 (Previously P7210–P7240 inclusive)</p>	<p>Temporary road layout with lane restrictions</p>		<p>See description below</p>	<p>TSRGD 2016 S13-6-14 Section U8.5</p>
<p>1. In the top panel the legend may be— (a) varied to “REJOIN MAIN CARRIAGEWAY” or “NARROW LANES”; (b) on one line; 2. The top panel may be omitted; 3. In the middle panel— (a) the arrows and symbols may be varied to indicate the layout of the traffic lanes provided that the shape of an arrow head is not varied; (b) an individual arrow may include more than one arrow head; (c) the numerals on the width limit symbol may be varied; (d) the width limit symbol may be omitted or varied to a symbol shown in column 3 of the sign table in Part 20 of TSRGD Schedule 12 at items 24, 25, 28, 30, 33, and 35; (e) the size of a symbol referred to in paragraph (d) may be varied from that shown for the symbol in Part 20 of TSRGD Schedule 12; (f) route numbers may be added with the x-height being 100, 125 or 150mm; (g) the route numbers referred to in paragraph (f) may be followed by “only” at the same x-height; (h) a motorway junction number in white characters on a black patch may be added in a manner similar to the patch shown in the diagram at item 15, the x-height being 80, 100 or 120mm; (i) a horizontal bar may be added in the manner shown in the diagram at item 15 where two or more lanes are associated with the same route number; (j) a white downward pointing arrow, as shown in the upper diagram at item 13, may be added to indicate a contraflow traffic lane; 4. In the bottom panel— (a) the numerals indicating the maximum speed advised may be varied; (b) the legend may be varied to a distance with an x-height of 100mm, 125mm or 150mm; (c) the distance referred to in paragraph (b) may be preceded by “For”; and 5. The bottom panel may be omitted.</p>				
<p>P7244 (Previously P7201 or P7201.1)</p>	<p>Temporary road layout, with an indication of destinations and route numbers, where the sign is placed on a motorway</p>		<p>See description below</p>	<p>TSRGD 2016 S13-6-15 Section U8.6</p>

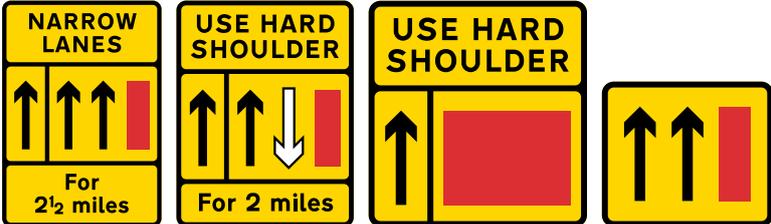
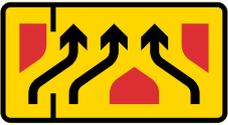
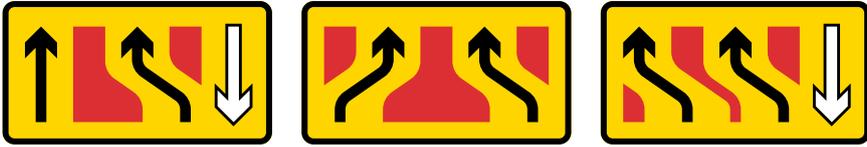
Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
				<p>1. A panel with the legend “USE HARD SHOULDER”, “REJOIN MAIN CARRIAGEWAY”, “NARROW LANES”, “EVENT TRAFFIC” or other appropriate legend, may be added above the top panel in a manner similar to the top panel shown in the diagram at item 14 with an x-height of not less than 100mm, nor more than 150mm;</p> <p>2. In the top panel— (a) the arrows may be varied to indicate the layout of the traffic lanes provided the shape of an arrow head is not varied; (b) a white downward pointing arrow, as shown in the upper diagram at item 13, may be added to indicate a contraflow traffic lane; (c) the symbol indicating a closed lane, as shown in the diagrams at item 1 may be added; (d) where the sign is placed other than on a motorway, any route number must have characters of the form shown in Part 2 of Schedule 17 with an x- height of not less than 100mm, nor more than 150mm; See below for typical variants for Diagram 7244; (e) a symbol shown in a diagram in Part 11 or 20 of Schedule 12 may be added and the size of the symbol may be varied from that shown; (f) a destination or route number may be varied or omitted, and additional destinations and route numbers added; (g) the junction number may be varied or omitted;</p> <p>3. In the bottom panel the distance may be varied and the distance may be preceded by “For”; and</p> <p>4. The bottom panel may be omitted.</p>

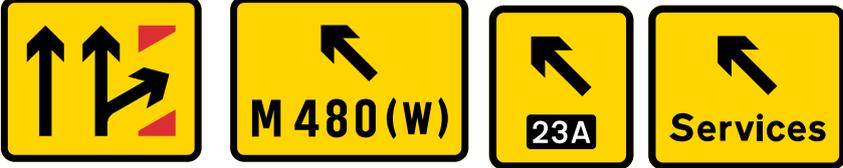
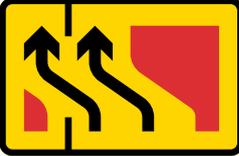
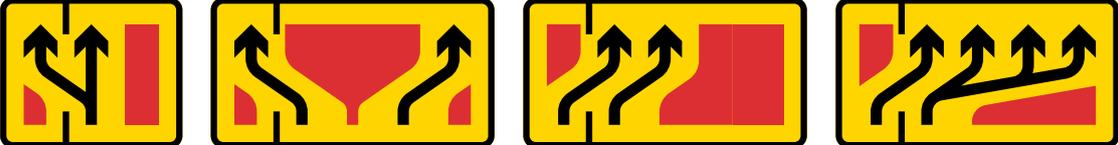
U3.15 Temporary lane alignment and destinations

U3.15.1. This signing should be designed in accordance with Working Drawing P7245. For basic design elements see [Table 3.18](#).

Table 3.18 Temporary lane alignment and destinations

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7245	Temporary road layout – lane alignment and destinations		See description below	TSRGD 2016 S13-6-16 Section U8.6

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
<p>1. In the top panel the legend may be— (a) varied to “USE HARD SHOULDER” or “NARROW LANES”; (b) on one line;</p> <p>2. The top panel may be omitted;</p> <p>3. In the middle panel— (a) the arrows and symbols may be varied to indicate the layout of the traffic lanes provided the shape of an arrow head is not varied; (b) an individual arrow may include more than one arrow head; (c) black symbols representing the division of traffic lanes may be added in a manner similar to that shown at item 14 of the sign table in Part 2 of Schedule 11 or at item 1 of the sign table in Part 28 of Schedule 12; (d) a white downward pointing arrow as shown in the upper diagram at item 13 may be added to indicate a contraflow traffic lane; (e) destinations and route numbers may be added with an x-height of 100, 125, 150 or 175mm; (f) a junction number panel may be added in a manner similar to that shown in the diagram at item 15, the x-height being 80, 100, 120 or 140mm; (g) symbols provided for in Parts 11, 12, 14, 15, 17 and 18 of Schedule 12 may be added;</p> <p>4. In the bottom panel— (a) the numerals indicating the maximum speed advised may be varied; (b) the legend may be varied to a distance with an x-height of 100, 125, 150 or 175mm; (c) the distance may be preceded by “For”;</p> <p>5. The bottom panel may be omitted.</p> <p>See below for typical variants for Diagram 7245.</p>				
<p>P7245 (Typical variants) (Previously P7203.1)</p>	<p>Length of road works</p>		<p>See above for permitted variants and below for typical variants</p>	<p>Part 1: Design, Paragraph D6.4.14 Section U8.6</p>
				
<p>P7245 (Typical variants) (Previously P7215)</p>	<p>Contraflow entry crossovers</p>		<p>See below for typical variants</p>	<p>Part 1: Design, Paragraph D6.4.7 Section U8.6</p>
				
<p>P7245 (Typical variants) (Previously P7216)</p>	<p>Contraflow exit crossovers</p>		<p>See below for typical variants</p>	<p>Part 1: Design, Paragraph D6.19.2 Section U8.6</p>
				

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7245 (Typical variants) (Previously P7241)	Junction signs		See below for typical variants	Part 1: Design, Paragraph D6.19.2 Section U8.6
Typical Variants 				
P7245 (Typical variants)	Hard shoulder signs		See below for typical variants	Section U8.6
Typical Variants 				
P7245 (Permitted variants) (Previously P7237)	Narrow lanes		Typical Variant 	Part 1: Design, Paragraphs D6.4.13 and D6.17.2 Section U8.6
P7245 (Typical variants) (Previously P7221)	Lane alignment		See below for typical variants	Section U8.6
Typical Variants 				
P7245 (Typical variants) (Previously P7240)	Lane loss		See below for typical variants	Part 1: Design, Paragraphs D3.17.1 and D6.4.13 Section U8.6

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
Typical Variants				
				
P7245 (Typical variants) (Previously P7250, P7256)	Lane gain		See below for typical variants	Part 1: Design, Paragraph D3.17.2 and D6.4.13 Section U8.6
Typical Variants				
				

U3.16 Recovery vehicles

U3.16.1. Temporary recovery vehicle signing should follow design guidance in Part 1: Design, Section D4.10. **U3.16.2** Recovery vehicle signing should be designed in accordance with Working Drawing P7291 and [Table 3.19](#).

U3.16.2. The 'x' height quoted on the Working Drawing may be reduced to a minimum of 75mm if traffic conditions and space constraint warrant such a reduction.

Table 3.19 Recovery vehicle

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7291	Information on breakdown recovery services during road works		"Await rescue" may be varied to "End"	TSRGD 2016 S13-6-40 Part 1: Design, Paragraphs D4.10.37 and D4.10.38

U3.17 Advisory speed limit

U3.17.1. Temporary advisory speed limit signing should follow design guidance in Part 1: Design, Section D3.7 and Section [U2.9](#).

U3.17.2. Advisory speed limit signing should be designed in accordance with Working Drawing P7294, with 'x' heights ranging between 50mm minimum and 125mm maximum. The sign is always 24 stroke widths high, see [Table 3.20](#).

Table 3.20 Advisory speed limit

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7294	Temporary maximum speed in mph advised		The numerals may be varied to the appropriate advised maximum speed	TSRGD 2016 – S13-6-41 Part 1: Design, Paragraph D3.7.5

U4.1 Introduction

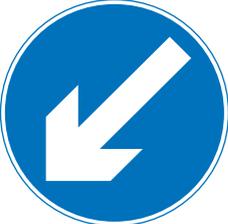
U4.1.1. This section deals with vehicle mounted signs and vehicle conspicuity markings. Guidance on the use of vehicle mounted signs is provided in Part 2: Operations, Sections O8 to O11.

U4.2 Vehicle mounted signs

U4.2.1. Vehicle mounted signing should be designed in accordance with Working Drawings P610, P7001, P7001.1, P7029, P7402, P7403 and P7404.

U4.2.2. The sign to Diagram 610 can be used on roads with any speed limit and may point to the right or left as appropriate (see [Table 4.1](#)). If the speed limit is more than 30mph the sign can only be vehicle mounted when it is on the rear of a vehicle immediately ahead of another vehicle displaying the sign to Diagram 7403.

Table 4.1 Keep right regulatory

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P610	Diagram 610 Sign— (a) attached to the front or back of a road maintenance vehicle to indicate the side on which traffic should pass; or (b) placed in relation to an emergency or breakdown vehicle which is temporarily obstructing the road to warn other traffic of the obstruction and to indicate the way past the vehicle		See description below	TSRGD 2016 S13-6-11 Part 2: Operations, Sections O8.1 and O10.610.6
Arrow may point downwards to the left; When attached to a vehicle, the diameter of the sign may be reduced to 1200 or 900mm where it is not practicable to mount the 1500 millimetre diameter sign on the vehicle; When placed in relation to an emergency or breakdown vehicle, the diameter may be reduced to 1200 or 900mm.				

U4.2.3. On roads with a speed limit of 30mph or under the signs shown in [Table 4.1](#) and [Table 4.2](#) may be attached to the front or rear of a road maintenance vehicle

Table 4.2 Road maintenance vehicle

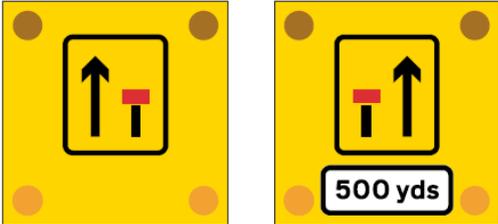
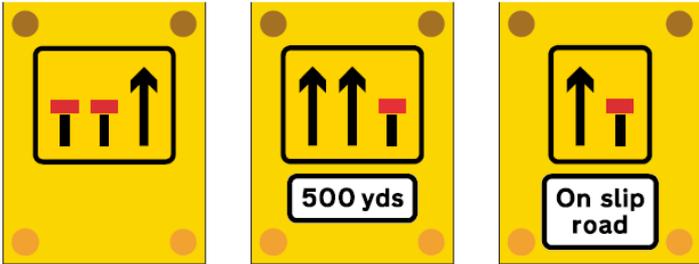
Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7001	Road works or temporary obstruction of the carriageway ahead		This sign is to be used in conjunction with 7001.1	TSRGD 2016 S13-2-9 Part 1: Design, Paragraph D4.8.1
P7001.1	Nature of road works		 See description below	Part 1: Design, Paragraph D4.8.2
<p>1. A distance; 2. "For" and a distance; 3. A word or phrase at paragraph 8 (where "End" indicates the end of all restrictions or prohibitions associated with road works); 4. A word or phrase at paragraph 8 (other than "End") followed by a distance; 5. An arrow pointing to the left or to the right on its own or with the legend at 1, 3 or 4; 6. "On" and a route number, with or without a direction of travel; or 7. A route number with or without a direction of travel; 8. The words and phrases are— (a) Line painting; (b) At level crossing; (c) Blasting; (d) Ditching; (e) Grass cutting; (f) Gritting; (g) Gully emptying; (h) Hedge cutting; (i) Lighting maintenance; (j) Mobile road works; (k) On hard shoulder; (l) On slip road; (m) Overhead works; (n) Road sweeping; (o) Salting; (p) Sign erection; (q) Sign maintenance; (r) Snow ploughing; (s) Surveying; (t) Tree cutting; (u) Weed spraying; (v) End.</p>				

U4.2.4. Signs mounted on convoy vehicles are to Working Drawing P7029 and [Table 4.3](#).**Table 4.3** Signs mounted on convoy vehicles

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7029	Vehicular traffic must not overtake the vehicle used to escort other vehicles through road works		The words "NO OVERTAKING" may be omitted and "CONVOY VEHICLE" may be on one line 	TSRGD 2016 S13-6-36 Part 1: Design, Paragraph D7.5.1

U4.2.5. The signs shown in [Table 4.4](#) may be attached to the rear of a road maintenance vehicle. The lanes indicated as closed may be varied, as may the distances.

Table 4.4 Rear mounted on maintenance vehicles

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7402	Lanes closed to traffic ahead by vehicles carrying out mobile road works (Alternative types)	 <p>(2500 x 2500)</p>	Typical Variants shown below	TSRGD 2016 S13-6-9 Part 2: Operations, Section O10.7
<p>The number of arrows and symbols indicating the number of lanes and those which are open or closed to traffic may be varied. The words “500 yds” may be varied to an alternative distance to the nearest 50 yards or to “Ahead” or to “On slip road” on two lines. The distance plate may be omitted</p> <div style="text-align: center;">  <p>Signs may be varied to a size of 2300 x 3000</p>  </div>				

U4.2.6. The prescribed signs to Diagrams 7403 may point to the right or left as appropriate, see [Table 4.5](#).

Table 4.5 Keep Right regulatory

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7403	Other traffic to keep to the right of vehicles carrying out mobile road works (Alternative types)	 <p>(2500 x 2500) (2300 x 3000)</p>	The arrow may point downwards to the left	TSRGD 2016 S13-6-10 Part 2: Operations, Section O10.7

U4.2.7. The sign to Working Drawing P7404 may be mounted to the rear of any road maintenance vehicle, see [Table 4.6](#).

Table 4.6 Highway maintenance

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7404	Nature of work being done by vehicle working on the highway	HIGHWAY MAINTENANCE	The word "HIGHWAY" may be varied to "MOTORWAY" or "ROAD". The legend may be on one line as shown below	TSRGD 2016 S13-6-12 Part 2: Operations, Paragraph O5.2.8 and Section O11.8
HIGHWAY MAINTENANCE				

U4.3 Vehicle conspicuity markings

U4.3.1. Chevron markings should be provided on the vehicles stopping on high-speed roads in accordance with Part 2: Operations, Paragraph O5.2.3.

U4.3.2. The rear markings for cars and vans are upward facing chevrons in red and yellow alternating stripes, as shown in [Figure 4.1](#). Each chevron stripe should be no less than 150mm in width (larger on big vehicles) and angled upwards between 45 and 60 degrees. The red stripes must be of retro-reflective material, designed to maximise night-time visibility. The fluorescent yellow stripes are non-reflective, providing good daytime and dusk visibility and contrasting with the red. The chevrons should cover as much of the rear as possible without obscuring windows, lights or registration plates. The recommended specification for various types of vehicle are shown in [Table 4.7](#).

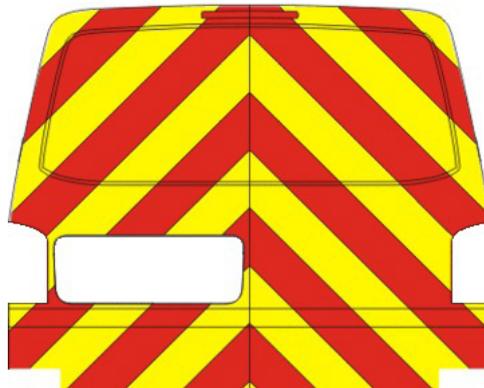


Figure 4.1 Rear mounted chevron markings

U4.3.3. It is also acceptable to have complete coverage of red retro-reflective material in place of chevrons on the rear but the red/yellow combination is generally considered to give the greater all round conspicuity.

U4.3.4. It is recommended that for higher speed roads retroreflective material to Class R3B is used. Class R2 material may be used to meet minimum retro-reflective requirement for low-speed roads (under 40mph limit). Material to Class R1 is not recommended for works vehicles.

Table 4.7 Recommended specification for chevron markings

Vehicle type	Higher speed road specification (above 40 mph)
Vehicles under 7.5 tonnes (typically cars and vans) on the public highway that operate or stop for work purposes	<ul style="list-style-type: none"> • Rear chevrons in retroreflective red and non-reflective fluorescent yellow; • Rear facing door edging / lockers / guardrail strips in red retroreflective material.; • “HIGHWAY MAINTENANCE” (or permitted variants) in non-reflective black on either non-reflective, reflective or retro-reflective yellow; and • 50 mm side outline / stripe in yellow retroreflective material.
Vehicles over 7.5 tonnes (including: spreaders, gritters, tippers, Road sweepers and Recovery trucks) on the public highway that operate or stop for work purposes	<ul style="list-style-type: none"> • Rear chevrons in retroreflective red and non-reflective fluorescent yellow; • Rear facing door edging / lockers / guardrail strips in red retroreflective material; • “HIGHWAY MAINTENANCE” (or permitted variants) in non-reflective black on either non-reflective, reflective or retro-reflective yellow; • Directional arrow in accordance with Part 2: Operations, Paragraph O10.7.5; • Rear marker chevron boards (ECE70 / 70.1); and • 50 mm red rear and yellow side outlines (ECE104).
Incident / Mobile Support Units (where the authority does not have a specification)	<ul style="list-style-type: none"> • Rear chevrons in retroreflective red and fluorescent yellow-green material; • Door edging strips in red retroreflective material; • “HIGHWAY MAINTENANCE” (or permitted variants) in non-reflective black on either non-reflective, reflective or retro-reflective yellow.

U5.1 Introduction

U5.1.1. Schedule 13, Part 9 of TSRGD provides for temporary signs to be placed on or near a road for the following purposes:

- convey a civil emergency warning or information;
- convey a temporary hazard warning;
- convey temporary information; or
- indicate the entrance to, or exit from, road works for vehicles involved in the carrying out of those works.

U5.1.2. The following definitions apply:

- “Civil emergency warning or information” – a warning or information about a civil emergency or the prospect of a civil emergency;
- “Temporary hazard warning” – a warning about, or information on how to avoid, any temporary hazards caused by:
 - works being executed on or near a road;
 - adverse weather conditions or other natural causes; the failure of street-lighting or malfunction of, or damage to, any other apparatus, equipment or facility used in connection with the road or anything situated on or near or under it; and
 - damage to the road itself.
- “Temporary information”:
 - information about –
 - the time, date or location of road works;
 - the expected delay that road works may cause;
 - convenient routes to be followed on the occasion of a sporting event, an exhibition or any other public gathering which is likely to attract a large volume of traffic;
 - diversions or alternative routes;
 - check points at which drivers of goods vehicles or public service vehicles may be required to stop;
 - the availability of new routes or destinations; and
 - changes in route numbers.
 - information for drivers of wide loads about action to be taken in respect of road works ahead; and
 - requests by the police for information in connection with road traffic accidents.

U5.1.3. Further guidance on the use of Schedule 13.9 signs for temporary events is given in Traffic Advisory Leaflet 04/11.

U5.1.4. Schedule 13.9 signs must not be used for enforcement purposes.

U5.2 Colour coding

U5.2.1. The following colour combinations for static signs are permitted (see [Figure 5.1](#)):

- black on a background of white or yellow, using Transport Heavy font;
- blue on a white background, using Transport Heavy font;
- white on a blue background, using Transport Medium font; and
- white on a red background, using Transport Medium font.

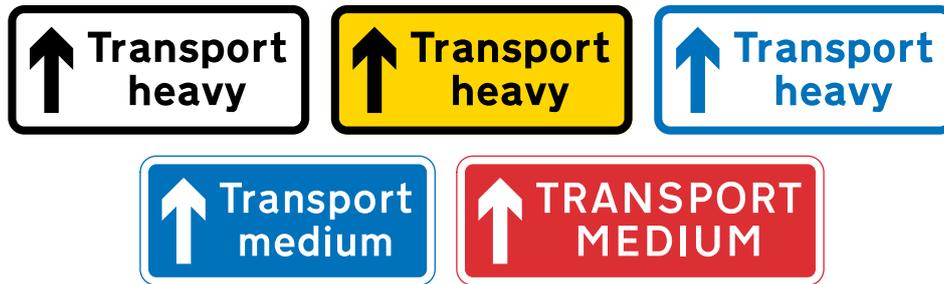


Figure 5.1 Schedule 13.10 colour combinations

U5.2.2. The background must be red and any letters, numerals, other characters, chevrons or borders must be white if the sign:

- conveys a temporary hazard warning;
- conveys only temporary information for pedestrians, cyclists or pedestrians; or
- indicates the entrance to, or exit from, road works for vehicles involved in the carrying out of those works.

U5.2.3. Text on red background signs is always in upper case lettering, unless otherwise shown on a Working Drawing.

U5.2.4. The background must be yellow and any letters, numerals, other characters, chevrons or borders must be black if the sign conveys:

- temporary information (other than for pedestrians, cyclists or equestrians) in connection with road works; or
- information about check points at which goods vehicles or public service vehicles may be required to stop.

U5.2.5. A variable message sign may have a black background and, if it does, any letters, numerals, other characters or chevrons must be white or yellow. Alternatively a variable message sign may have a yellow background and if it does, any letters, numerals, other characters or chevrons must be black. See Section [U5.16](#).

U5.2.6. If a sign contains warnings about, or information on how to avoid, any temporary hazards caused by any of the items listed below, the sign must be white on a red background.

U5.2.7. Text on red background signs is always in upper case lettering, unless otherwise shown on a Working Drawing. Variable message signs may be white or yellow on a black background or black on a yellow background, except when the sign is not in use when it should display a plain black or grey face unless otherwise authorised. See Section [U5.16](#).

U5.3 Sign design

U5.3.1. Static signs should have no more than 12 units of information with a unit defined as a word, name, date or symbol. For example, the signs shown in [Figure 5.1](#) each have 3 units of information. Designers should look critically at their designs and eliminate any superfluous items to help ensure driver comprehension.

U5.3.2. Where bilingual signs are lawful an assumption can be made that a driver would read either the English or the other language element of a bilingual sign, so the number of units could be increased further. For bilingual signs, therefore, the maximum number of units can be increased to 14 (i.e. 7 English and 7 Welsh). It is recommended that unless otherwise prescribed that all units in each language are grouped together.

U5.3.3. Distances must be given as “yards”, “yds”, “mile” or “miles”. Where distances are less than $\frac{1}{2}$ mile, they must be expressed in yards, to the nearest 10 yards, however the distances of $\frac{1}{4}$ or $\frac{1}{3}$ mile may be used. Where distances greater than $\frac{1}{2}$ mile are indicated they may be one of the following: “3 m”, “ $2\frac{3}{4}$ m”, “ $2\frac{2}{3}$ m”, “ $2\frac{1}{2}$ m”, “ $2\frac{1}{3}$ m”, “ $2\frac{1}{4}$ m”, “2 m”, “ $1\frac{3}{4}$ m”, “ $1\frac{2}{3}$ m”, “ $1\frac{1}{2}$ m”, “ $1\frac{1}{3}$ m”, “ $1\frac{1}{4}$ m”, “1 m”, “ $\frac{3}{4}$ m” or “ $\frac{2}{3}$ m”. Distances greater than 3 miles must be quoted to the nearest whole mile.

U5.3.4. Time periods, in any combination, should be expressed as:

- “Monday” or any other day of the week, abbreviated as appropriate;
- “Monday – Saturday” or any other days of the week, abbreviated as appropriate e.g. “Tue”, “Wed”, “Thur” etc.;
- “8.30 – 11.00 am”, “8.30 am – 3pm”, “2 – 3pm”, “Midnight – 6am”, “Noon – 9pm” or any other time periods as appropriate. N.B. 12 pm and 12 am must not be used as alternatives to Midnight or Noon and the 24 hour clock must not be used to define times; or
- “1 May – 30 September” or any other dates, abbreviated as appropriate, which may include references to bank and public holidays.

U5.3.5. The inclusion of web addresses, hashtags or other on-line references are not permitted on temporary signs. Except for Police requests for information, it is not acceptable to include telephone numbers on signs prescribed by Schedule 13 Part 9 if the ‘x’ height of the text is less than 100mm, or less than 150mm where the 85th percentile approach speed is over 40mph. It is therefore recommended that if the nature of a warning or information included on a temporary sign is likely to justify the display of a telephone number to contact then a sign to Diagram 7006.1 (Schedule 13 Part 6 Item1) should be placed downstream of the relevant sign to Schedule 13 Part 9. The distance between the signs should be the relevant clear visibility distance for the expected traffic speed.

U5.4 ‘x’ Height

U5.4.1. The ‘x’ height of Schedule 13.9 signs, unless otherwise indicated on Working Drawings, should be of one size for an individual sign. Varying sizes of text can place undesirable emphasis on part of a legend.

U5.4.2. On bilingual traffic signs the ‘x’ height should not be reduced to fit both languages on a standard size temporary sign face, rather, a larger sign face should be used to accommodate both languages at the appropriate ‘x’ height for the conditions, unless otherwise shown on Working Drawings.

U5.4.3. Standard rules for the capitalisation of proper nouns should be used on traffic signs, i.e. a proper noun should always begin with a capital letter. Examples of proper nouns are:

- geographic place names e.g. “Epsom Town Centre” or “South East England”;
- company or organisation names e.g. “Highways England”; and
- holidays e.g. “Easter”.

U5.4.4. Other terms such as town centre, the contractor or summer are not proper nouns and should not begin with a capital letter.

U5.4.5. Unless otherwise shown on Working Drawings, ‘x’ height sizes for Schedule 13.9 signs are shown in **Table 5.1**.

Table 5.1 ‘x’ height sizes for Schedule 13.9 signs

85th percentile approach speeds of private cars/ speed limit	Examples of typical roads for which Column 1 may apply	Minimum ‘x’ height (millimetres)
Up to 20mph	Very narrow and urban roads	60
20 to 30mph	Urban and rural roads of local character	75
30 to 40mph	Urban and rural single 2-lane roads (7.3m wide with 1m hard strips)	100
40 to 50mph	High standard rural single roads (7.3m wide with 1m hard strips) Urban all-purpose dual carriageway roads	125
50 to 60mph	Wide single carriageway roads (10m wide) Urban all-purpose dual carriageway roads	150
60 to 70mph	High standard all-purpose dual carriageway roads Motorways with a speed limit less than 70mph	200
70mph	All-purpose grade separated dual carriageway roads and motorways	250

U5.4.6. Where a sign includes a telephone number, the ‘x’ height must not be less than 100 mm.

U5.5 Temporary information and events

U5.5.1. On roads where the speed limit is 40 mph or less, designers have the option to use a standard size 1050 x 750 mm sign plate in lieu of using the basic sign design rules. The plate may be used in either a landscape or portrait format. The ‘x’ height of the text should be the largest that can fit on the plate, to ensure legibility. The minimum ‘x’ height must not be less than 60 mm.

U5.5.2. The horizontal gap between any text tile or symbol and the border should not be less than the border width. Designers may need to exercise judgement and adjust the vertical spacing of text on the sign or the orientation of the plate to present a design with a balanced appearance. See **Figure 5.2** and **Table 5.2** for examples.

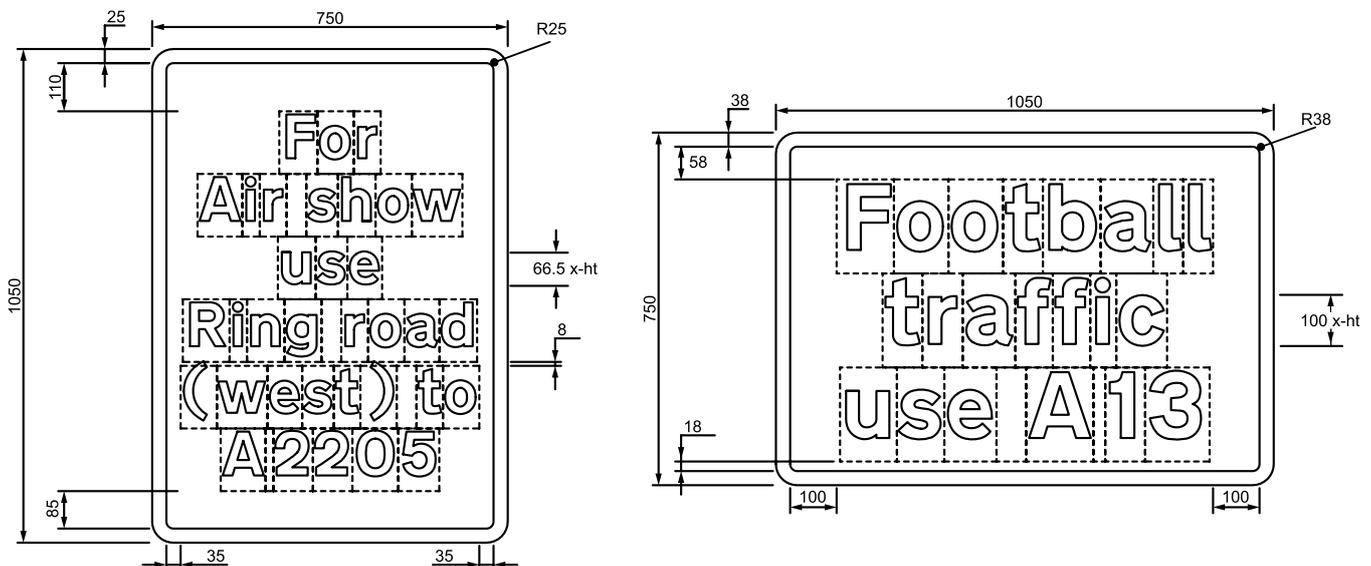


Figure 5.2 Example 1050 x 750 mm standard sign plates

Table 5.2 Temporary information and events

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
–	Name or nature and location of event		  	TSRGD 2016 Schedule 13 Part 9 Traffic Advisory Leaflet 04/11

U5.6 Infected areas

U5.6.1. Where signing is required to warn the public that they are entering an area infected with an animal disease, signing complying with Working Drawing P574 should be used. The name of the disease may be omitted or varied as required. See [Table 5.3](#).

Table 5.3 Warning of infected areas

Working Drawing No.	Sign Description	Sign Illustration	Legislation/ Design Guidance
P574	Area infected by animal disease ahead		In agreement with local public health officers

The word “RABIES” may be omitted or varied to any appropriate animal disease name on one or two lines. “AHEAD” may be omitted or varied to “ENDS” or a horizontal arrow pointing left or right

U5.7 Incident management

U5.7.1. Non-police incident management signs are shown in [Table 5.4](#), with further design details shown in Section [U8.3](#). The non-police “USE HARD SHOULDER” sign may only be deployed with the permission of a police officer in uniform or a traffic officer.

U5.7.2. Service Providers, which can be the maintaining organisation or Incident Support Units (ISUs) provided under a separate contract, may be requested or directed to provide temporary traffic management in support of incidents or emergencies by the police, traffic officer or other emergency service provider. This is not limited to when formal incident support is provided for in contracts or agreements (see Part 2 Operations: Section 07). Such unplanned temporary traffic management may be undertaken by suitably trained and competent individuals, using a ‘best endeavours’ approach to make use of any suitable and available equipment to provide support to the incident using an approach considered appropriate by the Service Provider.

U5.7.3. When requested to provide enhancements to Emergency Traffic Management (enhanced ETM), where incidents are expected to last for more than 20 minutes, Service Providers should provide sufficient TTM equipment and vehicles in the initial response to either close the carriageway or implement a taper leaving one lane open at the location of the incident. Service Providers should therefore identify which sections of their networks would require additional resources to be available e.g. four or five lane sections. When Service Providers

are contacted to provide enhanced ETM they should confirm the location of the incident if the information provided is not sufficient to identify the initial TTM requirements.

U5.7.4. The storage location and quantity of any TTM equipment and works vehicles (including IPVs) would need to be identified by the Service Provider’s risk assessment or in the relevant contract or agreements.

U5.7.5. For medium term duration incidents (between 20 and 90 minutes) the provision of additional TTM equipment and/or IPVs over and above that identified in this section may be limited by the location and number of incidents. For long duration incidents (over 90 minutes) it is considered reasonably practicable for a Service Provider to install enhanced ETM complying to the normal requirements of planned works in Part 1.

U5.7.6. Signs in [Table 5.4](#) are often of a ‘roll-up’ type. These signs should always be fabricated using retro- reflective sheeting.

Table 5.4 Non-police incident management

Working Drawing No.	Sign Description	Sign Illustration	Legislation/ Design Guidance
–	Potential danger temporarily ahead and consequent need to proceed with caution		Part 2: Operations, Paragraph O7.1.6
–	Traffic should use the hard shoulder in an emergency		Part 2: Operations, Paragraph O7.1.6
–	End of temporary permission for traffic to use the hard shoulder		Part 2: Operations, Paragraph O7.1.6

U5.7.7. Schedule 13.9 signs erected by or for the police, requesting information about road traffic accidents, should have as brief a message as possible so as not to distract drivers unduly. The telephone number used should be no longer than three digits. Although the sign can be to any of the colour combinations listed in Schedule 13.9, it is recommended that white on blue be used. An example sign face is shown in [Table 5.5](#).

Table 5.5 Typical police request for information sign

Working Drawing No.	Sign Description	Sign Illustration	Legislation/ Design Guidance
–	Police request for information		In agreement with local police procedures

U5.8 Vehicle check point

U5.8.1. Guidance on the use of vehicle check point signing provided in Part 1: Design Paragraph D3.27.2 should be followed. The deployment of vehicle check point signing should follow the principles shown in TA11.

U5.8.2. For further details of permanently sited vehicle check point signs, refer to Working Drawings P832.8, P832.9 and P832.10A, Section **U3.6** and see **Table 5.6**.

Table 5.6 Vehicle check point

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P832.8	Goods vehicles should leave the main carriageway of a road on the approach to a goods vehicle check point		The legend may be varied to “All goods vehicles and PSVs” or “All PSVs” The direction in which the arrow points may be varied	Part 1: Design, Paragraph D3.27.2
P832.9	Direction to a vehicle check point		The direction in which the sign points may be reversed	Part 1: Design, Paragraph D3.27.2
P832.10A	End of vehicle check point area		N/A	Part 1: Design, Paragraph D3.27.2

U5.9 Diversion signing

U5.9.1. Guidance on the use of diversions and road closures is provided in Part 1: Design, Section D3.15 and Sections **U2.19** and **U7.2** of this part.

U5.9.2. Diversion route signing should generally follow standard sign design rules, as laid out in TSM Chapter 7 and be at a suitable ‘x’ height for the 85th percentile approach speed of traffic given in **Appendix A1**.

U5.9.3. The legend ‘DIVERSION’ should normally be used at the start of the diversion route rather than being encountered along the diversion route. The exception to this is where a sign to Working Drawing P2716 is used.

U5.9.4. Diversion route signs may incorporate a symbol (from Working Drawing S56) indicating to drivers the route to follow. Routes signed with a symbol should always have a worded sign at the start of the route indicating to drivers the symbol they are to follow. See Working Drawings P2703, P2704, P2706 and P2716; and in [Table 5.7](#).

Table 5.7 Diversion Signing

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P2703	Direction of temporary diversion route from junction ahead		<p>The direction in which the arrow points may be varied. Identification numbers of routes, including compass points and junction numbers as required may be added, varied or omitted. Any symbol shown on Working Drawing S56 may be substituted for "Diverted traffic"</p>  <p>A U-turn arrow may be substituted for the horizontal arrow and should always be on the right-hand side of the sign</p>	TSRGD 2016 S12-28-15 Part 1: Design, Section D3.15 and Paragraph D4.2.8
P2704	Direction of temporary diversion route		<p>The sign may point to the left instead of to the right. Identification numbers of routes, including compass points and junction numbers as required may be added, varied or omitted. Any symbol shown on Working Drawing S56 may be substituted for "Diverted traffic"</p> 	TSRGD 2016 S12-25-15 Part 1: Design, Section D3.15 and Paragraph D4.2.8

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
–	Junction ahead leading to temporary diversion routes to the destinations shown		The direction in which the arrow points may be varied. Identification numbers of routes, including compass points and junction numbers as required may be added, varied or omitted. Any symbol shown on Working Drawing S56 may be substituted for destinations and routes.	Part 1: Design, Section D3.15 and Paragraph D4.2.8
P2706	Map type advance direction sign indicating temporary diversion		Map type signs should have arms 4 stroke widths wide. See TSM Chapter 7 for further details of map type sign design, including the addition of warning triangles and regulatory roundels 	Part 1: Design, Section D3.15 and Paragraph D4.2.8
P2716	Junction ahead leading to a temporary diversion route, the direction along which is indicated by a symbol shown on Working Drawing S56		 See description below	Part 1: Design, Section D3.15 and Paragraph D6.21.3

“M1 North” may be varied to the name of a road, to a route number and a place name or to a description of a route. “Closed” may be varied to “closed to” and a type of vehicle or road user. The upper part of the sign may be omitted. “Alternative route” may be varied to “To re-join” with or without a route number. “To” and a destination may be added after “Alternative route”. The diversion symbol may be varied to any of those shown on Working Drawing S56, to any combination of place names and route and junction numbers, to a description of a route or to the name of a road. The term “follow” may be varied to “use” or “via” as appropriate. Hollow or solid combinations of the same shape diversion on the same or overlapping route should be avoided as the symbols cannot be clearly represented on matrix signals.

The legend ‘Alternative route’ is only used when an alternative route is signed. The use of ‘Find alternative route’, ‘Use alternative route’ or similar is not acceptable.

An alternative to the sign shown on Working Drawing P2716 is shown below. A simple two panel sign following standard design rules may be used. Such a sign may be used at closed exit slip roads on motorways or dual carriageways for example.

Typical Variants



U5.9.5. Signs on the approach to and at the start or end of a diversion route on a low speed road may be on standard 1050 x 750mm plates, see Working Drawing P2702 and see [Table 5.8](#).

Table 5.8 Low speed road diversion signing

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P2702	Start of temporary diversion route		The arrow direction may be varied. The arrow symbol may be replaced by the word "ENDS" or a distance in yards up to 400 yards (to the nearest 10 yards)	Part 1: Design, Section D3.15

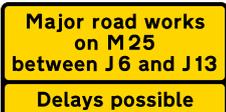
U5.10 Advance signing

U5.10.1. Guidance on the use of advance signing of road works is provided in Part 1: Design, Sections D4.12 and D4.13.

U5.10.2. This signing should be designed in accordance with Working Drawings P7001.3, P7002A, P7002B and P7002.1 and [Table 5.9](#).

U5.10.3. Designers should carefully consider whether or not signs giving notice of road closures taking place at some point in the future should include specific times on them. The inclusion of times gives drivers clear information and allows journeys to be planned with more certainty where diversions are in place. Where the exact timings of a closure can vary by half an hour or more within a general timeframe, references should be limited to such phrases as "overnight", "off-peak hours", "daytime", "next weekend" and the like. See also Paragraph [U5.3.4](#).

Table 5.9 Advance notification

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7001.3	Vehicular traffic should proceed slowly owing to workforce in road ahead		"WORKFORCE IN ROAD" may be varied to "SETTING OUT ROAD WORKS AHEAD" and "SLOW" may be omitted 	Part 1: Design, Paragraph D4.8.10
P7002A	Major road works at a specified location ahead		 	Part 1: Design, Paragraph D4.12.6

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
Details of road works may be varied` as appropriate. “J6 and J13” may be varied to “Junctions 6 and 13”. The bottom panel may be omitted.				
P7002B	Time and date when a route is to be closed to traffic		<p>Details of route to be closed and dates may be varied as appropriate. “Junction 16 to 15” may be varied to “J16 to J15”</p> 	Part 1: Design, Paragraph D4.12.4
P7002.1	Dates when road works are to take place overnight and delays are to be expected		<p>Details of road works may be varied as appropriate. “Expect delays” may be varied to “Delays possible”. The description may be on five lines rather than three</p> 	Part 1: Design, Paragraph D4.12.3

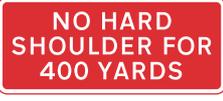
U5.11 Hazard information or warning

U5.11.1. Guidance on the use of hazard information and warning signs is provided in Part 1: Design, Sections D3 to D6.

U5.11.2. This signing should be designed in accordance with Working Drawings P7010.1, P7013, P7015, P7016, P7017, P7018.1, NP430 and NP431; and [Table 5.10](#).

Table 5.10 Hazard signing

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7010.1	Vehicular traffic should proceed slowly owing to temporary hazard resulting from wet tar on the road		 See description below	Part 1: Design, Sections D3.15, D3.18 and Paragraph D4.8.31

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
“SLOW WET TAR” may be varied to the following: “ADVERSE CAMBER”, “RAMP AHEAD”, “ROAD AHEAD CLOSED”, “ROAD CLOSED” (name of road may be substituted for “ROAD”), “TEMPORARY ROAD SURFACE”, “TRAFFIC CONTROL AHEAD”, “TRAFFIC SIGN MAINTENANCE”, “TRAFFIC SIGNAL MAINTENANCE” or “WORK IN CENTRE OF ROAD”.				
P7013	Temporary sudden change in level of carriageway surface		N/A	Part 1: Design, Section D3.18 and Paragraph D5.10.10
P7015	Temporary absence of hard shoulder for specified distance		The legend may be on three lines. The distance may vary 	Part 1: Design, Paragraphs D4.8.11 and D6.10.6
P7016	Zebra or signal controlled crossing facility temporarily out of use. (Sign for pedestrians, cyclists or equestrians)		N/A	Part 1: Design, Paragraph D3.32.9 and D4.6.2
P7017	Direction in which pedestrians should look for approaching traffic. (Sign for pedestrians)		“LEFT” may be varied to “RIGHT” or “BOTH WAYS”	Part 1: Design, Paragraphs D3.32.7 and D6.4.9
P7018.1	Pedal cyclists to dismount and use adjacent footway		N/A	N/A
NP430	Warning for traffic of the possible requirement to stop on the approach to a section of carriageway subject to a Mobile Carriageway Closure		N/A	Part 2: Operations, Plan MCC3
NP431	Point at which traffic shall wait for a Mobile Carriageway Closure convoy to pass		N/A	Part 2: Operations, Plan MCC3

U5.12 Street lighting not in use

U5.12.1. Signs indicating that street lighting is not in use during works gives a warning that road users should use their headlights as though the road is unlit i.e. using headlights and not side lights. It is also required where 30 mph speed limit signs (diagram 670) are used to enforce the speed limit where any remaining lit street lamps are insufficient to indicate it is a restricted road as defined by Section 83 of the Road Traffic Regulation Act, see [Table 5.11](#).

U5.12.2. Street lights should not be turned off outside of maintenance activities where this would be a hazard to road users. White text on a blue background signs, informing road users that the street lights have been switched off during certain periods and are not faulty may be used. As these signs can only be placed on, or near, a road for up to six months they cannot be used to provide a permanent warning of sudden change in illumination when the lights are turned on or off. It is considered practicable that a dimming system be installed within six months of any start of any partial illumination of street lights.

Table 5.11 Street lighting not in use

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
–	Indication that the street lighting is not in use during works		N/A	–
–	Indication that street lights are not continuously lit during periods of darkness		N/A	–

U5.13 Alternative routes for pedestrians

U5.13.1. Alternative route signing for pedestrians should be designed is shown on Working Drawing P7018 and in [Table 5.12](#).

Table 5.12 Pedestrian temporary route signing

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7018	Direction of temporary route for pedestrians		The direction in which the arrow points may be varied. "USE OTHER FOOTWAY" may be substituted for the arrow.	Part 1: Design, Paragraph D3.32.6-8

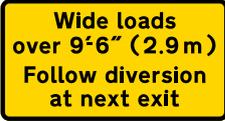
U5.14 Wide load

U5.14.1. Guidance on the use of wide load signing is provided in Part 1: Design, Section D4.10.

U5.14.2. Wide load signing should be designed in accordance with Working Drawings P7292 and P7293; and [Table 5.13](#).

U5.14.3. The 'x' heights quoted on the Working Drawings may be reduced to a minimum of 75 mm if traffic conditions and space constraint warrant such a reduction.

Table 5.13 Wide load signing

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7292	Instructions to drivers of wide loads on action to be taken before reaching road works ahead		 See description below	Part 1: Design, Paragraphs D4.10.31 and D4.10.32
Typical Variants				
Dimensions may be varied or omitted as appropriate. "Follow diversion at next exit" may be varied to an appropriate instruction, see description below. The sign description may be on four, five or six lines. Example of instructions: "Contact police from emergency phone", "Straddle nearside two lanes", "Use offside lanes at next overbridge", "Stop at next lay-by", "Phone Bridge Authority ahead", "Stop at holding area 2 miles ahead" or "For docks use A123(E)".				
P7293	Instructions to drivers of wide loads on location from which they should telephone for assistance		N/A	Part 1: Design, Paragraphs D4.10.35 and D4.10.36

U5.14.4. The instructions to the driver may vary from those shown on the Working Drawings to suit the situation. Any such instructions should be checked to ensure that they are as brief as possible. Telephone numbers should not be included on signs in locations where it is not possible for a vehicle to stop.

U5.14.5. A supplementary plate giving a telephone number may be added below the 7293 sign as required. Such a plate must not be installed at a location in which a vehicle may not stop. The plate should be to the same 'x' height as the 7293 sign. An example plate is shown in [Figure 5.3](#).

**Figure 5.3** Telephone number supplementary plate

U5.15 Works traffic

U5.15.1. Guidance on the use of works traffic signing is provided in Part 1: Design, Sections D3.21 and D3.22.

U5.15.2. Signing relating to works accesses, exits and the routing of works traffic should be designed in accordance with Working Drawings P7301 to P7307 inclusive, and [Table 5.14](#).

Table 5.14 Works Traffic Signs

Working Drawing No.	Sign Description	Sign Illustration	Typical Variants	Legislation/ Design Guidance
P7301	Temporary access to a construction or road works site		The term "WORKS ACCESS" may be varied to "WORKS TRAFFIC ONLY" or "NO WORKS TRAFFIC" The description may be on two or three lines 	Part 1: Design, Paragraph D3.21.2-4
P7302	Temporary exit from a construction or road works site		N/A	Part 1: Design, Paragraph D3.21.2
P7303	Direction to be taken by road works or construction traffic at a junction ahead		The direction of the arrow may be varied 	Part 1: Design, Paragraph D3.21.3
P7304	Direction to be taken by road works or construction traffic at a junction or works entrance ahead		The direction of the arrow may be varied 	Part 1: Design, Paragraph D3.21.3
P7305	Direction to be taken by road works or construction traffic at junction or works entrance		The sign may point to the right 	Part 1: Design, Paragraph D3.21.3
P7306	Direction to be taken by road works or construction traffic to an access to a works site ahead		The distance and route symbol may vary. See also Paragraph U5.15.3 and Figure 5.4	Part 1: Design, Paragraph D3.21.4
P7307	Exit from a works site ahead		The distance may vary	Part 1: Design, Paragraph D6.22.3

U5.15.3. Details of a reversible, multi-use version of the sign shown in **Figure 5.4**, with further information and Working Drawings in Section **U8.2**.

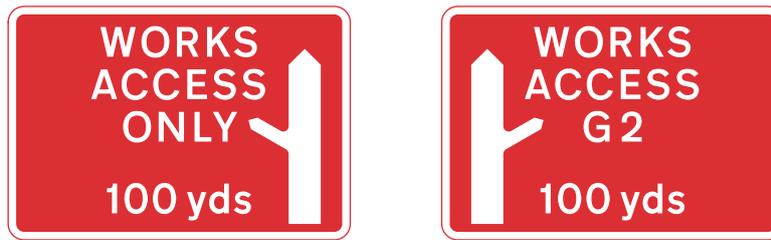


Figure 5.4 Multi-use version of works access sign

U5.16 Temporary variable message signs (VMS)

U5.16.1. VMS may only be used to display traffic signs as defined in the Road Traffic Regulation Act. Their use to display any other message renders the installation unlawful.

U5.16.2. Statutory Type Approval of VMS products is not a requirement of TSRGD 2016. Contractors should check with the authority to identify if there are any contractual requirements for third party type approval of the sign and/or the equipment which brings the sign into and out of use. In most cases this third party would be a competent national body; an example is Traffic Open Products and Specification Ltd (TOPAS). Not all technical specifications held by bodies such as TOPAS are applicable to all VMS products; Service Providers are recommended to check with the sign manufacturer which specifications are relevant and obtain copies of any accreditation.

U5.16.3. All parts of the sign other than those facing traffic should be coloured grey or black or be in a non-reflective metallic finish. Any lettering required for identification purposes should be no more than 25mm high on the sign housing or, if applied by means of a label, should be printed on a label that is either transparent or the same colour as the sign housing. On no account should any label or any part of the sign housing comprise retroreflective material. VMS must conform to the requirements of BS EN 12966.

U5.16.4. Any part of the sign surrounding the rectangular area used to display a message should be coloured grey or black. There must be no text or symbols on the surround as this would render the sign unlawful.

U5.16.5. Text on a light-emitting VMS must be displayed in white or yellow. A prescribed sign incorporating a black legend or symbol on a white or yellow background may be displayed with the colours reversed, i.e. as a white or yellow symbol on a black background. Any red triangle or circle forming part of the sign must be displayed in red. A VMS should exhibit a black or grey rectangular area when no message is being displayed.

U5.16.6. **Table 5.15** sets out the minimum sizes of text recommended for use on light-emitting VMS. A VMS that displays a sign shown in one of the Schedules to TSRGD must do so at the prescribed size appropriate to the traffic approach speed, unless special authorisation has been obtained. In practice, the more complex pictograms contained within many warning signs lose resolution at smaller sizes and so the largest size (generally 1500 mm) should be used wherever possible to ensure adequate clarity.

Table 5.15 Sizes of characters on Verge Mounted VMS

85th percentile approach speed of private cars (mph)	Number of words in longest message to be displayed	x-height of transport alphabets (millimetres)				Upper case letter height (millimetres)							
		Verge mounted signs				Verge mounted signs							
		Motorways and all-purpose dual carriageway roads with hard shoulders		All-purpose roads without hard shoulders D = dual carriageway roads S = single carriageway roads		Motorways and all-purpose dual carriageway roads with hard shoulders		All-purpose roads without hard shoulders D = dual carriageway roads S = single carriageway roads					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	Column 13	Column 14
	2	2 lane	3 lane	4 lane	1 lane D 2 lane S	2 lane D 4 lane S	3 lane D	2 lane	3 lane	4 lane	1 lane D 2 lane S	2 lane D 4 lane S	3 lane D
Up to and Including 30	2 4 6 8	200 250 200 250	200 250 250 250	250 300 300 350	75 100 100 150	100 150 150 150	150 150 200 200	100 100 100 200	100 100 100 200	100 100 100 200	100 100 100 200	100 100 100 200	100 100 100 200
Over 30 and up to and including 40	2 4 6 8	150 200 200 250	200 250 250 250	250 300 300 350	100 150 150 150	150 150 200 200	200 200 250 250	250 250 300 300	300 300 350 350	300 350 350 400	100 100 250 250	100 100 250 250	100 100 250 250
Over 40 and up to and including 50	2 4 6 8	200 200 250 250	250 250 300 300	300 300 350 350	150 150 200 200	150 200 200 250	200 200 250 250	250 250 300 300	300 300 350 350	300 350 350 400	100 100 250 250	100 100 250 250	100 100 250 250
Over 50 and up to and including 60	2 4 6 8	200 250 250 300	250 300 300 350	300 300 350 350	150 200 200 250	200 200 250 250	200 250 300 300	250 250 300 350	300 300 350 400	300 350 350 400	100 100 250 250	100 100 250 250	100 100 250 250
Over 60	2 4 6 8	250 250 300 350	250 300 350 350	300 350 350 400	150 200 250 250	200 250 250 300	250 250 300 350	300 300 350 400	300 350 400 400	300 350 400 400	100 100 250 250	100 100 250 250	100 100 250 250

U5.16.7. On roads where the 85th percentile approach speed of private cars, as determined in accordance with TA 22, is greater than 40 mph, it is recommended that two VMS displaying the same legend are provided where possible. This is especially important if the information to be displayed is likely to conflict with that on fixed directional signs, for example a VMS message indicating a mandatory or advisory diversion.

U5.16.8. Messages should be as short as possible while being fully comprehensible to drivers. They should not normally consist of more than eight words or six units of information, see [Table 5.16](#).

Table 5.16 Number of words comprising Unit of Information for VMS legends

Type of Legend	Unit of Information	Number of Words
Place name or other destination, even if it consists of more than one word, e.g. "STOKE-ON-TRENT" or "FORTH ROAD BRIDGE"	1	1, 2 or 3
Place name with associated compass point, e.g. "READING (E)" or "SLOUGH (WEST)"	1	1 or 2
Place name with associated route number, e.g. "DORKING A24" or "LAMPTON (M11)"	1	2
Location comprising route number, junction number or numbers and compass point, e.g. "M6 J20-21 NORTH"	2	3
Distance, e.g. "600 YDS" or "3 MILES"	1	1
All other words, with the exception of prepositions, regardless of length, e.g. "FOG" or "WORKFORCE"	1	1
Prescribed sign, e.g. warning triangle, speed limit roundel or wicket (lane closure) pictogram	1	1
Driver information consisting of up to three words (as a defined above), e.g. "ACCIDENT", "LONG DELAYS" or "REJOIN MAIN CARRIAGEWAY"	1	1
Supplementary information associated with warning signs, e.g. "3 "MILES" or "ICE"	1	1
Arrow or emergency diversion route symbol	1	0
Punctuation marks, dashes, etc.	0	0

U5.16.9. All messages must be displayed on a single sign aspect. It is unlawful to display messages that require the use of multiple displays (e.g. 'paging' or 'scrolling' text). Where possible, the prescribed messages in TSRGD should be used. A temporary VMS may be used to display messages for the same purposes as a temporary fixed sign. Schedule 13.9 permits the placing of temporary signs to convey to traffic various types of message, see Section [U5.3](#). All other messages require authorisation by the national authority. This is also the case where TSRGD messages are to be displayed in mixed (sentence) case text or where pictograms to be incorporated into messages are either not prescribed in TSRGD or are prescribed for a different purpose.

U5.16.10. To assist driver assimilation of VMS, non-prescribed legends should broadly follow the same principles as the prescribed legends in TSRGD. Strategic traffic and diversion legends should be constructed such that the information appears in the following order:

- location e.g. M1 J3-4 NORTH;
- problem e.g. ACCIDENT;
- effect e.g. LONG DELAYS; and

- guidance e.g. USE M40.

U5.16.11. Depending on the capability of the VMS, some information may have to be omitted. In general, the ‘effect’ is more important than the ‘problem’ (see above). Partial information should only be given when it will be supported by other signing in the area.

U5.16.12. VMS can be used to forewarn drivers of future events that might affect journeys. These could include road works or major events. Advance or remote notice of road works should follow the order and style of the information on signs to Working Drawings 7002A to 7003.1. Advance notice of major events should follow the same broad principles. Dates and times must be expressed in the formats prescribed in TSRGD, see Paragraph **U5.3.4**. The 24 hour clock must not be used under any circumstances.

U5.16.13. TSRGD permits the display of flashing amber lamps with certain types of display. Generally for temporary VMS considered in Chapter 8 this means they may only be displayed with immediate safety-related and tactical diversion messages. They may not be displayed with other types of message such as advanced notice of special events or strategic diversion messages. When a non-prescribed legend is specially authorised, flashing amber lamps may only be used with that message if the authorisation expressly permits it.

U5.16.14. The siting of VMS should be carefully considered to ensure safe access for maintenance personnel. Such signs may be trailer or post mounted behind a vehicle restraint system as necessary. Where a temporary VMS is to be in place for a considerable period of time, consideration should be made to mounting the sign on posts and providing a mains power supply. The posts should be passively safe if site conditions warrant this. See also Part 1: Design, Section D3.38 for further details on the use of temporary VMS.

U6.1 Introduction

U6.1.1. The changes to the TSRGD have increased the range of signs for temporary situations which have either been specifically prescribed or covered under Schedule 13.9. It is expected that there will be very few occasions which necessitate the use of signs which are not permitted by the TSRGD. For these limited situations, signs of different natures can be authorised by the relevant national authority. Due to frequent changes in technology and available products, many vehicle mounted signs are permitted for use by authorisations.

U6.1.2. There are legal limitations on what, and how, signs can be authorised. For temporary signs relating to road works those authorising signs may take on some designer responsibility for the adequacy of the sign design; therefore there may be some additional limitations on what can be authorised where there is insufficient evidence relating to the safety of a proposed sign. A summary of the limitations include:

- it is not possible to authorise a prescribed sign to have the same legal meaning as another prescribed sign;
- there are limitations on the design of signs which indicate mandatory requirements or prohibitions to road users;
- authorisations indicate if signs have to be installed at a specific location, can be used over a length of a route within a single authority or over the network of a single authority (e.g. vehicle mounted signs). A single authorisation cannot permit a sign to be used in more than a single authority, although it is possible for a sign to be covered by more than one authorisation. This permits portable and mobile signs and equipment to be used in multiple authorities;
- it is not possible to include certain elements where there is insufficient data to show that the sign would be safe;
- authorisations may limit the use of signs and equipment covered by them; this can include how they could be used; with what other signs they may, must, or must not be used: any type approval requirements; and what training requirements are needed for use. If using authorised signs it is recommended that designers and supervisors check for specific requirements;
- sign authorisations are solely at the discretion of the national authority and may be revoked; and
- signs may be required to be trialled or tested on or off-road before temporary or permanent authorisations can be agreed. The nature of these trials or tests will need to meet the requirements of the national authority and may vary from sign to sign.

U6.1.3. If a maintaining organisation identifies the need for a sign authorisation, they should contact the authority who will identify the relevant organisation with whom delegated rights for authorisation rests. The procedure for seeking sign authorisation should be checked, particularly with respect to the information required and timescales for processing applications.

U6.1.4. Where generic products require authorisation manufacturers may contact the relevant authorising body for any specific requirements; however, products will be authorised on an authority basis and it is recommended that applications for authorisation be forwarded by

the relevant authority. Manufacturers may also be able to obtain help and guidance from the relevant trade bodies.

U6.2 Vehicle mounted signs

U6.2.1. Signs can only be attached to vehicles if specifically permitted in the Regulations (see Section **U4.2**) or if stated in an authorisation. Prescribed signs can be used on vehicles in motion or stationary. Authorisations may sometimes permit signs, or specific aspects, to be placed on vehicles only when stationary; any limitations should be identified before use. Where vehicles, or trailers, are used as support for other signs, as a minimum, the ignition should be off; the TTM Provider should check with the authority for specific requirements.

U6.2.2. There are various types of light arrow authorised. These can consist of individual lamps to make up the arrow or they can be displayed on LED matrix panels. The latter versions have the benefit of being able to display other signs (e.g. Diagram 7402 wicket signs see **Table 4.4**) and legends. A full sized light arrow, with associated impact protection device, requires a large vehicle. For some locations, and some activities, works vehicles are not able to mount a full size light arrow; in several authorities mini-light arrows have been authorised for use as a replacement for Diagram 610 and/or Diagram 7403 There are limitations for their use and these limitations are not standard for all products and for all authorities; the authorisation should be checked for specific requirements.

U6.2.3. While the use of light arrows formed using individual lamps is an acceptable option it is recommended that authorities and those undertaking works consider using vehicles using LED matrix panels for some types of works. These are more flexible and allow vehicles to be used for other activities e.g. for mobile works wicket signs or mobile carriageway closures. While some existing products have been authorised using amber and off- white aspects, it is expected that future products will only be authorised which display wicket signs, legends etc. using white LEDs. Also it is expected that those parts of signs prescribed as being red e.g. 'T' bars, warning triangles, are displayed as that colour. In many cases signs or aspects are authorised at sizes that suitable for used at all traffic speeds; however, some signs, or individual aspects are only authorised for use up to a set speed limit.

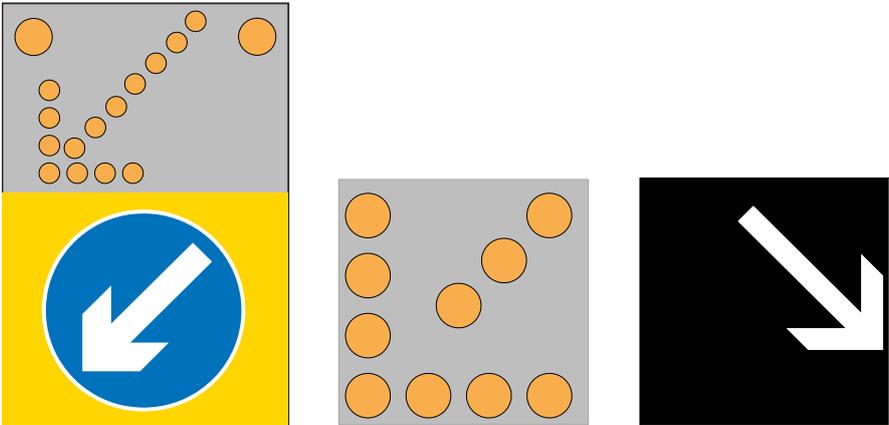
U6.2.4. There are sometimes other limitations on use e.g. a maximum height of 5.03m for a mobile sign (except when used only on a 'high' route). It is therefore vital that those driving, operating or supervising the works are aware of both general requirements (e.g. Highway Sector Scheme 12C) and any vehicle specific requirements for use when both stationary and in motion. This is particularly important for general hire vehicles or vehicles used in more than one authority.

U6.2.5. In addition to the signs (including the individual aspects) being authorised for use for the works being undertaken, those using the vehicles should identify that the mechanisms (whether mechanical or electrical) for bringing the sign, or aspects, into use does not impact on the safety or effectiveness of the sign or other equipment on the road. It is therefore considered reasonably practicable to only use equipment certified by a relevant national and competent body (e.g. TOPAS).

U6.2.6. Consideration should be given to fitting new IPVs with 360° vision (camera) systems to give operatives clear information about the area around the vehicle when driving and also to record any near misses or IPV strikes. Consideration should also be given to fitting new IPVs with reliable systems for detection of vehicles approaching close to the rear of IPVs. The retrofitting of these technologies to existing IPVs currently in service is likely to be beneficial

but may not always be practical. It is considered likely that future good practice will expect all vehicles to have such systems and technologies fitted as standard.

Table 6.1 Road maintenance vehicle signs

<p>Other signs may be attached to the rear of road maintenance vehicles if authorised by the relevant national authority. Examples of signs which may be attached to vehicles on the English motorway and all-purpose trunk road network are shown below.</p>		
		
<p>Standard and mini light arrows</p>		
		
<p>Other mobile signs</p>		
		
<p>Incident management VMS</p>		

U7.1 Introduction

U7.1.1. Operational issues covered in this section are diversion signing principles associated with slip road closure; the use of Impact Protection Vehicles for Temporary Traffic Management; Lane Control (Red 'X') signals; amendments to approach and lane-change zone signing for relaxation closures; alternative entry taper – application and use, works site signs and signals and scheme inspections.

U7.2 Diversion signing – slip road closures

U7.2.1. Typically these closures occur overnight or during off-peak periods to facilitate work which might otherwise be difficult to carry out safely, due to a combination of traffic speeds and limited working areas.

U7.2.2. When a slip road at a grade separated junction is closed, it is often convenient to simply direct traffic to the next grade separated junction up or down stream. This helps to ensure that traffic is not diverted onto other roads which may not be suitable for the traffic which otherwise would have accessed the closed slip road. Local knowledge of the surrounding network and traffic conditions should be used to determine the most appropriate diversion route.

U7.2.3. A two-panel sign to working Drawing P2716 (see [Table 5.8](#)) may be used at the start of the closure. Such a sign may be particularly useful if symbolic diversion signs are being used. Alternatively, a “ROAD CLOSED” sign to Working Drawing P7010.1 may be used. See [Figure 7.1](#) and [Figure 7.2](#) for typical direction signs for closed entry and exit slip roads. These are in addition to the signs and other TTM shown in Part 1 Section D6.21 delineating the start of the closure.

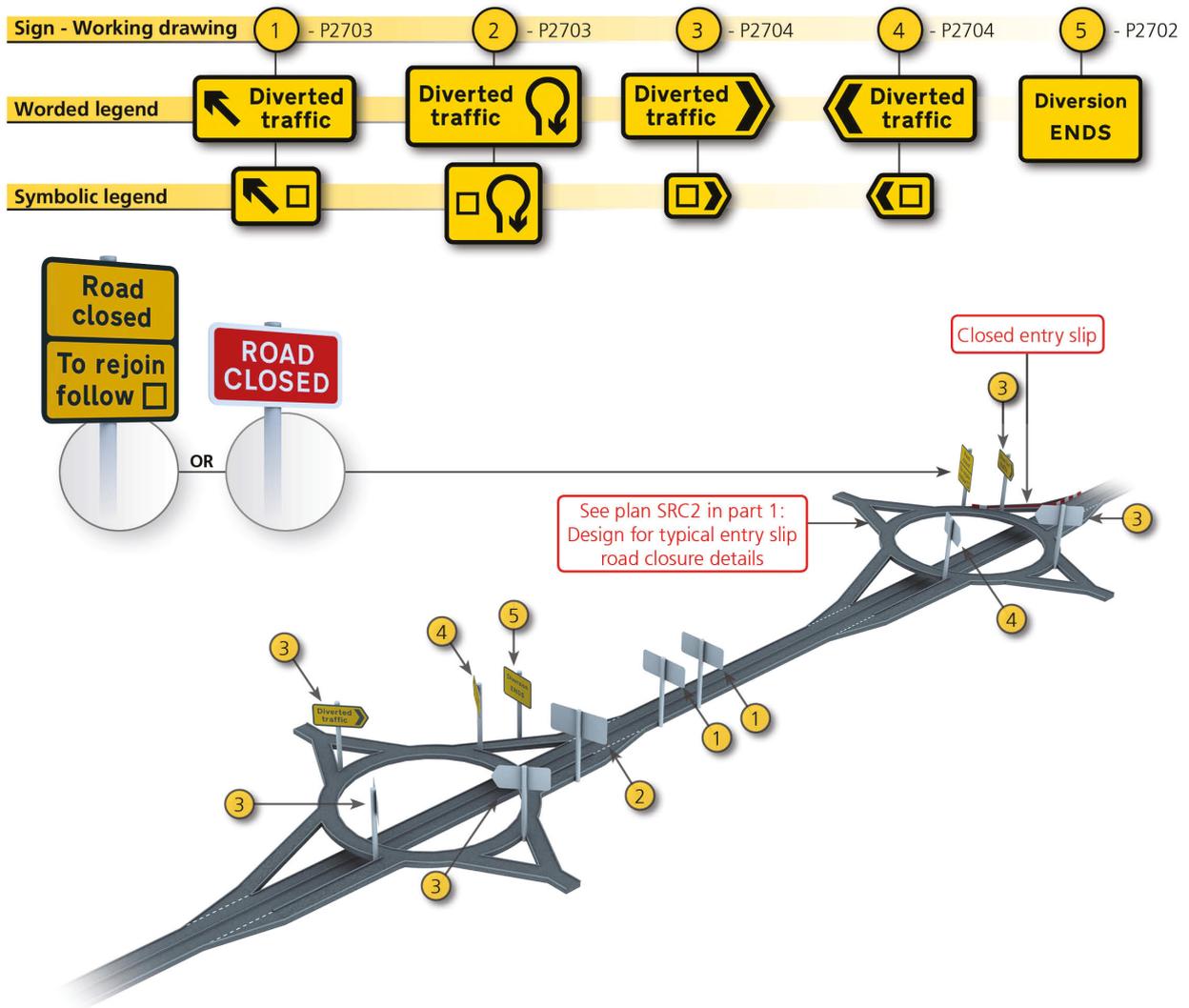


Figure 7.1 Diversion route signing for a closed entry slip

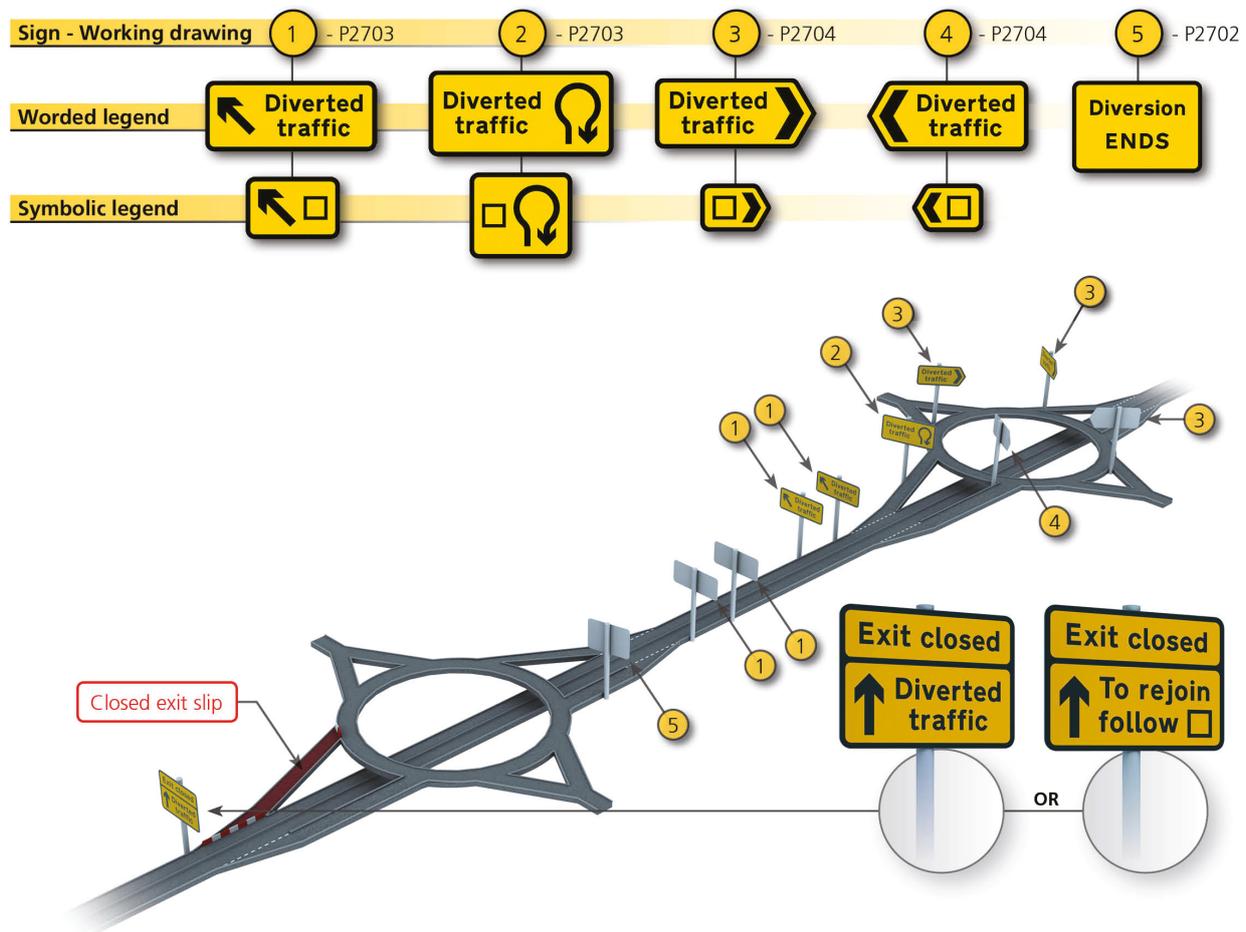


Figure 7.2 Diversion route signing for a closed exit slip

U7.2.4. If symbolic signing is used, care should be taken to ensure that the chosen symbol does not conflict with the same symbols on other signs which carry diversion symbols along the diversion route. Such a match could cause diverted traffic to become misdirected. Similarly if worded signs are used, a check should be undertaken to ensure that other worded diversion signs are not present from other works in the area.

U7.2.5. Additional signing will be needed if there are intermediate junctions present between the closed slip road and the junction at which traffic U-turns. Typically these intermediate signs will take the form of a sign to Working Drawing P2703 with either a worded legend or a diversion symbol and an arrow pointing in the appropriate direction. If the intermediate junction is an at-grade junction, the P2703 will usually suffice providing that the route through the junction is otherwise obvious. If the diversion route at an intermediate junction requires traffic to turn off a through-route, additional signs to P2703 or P2704, as appropriate, may be required. On the approach to a roundabout, as long as signs to P2704 are installed to guide traffic around to the relevant exit, there should be no need to provide a map type sign to P2706, as a sign to P2703 will provide adequate guidance.

U7.2.6. Although signs to Working Drawing P2702 are generally not suitable for use on high speed dual carriageway roads due to their small size, a P2702 bearing the legend “Diversion ENDS” may be installed on a slip road to indicate to traffic that either they have returned to the junction they were wishing to use or are about to re-join the route they were diverted from.

U7.2.7. Drivers with local knowledge may find it preferable to leave a route at a junction prior to a closed exit slip road should a suitable alternative route be available. This is particularly the case if the signed diversion route from the closed slip road is significantly longer than that via a potential alternative route. A sign advising of the closed exit slip road should be installed prior

to the junction where drivers may leave to use the alternative route. The sign should be located at a sufficient distance from the junction for drivers to make a decision as to whether or not to make a voluntary diversion, see [Figure 7.3](#). It is not generally recommended that this voluntary alternative route be otherwise signed, other factors may make the route undesirable to be used by drivers not familiar with the area. Prior to using this type of sign, the relevant authority for the alternative route should be consulted.

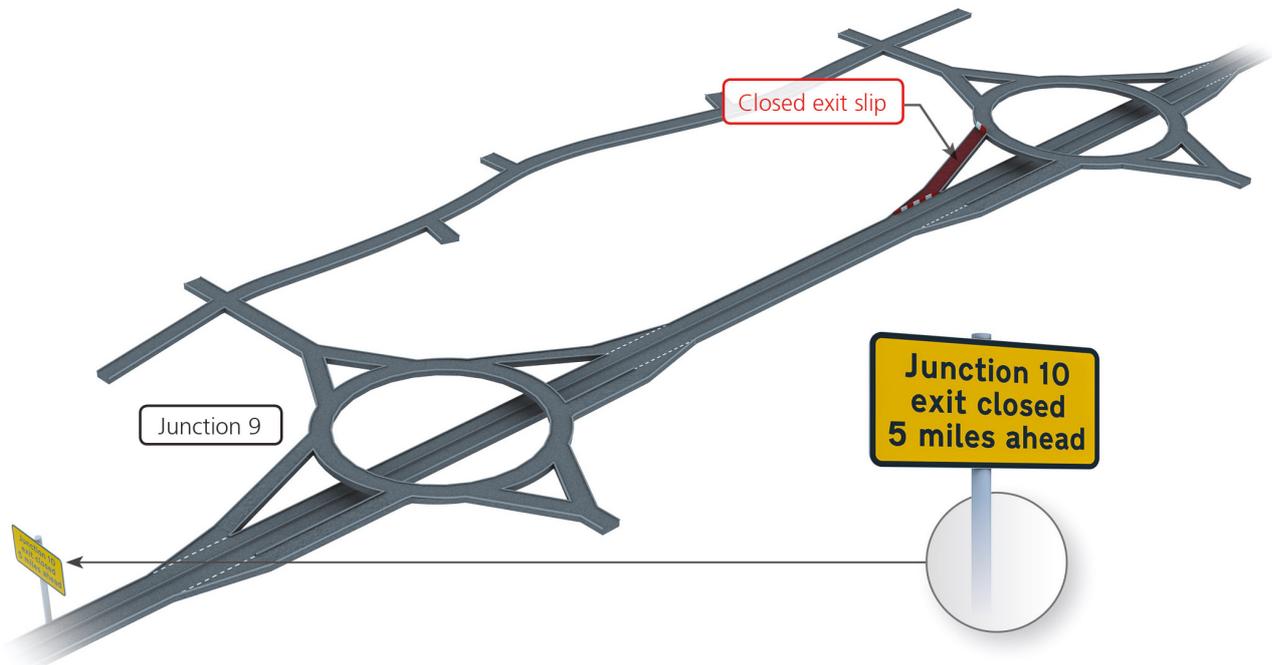


Figure 7.3 Advanced signing for a closed exit slip road

U7.3 The use of impact protection vehicles for temporary traffic management

U7.3.1. The purpose of IPVs is to:

- alert road users to the presence of road works vehicles on the hard shoulder or on the carriageway and, by association, road workers;
- provide appropriate information and instruction to road users through the use of prescribed or authorised traffic signs;
- reduce the severity of injury to road users should a collision with a works vehicle occur;
- reduce risks to road workers on foot on the carriageway and working on the rear of works vehicles; and
- reduce risks to road workers in and around temporary traffic management vehicles and other works vehicles.

U7.3.2. The Management of Health and Safety at Work Regulations require contractors to undertake a suitable and sufficient assessment of the risks to the health and safety of their employees. See also Part 2: Operations, Paragraph O2.2.1.

U7.3.3. This section builds on the above requirement, by providing guidance on the basis for the risk assessment.

U7.3.4. The risk assessment should be site specific, suitably recorded and consider all relevant factors that may affect the risks associated with an operation. The risk assessment should also record the method used to install, maintain or remove temporary traffic management, specifically including the use of dual or single vehicle working.

U7.3.5. The installation, maintenance and removal of temporary traffic management may be carried out using one of the following options:

- dual vehicle working. This is two vehicles working together, with an IPV positioned 75 m (+/-25 m) upstream of a works vehicle; or
- single vehicle working. This is one vehicle which acts as both IPV and works vehicle.

U7.3.6. The use of dual or single vehicle working is likely to result in different injury risks for road workers. This difference in injury risk means that the choice of dual or single vehicle working (and the separation distance if dual vehicle working is used) can be crucial to ensuring that the risk to both road workers and road users is managed to a level that is 'As Low As Reasonably Practicable'. Refer to Part 2: Operations, Section O2.3.

U7.3.7. In some circumstances, it may be appropriate to use more than two vehicles with more than one upstream IPV. The principles of dual vehicle working apply equally to such scenarios.

U7.3.8. Dual vehicle working refers to the use of two vehicles that work together at a separation distance of 75 m (+/-25 m). The first (upstream) vehicle is fitted with a Lorry Mounted Crash Cushion (LMCC) and offers protection to the downstream works vehicle. Where practicable, the works vehicle may also be fitted with an LMCC.

U7.3.9. Signing on the vehicles should comply with the recommendation in Part 2: Operations, Paragraphs O5.5.5 and O10.6.6 for the working vehicle. Vehicle mounted approach signs identified in Plans MLC1 to MLC5 may be replaced where suitable signals or remote control fixed taper point signs are available.

U7.3.10. Research indicates that, when working in a live lane, dual vehicle working may achieve the lowest level of relative risk to road workers.

U7.3.11. When working on a motorway or dual carriageway, dual vehicle working should normally be used when installing, maintaining and removing temporary traffic management, in accordance with the HTMA guidance document. Following the HTMA guidance document, "Temporary Traffic Management Vehicle Selection And Operation On High Speed Dual Carriageways Including Motorways", should substantially reduce road worker exposure to risks from traffic.

U7.3.12. When using dual vehicle working, a suitable separation distance should be maintained between the IPV (the upstream vehicle) and the downstream vehicle at all times. This distance should be 75m (+/-25 m) as shown in Plans MLC1 to MLC7 in Part 2: Operations, Section O10. Selection of an appropriate distance between the vehicles should consider that:

- shorter distances decrease the risk of road users re-entering the closed lane between the two vehicles but may increase the risk that, if the upstream vehicle is hit, it may be shunted into the rear of the downstream vehicle; and
- longer distances decrease the risk of the upstream vehicle being shunted into the rear of the downstream vehicle, but present a greater likelihood of road users cutting back in to the gap between the two vehicles and colliding with the rear of the downstream vehicle. If the downstream vehicle is not fitted with an LMCC, the severity of such a collision is likely to be greater.

U7.3.13. Single vehicle working refers to the use of a single vehicle for installation, maintenance, or removal of temporary traffic management equipment. This vehicle may or may not be equipped with an LMCC; if it is not fitted with an LMCC, it should not operate as a single vehicle in a live lane of a dual carriageway open to vehicular traffic (Part 2: Operations,

Paragraph O5.9.5). Signing on the vehicle should comply with the recommendation in Part 2: Operations, Paragraphs O5.5.5 (if the vehicle is fitted with an LMCC) and O5.2.3 (if the vehicle is not fitted with an LMCC).

U7.3.14. Single vehicle working may be considered for use when installing, maintaining and removing temporary traffic management, in accordance with the HTMA guidance (see Appendix A3.6) during activities which do not require road workers to operate on the rear of a vehicle in a live lane.

U7.3.15. A site specific risk assessment enables the risks to road workers and road users to be suitably identified and subsequently managed to a level that is 'As Low As Reasonably Practicable'.

U7.3.16. The advice contained within this section is given on the basis that a contractor's competent person carries out a suitable and sufficient site specific risk assessment well before site works commence and ensures that it is appropriately recorded.

U7.3.17. The site specific risk assessment will need, as a minimum, to include consideration of the fixed environment requirements, static operational requirements and dynamic operational requirements.

U7.3.18. Fixed environment requirements are the characteristics of the site which do not change on a regular basis; for example this should normally include (but is not restricted to):

- number of lanes on the carriageway;
- availability of safe taper locations, emergency refuge areas and maintenance access areas;
- presence of a hard shoulder, or hard shoulder discontinuities;
- dynamic use of the hard shoulder as a running lane (if present);
- presence of Variable Signs and Signals (VSS) to support lane closure;
- horizontal and vertical road alignment and sightlines;
- presence of junctions, slip roads, roundabouts, access roads, central reserve gaps, etc.; and
- presence of road lighting, if in use.

U7.3.19. Fixed environment assessments should be carried out before the works commence. Sites that have been pre-assessed should be reassessed on a regular basis, or immediately following any changes to the road layout.

U7.3.20. Static operational requirements are the characteristics specific to the type of works being carried out at a given site. The risk assessment should consider the traffic management technique used, including the choice of dual or single vehicle working (and the spacing between the vehicles if dual vehicle working is used). The choice of technique should be made whilst taking into consideration the intended use of IPVs, the characteristics which are specific to the operation being carried out and the predicted characteristics at the site during the period of the works; for example this should normally include (but is not restricted to):

- lane(s) to be closed;
- expected traffic flow per hour per lane;
- expected HGVs per hour per lane;
- likely speed of approaching vehicles (not the speed limit of the road);
- any known issues concerning compliance with signing or signals;
- availability of a suitable escape route for operatives;

- type of vehicle(s) to be used to install/remove equipment, including whether the works vehicle is fitted with an LMCC;
- requirement for carriageway crossings by operatives;
- manoeuvrability when installing/removing temporary traffic management using more than one vehicle; and
- use of a dedicated lookout person, with a suitable means of communication.

U7.3.21. Appropriate mitigations should be put in place to reduce the risks to road workers and road users by using an 'As Low As Reasonably Practicable' methodology. Assessment of these characteristics should be carried out in advance of the works in order that operatives have sufficient time to familiarise themselves with the techniques and mitigations required at different times during the operation.

U7.3.22. Dynamic operational requirements are the characteristics of the working environment which can vary during the operation itself; this should normally include (but is not restricted to):

- visibility of oncoming traffic for operatives;
- weather conditions;
- actual traffic flow;
- actual HGV traffic;
- actual traffic speed;
- confirmation of setting of VSS; and
- communications with the relevant control centre.

U7.3.23. These factors should be assessed at the site immediately prior to the start of the on-road work and reassessed regularly, including whenever circumstances at the site change significantly. The scope for the dynamic part of the risk assessment should be documented within the written risk assessment.

U7.3.24. The term "Smart Motorway" includes three types of motorway:

- Controlled Motorway, i.e. a motorway with variable speed limits and with a hard shoulder which should only be used in a genuine emergency;
- Hard Shoulder Running (HSR), i.e. part time use of the hard shoulder as a running lane; and
- All Lane Running (ALR), i.e. where the motorway does not have a hard shoulder, all lanes are used as running lanes.

U7.3.25. Additional risks to road workers on Smart Motorways should be considered at the planning stage and included in the site specific risk assessment.

U7.3.26. When working on a Smart Motorway HSR section, there may be an increased risk of hard shoulder misuse by road users, i.e. road users driving on the hard shoulder when the hard shoulder is closed as a running lane. This increased risk of hard shoulder misuse may also arise in the case of sections of dual carriageway with hard shoulder that are immediately downstream of a Smart Motorway HSR or ALR section. Particular consideration should also be given to driver compliance with VSS on these sections. When an IPV with an enhanced light arrow system is placed on a section of road which is not a live lane e.g. hard shoulder, the sign must display the aspect which includes only the Diagram 610 arrow with two amber lamps, it must not display an intermittent light arrow. This applies to all lanes closed to traffic; this includes those closed by Diagrams 6031.1 or 6031.2 (red 'X') signals.

U7.4 Lane control (red 'X') signals

U7.4.1. The meaning of Diagram 6031.1 has changed in TSRGD 2016. This is now a length restriction prohibiting entry into a lane rather than a point restriction passing under the signals. This has an impact on the use of works vehicles and IPVs in both planned works and Emergency Traffic Management.

U7.4.2. Where lane control signals are in place which can display Diagram 6031.1, works vehicles and IPVs are permitted to pass under the signal for traffic authority purposes where the vehicle is being used in connection with the execution of works on the road. This includes the purpose of installing TTM. This exemption should only be used where it is not reasonably practicable to enter a closed lane from an adjacent live lane. The identified method of maintaining or removing TTM should where practicable allow all vehicles to access the work site or closed lanes from a live lane without the need to pass under a signal displaying a red 'X'. When passing under a signal into a closed lane vehicles should display their amber beacons and then proceed at a significantly reduced speed.

U7.4.3. For planned works, lanes closed by Red 'X's are to be considered to be a part of the safety zone and cannot be part of the working space or works area. This applies for the whole length of the lane until the next signal or where physical protection is used e.g. IPVs, see Part 1: Design D6.13.13. It is therefore recommended that the use of red 'X' signals is limited to situations where TTM is being installed or removed. Where a lane is closed with cones and barriers any red 'X' signal over that lane must be turned off once the installation of the TTM is complete.

U7.4.4. It is not permitted to design or install TTM which includes a changeover, crossover or other layout which requires traffic to enter a traffic lane closed by either Diagrams 6031.1 or 6031.2 Red 'X's.

U7.4.5. When involved in installing any emergency traffic management or enhanced emergency traffic management (see Part 2: Operations Section O7) any works vehicle or IPV may pass under Diagram 6031.1 indicating the lane the vehicle is using is closed, for the purposes of setting up TTM. The prohibition indicated by the red 'X' is only cancelled by the display of 'END' or diagrams 670 or 671 on a signal; therefore, contractors must not place any IPV or TTM in a live lane which would result in road users entering a closed lane.

U7.4.6. Diagram 6031.2 is a new signal aspect which is placed on a verge mounted sign (or a sign placed partly over the verge and the carriageway). This, along with Diagrams 6002.1 and 6008.2 can be combined to display a variety of lane control aspects. The provision for works vehicles and IPVs entering a lane closed by diagram 6031.2 is the same as for diagram 6031.1. For planned works the display of Diagrams 6031.2 (red 'X') and 6002.1 (cranked arrow) should only be used during the setting up and removal of TTM. During the works, lane closure information should be on separate signing under the control of the TTM provider. Permanent VMS may display diagram 6008.2 as part of the approach signing (see [U2.15.29](#) – [U2.15.31](#)).

U7.5 Amendments to approach and lane-change zone signing for relaxation closures

U7.5.1. Guidance in Chapter 8 around wider carriageways on motorways, considering the use of permanently mounted remotely controlled signs to minimise the need for personnel to cross the carriageway, is provided in Part 1: Design, Section D6.13 and U.2.15. This guidance may be applied to narrower carriageways subject to a scheme specific risk assessment. In addition the following guidance should be considered.

U7.5.2. A reduced level of sign provision from that shown in Plans DZA3 and DZB6 (nearside and offside signs at the 1 mile, 800, 600, 400 and 200 yards locations), may be considered subject to the following guidance.

U7.5.3. Any work activity involving installation, maintenance and removal of temporary traffic management on high speed roads is hazardous. The selection of the actual method of work should be made by a competent contractor and should reflect the risks of the planned work, for example the type of road, type of works, duration and location-specific circumstances.

U7.5.4. Overriding is the Chapter 8 objective to minimise potential conflict between road users, and between road users and road workers and their operations, by providing clear directions relating to decisions/ actions required on the part of road users (see Part 2: Operations Paragraphs 02.3.1). The risk of such conflicts must be assessed carefully and rigorously, ensuring it is eliminated where possible and otherwise reduced to a minimum during the installation removal and maintenance of temporary traffic management (see Part 2: Operations Paragraphs 02.4.5).

U7.5.5. Underlying the design of the temporary traffic management arrangements should be the aim to produce a safety performance and road user comprehension no worse than for the rate for non-works conditions. This requires that adequate guidance is provided for road users by use of temporary signs that are suitably sized and placed so as to be readable (see [U2.8.4](#), [U2.17.2](#) and [Appendix A1.7](#)). This is particularly important where only nearside signing is provided. A review of the use of this option indicates that the readability requirements are not always met where traffic is more likely to be in lane one e.g. at junctions, including diverges; after the start of dual carriageways; or where traffic speeds and/or headways are reduced e.g. inclines. This is likely to increase the level of nearside sign obscuration for any given traffic flow.

U7.5.6. Removing the necessity of installing offside signs for nearside closures at relaxation scheme works reduces the time taken to install and remove the lane closure, decreasing risk to road workers and road users. This is a key consideration in the risk based design but must not be the justification for omission of offside signs, which must ensure that reduced signing will not adversely affect road user safety.

U7.5.7. The alternative techniques identified below must be considered within a risk based design as an option for implementation of relaxation works (as defined in Part 1: Design. Paragraph D1.6.3 and Part 2: Operations. Paragraph 01.6.3) along with the full signing layouts shown in Part 1: Design Plans DZB6. DZB7 and DZB8. The alternative techniques identified below are not considered appropriate for Standard works (as defined in Part 1: Design. Paragraph D1.6.2 and Part 2: Operations. Paragraph 01.6.2) except that they may be used within or to establish Standard work sites.

U7.5.8. When undertaking relaxation schemes, as part of the site-specific risk assessment the contractor should determine whether the general temporary traffic management layout in Part 1 or one of the simplified temporary traffic management options is most appropriate. Generic risk assessments may be used to develop safe systems of work for installing full and simplified temporary traffic management layouts; however, the selection of the individual design to use must be achieved via a site-specific risk assessment. This must consider the risk to road workers and road users from the scheme to be undertaken and all other relevant factors detailed in Part 1: Design. Paragraphs D1.6.3 - D1.6.5 and Part 2: Operations. Paragraphs 01.6.3 - 01.6.5. with the definition of 'low traffic flows' given in Appendix A2.41 of Part 1 and Part 2.

U7.5.9. The site-specific risk assessment should also detail contingency arrangements to be implemented that will ensure risk to both road users and road workers is maintained in the event that conditions on site deteriorate such that relaxation scheme TTM is no longer appropriate. The site-specific scheme risk assessment will need to be validated before the start of the works and if conditions are inappropriate for relaxation scheme works, the works should be aborted with no TTM installed, or TTM suitable for the conditions should be installed. Once the scheme has commenced, the works should be monitored continuously to ensure approach signing remains appropriate for conditions. If conditions deteriorate such that the approach signing is no longer appropriate the contingency arrangements to remove the works, enhance the advance signing or otherwise protect the closure must be implemented immediately.

U7.5.10. For motorways with three lanes or more open to traffic, certain classes of vehicles are prohibited from the outside lane (e.g. Regulation 12 of the Motorways Traffic (England and Wales) Regulations 1982). The display of a wicket sign (e.g. Diagram 7202.1) does not exempt these classes of vehicle from this restriction. Therefore, a nearside taper on a three lane or wider dual carriageway which leaves only the outside lane open must only be implemented where an appropriate order is in place permitting restricted vehicles to use the outside lane on the approach to the lane closure and an additional sign is provided indicating that restricted vehicles may use the outside lane. See [Figure 7.8](#) for details. This may be one or more aspects on suitable VMS on the approach to the taper, or one or more fixed plate signs, to Schedule 13 Part 9. When considering this as an option, the risk-based design must demonstrate that HGVs or other restricted vehicles will be able to move from the inside lane to the outside lane in the distance from the first wicket sign to a point 100m from the first cone of the taper. Where additional signing cannot be installed, the option to install an offside taper using the protection of IPVs and then a changeover may be considered. While it is possible to use a stepped taper this is not normally a recommended layout.

U7.5.11. In summary the options below should only be considered if all of the eligibility criteria shown below are met:

- the scheme is a relaxation scheme, as defined in Part 1: Design, Section D1.6;
- backlit sequentially flashing warning lamps are installed on the lead-in taper, see Part 2: Operations, Paragraph O4.7.19;
- the traffic flow past the site is less than that defined in Appendix A2.41 and sign obscuration (see [U2.17.5](#)) is not likely to be an issue;
- the contractor has carried out a suitable location specific risk assessment which indicates that it is safe to implement; and
- Signs of a sufficient size to be read by approaching road users can be installed and are available for use.

U7.5.12. Reduced levels of sign provision may be made on lower speed roads subject to the above criteria.

U7.5.13. A reduction in the level of signing provision for Standard schemes is not recommended.

U7.5.14. A plan showing the normal relaxation layout is shown in [Figure 7.4](#). Examples showing various reduced levels of signing provision are shown in [Figure 7.5](#), [Figure 7.6](#) and [Figure 7.7](#). They are neither exhaustive nor prescriptive. Other signing combinations may be used subject to the criteria set out in Paragraph [U7.4.1](#) being met.

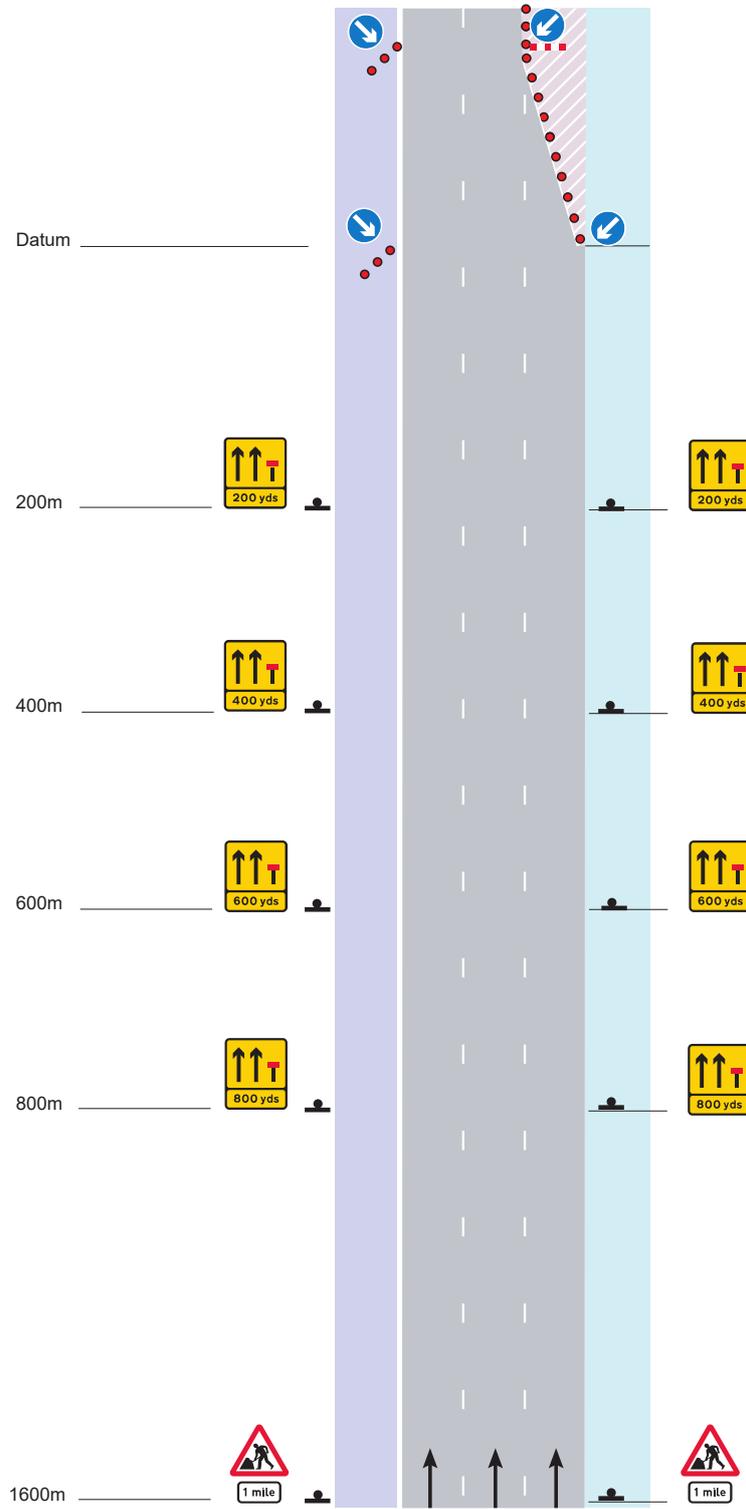


Figure 7.4 Normal levels of signing provision for relaxation schemes

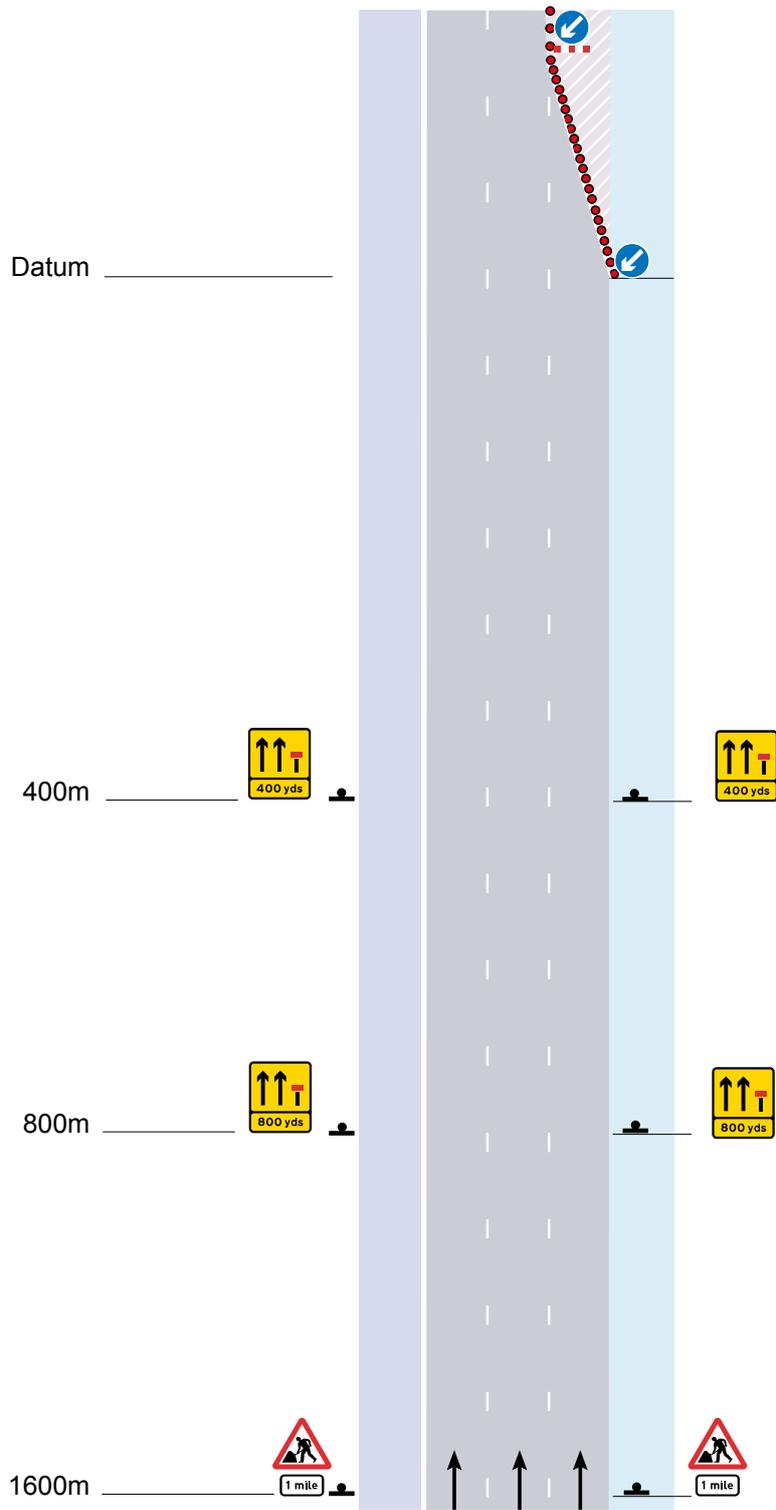


Figure 7.5 Example of reduced levels of signing provision for relaxation schemes, with the removal of 200 and 600 yds signs

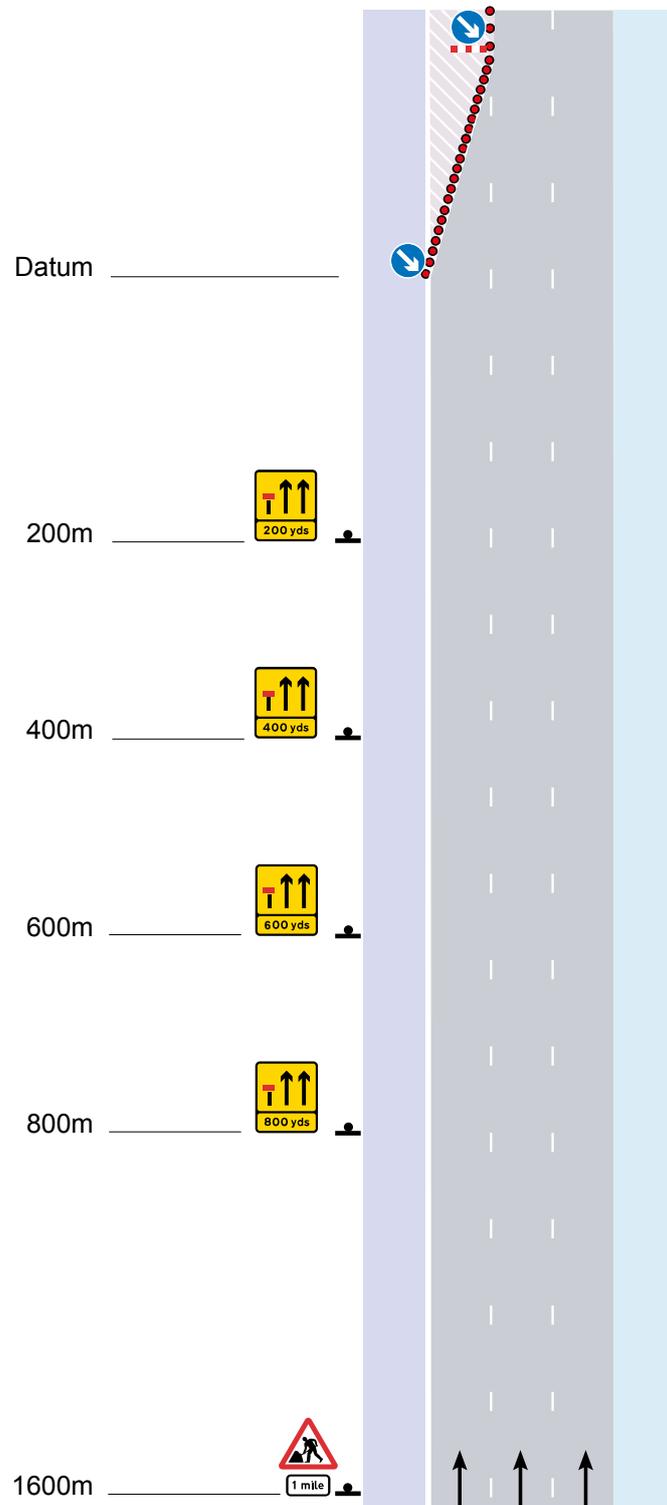


Figure 7.6 Example of reduced levels of signing provision for relaxation schemes, with the removal of the offside signs

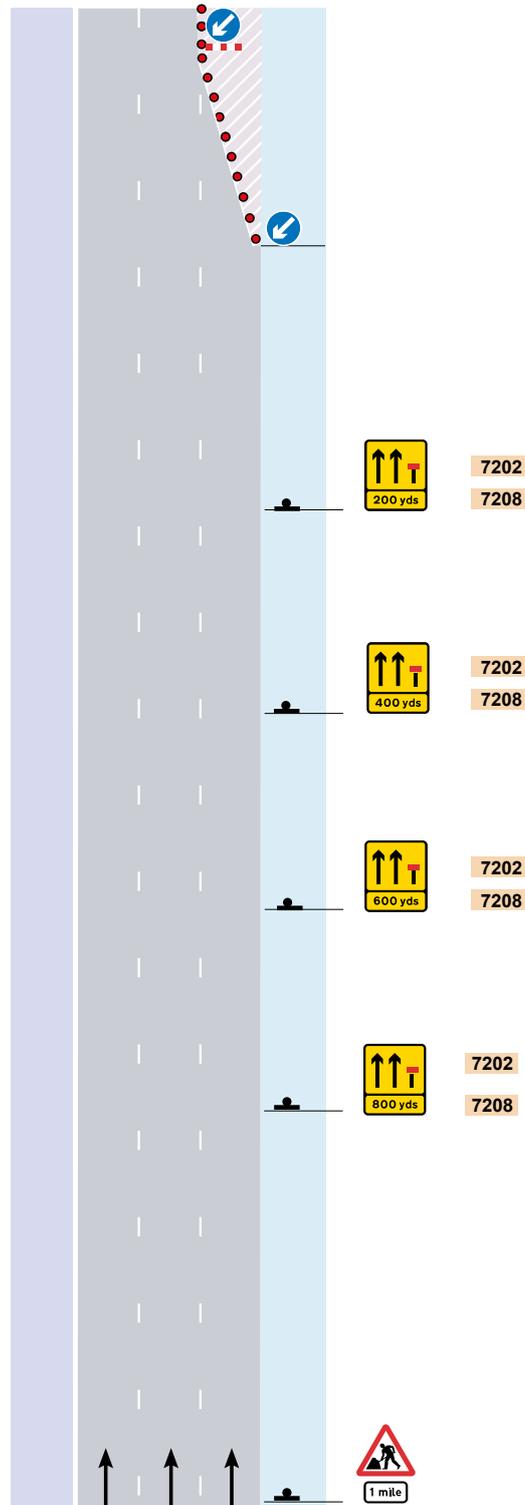


Figure 7.7 Example of reduced levels of signing provision for relaxation schemes, with the removal of the nearside signs

U7.6 The alternative entry taper – application and use

U7.6.1. The alternative entry taper layout described below may be used, subject to appropriate risk assessment and where conditions are considered suitable, as a direct replacement for the relaxation scheme entry taper shown in Part 1: Design, Plan DZB3.

U7.6.2. The alternative entry taper layout may be used for relaxation scheme temporary traffic management at road works on dual carriageways where single or multiple lane closures are to be installed on the offside or nearside.

U7.6.3. The alternative entry taper arrangement (shown in [Figure 7.9](#)) consists of five rows of cones placed perpendicular to the normal axis of travel at 27 m centres. Each successive row in the direction of travel has one additional cone, with two intermediate cones placed at 9m centres between the perpendicular rows. Sequentially flashing road danger lamps are placed on the outer cones of each perpendicular row and on the intermediate cones between the perpendicular rows. This configuration is repeated in each lane closed.

U7.6.4. The placement of cones at 9m centres allows the cones forming the alternative entry taper to be aligned with Diagram 1004.1 or 1005.1 carriageway markings. Using the carriageway markings in this way as a template/baseline for alignment of the cones forming the alternative entry taper simplifies setup and enables more accurate cone placement. This layout does, however, result in a slightly shorter relaxation scheme entry taper of 135m (1 in 37) compared to the 150 m (1 in 40) specified in Part 1: Design Appendix A1, Table A1.3. This factor should be considered when applying the alternative entry taper.

U7.6.5. Planning processes for the selection of taper type must give robust consideration to ensuring risk is adequately controlled for both road users and road workers.

U7.6.6. Any decision to adopt the alternative entry taper layout should take account of the road conditions as set out in Part 1: Design, Paragraphs D1.6.3 and D1.6.5 and Section D3.8; and Part 2: Operations, Section O1.6. The definition of “low traffic flows” is as per Part 1: Design, Appendix A2.41.

U7.6.7. If an appraisal of the aspects given in these sections indicates that the use of the alternative entry taper layout is inadvisable or inappropriate, the use of the entry taper layout shown in Part 1: Design, Plan DZB3 should be specified. This is shown for reference in [Figure 7.8](#).

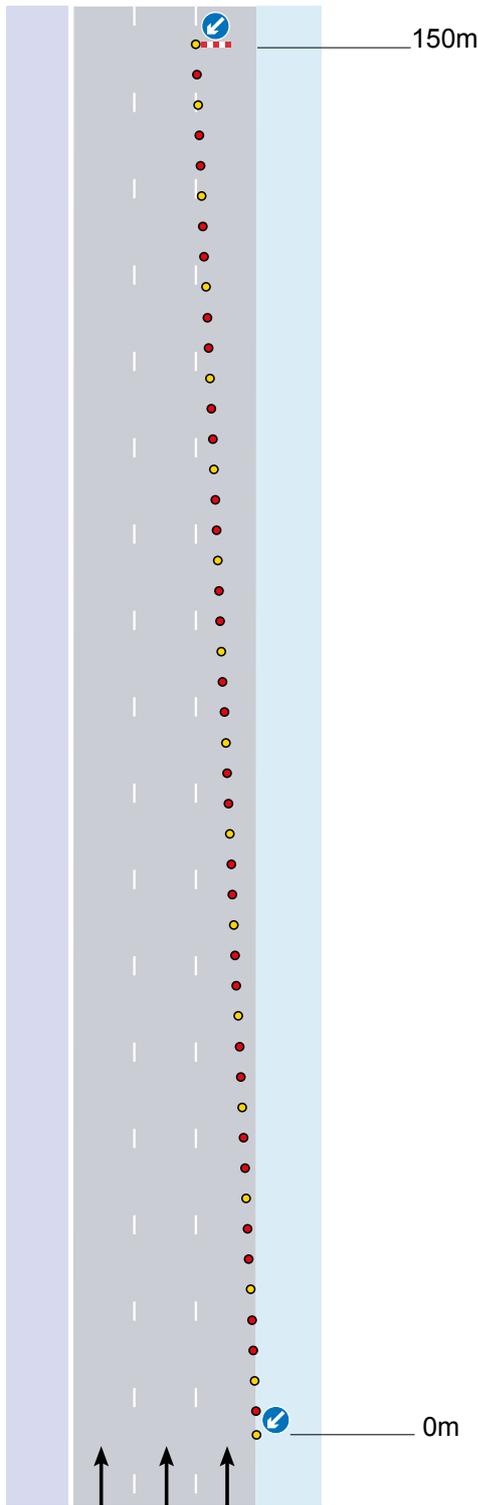


Figure 7.8 Relaxation scheme entry taper layout (from Plan DZB3)

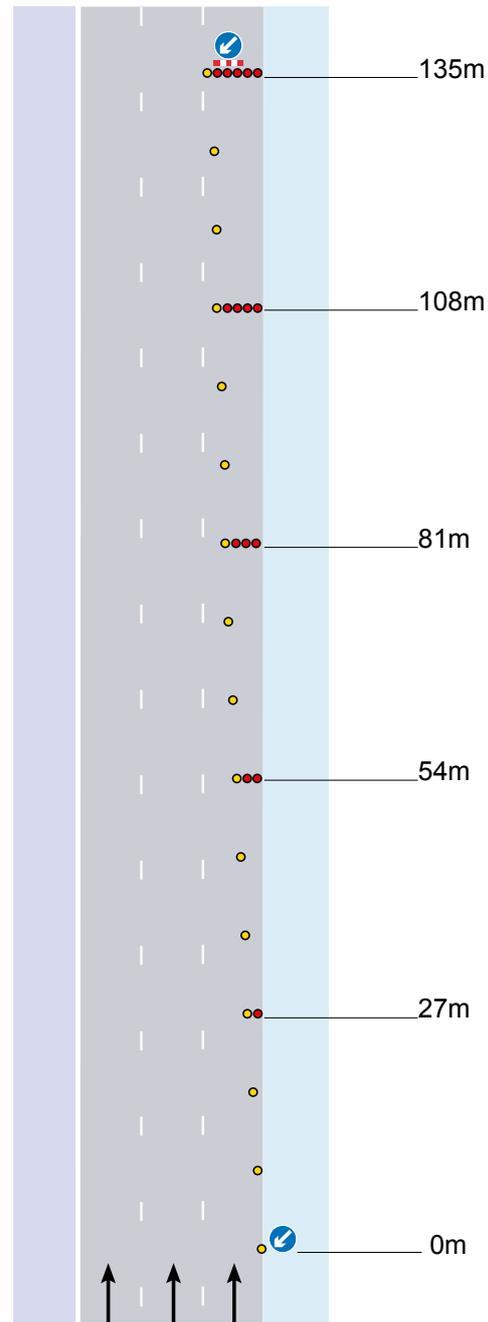


Figure 7.9 Alternative layout for an entry taper for relaxation scheme works on a dual carriageway

U7.7 Work site signs and signals

U7.7.1. For works activities, adequate signing is required to highlight risks to workers within the works area and working space as identified in the specific risk assessment for the relevant work activities and as required by the Health and Safety (Safety Signs and Signals) Regulations 1996. Where signs are required for highlighting hazards not related to the movement of traffic in the works area, working space or adjacent carriageway these do not need to be designed as prescribed traffic signs (which includes cones, cylinders etc.). These signs must not be designed or placed on site in a manner which approaching traffic could interpret them as indicating a message, warning, restriction or requirement to road users.

U7.7.2. Where signs are needed within the works area and working space to indicate to workers risks related to moving vehicles, then prescribed signs and equipment must be used if there is a suitable method of signing the hazard using any prescribed sign or permitted variation. Only if there is no suitable sign, or combination of signs, which could be used to highlight the hazard should signs not prescribed in the Regulations, or authorised, be used; it is not acceptable to design or place signs of this nature in the works area or working space which could be seen as indicating a message, warning, restriction or requirement to approaching road users.

U7.7.3. The design of the temporary traffic management may need to be adjusted so that work site signs which are neither prescribed nor authorised are not visible to road users e.g. placing them behind barriers or screens, or behind traffic signs, but are only visible to workers. Extra care must be taken if using any non-prescribed signs along the boundary of the working space and the safety zone. Unless signs or equipment are likely to be obscured from the view of workers it is recommended non-prescribed signs are set back from any live section of road e.g. the back of hard shoulder or on the verge.

U7.7.4. Non-prescribed site safety signs should be kept separate from prescribed signs (particularly cones) and in no circumstances should they be used as substitutions for prescribed signs outside of the working space or works area. This includes all planned works and emergency traffic management. Non-prescribed work site signs used in this way would be an unlawful obstruction. Where off-peak only works are being implemented, these signs must be not be left in view of road users e.g. on verges or in central reservations, when the TTM has been removed during peak periods. If needed, signs should be removed from site after the works have been completed and before the temporary traffic management is removed.

U7.7.5. Workers must be adequately briefed or trained on how to access the worksite, on what hazards from vehicles in the works zone or working space may be present and how to exit the works safely. Signs (whether prescribed or not) are not sufficiently reliable to be the primary method of highlighting that a hazard is present on-site; signs should only be used to highlight the location of a hazard for which the worker is already aware. While work site signs should be considered as necessary to highlight hazards it is recommended that activities in the working area and works zone should be designed and undertaken so that the hazards would be obvious to workers, for example by directly lighting the hazard.

U7.7.6. The design of the temporary traffic management should permit its safe installation, maintenance and removal using only prescribed or authorised traffic signs. Non-prescribed works site signs should not be needed to enable these types of activities to be undertaken.

U7.7.7. Organisations undertaking works should review guidance and industry practice relating to work site signs. Where there are industry standard details and solutions for specific hazards e.g. overhead power cables and reduced headroom at structures, extra care should be taken if other methods of signing and highlighting are used. The comprehension of site signs should be reviewed particularly where the signs are symbolic; where nonstandard colours are used e.g. coloured cones, the impact of colour blindness and the differences in contrast, reflective and retroreflective performances of materials of different colour must be taken into account.

U7.8 Scheme inspections

U7.8.1. The requirements for inspecting schemes after installation, during works and after removal are given in Part 2: Operation Section O3. While it is recommended that formal records of these inspections are retained, if contractors wish to undertake works with the following

features then records should be kept for a period of at least six months after the completion of the works:

- Mandatory reduced speed limits;
- Narrow lanes;
- Road marking and road stud surveys where warning lamps are omitted as identified in Section **U2.14**;
- Relaxations schemes with a reduced number of approach signs;
- Schemes where smaller signs than recommended in this Chapter are used; and
- Schemes with unlit signs in street lit areas.

U7.8.2. On completion of the works contactors are required to remove all signs and equipment, including any remote signs used to give advance warning. This should be recorded and audited against the initial inspection.

U8.1 Introduction

U8.1.1. This section outlines sign face design and, in particular in relation to, works traffic; non-police incident management signs; the design and use of signs to Diagram 7202.1; the design and use of signs to Diagrams 7243, 7244 and 7245; amendments to traffic signs in lane-change layouts; installation, maintenance and removal of temporary signs; and signs indicating length of road works.

U8.2 Works traffic

U8.2.1. Guidance relating to the design of the works access only sign is provided in Section U5.17 and Working Drawing P7306. Design of the reversible, multi-use version of sign is provided in **Figure 8.1**.

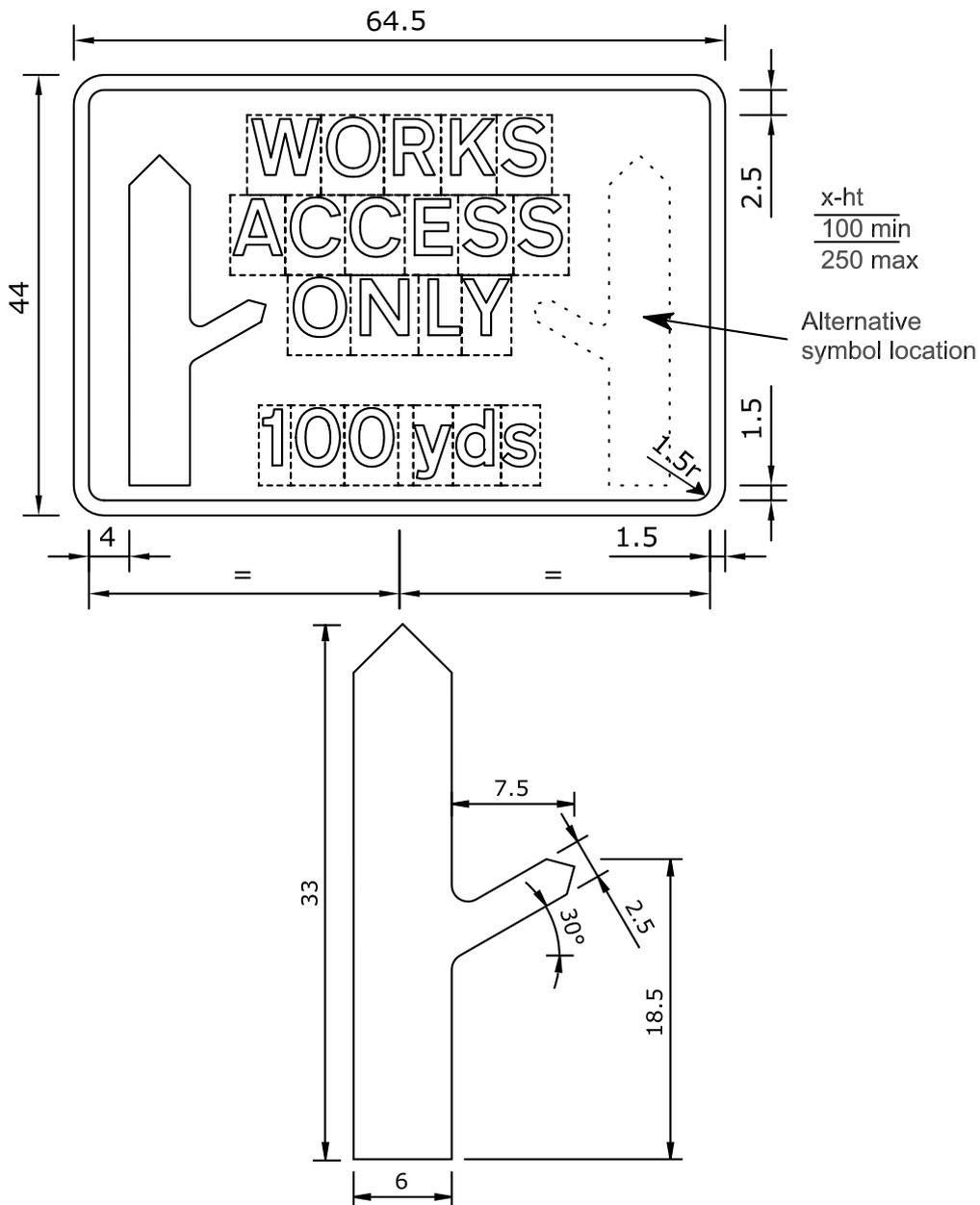


Figure 8.1 Works Traffic sign

U8.3 Non-police incident management signs

U8.3.1. Guidance on the use of non-police equivalent of Diagram 829.1, 829.3 and 829.4 signs is given in Section **U5.7** and sign design shown in **Figure 8.2**. The non-police “USE HARD SHOULDER” sign may only be deployed with the permission of a uniformed police officer or a traffic officer in uniform. These signs are to Schedule 13.9 and are white on blue.

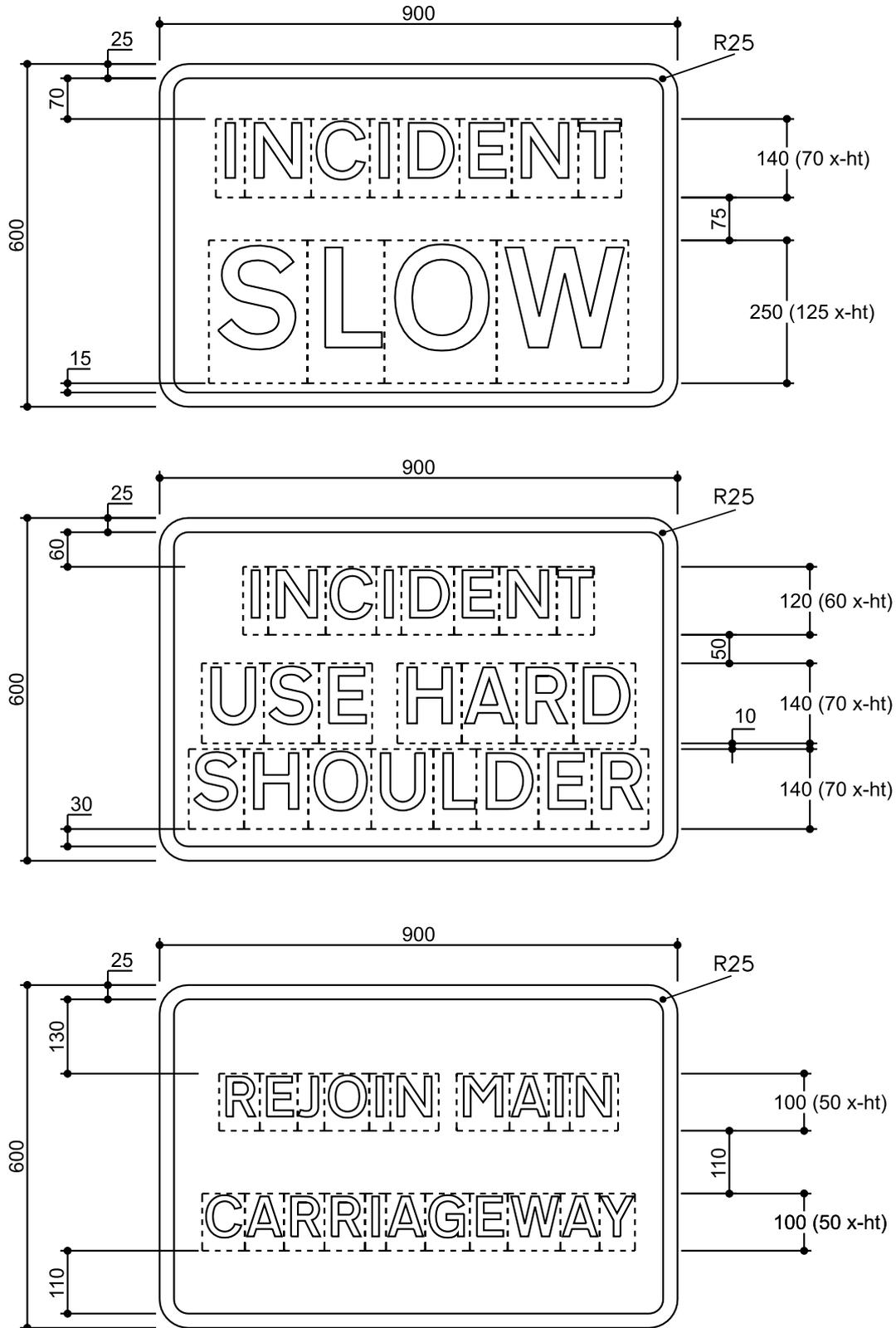


Figure 8.2 Non-police incident management signs

U8.4 The design and use of signs to diagram 7202.1

U8.4.1. The design of signs to Diagram 7202.1 must be in accordance with Working Drawing P7202.1. The part of the sign coloured yellow may be fluorescent yellow.

U8.4.2. These signs may be at one of four 'x' heights 100, 125, 150 or 175mm, depending on the situation in which they are located. See [Appendix A1](#).

U8.4.3. Signs to Diagram 7202.1 must be used to replace those equivalent TSRGD 2002 Diagram numbers 7202 and 7206, where those signs appear or are mentioned in Part 1 or Part 2. See [Figure 8.3](#).

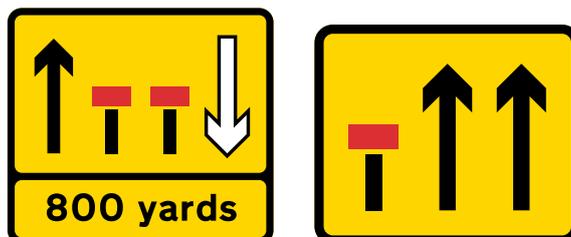


Figure 8.3 Typical Diagram 7202.1 signs

U8.5 The design and use of signs to diagram 7243

U8.5.1. The design of signs to Diagram 7243 should be in accordance with the design rules laid out in TSM Chapter 7 2013, Section 13. The part of the sign coloured yellow may be fluorescent yellow. For a typical design see [Figure 8.4](#).

U8.5.2. The rules in Section 13 quote a single set of dimensions, based on 150mm 'x' height. Regulations now permit the signs to be designed to two smaller 'x' heights, 125 and 100mm. The dimensions quoted in Section 13 must be varied proportionally to create signs at the smaller 'x' heights. Note that black central reservation shape shown in TSM Chapter 7:2013 Figures 13.9 and 13.10 is no longer prescribed and must not be used.

U8.5.3. Correctly designed signs to Diagram 7243, combining text or regulatory signs above arrows, can be very large. Such large signs can be difficult to locate on site and may present manual handling and installation difficulties.

U8.5.4. The infinite variety of layouts permitted in Section 13 generally does not make the design of these sign amenable to automated computerised design.



Figure 8.4 Typical Diagram 7243 sign

U8.5.5. Signs to Diagram 7243 must be used to replace those equivalent superseded Diagram numbers 7201, 7201.1, 7210 to 7240 inclusive and 7260 to 7288 inclusive where those signs appear or are mentioned in Part 1 or Part 2.

U8.6 The design and use of signs to diagrams 7244 and 7245

U8.6.1. The design of signs to Diagram 7244 must be in accordance with Working Drawing P7244. The part of the sign coloured yellow may be fluorescent yellow. For a typical design see [Figure 8.5](#).

U8.6.2. These signs may be at any 'x' height between 100 and 150 mm, depending on the situation in which they are located. See [Appendix A1](#) and Paragraph [U8.6.5](#) below.

U8.6.3. Text or regulatory signs may be placed above arrows. It is not permitted to place both text and regulatory signs together above a single arrow or group of arrows, nor on the same sign. If there is a need to show both text and regulatory signs then separate signs, spaced 100 to 200m apart should be used. This will help ensure that signs are of a size that is practical to fit on site and also that the legend shown on them does not become unintelligible to drivers due to excessive content.

U8.6.4. The space available on Diagram 7244 signs for text is limited. This is a deliberate design feature to prevent excessive content. Consequently the use of 'For X follow Y' signs in advance of the 7244 may be required.

U8.6.5. Where regulatory signs are to be included in a 7244 sign, the 'x' height of the sign should be fixed at either 100, 125 or 150 mm. The corresponding diameter of regulatory roundels is 600, 750 and 900 mm diameter. Designers should note that regulations require some signs to have a minimum diameter of 750 mm. Signs displaying these types of roundel should only be provided at 125 or 150 mm 'x' height. Where width or height restrictions are shown on a sign, dual imperial/metric signs should be used (Diagrams 629A and 629.2A).

U8.6.6. The position of arrows and thus any text or roundels above the arrows, is generally fixed, making the design of these signs amenable to computerisation.



Figure 8.5 Typical Diagram 7244 sign

U8.6.7. The design of signs to Diagram 7245 must be in accordance with Working Drawing P7245. The part of the sign coloured yellow may be fluorescent yellow. For a typical design see [Figure 8.6](#).



Figure 8.6 Typical Diagram 7245 sign

U8.6.8. These signs may be at one of four 'x' heights 100, 125, 150 or 175 mm, depending on the situation in which they are located. See [Appendix A1](#).

U8.6.9. Text and symbols may be added to the centre panel of these signs when they are used as temporary directional signs. The legend content is limited to a maximum of three lines of text. Regulatory signs are not permitted to be included on Diagram 7245 signs.

U8.6.10. The centre panel is formed from a range of generally fixed shaped arrows and red blocks denoting areas of carriageway unavailable to traffic or the central reserve. The position of these blocks within the centre panel is fixed, making the design of these signs amenable to computerisation.

U8.6.11. Signs to Diagram 7244 must be used to replace those equivalent TSRGD 2002 Diagram numbers 7201 and 7201.1, where those signs appear or are mentioned in Part 1 or Part 2.

U8.6.12. Signs to Diagram 7245 must be used to replace those equivalent TSRGD 2002 Diagram numbers 7203 to 7205 inclusive and 7207 to 7256 inclusive, where those signs appear or are mentioned in Part 1 or Part 2.

U8.6.13. Where a TSRGD 2002 sign shows both text and a regulatory roundel above a cranked arrow, separate signs to Diagrams 7244 and 7245 should be provided instead. This will help to ensure that the resulting signs present no manual handling/installation issues and ease driver comprehension due to the reduced legend content of each individual sign. Where separate signs are provided, the order in which they are displayed to drivers should be:

- 7244 bearing destination information;
- 7244 bearing regulatory information; or
- 7245.

U8.6.14. Note: A minimum of one pair of each type of 7244 sign will be needed when both destination and regulatory information is displayed. Where a lane change zone plan shows four pairs of signs, the first two pairs of signs should bear destination information. Regulatory information will then be displayed on the next pair of signs if necessary. As there will generally be further signs to Diagram 7244 throughout the works showing the remaining distance of restrictions, it is more important to emphasise lane destinations in the lane change zone than lane restrictions.

U8.7 Amendments to traffic signs in lane change layouts

U8.7.1. Based on the guidance given in this document the following examples show typical changes to Part 1: Design, DZ series layout plans.

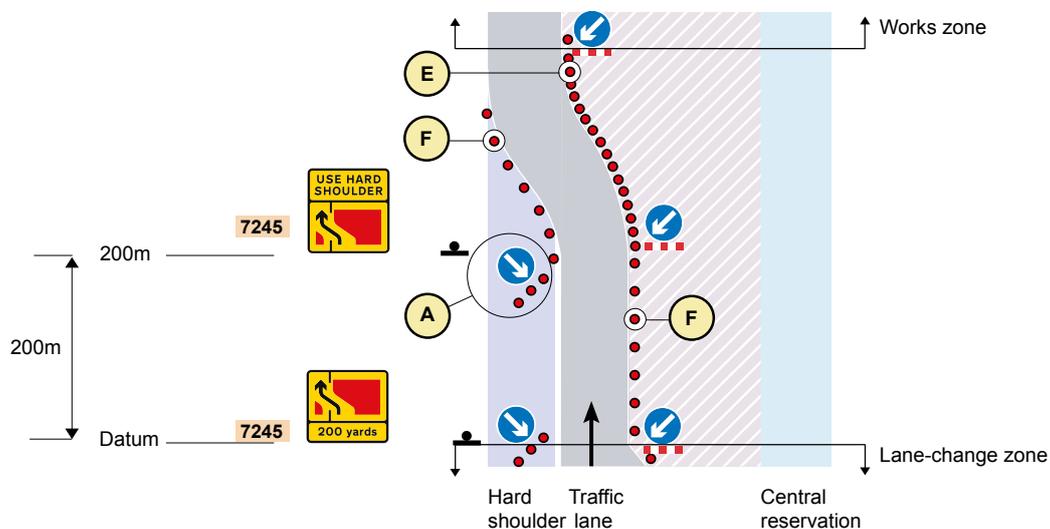
U8.7.2. Main changes to Diagram numbers are:

- 7252, 7256 are replaced with Diagram 508.1;
- 7253 is replaced with Diagram 509.1;
- 7201, 7201.1, 7263, 7264, 7271 are replaced with Diagram 7244;
- 7203, 7203.1, 7204, 7205, 7209, 7210, 7212, 7215, 7216, 7230, 7231, 7235, 7237, 7260, 7261, 7263, 7264, 7271, 7272 are replaced with Diagram 7245.

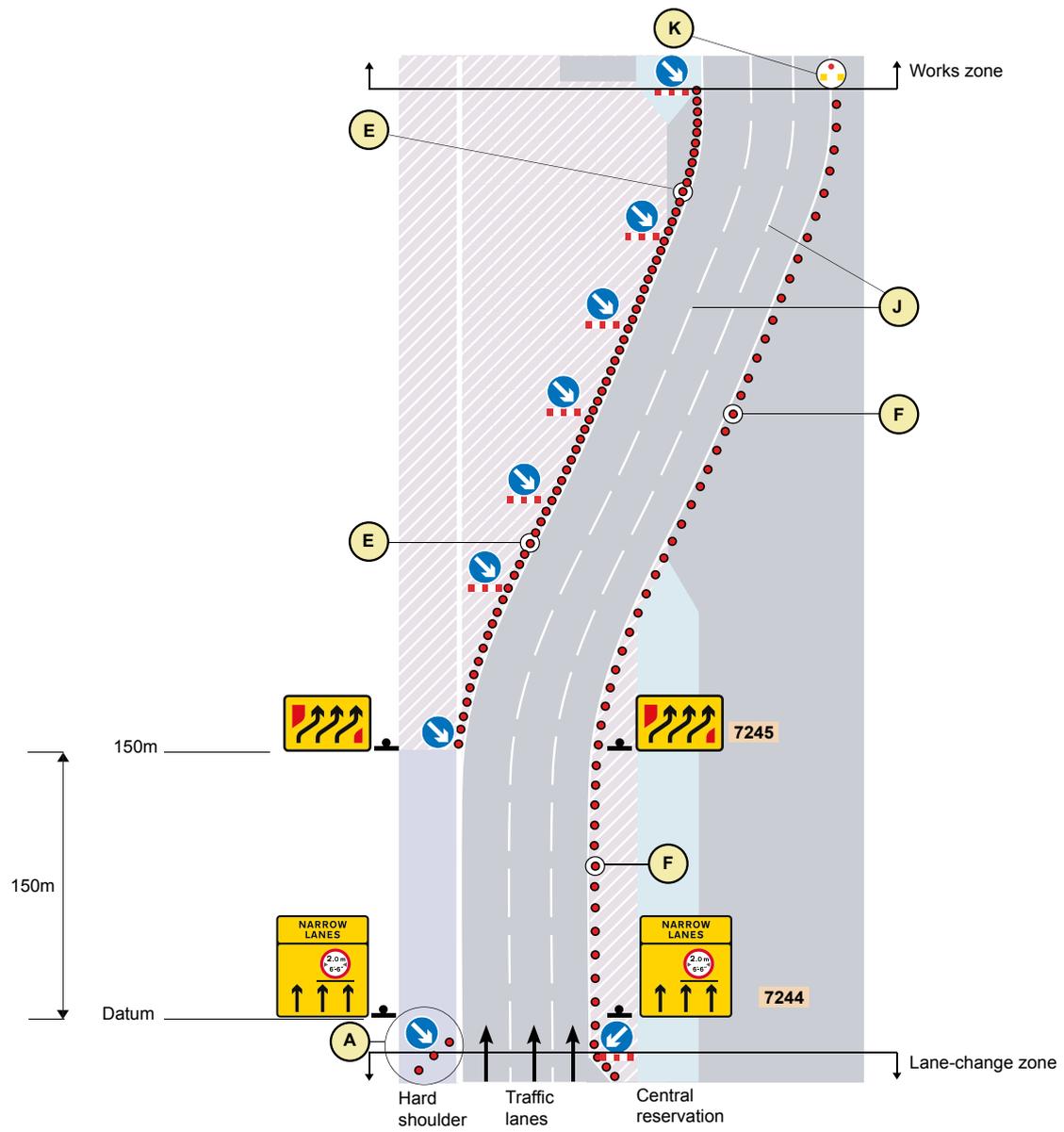
U8.7.3. Header and footer panels previously numbered as Diagrams 7263 and/or 7271 can be incorporated into Diagrams 7244 and 7245.

U8.7.4. The keys to the plans are given in Part 1: Design: Appendix 1, Tables A1.4 and A1.5 which show DZ revised layouts:

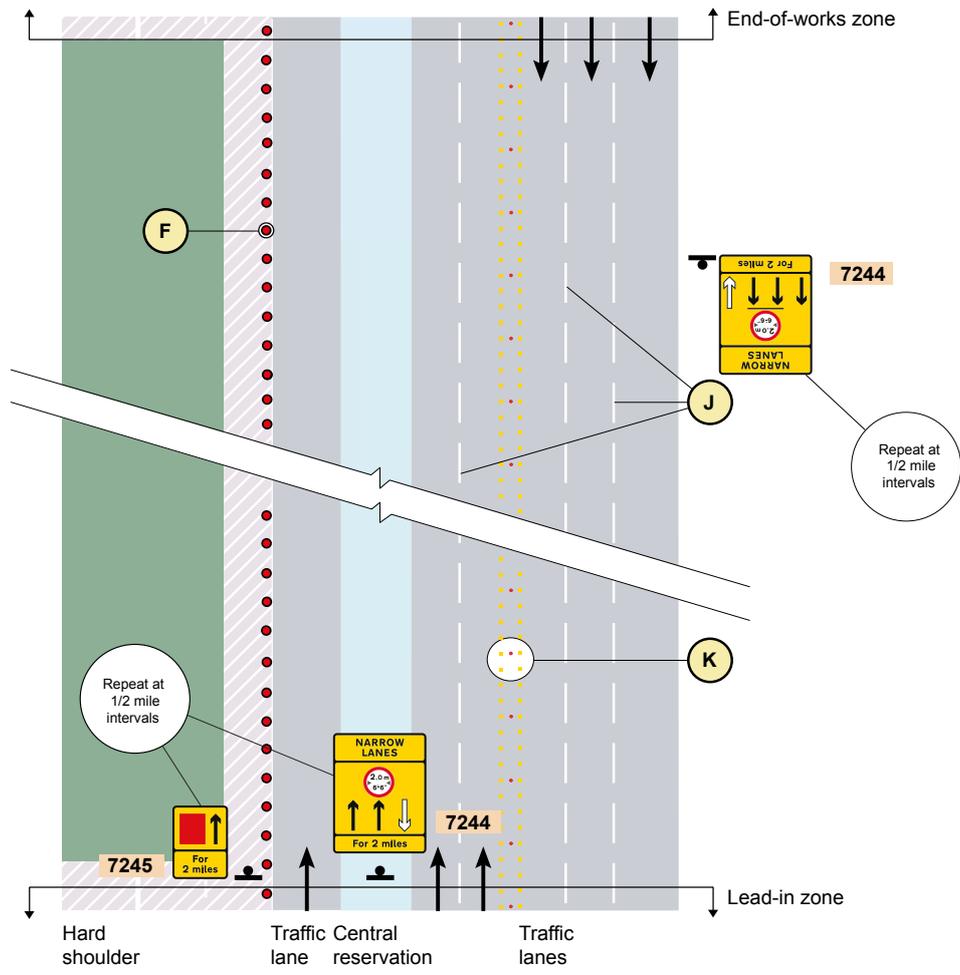
- DZC4 – Lead-in zone for a single-lane changeover onto the hard shoulder;
- DZC8 – Lead-in zone for a three-lane crossover with narrow lanes;
- DZC9 – Lead-in zone for splitting lanes for a changeover onto the hard shoulder and a single-lane crossover;
- DZD3 – Works zone showing a buffer lane;
- DZD5 – Works zone showing narrow lanes;
- DZD7 – Works zone including a junction (secondary carriageway);
- DZE6 – End-of-work zone for a two-lane return crossover with a single-lane changeover from the hard shoulder.

DZC4: Lead-in zone for a single-lane changeover onto the hard shoulder

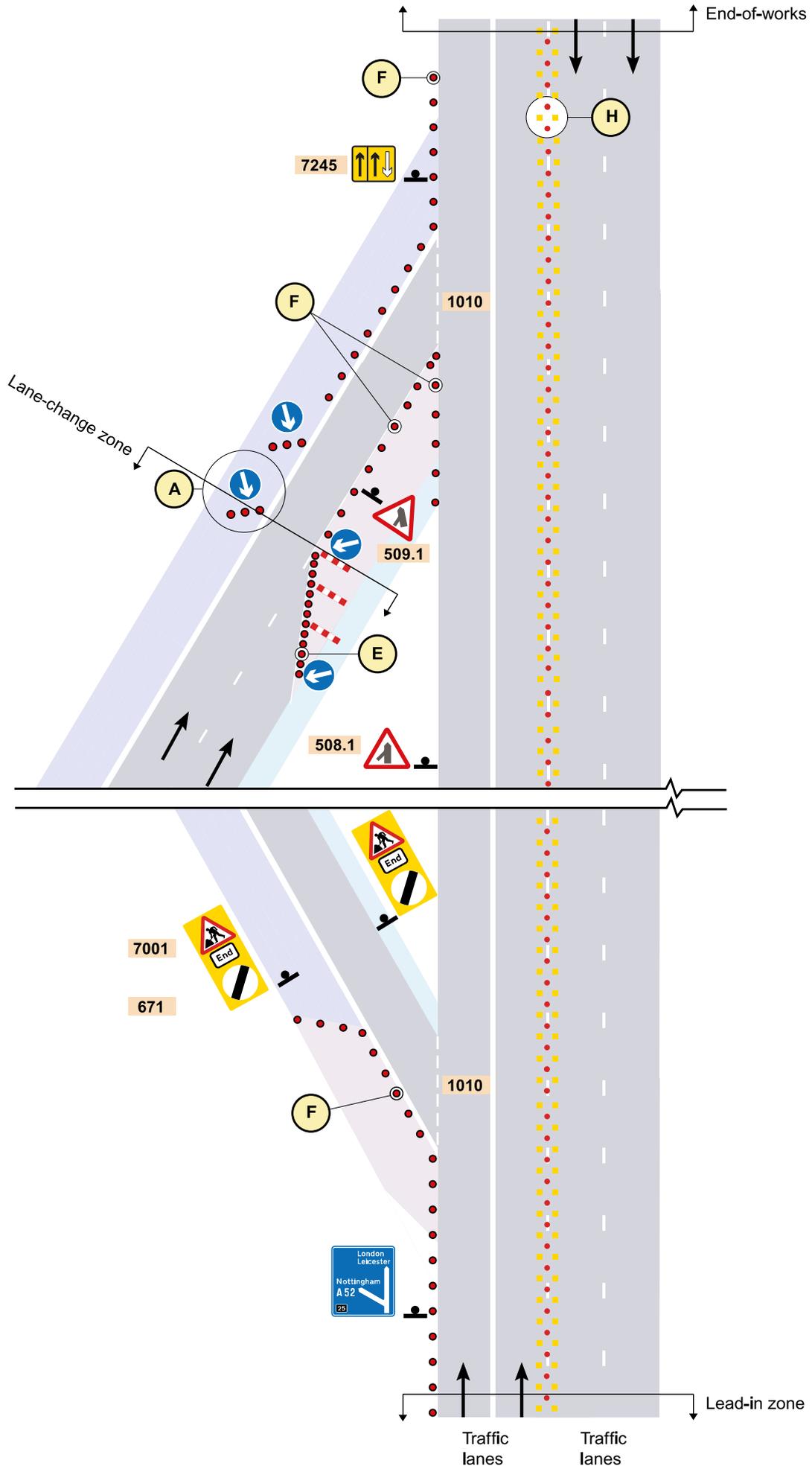
DZC8: Lead-in zone for a three-lane crossover with narrow lanes



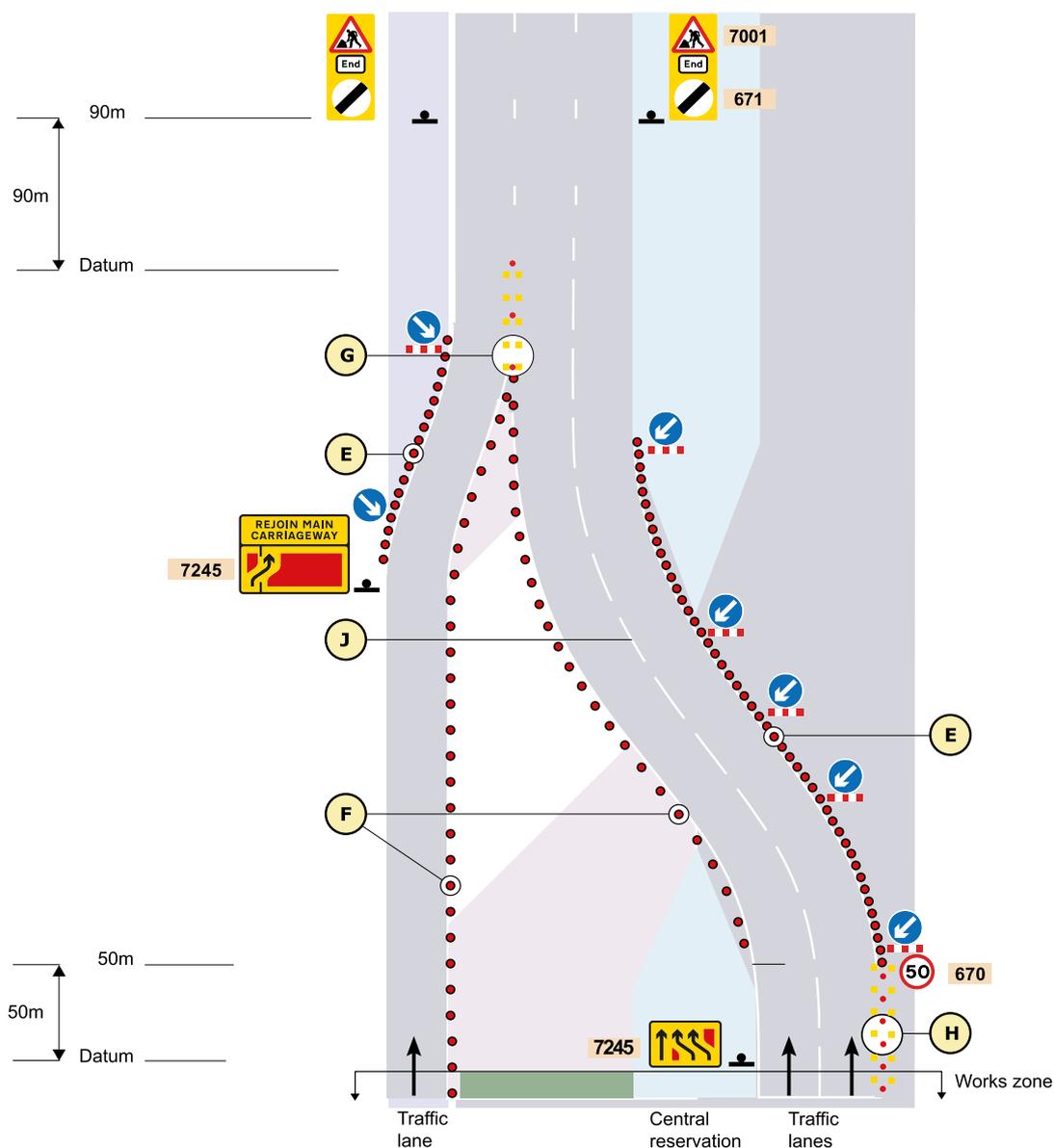
DZD5: Works zone with narrow lanes



DZD7: Works zone including a junction (secondary carriageway)



Plan DZE6: End-of-works zone for a two-lane return crossover with a single-lane changeover from the hard shoulder



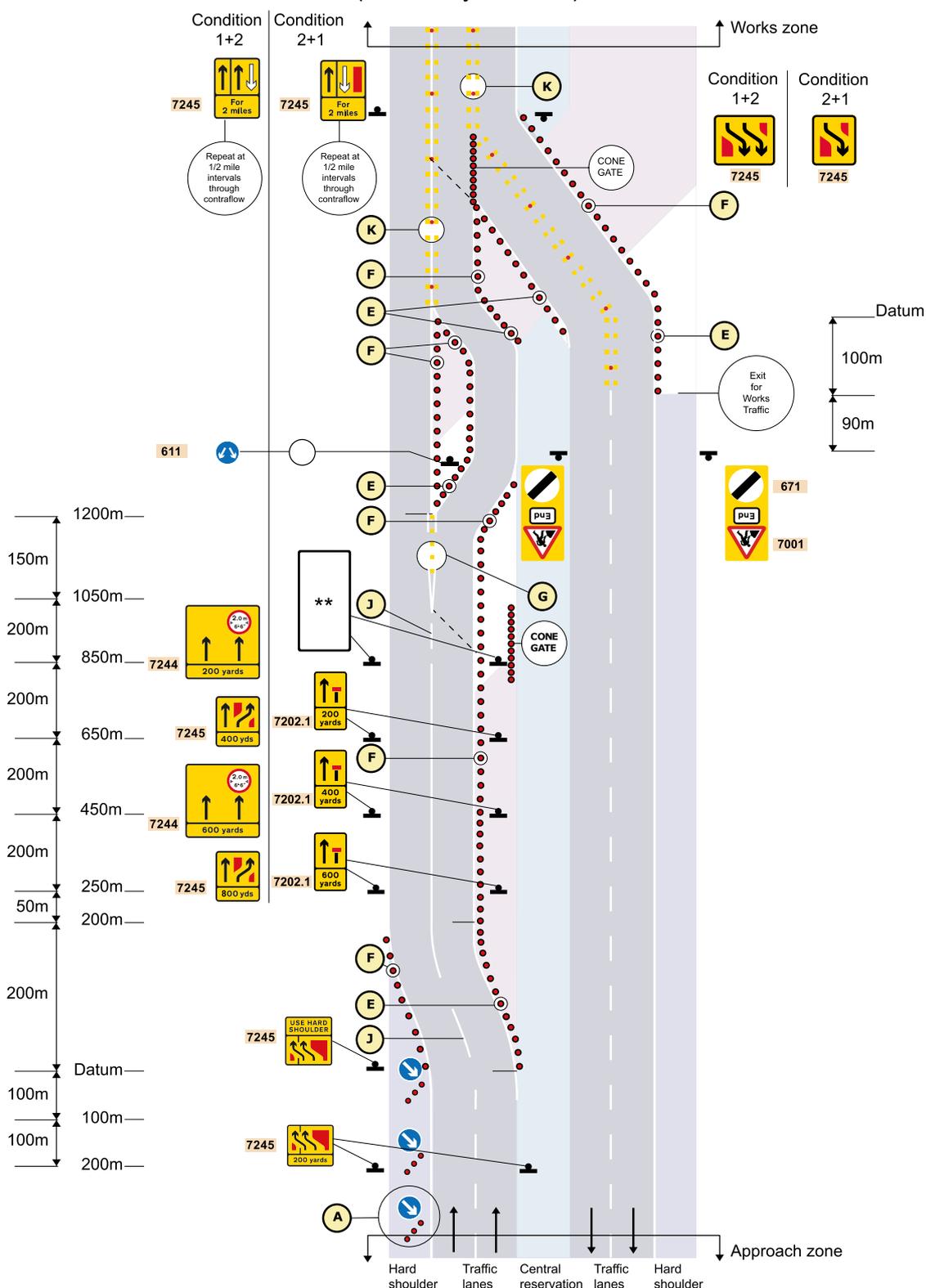
U8.7.5. Based on the guidance given in this document the following examples show typical changes to the DTF series layout plans provided in Part 1: Design:

- DTF1 – Tidal flow layout, lead-in zone for full contra-flow on a two-lane carriageway road (primary direction);
- DTF2 – Tidal flow layout, lead-in zone for full contra-flow on a two-lane carriageway road (secondary direction).

U8.7.6. Main changes to Diagram numbers are:

- 7201, 7238, 7263, 7271 are replaced with Diagram 7244;
- 7201, 7203, 7203.1, 7204, 7209, 7210, 7215, 7230, 7231, 7232, 7238, 7260, 7261, 7263, 7271 are replaced with Diagram 7245.

Plan DTF2: Tidal flow layout, lead-in zone for full contra-flow on a two-lane carriageway road (secondary direction)



U8.7.8. Note: * indicates where a sign is required for one condition but not for the other; and should be covered or removed then not required.

U8.8 Installation, maintenance and removal of temporary signs

U8.8.1. Authorities and contractors are encouraged to record and audit the design, installation and removal of temporary signs. This is to ensure that correctly designed and appropriate signs are used and also to provide an evidence trail in the event of future queries regarding signing provided at a location. This is particularly important, but not limited to, the use of regulatory

signs, where drivers could face prosecution. See also Part 1: Design, Section D2 and Part 2: Operations, Section O2.

U8.8.2. Where automatic speed enforcement equipment is in use at a site, it is recommended that regular recording of the condition of speed limit signing be undertaken at intervals agreed with the local police. Video recordings undertaken via a drive-through of the length of road subject to enforcement and subject to the agreement of the local police are one suitable method of recording the condition of the signing system. Other methods may be used as appropriate.

U8.9 Signs indicating length of road works

U8.9.1. With reference to Part 1: Design, Plans DZD1, DZD2, DZD3, DZD4, DZD5, DTF1, DTF2, DTF3, DTF4, DTF5, DTF6, DTF7 and DTF8, where signs are shown informing traffic of the length of road works and where the distance quoted on the sign would exceed 3 miles, the signs beyond 3 miles should be repeated at 1 mile intervals, to comply with regulations. Thus beyond 3 miles, the quoted distances would be “For 4 miles”, “For 5 miles”, etc.

U8.9.2. The Diagram numbers of these signs will be either 7244 or 7245 as appropriate.

This appendix contains the following tables:

Table A1.2 Sizes of Signs

Table A1.6 Delineation

Table A1.7 Approach 'wicket' signing for relaxation schemes

Table A1.8 Determination of a design speed for standard schemes

A1.2 Sizes of Signs

This table supersedes Table A1.2 in Part 1: Design and Part 2: Operations. Bilingual signs sizes may differ from those quoted below.

Signs added to the table are: 554.2, 554.3, 574, 633, 633.1, 636, 636.1, 636.2, 640.1, 829.3, 829.4, 829.5, 830.2, 830.3, 831, 831.2, 832.1A – 832.10A, 878, 879, 2701, 2708, 2716, 7009.1, 7011.1, 7011.2, 7014.1, 7018.1, 7202.1, 7025 – 7032, 7402 – 7404, NP430 and NP431.

Signs deleted from the table are: 7202, 7203, 7203.1, 7204, 7206, 7208 – 7242, 7246 – 7255, 7260 – 7264, 7270, 7271, 7272, 7274, 7275 and 7280 – 7288.

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P504.1	Crossroads ahead Triangle	600	750	900	750	1200	1500
P506.1	Side road ahead Triangle	600	750	900	750	1200	1500
P511	Reduce speed x-height	62.5	75	100	75	125 / 150	200
P516	Road narrows both sides ahead Triangle	600	750	900	750	1200	1500
P517	Road narrows on right ahead Triangle	600	750	900	750	1200	1500
P518	Single file traffic x-height	62.5	75	100	75	125 / 150	150
P521	Two-way traffic Triangle	600	750	900	750	1200	1500
P522	Two- way traffic on route crossing ahead Triangle	600	750	900	750	1200	1200
P530	Maximum headroom Triangle	600	750	900	750	1200	1500
P530A	Maximum headroom Triangle	600	750	900	750	1200	1500
P543	Traffic signals ahead Triangle	600	750	900	750	1200	1500
P543.1	Part time traffic signals x-height	62.5	75	100	75	125	150
P554	Worded warning sign Triangle	600	750	900	750	1200	1200
P554.1	Try your brakes Triangle	600	750	900	750	1200	1500
P554.2	Risk of ice ahead Triangle	600	750	900	750	1200	1500

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P554.3	Ice ahead x-height	62.5	75	100	75	50mph 125 / 60mph 150	200
P556	Uneven road ahead Triangle	600	750	900	750	1200	1500
P557	Slippery road ahead Triangle	600	750	900	750	1200	1500
P560	Carriageway edge or obstruction near that edge Circle (Alternative Rectangle)	75-150 240 high max					
P562	Other danger ahead Triangle	600	750	900	750	1200	1500
P563	Nature of other danger ahead x-height	62.5	75	100	75	125 / 150	200
P570	Distance over which hazard extends x-height	62.5	75	100	75	125 / 150	200
P572	Distance ahead to hazard x-height	62.5	75	100	75	125 / 150	200
P573	Distance and direction to hazard x-height	62.5	75	100	75	125 / 150	200
P574	Area infected by animal disease ahead x-height	40	62.5	100	75	125 / 150	200
P601.1	STOP sign Octagon	750	750	900	750	1200	1200
P602	Give way Triangle	600	750	900	750	1200	1500
P606	Traffic must proceed in direction of arrow Circle	600	750	900	750	1200	1500
P609	Traffic must turn ahead in direction of arrow Circle	600	750	900	750	1200	1200
P610	Keep left or right Circle	600	750	900	750	1200	1500
P610	Keep left or right attached to a road maintenance vehicle Circle	Single size 1500 high (Size may be reduced to 1200 or 900 where it is not practicable to mount the 1500 diameter sign on the vehicle)					

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P611	Traffic may proceed either side of sign Circle	600	750	900	750	1200	1200
P612	No right-turn for traffic Circle	600	750	900	750	1200	1200
P613	No left-turn for traffic Circle	600	750	900	750	1200	1200
P614	No U-turns for traffic Circle	600	750	900	750	1200	1200
P615	Priority must be given to vehicles for the opposite direction Circle	600	750	900	–	–	–
P615.1	Give way to oncoming vehicles x-height	62.5	75	100	–	–	–
P616	No entry for traffic Circle	750	750	900	750	1200	1200
P622.1A	Entry prohibited to goods vehicles exceeding weight specified Circle	600	750	900	750	1200	1500
P626.2A	Weak road structure, vehicles exceeding weight specified prohibited Circle & x-height	450 / 60	600 / 80	900 / 100	600 / 80	900 / 100/120	900 / 120
P627.1	Exemption for vehicles conveyed in sign 626.2A x-height	37.5	50	62.5	50	62.5 / 75	75
P632	No overtaking Circle	600	750	900	–	–	–
P633	STOP police Circle	450 (540 size can be used at the discretion of the police)					
P633.1	STOP cycling Circle	Sign used in accordance with the British Cycling protocol					
P636	No waiting Circle	200 (275 size can be used at the discretion of the police)					
P636.1	No loading x-height	20 (40 can be used at the discretion of the police)					
P636.2	No stopping x-height	Single size – 20/40					
P640.1	Temporary suspension of a parking place x-height	80 (100 can be used depending on prevailing conditions)					

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P645	End of restriction or prohibition x-height	62.5	75	100	75	125 / 150	200
P670	Maximum speed limit in mph Circle	600	600	750	750	900	1200
P671	National speed limit applies Circle	600	600	750	750	900	1200
P670 / P671	Speed limit repeaters Circle	300	300	450	300	450	600
P790	New method of controlling traffic at a railway or tramway level crossing ahead Rectangle	Single size 1050 x 750 high					
P811	Traffic has priority over vehicles from the opposite direction Rectangle (high)	800	1000	1200	–	–	–
P811.1	Traffic priority descriptive sign x-height	50	62.5	100	–	–	–
P829.1	Potential danger ahead proceed with caution Rectangle	550 x 375	550 x 375	900 x 600	550 x 375	900 x 600	900 x 600
P829.2	Accident ahead proceed with caution Rectangle	550 x 375	550 x 375	900 x 600	550 x 375	900 x 600	900 x 600
P829.3	Traffic should use hard shoulder Rectangle	550 x 375	550 x 375	900 x 600	550 x 375	900 x 600	900 x 600
P829.4	Traffic should re-join carriageway Rectangle	550 x 375	550 x 375	900 x 600	550 x 375	900 x 600	900 x 600
P829.5	Speed check area x-height	50	62.5	75	75	50mph 150 / 60mph 150	200
P830	Vehicles required to stop at census point Rectangle	Single size 750 high					
P830.1	Vehicles to stop at census point if directed Rectangle	Single size 750 high					

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P830.2	Goods vehicles to stop if directed x-height	75	100	150	125	150	200
P830.3	Vehicles should stay in lane Rectangle	Single size 750 high					
P831	Slow on approach to census point Rectangle	Single size 750 high					
P831.2	Vehicle excise licence check point ahead and variants x-height	75	100	150	125	150	200
P832	Location of traffic survey and variants Rectangle	Single size 750 high					
P832.1A	DVSA check point ahead x-height	37.5 / 75	50 / 75	75 / 100	50 / 75	75 / 100 / 150	100 / 200
P832.2B	Vehicle condition inspection point ahead x-height	37.5 / 75	50 / 75	75 / 100	50 / 75	75 / 100 / 150	100 / 200
P832.3	Goods vehicles should leave motorway if directed x-height	N/A	N/A	N/A	200	250	250
P832.4	Goods vehicles should enter check point if directed x-height	100	125	150	125	150 / 175	250
P832.5	Goods vehicles should keep to left-hand lane x-height	100	125	150	125	150 / 175	250
P832.6	Lane segregation of goods vehicles and other traffic x-height	150 / 100 / 125	150 / 100 / 125	180 / 120 / 150	150 / 100 / 125	210 / 150 / 175	240 / 160 / 200
P832.7	Goods vehicles should get into the left-hand lane on approach to a check point ahead x-height	150 / 100 / 125	150 / 100 / 125	180 / 120 / 150	150 / 100 / 125	210 / 150 / 175	240 / 160 / 200
P832.8	Goods vehicles should leave the main carriageway x-height	100	125	150	125	150 / 175	250
P832.9	Direction to vehicle check point x-height	75	75	100	75	100 / 150	200

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P832.10A	End of vehicle check point area x-height	75	75	100	75	100 / 150	200
P878	Cameras used to enforce regulations x-height	50	75	100 / 150	75	100 / 150	250
P879	Cameras used to enforce regulations (reminder) Rectangle (high)	600	750	900	750	1200	1500
P2701	Direction to new housing development x-height	50	75	100	75	125	150
P2701.1	Advance direction to new housing development x-height	50	75	100	75	125	150
P2702	Start of temporary diversion route Rectangle	Single size 750 high					
P2703	Direction of temporary diversion route x-height	60	75	100	75	100 / 150	200
P2704	Direction of temporary diversion route x-height	60	75	100	75	100 / 150	200
P2706	Roundabout ahead leading to diversion route x-height	60	75	100	75	100 / 150	200
P2707	Direction of temporary diversion route to destination x-height	60	75	100	75	100 / 150	200
P2708	Direction of route for emergency vehicles x-height	Single size 40					
P2716	Junction ahead leading to diversion route x-height	75	150	250	150	250	2 lanes: 250 3 lanes: 300 4 lanes or more:400
P7001	Road works or temporary obstruction ahead Triangle	600	750	900	750	1200	1500
P7001.1	Nature of road works x-height	62.5	75	100	75	125	150

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P7001.2	Location of road works x-height	62.5	75	100	75	125	150
P7001.3	Workforce in road proceed slowly x-height	100 140	100 140	125 180	100 140	125 / 150 180 / 200	150 210
P7002A	Major road works ahead x-height	75	75	100	75	100 / 150	200
P7002B	Time and date when route is to be closed to traffic x-height	75	75	100	75	100 / 150	200
P7002.1	Date when road works are to take place and variants x-height	75	75	100	75	100 / 150	200
P7003.1	Starting date and duration of road works x-height	100	100	125	100	125 / 150	200
P7004	Description of road works ahead x-height	100	100	125	100	125 / 150	200
P7005	Delays possible for specified period x-height	100	100	125	100	125/150	200
P7006	End of road works x-height	100	100	125	100	125 / 150	200
P7006.1	Telephone number for enquiries about road works x-height	150	150	200	150	200 / 250	200 / 250
P7007.1	Description of major construction or improvement scheme ahead x-height	100	100	125	100	125 / 150	200
P7008	Nature of street works x-height	Single size – 200/50/200 (Panel height and x-height)					
P7009	Loose chippings on road ahead Triangle	600	750	900	750	1200	1500
P7009.1	Risk of skidding, max speed of 20mph x-height	62.5	75	100	75	100	125
P7010.1	Traffic should proceed slowly owing to temporary hazard described x-height	60	75	100	75	100 / 150	200

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P7011	Point where vehicles should wait when red light shows Rectangle	Single size 750 high					
P7011.1	Point at a road junction beyond which vehicular traffic must not proceed when required to stop Rectangle	Single size 750 high					
P7011.2	Instruction to traffic at signal-controlled pedestrian facility Rectangle	Single size 750 high					
P7012	Temporary absence of road markings x-height	60	75	100	75	100 / 150	200
P7013	Ramp ahead Rectangle	Single size 450 high					
P7014	Permanent change in road layout ahead x-height	60	75	100	75	100 / 150	200
P7014.1	Reduction in bridge headroom ahead x-height	60	75	100	75	100 / 150	200
P7015	Temporary absence of hard shoulder for specified distance x-height	100	100	125	100	125 / 150	200
P7016	Crossing not in use Rectangle	Single size 375 high					
P7017	Direction pedestrians should look for approaching traffic Rectangle	Single size 450 high					
P7018	Direction of temporary route for pedestrians Rectangle	Single size 450 high					
P7018.1	Cyclists to dismount and use footway x-height	40/50					
P7019	Light signals not in use Rectangle (high)	700	875	875	875	1050	1050
P7020	Sign not in use x-height	100	100	150	125	150	200

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P7021	Traffic on road ahead controlled by portable light signals Rectangle	Single size 750 high					
P7022	Traffic joining is not controlled by signals Rectangle	Single size 750 high					
P7023	Manually operated STOP sign Octagon	600	900	900	900	900	900
P7024	Manually operated GO sign Circle	600	900	900	900	900	900
P7025	Convoy system in operation ahead x-height	75	100	125	100	125	150
P7026	Convoy system to protect workforce x-height	Single size 50					
P7029	Vehicular traffic must not overtake the convoy vehicle x-height	50 / 62.5	N/A	N/A	N/A	N/A	N/A
P7031	Vehicular traffic must STOP at sign Circle	450 / 540	450 / 540	450 / 540	N/A	N/A	N/A
P7032	Commencement point of a new contiguous 30mph speed limit x-height	50 / 75	–	–	–	–	–
P7101.1	Traffic cone	See Table A1.3 (Chapter 8 Part 2 – Appendix 1)					
P7102	Flat traffic delineator	See Table A1.3 (Chapter 8 Part 2 – Appendix 1)					
P7103	Traffic cylinder	See Table A1.3 (Chapter 8 Part 2 – Appendix 1)					
P7104	Sharp deviation of route Rectangle (high)	200	200	400	200	800	800
P7105	Barrier to mark length of road closure or to guide traffic past an obstruction Rectangle (high)	150	150	300	150	300	300
P7202.1	Temporary lane availability x-height	100	125	150	125	150	175
P7243	Temporary lane usage, alignment and destination x-height	100 / 65 / 265	100 / 65 / 265	125 / 85 / 335	100 / 65 / 265	125 / 85 / 335	150 / 100 / 400

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P7244	Temporary lane usage x-height	100	100	125	100	125	150
P7245	Temporary lane alignment and destinations x-height	100	125	150	125	150	175
P7291	Free recovery, await rescue x-height	75	100	150	125	150	200
P7292	Instructions to drivers of wide loads x-height	75	100	150	125	150	200
P7293	Drivers of wide loads should telephone for assistance x-height	75	100	150	125	150	200
P7294	Temporary maximum speed advised x-height	62.5 250	62.5 250	100 400	62.5 250	75 / 100 / 300 / 400	125 500
P7301	Works site access Rectangle	Single size 750 high					
P7302	Works site exit Rectangle	Single size 750 high					
P7303	Direction works traffic should take at junction ahead Rectangle	Single size 1050 high					
P7304	Direction works traffic should take at junction or works entrance ahead x-height	75	75	100	75	100 / 150	200
P7305	Direction works traffic should take at junction or works access x-height	75	75	100	75	100 / 150	200
P7306	Direction works traffic should take at a works access ahead x-height	100	100	125	100	125 / 150	200
P7307	Exit from a works site ahead x-height	100	100	125	100	125 / 150	200
P7402	Lanes closed to traffic ahead by vehicles carrying out mobile road works Rectangle	2500 x 2500 or 2300 x 3000					

Sign Working Drawing No.	Description/Type	Sizes of signs					
		Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
		30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
P7403	Other traffic to keep to the right of vehicles carrying out mobile road works Rectangle	2500 x 2500 or 2300 x 3000					
P7404	Nature of work being carried out x-height	Size of x-height varies 37.5 to 150 depending on type of vehicle and nature of operation.					
NP430	STOP for convoy if directed x-height	62.5	62.5	62.5	62.5	62.5	62.5
NP431	Wait here for convoy x-height	62.5 / 75	62.5 / 75	62.5 / 75	62.5 / 75	62.5 / 75	62.5 / 75

A1.6 Delineation

The basic principles for delineating works are covered in Sections D3.14 and O3.4 in Parts 1 and 2. Providing adequate guidance through the use of road markings, studs, cones and barriers is vital to enable road users to navigate safely through works. For longer schemes, those with narrow lanes or other similar restricted design features, the level of delineation also needs to be improved to reduce fatigue in road users which may otherwise increase the risk of accidents towards the end of schemes and downstream of works.

The performance requirements for temporary road markings should be no lower than that for equivalent permanent markings in the National Annex to BS EN 1436. The application of these requirements to temporary markings is shown in [Table A1.6](#). The main changes from the specifications in Part 1 is that RL for unlit roads or those which are partly lit or dimmed should be no less than Class R3 (150 mcd/m²/lx). In addition where a temporary mandatory speed limit above 50 mph is applied and at any point lane widths are less than the desirable minimum then markings with a performance class of R4 (200 mcd/m²/lx) or greater will need to be used over the length of the reduced lane widths.

Where poor delineation is considered to be a problem, irrespective of lane width or length of works, then the first option which should be considered is to increase the width of lane and edge lines to 150 mm. In addition for lighter coloured road surfaces it is recommended that the benefit of specifying markings with one class higher than that recommended in [Table A1.6](#) of luminance factor (Q_d or β) be assessed. For concrete road surfaces it should be assumed that a higher class is justified.

Contractors should note that the nature of temporary marking materials whether tapes to BS EN 1790 or in-situ material to BS EN 1871 means it may not be possible to simultaneously provide all the higher (or the highest) performance classes while providing a sufficiently durable marking, or requires a marking of a type which would be difficult to remove without damaging the road surface. Before setting any performance criteria it is recommended that contractor's check for issues of this type with either the material supplier or road marking sub-contractor.

Any temporary road marking material used should be able to be removed without significantly affecting the road surface to the point that 'ghost' markings are clearly visible to road users. Technical Report PD CEN/TR 16958:2017 covers the removal or masking of road markings and studs. Not all the options identified in this Technical Report may be acceptable and should be checked with the relevant authority. In the absence of any specific specifications, it is recommended that on roads with a permanent speed limit of 50 mph or greater, that a requirement for removal of markings should be to Class 1 for the following characteristics - Texture Depth (X1) and Grooving (D1); where relevant Profile Depth should be to Class Y1. The use of temporary markings on road surfaces which will continue to be used after the works are completed may be restricted; also limits may be placed on the methods of removal or on the impact on the road surface of any removal process.

Markings may be temporarily obscured with black masking material to BS 7962; these types of material are not suitable for the permanent masking of markings upon the completion of works. Contractors should note that some masking materials may be as conspicuous as normal marking materials in the same illumination conditions as when ghost markings are most prominent. This should normally be checked in any drive through survey.

It is critical for both road user and road worker safety that where some form of ghost markings is still visible on any temporary surface after any masking or removal (and especially so during

the use of narrow lanes) that the ghost marking must have a lower level of conspicuity than the replacement line.

The use of chemical marking removers which facilitate the use of a lower pressure water system may be used but both the chemical used and the method of collecting the water (and any other waste material) must be compliant with applicable environmental Regulations and best practice.

When temporary studs are used to form Detail G2, G3 and J2 in Table A1.5 and are used where the lane width is at the desirable minimum, studs to class PRT2 should be considered. They are also recommended where works are longer than 4km irrespective of lane width. Where lane widths are at the absolute minimum then studs to class PRT2 should be used; where the works are also over 4km studs to class PRT1 should be considered, subject to the availability of products in this class. For Details E2, F2, G1, H and K studs to class PRT2 should be used where higher performance cones and cylinders are used, or are recommended in this Chapter, and also where either the lane widths are less than the desirable minimum or works are longer than 4km.

The cleaning of road markings and studs is an effective way of maintaining their effectiveness and covered in brief in TR 16958. Where temporary vehicle restraint barrier systems are in use it is often difficult to clean markings and studs. Where Detail F1 is used with barrier systems it is now recommended the marking should be 150mm wide, with other specifications as per [Table A1.6](#). Where Detail F2 is in use with barrier systems it is recommended that studs to class PRT 2 are used. As an alternative to either Details F1 or F2 contractors may wish to consider using both a solid edge line (100mm wide) and road studs; this is likely to provide more consistent delineation particularly where there is poor contrast or a damp road surface.

Contractor's should consider the use of higher performing material for barriers to Diagram 7105 where the underlying road geometry has a relaxation, departure from standard or is otherwise substandard. It is not normally considered necessary to visually highlight vehicle restraint barriers. Where these have been highlighted, some road users have followed the barrier instead of the markings and driven onto verges or into works accesses. Therefore if the contractor identifies the need to visually highlight the barrier then markings/studs to Detail F would also need to be enhanced. The edge line delineation must be more conspicuous than any visual highlighting of the vehicle restraint barrier.

The performance requirements in TSRGD 2016 for cones and cylinders to BS EN 13422 prohibit the use of cones conforming to classes R1A, R2A and LA. Cones and cylinders to class R2B are recommended where this appendix recommends the accompanying markings or studs to be specified to an enhanced performance class. Class R2B products are also recommended where the underlying road geometry has a relaxation, departure from standard or is otherwise substandard. It is expected that Class R2B cones be used for relaxation schemes where warning lights are omitted (see Section [U2.14](#)); however, they are also likely to provide a useful enhancement to delineation and safety for all relaxation scheme.

Table A1.6 Recommended minimum classes for temporary road markings in the UK

Road type	Enhanced performance required	Street lighting status	Recommended minimum performance class(es) from BS EN 1436		
			Qd or β ⁴	R _L	RW
Any	None	Unlit / partially lit / dimmed ²	Q3 or B2	R3	See Note 1
		Lit	Q3 or B2	R2	
	Higher performing markings may be required to maintain safety. The following classes should be specified in place of any recommended above				
	Enhanced Forward Visibility – Desirable minimum lane widths provided on schemes over 4km in length.	Unlit / partially lit / dimmed	Q4 or B3	R4	RW2 or RW3
		Lit	Q4 or B3	R3	
Enhanced Forward Visibility – Lane widths less than desirable minimum.	Any	Q4 or B3	R4 or R5	RW2 or RW3	
4 Lane & wider carriageways including Smart, Managed or Controlled Motorways		Any	Q4 or B3	R4 or R5	RW3

NOTES:

1 It is recommended that from 2020 a requirement of class RW1 is included in contracts and from 2022 class RW2. Higher performing products are currently available but are generally more suited only for permanent markings.

2. For the purpose of this table street lighting shall be defined as follows:

Lit – Permanently lit during the hours of darkness

Partially lit – When lighting is switched off for set periods during the hours of darkness

Dimmed – When the light level is reduced for a period(s) during the hours of darkness

3. Designers and procurers need to be aware that it may not be possible to achieve simultaneously the enhanced levels of performance for all characteristics. Consequently, enhanced performance requirements may need to be prioritised.

4. For concrete and light asphalt surfaces see the accompanying text.

A1.7 Approach ‘wicket’ signing for relaxation schemes

The recommended size and clear visibility requirements for approach signs to Diagrams 7202.1, 7244 and 7245 (Schedule 13 Part 6 Items 43, 44 and 45) in Chapter 8 are based on signs being placed on both sides of a road or carriageway. When these signs are placed only on one side of the carriage the sign has to be read at higher offsets and therefore needs to be read from further away.

The recommended sizes for relaxation schemes on dual carriageways subject to the national speed limit have been updated and expanded and is shown in [Table A1.7.1](#). This provides more options where there may be limitations on verge or central reservation width.

For offside ‘relaxation’ scheme lane closures, where it is proposed to only install signs on one side of the carriageway smaller signs may be used if placed on the offside rather than nearside, the recommended sizes are shown in [Table A1.7.2](#). Depending on the method of installing an offside closure (see Section 7), installing the advance signing on the offside employing a safe system of working may have fewer manual handling issues than installing signs only on the nearside.

Approach ‘wicket’ signing – sizes, clear visibility distances and specification.

Where signs are only provided on one side designers can, as an alternative to using [Table A1.7.1](#) use the methodology provided on the Traffic Sign Manual section of the DfT website for calculating the ‘x’ height (and therefore arrow size). Each lane arrow or ‘T’ bar counts as one item of information, as does the distance plate. The sizes of signs prescribed in the TSRGD may not be sufficient for signs placed only on one side of the carriageway to be sufficiently readable, particularly for carriageways wider than three lanes. For short term use larger signs may be used under the provision of Schedule 13 Part 9. Risk assessments must identify the minimum size of sign and the clear visibility distance which ensures that the signs are readable and clearly communicate the relevant warning, requirement or message to road users (see also [U2.8.4](#)).

When calculating the required size of a sign using the identified methodology the designer should, for all schemes, identify the clear visibility distance needed for the sign to be readable. Placing other signs, and anything which could obstruct the ability for road users to read the sign, in the clear visibility distance should be avoided.

For all schemes where a sign smaller than is recommended in this Chapter is used, or where the clear visibility distance for a sign is greater than 175m, a higher performing sign face material should be used – in most cases this would be Class R3B-UK to BS EN 12899-1; however, where the road geometry is suitable a material to Class R3C-UK may provide better performance where clear visibility distances over 200m are required.

Table A1.7.1 Wicket sign sizes and clear visibility distances for relaxation schemes on dual carriageways

Roads with hard shoulder	Signs size Nearside (mm)	Offside (mm)	Reduced offside sign size option Nearside (mm)	Offside (mm)	Nearside only signs (outside two lanes open) (mm)	Nearside only signs (outside lane open only) (mm)	Clear visibility distance Near and Offside signs	Clear visibility distance (outside two lanes open)	Clear visibility distance (outside lane open only)
3 Lanes	1575	1350	1800	1125	1800	2250	145 m	165 m	190 m
4 Lanes	1575	1350	N/A	N/A	2250	2475	155 m	200 m	220 m
5 Lanes	1575	1575	2025	1125	2475	N/A	170 m	230 m	N/A
Roads without hard shoulder									
3 Lanes	1350	1350	1575	1125	1575	1800	140 m	150 m	170 m
4 Lanes	1575	1350	N/A	N/A	1800	2250	150 m	180 m	200 m

Table A1.7.2 Wicket sign sizes and clear visibility distances for offside only signs for offside closures on dual carriageways

Number of outside lanes closed	Signs size (mm)	Clear visibility distance
1 Lane	1350	140 m
2 Lanes	1575	175 m
3 Lanes	1800	195 m
4 Lanes	2250	225 m

NOTES FOR BOTH TABLES;

1. Recommended sign sizes are sign height excluding any distance plate or header – see working drawings for Schedule 13 Part 6 Items 13, 15 and 16.
2. Where there are constraints on offside sign size due to central reservation, or offside verge, width then the smaller offside sign size identified in the table may be used as long as it is possible to install a sign on the nearside verge of the recommended size. Where there are constraints on the maximum width of nearside verge signs (and it is not possible to move the location of the taper) then it may be acceptable to swap the recommended sign sizes subject to a scheme specific calculation of the required clear visibility distance.
3. While it may be acceptable, on a case by case basis, for smaller individual signs to be used due to space considerations or ability to physically install the signs. The lack of availability of signs of the recommended size is not sufficient to justify the use of a smaller sign.
4. Signs with a height above 1575mm are not prescribed and come under Schedule 13 Part 9. This results in restrictions in their use and also a maximum time they are allowed to be placed on the road.
5. Signs will need be constructed with material to Class R3 (see National Annex to BS EN 12899-1) to be readable at over 175m from the sign. Where signs smaller than that recommended are used they should be constructed with material to Class R3.
6. The clear visibility distance (see Section D4.4, [Table 1.1](#) and [Appendix A1.1](#)) is the distance from which the sign is required to be visible in all traffic lanes, free from obstruction from other signs, other TTM equipment, bridge piers and other features such as vehicles restraint systems. Transient obscuration from light columns etc. may be discounted when measuring the clear visibility distance.

A1.8 Determination of a design speed for standard schemes

The combination of prescribed sign sizes and the limited performance characteristics and classes of Temporary Traffic Management equipment has historically justified a 20 mph speed reduction for many standard schemes. The extra flexibility introduced in TSRGD 2016 and the availability of higher performing classes of most TTM equipment means that that assumption of a 20 mph reduction in speed is not justified. As with the design of permanent road features, it is possible to design schemes based on a set design speed. To enable this to be adequately implemented the characteristics of the underlying road will need to be known; the nature of the UK road network would mean that the use of a set design speed may only be practicable on high quality Motorways, All-purpose Trunk Roads, Major Road Network (MRN) and Primary routes.

On these types of roads designers should identify an achievable design speed which is practicable to implement. As identified in Section [U2.5](#) this should ideally be the permanent speed limit, with relevant enforcement. If it is not possible to implement a design which meets this while still enabling the safety of road workers and road users to be maintained, along with an acceptable impact on the network e.g. capacity, then designers should consider lower design speeds, in 10 mph bands, until a safe and effective design can be achieved. A different design speed may need to be applied to different sections of a scheme or different phases of a scheme. For road user confidence, if the characteristics leading to different design speeds being used are not obvious it is recommended that the hazard or other relevant factors are identified on a suitable sign.

As with the design of permanent highway features, relaxations for minor or localised sub-standard characteristics may be acceptable on a case by case basis to avoid the need for an lower design speed than necessary over the majority of the scheme. Unlike some relaxations or departures the design responsibly remains with the designer and not the authority.

Authorities may give advice to designers on the design speed(s) that would be acceptable or preferred based on the network impact of different types of schemes. Designers should identify to the authority if these are practicable and also identify if an alternative design speed would result in a more effective scheme. The responsibility for the selection of an acceptable design speed remains with the designer; however, the designer should provide to an authority, upon request, a justification for this choice. This should be based on the characteristics in [Table A1.8](#) but may include any other relevant factors.

A proposition of the all-purpose trunk roads, MRN and primary route network was constructed to pre 1960's standards. If this results in a designer being unable to identify an acceptable design speed then this should be notified to the authority; the presumption would be to adopt the same principles of identifying a reduced mandatory speed limit as used on other roads (see [U2.10.6](#)).

Table A1.8 Criteria for identification of design speed for standard schemes

Temporary Traffic Management Feature		Design criteria for trunk and primary roads	Recommended reduction in speed limit (Other Roads)
Restricted Visibility	restricted driver forward visibility	Achievable Stopping Sight Distance; derive from TD 9.	20 mph
Loss of Hard Shoulder	used as a running lane (without remarking)	See Appendix A1.6 – Delineation.	20 mph
	closure of hard shoulder refuge		Zero
Loss of vehicle restraint barrier	without protection	Use TD19 to check if barrier would be justified for a specific design speed.	20 mph
	with protection		zero
Lane merge	other than light traffic flow	Design speed for 'x' heights of signs and clear visibility distance	20 mph
	light traffic flow		zero
Narrow lane width	HGV lanes less than 3.3m and other lanes subject to width restrictions less than 3.0 m	See Appendix A1.6 – Delineation.	20 mph.
Contra-flow traffic management	with or without narrow lanes	Design Speed for 'x' heights of signs and clear visibility distance. See Appendix A1.6 – Delineation.	20 mph
Crossovers and changeovers	determined by design speed	Geometry requirements can be interpolated from TA 92/19.	See TA 92

NOTES

1. Stopping Sight Distance (SSD) is measured to a low point (0.26m above the ground) and high point (2.0m above the ground). In general, if visibility to the high point is maintained then the designer may, depending on the individual parameters, identify a reduced SSD to the low point an acceptable relaxation. When considering the measurement of SSD, visibility over TTM equipment and through safety zones may be considered acceptable when identifying any design speed. This is unlikely to apply to visibility through active working spaces and works areas.

2. The reference to using the hard shoulder as a running lane only applies where the original markings are still in place. If the markings have been replaced with normal lane and nearside edge lines then no reduction in design speed would be justified as long as the lane widths meet those identified in Chapter 5 for the relevant road type. A hard shoulder with a nearside edge line, particularly if 150 mm wide and/or to Class R_L3 may permit a higher design speed than a normal hard shoulder. A lack of nearside refuge, either from a closed continuous hard shoulder or closed emergency refuge areas would not normally justify a reduced design speed unless there were other co-existent substandard features – a recovery service provided as part of the scheme would need to be considered. A reduction in design speed to enable a recovery service to be omitted when this Chapter otherwise recommends its provision is not acceptable.

3. Existing vehicle restraint barriers may have been installed prior to the current risk based approach in TD19 and previous interim advice. If a barrier is removed to enable works to be undertaken, or due to it being damaged, then if a temporary replacement is not provided the design speed should be taken be the highest speed where the provision of a vehicle restraint barrier is not required by TD19 for that location. If the resultant design speed is not within 20 mph of the permanent speed limit this does apply and a temporary replacement barrier would be needed. The specification of this barrier should result in a design speed within 20 mph of the permanent speed limit.

Glossary explanations listed in Appendix A2 of Part 1: Design and Part 2: Operations remain current with the exception of those items listed below.

Amendments

“Diagram number” means the appropriately numbered Diagram in the Schedules to the Regulations or the Working Drawings for traffic signs.

The term “direction XX” means the appropriately numbered direction in the Schedules to the Regulations and General Directions. See [Appendix A4](#). (The N.I instrument does not include directions.)

“Flat traffic delineator” means a device complying with the relevant requirements of TSRGD 2016, Schedule 13, Part 6 (in Northern Ireland, regulation 45). A specification for flat traffic delineators is given in BS8442.

“General Directions” means the Traffic Signs Regulations and General Directions 2016 (SI 2016 No. 362), subsequent Amendment Regulations and Amendment General Directions. (The N.I instrument does not include directions). In Wales “the Directions” also include the Traffic Signs (Welsh and English Language Provisions) Regulations and General Directions 1985 (SI 1985 No 713).

“Portable traffic signals” (portable light signals) means traffic signals, as prescribed by TSRGD 2016, Schedule 14, Part 6 (regulation 32 in Northern Ireland) normally mounted on a tripod, which are intended for positive control of traffic in shuttle lanes for relatively short periods of time.

“Prescribed traffic sign” means a sign as defined in the Road Traffic Regulation Act 1984 Section 64, prescribed in the Regulations, identified by reference to a Diagram number as shown therein. In Wales bilingual prescribed sign Diagram numbers are prefixed by WAG. In Northern Ireland a “prescribed traffic sign” means a sign prescribed by regulations made under Article 28 of the Road Traffic Regulation (NI) Order 1997.

“The Regulations” means the Traffic Signs Regulations and General Directions 2016 (SI 2016 No. 362) and subsequent Amendment Regulations and Amendment General Directions. In Northern Ireland, “the Regulations” means the Traffic Signs Regulations (NI) 1997 (SR1997 No 386) and subsequent amendment regulations. In Wales “the Regulations” also include the Traffic Signs (Welsh and English Language Provisions) Regulations and General Directions 1985 (SI 1985 No 713).

The term “Regulation XX” means the appropriately numbered regulation in the Schedules to the Regulations. See [Appendix A4](#).

A “Schedule 13.9 sign” means a temporary sign complying with the requirements of TSRGD 2016, Schedule 13 Part 9 (in Northern Ireland, regulation 42 of TSR 1997). Schedule 13, General Direction 16 (1) requires that signs of the kind referred to in the regulation be removed with 6 months (see also Schedule 13, General direction 16 (3)), unless the national authority has authorised some longer period.

“Site approval” means formal written approval, given by the authority in accordance with TSRGD 2016, Schedule 14, Item 6, for a site which includes a junction to be signal controlled.

A “terminal” sign means a sign placed in accordance with TSRGD 2016, Tables 7 (2) and 40 (1).

“Traffic authority” is defined by the New Roads and Street Works Act 1991 as having the meaning given in Road Traffic Regulation Act 1984.

“Traffic cone” or “traffic cylinder” means a device complying with the relevant requirements of Schedule 3, Part 8 (in Northern Ireland, regulation 45) and manufactured in accordance with BS EN 13422: 2004 “Portable road traffic signs – cones and cylinders”.

“Traffic officer” should be interpreted as referring to an individual designated as such by, or under an authority given by, the Secretary of State or the Welsh Government in accordance with section 2 of the Traffic Management Act 2004(b)”. Traffic officers must be in uniform in order to exercise their powers.

“Traffic sign” refers to all traffic signs, road markings, and delineators either prescribed in the Traffic Signs Regulations and General Directions 2016 (SI 2016 No. 362) the Traffic Signs Regulations (NI) 1997 (SR 1997 No 386) and subsequent amendment regulations, or authorised by the national authority in accordance with Sections 64 and 65 of the Road Traffic Regulation Act 1984.

“TTM Equipment” includes but is not limited to any prescribed or authorised upright signs, cones, cylinders, markings, barriers, lamps, signals.

“Tunnel” means an enclosed road tunnel of 150 m or more in length. For a full definition see BD 78 “Design of road tunnels” (DMRB 2.2.9).

“Warning light” means a lit lamp that conforms to the National Annex to BS EN 12352:2006 at all times during its use.

“Working drawing” means drawing available from DfT or the Welsh Government.

“Yellow” when describing the colour of traffic signs means the colour of retroreflective material described as yellow in BS EN 12899-1:2015 and the CUAP for microprismatic sheeting prepared in response to ETA request no 01.06/04.

Legislation

Unless indicated otherwise, these documents are available from the Stationery Office and from www.legislation.gov.uk

The Builders' Skips (Markings) Regulations 1984 (SI 1984 No. 1933).

The Construction (Design and Management) Regulations 2015 (SI 2007 No. 51), or in Northern Ireland, The Construction (Design and Management) Regulations (NI) 2016 (SR 2016 No. 146).

Disabled Persons Act 1981.

Disability Discrimination Act 1995 (Applies only to Northern Ireland). The Equality Act

Health and Safety at Work etc. Act 1974, or in Northern Ireland, the Health and Safety at Work (NI) Order 1978. The Health and Safety (Safety, Signs and Signals) Regulations 1996 (SI 1996, No 341).

Highways Act 1980 & Highways (Amendment) Act 1986.

The Management of Health and Safety at Work Regulations 1999 (SI 1999 No. 3242), or in Northern Ireland, The Management of Health and Safety at Works Regulations (NI) 2000 (SR 2000 No. 388) & Amendment Regulations 2006.

The Manual Handling Operations Regulations 1992 (SI 1992 No. 2793).

The Motor Vehicles (Construction and Use) Regulations (Northern Ireland) 1999 (SR 1999 No. 454) & The Motor

Vehicles (Construction and Use) Amendment Regulations (Northern Ireland) 2014 (SR 2014 No. 216). New Roads and Street Works Act 1991.

Traffic Signs Regulations and General Directions 2016.

The Traffic Signs Regulations (Northern Ireland) 1997 (SR 1997 No. 386) & various Amendments Regulations. The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013; or Northern Ireland 2004. Road Traffic Regulation Act 1984, or in Northern Ireland, the Road Traffic Regulation (NI) Order 1997 (SR1997 No. 410).

Roads (Scotland) Act 1984, or in Northern Ireland, the Street Works (NI) Order 1995. The Roads (NI) Order 1993.

The Road Vehicles (Construction and Use) Regulations & Amendment No 2 2014 (SI 1986 No. 1078). The Road Vehicle Lighting Regulations 1989 (SI 1989 No. 1796) & Amendment No 2 2005.

Traffic Management Act 2004: The Traffic Signs Regulations and General Directions 2016. Work at Height Regulations 2005 (SI 2005 No. 735) & Amendment Regulations 2007.

The Workplace (Health Safety and Welfare) Regulations 1992 (S.I .1992, No 3004). Working Time Directive (93/104/EC) 1993.

Standards

Traffic signs and road markings should conform to relevant British Standards, many of which are English language versions of adopted European Standards. Where a National Annex has been published, this sets out recommended performance classes most suitable for UK conditions and practice. Specifiers should note that it is not sufficient to simply require compliance with a Standard. The required performance class or classes must be specified to avoid the risk of suppliers providing the lowest performance class, which will seldom be adequate.

British Standards current at time of publication are listed below. Designers and specifiers should ensure that they are using the most up-to-date Standard and National Annex (where available). Reference should be made to the British Standards Institution's website at:

www.bsigroup.com

British Standards for traffic signs

BS EN 12899 Fixed Vertical Road Signs:

Part 1:2007 Corrigendum Jan 2018 Fixed, vertical road traffic signs (with National Annex)

Part 2:2007 Transilluminated traffic bollards

Part 3:2007 Delineator posts and retroreflectors

Part 4:2007 Factory production control

Part 5:2007 Initial type testing

BS EN 13422:2004+A1:2009 Vertical road signs. Portable deformable warning devices and delineators. Portable road traffic signs, cones and cylinders.

BS 8442: 2015 Miscellaneous road traffic signs and devices – Requirements and test methods.

BS 8408: 2005 Road traffic signs. Testing and performance of microprismatic retroreflective sheeting materials. Specification" (superseded by the 2018 National Annex to BS EN 12899 Part 1).

British Standards for road marking materials

BS EN 1423:1998 Drop on materials. Glass beads, antiskid aggregates and mixtures of the two.

BS EN 1424:1998+A1:2003 Premix glass beads.

BS EN 1436:2018 Road marking performance for road users.

BS EN 1790:2013 Material specifications. Preformed road markings.

BS EN 1824:2011 Road Marking testing

BS EN 1871:2000 In-situ Markings Physical properties.

BS EN 12802:2000 Laboratory methods for identification.

BS EN 13212:2001 Requirements for factory production control.

DD ENV 13459-1:1999 Quality control. Sampling from storage and testing.

DD ENV 13459-2:1999 Quality control. Guidelines for preparing quality plans for materials application.

DD ENV 13459-3:1999 Quality control. Performance in use.

BS 7962:2000+A1:2004 Black materials for masking existing road markings. Specification.

Other relevant British Standards

BS EN 40-3 Lighting columns. Design and verification (and PD 6547:2004+A1:2009 - Guidance on the use of BS EN 40-3-1 and BS EN 40-3-3).

BS EN 1991-1-1-4:2005 Eurocode 1. Actions on structures. General actions. Wind actions. (and National Annex in a separate volume.)

BS EN 12352:2006 Traffic control equipment. Warning and safety light devices (with National Annex)

BS EN 1463-1:2009 Road marking materials. Retroreflecting road studs. Initial performance requirements.

BS EN 1463-2:2000 Road marking materials. Retroreflecting road studs. Road test performance specifications.

BS EN 12767:2007 Passive safety of support structures for road equipment. Requirements, classification and test methods.

BS 1376:1974 Specifications for colours of light signals.

BS 381C:1996 (& 2002) Specification for colours for identification, coding and special purposes.

BS 1376: 1974 Specification for colours of light signals.

BS 5489-1:2013 Code of practice for the design of road lighting. Lighting of roads and public amenity areas”.

BS 7818:1995 Specification for pedestrian restraint systems in metal.

BS EN ISO 20471:2013 “High-visibility warning clothing for professional use. Test methods and requirements”.

BS EN 1317-3: 2010 Road restraint systems. Performance classes, impact test acceptance criteria and test methods for crash cushions.

BS EN 12352:2006 Traffic control equipment. Warning and safety light devices.

BS EN ISO 9002: 1994. Quality systems. Model for quality assurance in production, installation and servicing.

BS EN ISO 9001:2015 Quality Management Systems, Requirements”.

PAS 43:2015 Safe working of vehicle breakdown, recovery and removal operations. Management system specification.

Standard colours for traffic signs

The colours used for sign faces must conform to the chromaticity requirements specified in BS EN 12899 1:2007(a). The National Annex recommends appropriate classes for UK use. However, as an aid to comparison, the table below lists the equivalent colours from BS 381C.

Colour (from BS EN 12899-1)	Equivalent colour (from BS 381C)
White	N/A
Yellow	No 355 (Lemon)
Orange	No 557 (Light Orange)
Red	No 537 (Signal Red)
Blue	No 109 (Middle Blue)
Green (see Note)	No 225 (Light Brunswick Green)
Dark green (see Note)	No 226 (Middle Brunswick Green)
Brown	No 411 (Middle Brown)
Grey	No 693 (Aircraft Grey)
Black	N/A

NOTE: Primary route direction signs, as well as panels and patches indicating primary routes on other signs, are “dark green”, previously known as “Worboys green”. A small number of signs (e.g. Quiet Lane signs and direction signs for emergency vehicles) use “green”, which is lighter.

Standard colours for road markings

The colours white, yellow and red are prescribed for road markings.

The colours used for road markings must conform to the chromaticity requirements in BS EN 1436.

The standard colour for waiting and loading restriction road markings is No. 355 (Lemon). No. 309 (Canary) is also acceptable. However, in environmentally sensitive areas No 310 (Primrose) or No. 353 (Deep Cream) may be used. The numbers referenced are the equivalent colours from BS 381C.

Black material for masking road markings (for example, during road works) must conform to BS 7962:2000 with Amendment No 1, dated 2004, or an equivalent EEA Standard. There is currently no European Standard for this material.

Department for Transport: (The Stationery Office Ltd)

Department for Transport Working Drawings.

Department for Transport Code of Practice, “Co-ordination of Street Works and Works for Road Purposes and Related Matters”.

Department for Transport Local Transport Note 1/98, “The Installation of Traffic Signals and Associated Equipment”.

Department for Transport Traffic Advisory Leaflet 15/99, “Cyclists at road works”.

Temporary traffic signs for special events. Traffic Advisory Leaflet 04/11.

The above can be obtained directly from the Department for Transport’s website.

Department for Transport (2008). “An Introduction to the Use of Vehicle Actuated Portable Traffic Signals”.

Department for Transport (2013). “Safety at Street Works and Road Works – A Code of Practice”.

Manual for Streets and Manual for Streets 2 contain useful guidance on the principles of sign design and placement.

www.gov.uk/government/publications/manual-for-streets

Design Manual for Roads and Bridges (DMRB)

The DMRB provides a comprehensive manual system which accommodates current Standards, Advice Notes and other published documents. While most relate to Trunk Road works, some advice is applicable to local traffic authorities.

TA 11 Traffic surveys by roadside interview

TA 92 Crossover and Changeover Design

TD 9 Highway link design

TD 19 Requirement for road restraint systems.

TD 22 Layout of grade separated junctions.

TD 25 Inspection and Maintenance of Traffic Signs on Motorway and All-purpose Trunk Roads

TD 26 Inspection and Maintenance of Road Markings and Road Studs on Motorways and All-purpose Trunk Roads

TD 27 Cross-sections and headrooms

TD 49 Requirements for lorry-mounted crash cushions

TD 69 The location and layout of lay-bys and rest areas

HD 19 Road Safety Audit

The DMRB was in the process of being updated at the time of publication and designers should check the latest status of these documents before use.

www.standardsforhighways.co.uk/ha/standards

Guidance for works on the hard shoulder and road side verges on high speed dual carriageways". Highways Agency document IAN115/08.

Manual of Contract Documents for Highway Works (Volume 1 Specification for Highway Works).

HSE DOCUMENTS

Available from the HSE website and PO BOX 1999, Sudbury, Suffolk, CO10 2WA

Avoiding danger from underground services" HSE Guidance publication HSG47.

Avoidance of danger from overhead power lines" HSE Guidance Note GS6.

Crossing high-speed roads on foot during temporary traffic-management works (Construction Information Sheet No. 53).

Five steps to risk assessment" HSE Guidance publication INDG163.

Manual Handling, Manual Handling Operations Regulations 1992, Guidance on the Regulations HSE Legal Series publication L23.

Manual handling solutions you can handle HSE Guidance publication HSG115.

Managing Health and Safety in Construction, Construction Design and Management Regulations 2007, Approved Code of Practice HSE Legal Series publication L144.

Management of health and safety at work. Management of Health and Safety at Work Regulations 1999, Approved Code of Practice and Guidance HSE Legal Series publication L21.

Railway Safety Principles and Guidance. Part 2, Section E. Guidance on level crossings. HSE Guidance publication HSG 153/6.

The Health and Safety (Safety Signs and Signals) Regulations 1996. Guidance on Regulations. HSE Legal Series publication L64.

Institute of Highway Engineers guidance

The Institute of Highway Engineers Sign Structures Guide: Support Design for Permanent UK Traffic Signs contains useful guidance on sign structures.

www.theihe.org/news/publications

OTHER DOCUMENTS

Bilingual Working Drawings. Available on the Traffic Wales website.

CSS/HA/HSE (2002) "Guidance for Safer Temporary Traffic Management". Published by TRL on behalf of CSS, Health and Safety Executive and the Highways Agency.

Highways Agency/ACPO (2002). "Joint Association of Chief Police Officers (ACPO) and Highways Agency policy and procedures for the police use of Matrix Signals".

Highways Agency/ACPO (2005). "The Joint ACPO and HA Policy and Procedures for the use of Variable Message Signs (VMS) by the Police and Regional Control Centres".

Highways Agency (2006) – "Speed Limit Enforcement at Road Works: Guidance and Best Practice". Highways Agency "Temporary Road Markings: Working Group Findings".

Highways Agency "Specification for Traffic Signal Controller". Document TR2500. Highways Agency "Specification for Portable Variable Message Signs" Document TR2518.

Highways Agency "Performance Specification for Pedestrian Facilities at Temporary Stand-alone Traffic Signals". Document TR2503.

Highways Agency "Specification for discontinuous Variable Message Signs". Document TR2516. HTMA Guidance on Temporary Traffic Management Vehicle Selection and Operation.

RSDA/CSS Code of Practice for Signing at Surface Dressing Sites. Document reference ENG/4 – 2002. Available from CSS Publications.

SURVIVE Group. "Best Practice Guidelines for dealing with Breakdowns/Removals on Motorways and High Speed Dual Carriageways".

United Kingdom Accreditation Service (UKAS), 2006. "Scheme 9A. Sector Scheme for the Manufacture of Permanent and/or Temporary Road Traffic Signs".

United Kingdom Accreditation Service (UKAS), 2000. "Scheme 12A. Sector Scheme Document for Temporary Traffic Management on Motorways and Other Dual Carriageways".

United Kingdom Accreditation Service (UKAS), 2000. "Scheme 12B. Sector Scheme Document for Temporary Traffic Management on Motorways and Other Dual Carriageways".

United Kingdom Accreditation Service (UKAS), 2000. "Scheme 12C. Sector Scheme Document for Mobile Lane Closure Traffic Management on Motorways and Other Dual Carriageways".

United Kingdom Accreditation Service (UKAS), 2005. "Scheme 12D. Sector Scheme Document for Temporary Traffic Management on Rural and Urban Roads".

United Kingdom Accreditation Service (UKAS), 2005. "Scheme 17. Sector Scheme Document for Vehicle Recovery at Construction Sites".

Code of Practice: "Self-Escorting of Abnormal Loads and Abnormal Vehicles".

APPENDIX A4 TSRGD 2016

Paragraph Description	Part 1: Design Part 2: Operations	TSRGD 2002	TSRGD 2016
REGULATIONS			
Rotating reflector delineators complying with Diagram 560 or 561	D3.13.1	Regulation 56 (6)	Schedule 13, Part 8
Restricted headroom/working overhead	D3.16.2 & D6.23.9	Regulation 53(1) (e)(i)	Schedule 13, Part 9 Part 3 Update Section U5
Works vehicle displaying a “keep left/ right” sign to Diagram 610 at the rear	D3.28.4, D3.30.7 (Plan RM1), O4.1.10, O8.1.20, O8.1.21, O8.1.22, O10.6.10	Regulation 14	Schedule 13, Part 7 Part 3 Update Section U4
Messages displayed on temporary variable message signs	D3.38.1 & O7.2.32	Regulation 53(1) & 58	Schedule 13, Part 9 Part 3 Update Section U5
Road markings removal and reinstatement of lane markings at completion of the works before reverting to unidirectional traffic flow	D3.41.9	Regulation 26	Schedule 9, Part 7. Paragraph 9
Cones, delineators and cylinders	D4.9.1 & O4.5.2	Regulation 56	Schedule 13, Part 8
Use of portable signals	D5.17.6 & A2.54	Regulation 35	Schedule 14, Part 6
Flat traffic delineator	A2.25 & A2.81	Regulation 56	Schedule 13, Part 8
Regulation 53 sign	A2.64	Regulation 53	Schedule 13, Part 9 Part 3 Update Section U5
High intensity lights, flashing beacons	O3.9.3 & O3.10.2	Regulation 54	Schedule 13, Part 11
Signs attached to vehicles	O4.1.10	Regulation 14	Schedule 13, Part 7 Part 3 Update Section U4
Cone bases, sign plates and frames should be marked to facilitate identification of ownership	O4.5.12	Regulation 56(4)	Schedule 13, Part 8
Reflectorised/Illuminated road works signs	O4.6.2 & O4.6.5	Regulation 18 and Schedule 17	Schedule 13, Part 9 Part 3 Update Section U5
Mounting height requirements of lights	O4.7.6	Regulation 55(2)	Schedule 13, Part 12
Illumination of signs to diagram 7105	O4.7.12	Regulation 19	Schedule 13, Part 7
Intermittent blue light – flashing beacons	O4.7.16	Regulation 54(1) (b)	Schedule 13, Part 11
Height of road markings and size of studs	O4.12.19	Regulation 32	Part 1, Regulation 10
Sign shown in Diagram 610 and its significance	O8.1.1	Regulation 15	Schedule 13, Part 5 Part 3 Update Section U4

Paragraph Description	Part 1: Design Part 2: Operations	TSRGD 2002	TSRGD 2016
Signs authorisation – exceptional cases, special signs complying with regulation 53	O4.9.2	Regulation 53	Schedule 13, Part 9 Part 3 Update Section U5
Light signals for the control of vehicular traffic on motorways and all-purpose dual carriageway roads	O11.7.2	Regulation 37	Schedule 14, Part 1, Item 4
DIRECTIONS			
Performance of road studs	D3.11.4	Direction 57	Schedule 1 Definitions
Approval of types of sign and signals by the national authority	D3.15.21 & O4.2.4	Direction 56	Part 3 Update Section U6 Paragraph 1
Diagram 1003 and 1023 should be used where practicable, though their use with signs to Diagram 602 is not mandatory in temporary situations	D3.17.4	Direction 17(2)	Schedule 9, Part 7
Temporary traffic orders	D4.2.5	Direction 7(2)	None
Traffic regulation order	D4.8.30	Direction 8	None
Approval of the traffic authority will be required before portable traffic signals are placed on the highway	D5.10.3, O5.15.4, O5.16.4	Direction 53	Schedule 14, Part 6
Signs of the kind referred to in the regulation 53 be removed with 6 months	A2.64	Direction 38(1)	Schedule 13, Part 9
The colour on the back of signs is prescribed in direction 41 but the sign frame/post may be any colour	O3.13.8 & O4.5.12	Direction 41	None
The “STOP-WORKS” sign (7031) must not be used on a motorway	O3.23.1 & O7.1.4	Direction 13(3)	Schedule 14, Part 2
The “STOP-WORKS” sign (7031) must be double sided and mounted on a black/ yellow banded pole	O3.23.2	Direction 41(5)	Schedule 14, Part 2
Traffic cones complying with Diagram 7101.1 can be used to support signs to Diagram 7104 and 7105	O4.5.3	Direction 41(6)	None
Cone bases, sign plates and frames should be marked to facilitate identification of ownership	O4.5.12	Direction 42	Schedule 13, Part 8 (6)
Specifies road studs performance classes in the European Standard to be met	O4.12.15	Direction 57	None
A “terminal” sign means a sign placed in accordance with direction 8 or 10	A2.79	Direction 8 or 10	Part 1, Section 3
“Type approval” means approval in accordance with direction 56	A2.86	Direction 56	TOPAS Group

This index relates to three volumes of Chapter 8. References starting with D relate to Part 1: Design and those starting with O relate to Part 2: Operations and those starting with U relate to Part 3: Update.

Access for works vehicles	D3.21.4, D3.22.1, D6.22, O3.11, O3.22.2
Access lane	D3.2.15
“Accident” plate	D4.8.8 , O7.1.5, U3.2.1
Advance	
Direction	D3.15.17, U5.9.4
Signing	D3.6.6, D3.42, D4.12, D5.5.3, O3.19.6, O7.2.63, U5.11
taper of cones	D3.8.2, D3.9.2, D3.26.4
warning of motorway road works	D4.5.1, D4.12
warning signs	D3.2.19, D4.5, D6.29.7–11, U2.15.10, U3.2, U5.6
“ADVERSE CAMBER” sign	D4.8.31, U5.12
Adverse weather conditions	O3.10, U5.2.2
Advisory	
maximum speed	O7.2.34, U5.16.2
speed limit plate	D3.18.7, O3.17.2
speed limit sign	D3.7.5, U2.9, U2.16.2
speed limits	D3.7.5, U2.9, U5.16
Aircraft taxiways	O3.26
Airport authority	O3.26.1
All-purpose	
dual carriageway roads	D3.3.7, U3.8
Roads	D3.3.7, D5.5.3, D5.7.7
All-red Period	O11.5.6
Extended	D5.13
Alterations	
to existing road markings	D4.6, O4.2.5, O4.12.5, O4.12.10
to existing signs	D4.6.1, O4.3.4
Alternate one-way working	O3.21.10
Amber roof-mounted warning beacon	O3.19.4, O5.3, O8.1.17, O8.3.8, O8.3.10
Ancillary vehicles	O10.14.9
Approach	
and lane closure signing	D4.13, U2.15.10-31
sign location and number	A1.1
Approach visibility	D3.23.2
Approach zone	D6.14.1, D6.15, D6.29.1

Attendant at level crossing	O3.25.5, O3.25.11
Automatic braking system	O5.4.4
Backing board – traffic signals	O3.21.20
Ballast for signs	O4.4.2–4
Barriers	
alongside excavations	O4.11.10
Lightweight	D3.10.9, O3.2.10–12, O4.11.14
Pedestrian	D3.10.4–6, O4.11.6–11, O3.13.1–3, O3.19.6–7
safety fencing	O8.37
Traffic	D3.10.7–8, O4.11.12–13
use of	D3.10, O4.11
vehicle restraint	D3.7.8, D3.10.10–11, O4.11.15
vertical posts	D3.9.7
Beacons roof-mounted	O3.19.4, O5.3, O8.1.17, O8.3.8, O8.3.10
Bend in the road	D3.6.6
“Blasting” plate	D4.8.2–3, D4.8.9, U3.2.1
Block vehicle	O10.6.4
Blocking back of traffic	D5.17.5
Bridge	
Clearances	D3.2.12
Heights	D3.16.4, U5.12.1
safety zone	D3.2.12, D3.7.7
British Standards	A3.1
Broken-down vehicle	D4.10.37, D6.2.11, O7.2.10, O7.3, U5.14
Buffer lane	D6.4.2, D6.4.14, D6.17, D6.18, D6.19, U8.5.4
Buffer zone	D6.4.2, D6.4.14, D6.4.16, D6.17, D6.18, D6.19
Builders’ skips see Skips, builders’	
Bus stops	D3.15.10
Cable crossing protector	D3.18.4, D5.14.7, O3.21.11–13, O3.21.28
Cables, overhead or flexible interconnecting	D4.8.9
Capacity, lane	D3.4
Carriageway	
Closure	D6.20
closure mobile	D6.27
edge condition	D3.19
edge marking	D3.11.8, D3.19.2, D4.6.6, O3.4.4, O4.10.6
works – no parked vehicles	O3.19.3, O3.19.6–7
works – with works vehicle	O3.19.4
CCTV, use of	D3.35.13, D3.37, D6.2.11, O7.5
“Census” plate	D3.26.9, D3.26.18, D4.8.9, U3.2.1, U5.8

“CENSUS POINT” sign	D3.26.10, D3.26.18, U5.8
“CENSUS STOP if directed” sign	D3.26.10, D3.26.18, U5.8
Central reservation	D3.2.13, D3.2.16–17
“CHANGED PRIORITIES AHEAD” sign	O3.24.4
Changeovers	D4.6.5–6, D6.3.8, D6.6, D6.17, D6.19
CHART	D6.24.7
Clean signs	O4.1.7, O4.3.1
Clearance	
on bridges	D3.2.12
Lateral	D3.2.1, O3.2
Longitudinal	D3.2.1, O3.2
from parked vehicle	O3.19.6–7
from traffic signs	D3.2.11, O3.2.16
Vertical	D3.2.23–24, O3.2.18–19, O3.2.21
Close-boarded structures	O3.28.3
Closure	
of a carriageway	D6.13.8, D6.20, U7.2
establishment	O10.13, O11.12
of a lane	D4.8.13, D4.10, D4.13.10–16, U2.15.1, U2.15.5
Removal	O10.17, O11.15
of a road	D3.15, U5.9, U5.11
of a slip road	D6.21, U7.2
relaxation	U7.4
Clothing	O3.4.2
Code of practice	D6.24.7, O1.3.1, U1.3.1, U1.3.2, U1.8.1, U2.7.1
Communication system	O3.22.3, O8.1.14, O9.1.12, O9.7, O9.8.3, O10.12, O11.9
Compliance	D1.3.1, O1.4.2, U1.3, U2.6.3, U2.7.7
Concepts and objectives	D1.4, O1.4, U1.4
Condition of traffic signs, assessment of	OA4.2
Cones	
Construction	D4.9.1
and cylinders	D4.9
recommended spacing and sizes	A1.3
Spacing	D3.9.2–5, D3.29.3, D5.4.5, O4.10.3–4, O7.2.44, A1.3
taper in advance of works	D3.8.2, D3.9.2, D3.26.4, U2.10, U2.11, U2.15, U7.5
white lines	O4.10.6
Congestion	D1.1.1, D2.10.2, O2.3.2
Consent of Highway Authority see Highway Authority	
Conspicuous vehicles	O8.3.7
Conspicuousness of works vehicle	O5.2, O7.2.40, O7.2.73, O8.3.7

Construction traffic	O3.11.4
Contingency plans/planning	D7.11.1, O2.4.5, O3.25.15
Contra-flow	
lane diversion signs	D4.10, U8.5.4, DTF1-2
Operation	D6.4
Convoy working	D7, O9
convoying method	O9.11
emergency vehicles	D7.11, O9.10
General	D7.1, O9.1
legal issues	D7.4, O9.2
number of vehicles	D7.2.1, O9.1.7, O9.4
queue management	O9.9
radio communication	O9.1.2, O9.7, O9.8.3
side roads within the site	D7.8.6, D7.9, O9.8
speed limits	D7.1.3, D7.5.3, D7.8, O9.6
Traffic control	D7.7, O9.5
Vehicles	D7.5.1, O5.6, O9.2.3, O9.3, U4.2.4, U5.12
Courtesy message	D6.19.3
Covers	
Drain	D3.18.1, O3.16.1, O3.16.3, O3.16.6, O4.11.9
on existing signs	D3.7.21, D3.7.24, D4.6.1, O4.2.2
Crash cushions	D3.35.14, O5.4.1–2, O5.4.4, O8.1.5, O10.6.9
Criteria for traffic control	D5.4.2
Crossroads ahead sign	D3.23.5
“CROSSING NOT IN USE” sign	D3.32.9, D4.6.2, O4.2.4, U5.2.2, U5.12.1
Crossing the carriageway on foot	O3.5, O8.3.9
Crossovers	D6.5, D6.17, D6.19, D6.29.14–18, U2.9.8, U2.10.7–8
Cyclists	D1.5.2, D3.3.7, D3.15.6, D3.32.13–20, O3.14, U3.3.4, U1.5.2
Cylinders	D4.9, O4.10
Damaged signs	OA4.2
Debris	O7.2.10, O7.2.28, O7.2.30
Definitions, primary	D1.5, O1.5, U1.5
“Delays possible” plate	D4.12.3, D4.12.6
Delineation	
Temporary	D2.1.8, D6.3.7
of works	D2.1.8, D6.3.7, A1.6
Delineators rotating	O4.10
Reflector	D3.13, O4.10.9–10
use of	D3.9
Demarcation of haul route	D3.23.8

Depressible road studs	D3.18.2, O4.12
Design	
Brief	D2.3
Criteria	D3
Design Manual for Roads and Bridges (DMRB)	A3.4
Details A to K used in plans	A1.5
Dimensions of signs	D4.4, A1, A1.2
Direction of temporary pedestrian route sign	D3.32.8
Direction signs	D3.15.17, U5.9.4
Disabled people	D3.10.4, O3.13.6, O3.25.10, O4.11.6, O7.1.9
Discontinuity of hard shoulder	D6.10.3
Displaced signs	O3.7.10, O4.1.7
Distance	
between sites	D3.5.2–3, D3.7.9
to “end of works” sign	D3.7.15
Plate	D4.8.5–6, D6.10.8, U4.2.5
Distance to restriction panel	D4.10.15
“Ditching” plate	D4.8.2, U4.2.3
Diversion	D3.15, D4.2.8, O7.1.4, U2.19
from motorways	D3.15.12
Route	D3.15.3
“Diversion ENDS” sign	D3.15.17, U5.9.5, U7.2.6
Diversions/road closures	D3.15, U2.19, U5.9, U7.2
Diverted traffic	D3.15.3, D3.15.17, U5.9.4
Documentation	D2.15
Double white lines	D4.6.4
Dual carriageway roads	D3.3.4, D3.42.4, D6
use of one carriageway	D3.42.10, D6.4
Duration of restriction panel	D4.12.2–6
“Dust cloud” plate	D4.8.9, U3.2.1
Edge of carriageway marking	D3.11.8, D3.19.2, D4.6.6, O3.4.4, O4.10.6
Electrical illumination	D3.7.23, O3.22.11, O3.23.3, O4.6, O10.10
Emergencies	O7.1
Emergency	
Access	D3.34
through the works	D6.7
Crossings	O3.11.9
Route	O7.3.16
Services	D2.6
telephone sign	D4.10.35, U5.15

traffic management	D3.33
on high-speed roads	O7.2
Vehicles	D2.6, U5.10
End of road works	D4.14, D5.5.3, D5.10.16, D6.19.3
End-of-works zone	D6.14.1, D6.19, D6.29.21–24, U8.7.4
England, applicability	D1.3.1, D2.6.2, D4.2.4, D4.15.8, D6.23.9, O1.3.1, O2.5.3, O6.2.7–8, O7.2.32, O7.7.2, O10.5.3, O10.8.2, O11.10.2, U1.3.1, U2.7.7
Entries for works vehicles	O3.11.11
Entry slip road, effect on contra-flow	D3.17.3
Entry taper see Taper	
Equipment installation/removal vehicles	O5.5.4
Excavation barriers	O4.11.10
“Except empty vehicles” panel	D4.8.30
Existing signs	D4.6
Existing markings	D4.6, O4.2.5, O4.12.5, O4.12.10
Exit slip road	D6.10.9, A1.4–5, U5.9.4, U7.2.3, U7.2.7
Closure	D6.21, U7.2
Exit taper	D5.4.3, D5.5.3, D5.6.4, D5.7.7, D5.8.12, D5.10.16
Expanding barriers	O4.11.14
Extended all-red period	D3.2.8, D5.10.4, D5.13
“Fallen tree” plate	D4.8.9
Falling objects	D3.16.3, O2.4.7
Fatigue	O3.9.3, O6.5.1, O10.18.4
Fend positions	O7.2.77–78, O8.3.8
Fitness for task	O6.4
Fixed time operation	D5.15.1, O3.21.3, O3.21.29
Flap type signs	D3.15.21, O10.7.9, O10.7.10
Flashing amber lanterns	O10.9
Flat traffic delineators, specification of	O4.10.5–8
“Flood” sign	D4.8.20, U3.2.1, U3.2.2
Floodlighting	O4.8.1
Fog – warning of	D4.8.21
Footway	
Obstructions	O3.13.11–12
Temporary	O3.13.5, O3.13.9–10, U5.13.1
Works	D3.2.19, D3.20.2
Forward visibility	O2.3.6
Frames	O4.5.1
Free recovery service	D3.35
“Frost damage” plate	D4.8.9

Future road works	D4.12.1–4
Gantry signing	D6.13.3-6, O4.2.3
“GET IN LANE” panel	D4.10.14, D6.16, D6.17, U3.5.2
“Give and take” traffic control	D5.4.3, D5.5.2, D5.6
Give way	O3.25.13, O4.12.4
Junction works	D5.14.7
Marking, temporary	D3.15.13
Signs	D3.17
Glossary	A2
“GO” sign see “STOP/GO”	U3.11.1
Gradients	D2.1.10, D4.4.4, O10.4.3
“Grass cutting” plate	D4.8.2, U4.2.3
Green setting optimum	O3.21.7
Gritting	D6.25.2, O8.2.1, U4.2.3
“Gritting” plate	D4.8.2, D6.25.2, O8.2.1, U4.2.3
Guide islands	D5.11, D6.9
Gully emptying	D4.8.2, U4.2.3
Hard shoulder	
Discontinuity	D6.10.3
limited width	D6.2.4
remedial works	D6.2.6
sign usage	D4.8.2
skidding resistance	D6.2.5
structural adequacy	D6.2.5, O3.16.12
as temporary running lane	D6.2, O3.4.4
Use	D6.2
Working	D6.10
Haul route	
Approach	D3.23.1
Crossing	D3.23
Demarcation	D3.23.8
modes of crossing control	D3.23.2, D3.23.6
road marking	D3.23.7
sequence of signing	D3.23.9
site approval	D3.23.2
site signing	D3.23.5
traffic signals	D3.23.1–3
Hazards	D4.8.4–5
Headroom	D3.2.23–24, D3.16, O3.2.19–20, O3.2.22, U1.4.2, U2.1-5, U5.12.1, U7.6.1, U7.6.7
Health and safety	D2.14, O2.1, U1.6.3, U7.3.2, A3.5

Health and Safety at Work, etc. Act	D2.14, O1.1.3, U1.6.3, U2.5.1, U7.3.2, A3.2, A3.5
Heavy goods vehicles	
Restrictions	D6.12
“HEAVY PLANT CROSSING” plate	D3.23.2, D3.23.5, D5.10.15, O3.11.4
“Hedge cutting” plate	D4.8.2, U4.2.3
Height restriction	D3.16, D4.10.25–26, O3.2.19-20, O3.2.22, U8.6.5
High intensity flashing warning lights	D3.12.1, D5.5.3, D5.7.7, D6.14.5, O3.9.3, O4.7.14–16, O7.2.62
Police	O4.7.16, U3.3, U8.8.2
High intensity Xenon lamps	O10.8.3
High visibility garments	O3.4.2, O3.22.10, O3.23.2, O6.3.2, O6.3.4
Highway Authority	D2.4, U2.2.2, U2.6
Adjoining	D2.5
Horizontal alignments	D6.5.4, O10.4.3
Horizontal boards/barriers	O4.11.3, O4.11.13
HSE documents	A3.5
“Ice” plate	D4.8.21, U3.2.3
Illumination of signs	D3.7.23, O3.22.11, O3.23.3, O4.6, O10.10
at survey sites	D3.26.8
Impact protection vehicle	D3.35.30, O5.4, O5.5.5, O7.3.6, O11.5.3, U7.1.1, U7.3
Incident management	O7, U3.2, U3.3, U5.7, U8.1
System	O7.7
“INCIDENT SLOW” sign	O7.1.6, U5.7.2
“INCIDENT USE HARD SHOULDER” sign	O7.1.6, U5.7.2
Incident Support Units (ISUs)	O7.2.5, O7.2.17, O7.2.39
Information board	D4.15.1–5, U3.6
Information on existing signs	D4.6
Information signs	D4.2.9, D4.11, U5.11
Inner boundary	
safety zone	D3.2.2, D3.10.6, D3.10.9, O3.2.9, O3.2.11, O3.2.14, O4.11.11, O4.11.14
Inspection	
of signs	O3.6.8, A4.3.4, U2.8.4
on a motorway	D3.28.5, U2.15.16
Site	O10.18.2
Stops	D3.31, O8.3
Inspection/supervisor vehicles	O5.5.2
Installation of static traffic management	O3.6
Interference with pedestrian movement	O3.13.1
Island sites	D6.11

“JOINING TRAFFIC NOT SIGNAL CONTROLLED” sign	D5.10.12, D5.15.7, O3.21.18
Junction within road works	D3.17, D4.8.6, D5.14, D6.18.3, O3.21.28–29, O3.21.31–32
Junctions	D5.14, O11.18
Keep left/right sign	D4.8.16, U4.2.2
Key to areas and symbols shown in plans	A1.4
Lane	
capacity	D3.4
diversion on one carriageway sign	D6.4.12
restriction panels	D4.10.16–36, D4.13.8
Widths	D3.3
Lane closed barrier	D4.8.13
Lane-change zone	D6.31.1, D6.16, D6.29.2–3, U7.4, U8.6.13, U8.7
Lanterns, flashing amber	O10.9
Lateral clearance	D3.2.1, D3.2.4, D3.2.6–11, O3.2.1–7
Additional	D3.2.10
Specified	D3.2.6–11
Lead-in zone	D5.4.6, D6.14.1, D6.17, D6.29.4–6, U2.16.1, U8.7
Legal	
Requirements	D1.3.1, U1.3.1
Status	D1.3, O1.3, U1.3
Legislation	A3.2
Length of site	D3.5.1
Length of works	D3.5, U2.20, U8.9
Level crossings	D5.17, O3.25, U3.9
Automatic	D5.17.2, O3.25.3
specification for an	O3.25.11
Types	D5.17.2, O3.25.3
works procedures	D5.17.6–7
Liaison in planning	D3.35.6–11
Light arrow sign	O5.9.7, O7.2.74, O10.1.7, O10.6.9, O10.7.6, O10.19
Light arrow sign – small	O8.1
Light batteries and bulbs	O4.7.13
Lighting	
maintenance plate	D4.8.2, U4.2.3
of signs	D3.7.23, O3.22.11, O3.23.3, O4.6, O10.10, U2.8
Regulations	O10.10.3
“Line painting” plate	D3.30.5, D4.8.2, U4.2.3
Loading and unloading of materials	O3.12
Location and number of approach signs	A1.1

Longitudinal	
Clearance	D3.2.1, D3.2.4, D3.2.20-22, O3.2.7
road marking	D3.30.1, D3.30.2
Loose chippings	D3.18.7, D3.29.3, O3.17.2
Maintaining static traffic management	O3.7
Maintenance	
Inspections/operations	O8.4, U2.6, U2.11.4, U2.12.1, U2.13
of diversion route	D3.15.11
Signs	O5.2.8, U2.15.10-31, U4.2, U4.3.4, U6.2.6
of signs	O4.1.14, U8.8
works planning	D2
Major-minor junctions	
close by	D5.14
permanent signals	D5.15.1, O3.21.29
traffic signals	D5.15
Mandatory speed limits	D3.7.6, D3.7.25-26, U2.9, U2.10
Manual control	
of signals	O3.21.5
Manual level crossings	D5.17.2, O3.25.3
Manual "STOP/GO" control see "STOP/GO"	
Manufacture of signs	O4.9.2
Marking	
edge of carriageway	D3.11.8, D3.19.2, D4.6.6, O3.4.4
stop line	O4.12.4
temporary give way	D3.15.13
temporary hazard	D3.7.9, U2.10.5, U2.14, U2.16.5
Material storage	D3.24, O2.3.2, O3.18
Matrix signals	D3.7.5, D3.7.29, D6.26.4, O2.5.3, O3.20, O7.2.33, O10.1.7, O10.5, O10.13.8, O11.7.9, O11.12.5, O11.20.1
Merge in turn signing	D6.23
Method statement, formulation of	O2.4, U2.5
Mini-roundabout works	D5.16.6
Minimum clear visibility to first sign	D4.4.7
Minor road	
Characteristics	D5.3.2
general requirements	D5.1
junction works	D5.14.5-6
Works	D3.3.3, D5.3
Misleading lights	O4.7.4, O4.7.15
Mobile Carriageway Closure	

technique	D2.1.13, D6.27, O11
background	O11.1
breach of the closure/ passage of emergency vehicles	O11.17
closing access junctions	O11.5
communication failure	O11.21
Communications	O11.9
dealing with a lane drop/lane gain	O11.19
establishing the closure	O11.12
Junctions	O11.18
operational issues prior to the operation	O11.11
other works/weather conditions	O11.22
planning issues	O11.4
the principle of the technique	O11.3
removing the closure	O11.15
roads without a hard shoulder	O11.6
the role of the control office	O11.20
the role of the monitor vehicle	O11.16
signing	O11.7, U5.12
speed of the closure	O11.13
Training	O11.10
Vehicles	O11.8
the working window	O11.14
Vehicles	O5.4, O5.8, O11.8
Mobile Lane Closure	
Technique	D6.24.4–5, D6.26, O10
Communications	O10.12
during a closure	O10.14
establishing a closure	O10.13
flashing amber lanterns	O10.9
General	O10.1
illumination of signs at night	O10.10
light arrow system for block vehicles	O10.8
matrix signals	O10.5
operations at night	O10.18
planning	O10.2
plans and principles for Mobile Lane Closures	O10.19
removing a closure	O10.17
Signs	O10.7, U2.15.11, U7.5.2, U4.2
station keeping	O10.14.4
traffic parameters	O10.4

training and personnel issues	O10.3
vehicle checks	O10.11
Vehicles	O10.6
working on foot	O10.19.8
working through junctions with a hard shoulder	O10.16
working through junctions without a hard shoulder	O10.15
Vehicles	O5.4, O5.7, O10.6
“Mobile road works” plate	D4.8.2, O8.1.13, O10.15.2, O10.16.2, U4.2.3
Mobile traffic management	D6.24
Monitoring traffic flows	O2.3.5
Motorway	
Regulations	O6.1.2
Signals	O3.20, U3.10
Mounting and siting of signs	O4.5
Movement of signals	O3.21.9
Mud nuisance	O.3.16.10
Narrow lanes	D3.4.2, D3.18.2, D6.3, D6.18.3, O4.12.9, U2.10.5-7, U8.7.4
use of	D3.5.4, D6.3
“NARROW LANES” panel	D4.10.14–15, D6.16, D6.17, D6.18, U3.8.2-3
National Highway Sector Scheme	U2.5-7
No entry sign	D3.42.4, D5.14.6, O7.2.60
“NO HARD SHOULDER FOR X YDS” sign	D4.8.11, D6.10.6
No left turn sign	D4.8.17
No overtaking	
Restrictions	D4.6.4
Sign	D3.29.3, D4.8.19
No right turn sign	D4.8.17
“NO ROAD MARKINGS FOR X MILES” sign	O4.12.4
“NO WORKS TRAFFIC” sign	O3.11.6
Non-motorised road users	D1.5.2, D3.32, O1.5.2, U1.5.2
Northern Ireland, applicability	D1.3.1, D2.6.2, D3.31.1, D4.1.4, D4.2.4, D5.17.4, D6.10.1, D6.26.4, DA4, O1.3.1, O2.5.3, O4.1.4, O4.7.6, O5.4.4, O8.3.3, O10.2.5, O10.5.3, O10.7.4, O10.8.2, O11.8.4, U1.3, U2.7.3, A2.2, A3.2, A3.6
Objectives	D1.4, O1.4, U1.4
Obscuration of permanent signals	D5.15.2
Obstructions on footway	O3.13.11–12
Oil drums	O4.10.2
Oncoming traffic has priority sign	O3.24.3
One-way street for two-way traffic, use of	D6.4.9
One-way working	O3.21.10

Optimum green settings	O3.21.7
Options for traffic control	D5.4.3
Other danger ahead sign	D3.26.9, D4.8.8, D5.10.12, D5.15.8, O3.21.18, U3.2.1
Overhead cable repairs plate	D4.8.9, U3.2.1
Overhead works	D3.16, D4.8.2, O5.9.4, U4.2.3
“OVERHEIGHT VEHICLE DIVERT” sign	D3.16.5
Overload of controlled area	D5.1.6
Panels	
advisory maximum speed	D3.7.5
Destinations	D3.17.5, U5.9.4
distance to restriction	D4.10.15 , U4.2.5
duration of restriction	D4.12.2–6
“GET IN LANE”	D4.10.14, D6.16, D6.17, U5.8.2-3
lane restrictions	D4.10.16–36
“NARROW LANES”	D4.10.14-15, D6.16, D6.17, D6.18, U3.8.2
“REJOIN MAIN CARRIAGEWAY”	D4.10.14, D6.2.14, D6.19, U3.8.2-3, U8.3.1
“STAY IN LANE”	D4.10.14, D6.16, D6.17, D6.29.9–10, U3.7, U3.8.2-3
“USE HARD SHOULDER”	D4.10.14, D6.2.14, D6.16, D6.17, D6.18, U3.10.2-3, U3.8.2-3, U5.7.2, U8.3.1
Paraffin lamps	O4.7.5
Parked vehicles	O3.19, O7.2.78–9
“Part time signals” plate	D3.23.6
Peak period avoidance	D2.1.5
Pedestrian	
Barriers	D3.10.4–6, O3.13.1–3, O3.19.6–7, O4.11.6–11
Crossing	D4.6.2, O4.2.4, U3.2.1, U5.12.1
Movement	O3.13.1
Routes	D3.32.3–12, O3.4.2, O3.13, O4.1.11–12
Pedestrians	D1.5.2, O2.1.5, O3.13, U5.12.1, U5.13.1
“PEDESTRIANS LOOK LEFT/RIGHT” sign	D3.32.7, D6.4.9, U5.12.1
Permission for builders’ skip see Skips, builders’	
Personal protective equipment (PPE)	O6.3
Planning	
a closure	D2
Considerations	O2.3
permission for builders’ skip	O3.29.1
road works	D2
Plans – list	DA5, OA5
Plates	
“Accident”	D4.8.8, O7.1.5, U3.2.1
advisory speed limit	D3.18.7, O3.17.2

“Ambulance Station”	U3.2.1
“At level crossing”	D4.8.2, U4.2.3
“Blasting”	D4.8.2–3, D4.8.9, U3.2.1, U4.2.3
“Blind Summit”	U3.2.1
“Census”	D3.26.9, D3.26.18, D4.8.9, U3.2.1
“Delays possible”	D4.13.5–6, D4.14.5
Distance	D4.8.5–6, D6.10.8
“Ditching”	D4.8.2, U4.2.3
“Dust cloud”	D4.8.9, U3.2.1
“Except empty vehicles”	D4.8.30
“Fallen tree”	D4.8.9, U3.2.1
“Fire Station”	U3.2.1
“Frost damage”	D4.8.9
“Grass cutting”	D4.8.2, U4.2.3
“Gritting”	D4.8.2, D6.25.2, O8.2.1, U4.2.3
“Gully emptying”	D4.8.2, U4.2.3
“Hedge cutting”	D4.8.2, U4.2.3
“Hidden Dip”	U3.2.1
“Lighting maintenance”	D4.8.2, U4.2.3
“Line painting”	D3.30.5, D4.8.2, U4.2.3
“Mobile road works”	D4.8.2, O8.1.13, O10.15.2, O10.16.2, U4.2.3
“On hard shoulder”	D4.8.2, U4.2.3
“On slip road”	D4.8.2, U4.2.3
“Overhead cable repairs”	D4.8.9, U3.2.1
“Overhead works”	D4.8.2, U4.2.3
“Part time signals”	D3.23.6
“Queues likely”	D4.8.23
“Road sweeping”	D4.8.2, U4.2.3
“Road liable to flooding”	D4.8.9, U3.2.1
“Runners in road”	D4.8.9
“Salting”	D4.8.2, D6.25.2, O8.2.1, U4.2.3
“Sign erection”	D4.8.2, U4.2.3
“Sign maintenance”	D4.8.2, U4.2.3
“Single file traffic”	D3.26.15, D3.26.18, D4.8.26, D5.7.7, D5.8.12, D5.10.16, O8.1.10
Sizes	A1.2
“Smoke”	D4.8.9
“Snowdrifts”	U3.2.1
“Snow ploughing”	D4.8.2, U4.2.3
Supplementary	D4.8.2, D4.8.9
“Surveying”	D3.26.11, D4.8.2, O8.3.11, U4.2.3

“Tree cutting”	D4.8.2, U4.2.3
“Walkers in road”	D4.8.9
“Weed spraying”	D4.8.2, U4.2.3
Poles as horizontal barriers	O4.11.3
Police	
high intensity warning lights	O4.7.16
Sign	D4.15.6–11, O4.1.3–4, U3.3, U3.4.1, U5.7
Supervision	O7.2.6
temporary signs	D3.15.13, U3.3, U5.7
“POLICE ACCIDENT” sign	O7.1.6, U3.3.1
“POLICE SLOW” sign	O7.1.6, U3.3.1
Poor visibility	D3.8
Portable frames	O4.5.1
Portable traffic signals	D4.7.3, D5.4.3, D5.17.7, O3.21, U6.1.2
Possible delays	D4.12.1–3, D4.12.6, D4.13.5–6, D4.14.5
Post-design review	D2.13
Prams	D5.5.3, O3.13.6
Prescribed signs used temporarily	O4.1.1
Primary definitions	D1.5, O1.5, U1.5
Priority	
Control	D5.7.1–6
over vehicles from opposite direction	O3.24.2
Signs	D4.7.2, D5.4.3, D5.7
to vehicles from opposite direction	O3.24.3
traffic	O3.24
Programming	D2.9
Prohibition signs	D4.8.4
Public service vehicles, diversion	D3.15.10
Public transport	
co-ordinator	D2.1.5, D3.3.6
Notification	D2.1.5, D3.3.6
Publicity	D3.40
“Queues likely” plate	D4.8.23, D7.5.6–7, O11.6.1
Radio	O3.22.3, O8.1.14, O9.1.12, O9.7, O9.8.3, O9.12, O10.12, O11.9
Railway authority	D5.17.5, O3.25.5–6, O3.25.14, O3.25.16
Railway crossing attendant	O3.25.5, O3.25.11
Railway level crossings see Level crossings	
“RAMP” sign	D3.18.5, D5.10.10, O3.16.9, O3.21.13, U5.12.1
“RAMP AHEAD” sign	D3.18.4, D4.8.31, O3.16.8, O3.21.13, U5.12.1
Rear markings	O5.2.3–5

Recharging tanks	O10.14.8
Recovery vehicles	D3.35, D4.10.37–8, O7.3
Recovery service – free	D3.35, O7.3
Reduced road width	D5.1.3
Reduction	
of vehicle speed	D3.7.8, D3.7.26–28, O2.3.2, O2.3.6
in visibility distance	D3.8, O2.3.6
Redundant signal heads	D4.6.1, O3.21.30
Redundant signs	D4.6.1
Reflectorisation	O4.6.2
Reflectorised hazard marker sign	D4.8.27
“REJOIN MAIN CARRIAGEWAY” panel	D4.10.14, D6.2.14, D6.19, U3.8.2
Relaxation works	D1.6, O1.6, U2.15.3, U7.5
Relief driver	O9.1.3
Removable road marking materials	O4.12.11
Removal	
of closure	O10.17, O11.15
road studs	D6.3.6, O4.12.2, O4.12.7, O4.12.9, O4.12.16
of static traffic management	O3.8
Repair of traffic signals see Traffic signals, maintenance	
Repeater	
sign sizes	D4.4.4–5
speed limit signs	D3.7.18, U2.9
Reporting of incidents	O7.6
Responsibilities	D2.2
Restricted	
headroom/working overhead	D3.16, U5.12, U7.6.7
Width	D4.10.23–24
Restriction of heavy goods vehicles	D6.12
Retroreflective material	O4.6.2
Risk assessment	D3.20.1, O2.2, O3.21.20, O3.22.2, O3.28.1, U2.2.3, U2.5, U2.8.4, U2.9.7-8, U2.10.2, U2.10.8, U2.11.2, U2.15.11, U7.3, U7.4
Road	
Closure	D3.15, D6.20, U5.9, U7.2
condition surveys	D3.28
Diversions	
see Diversion; Diversions/road closures	
lighting maintenance	D4.8.2, U5.9, U7.2
markings	D3.30, O4.12

Existing	D4.6, O4.2.5
haul route	D3.23.7
temporary	D3.11, O4.12.11–12
studs, temporary reflecting see Temporary reflecting road studs	
sweeping plate	D4.8.2, U4.2.3
Road works	
End	D4.14, D5.10.16, D6.10.8, U2.15.18
location	D4.8.7, D4.12.5
use of vehicles	D5.2, O3.19.4, O5.9
“ROAD AHEAD CLOSED” sign	D3.15.15, D4.8.20, D4.8.31, U5.12.1
“ROAD CLOSED” sign	D3.15.14–15, D4.8.20, D4.8.31, U5.12.1, U7.2.3
“Road liable to flooding” plate	D4.8.9
Road narrows sign	D4.8.24
Road plates	D3.44
Roadside containers	O3.29.1
Roadside interview surveys	D3.26
Roles and responsibilities	D2.2
Rolling road blocks	O7.2.29–30, O7.2.67–68
Roof-mounted beacon	O3.19.4, O5.3, O8.1.17, O8.3.8, O8.3.10
Rotating reflector delineators	D3.13, O4.10.9–10
Roundabout	
circulatory works	D5.16.3
entry works	D5.16.1–2
exit works	D5.16.5
obstructing works	D5.16.4
Routes	
for diversion	D3.15.23, U5.9.2, U7.2.3
for pedestrians	O3.13
for site vehicles	D3.22
Routine Maintenance Management Systems	D6.24.7
Running lane width	D3.3
Safe	
systems of work	D2.1.3, D2.1.6, O1.4.2, O2.1.2, O3.5.7
taper positions	D3.6, O3.3
Safety	
Camera signs	D4.15.6–11, U3.5.3
Clearances	D3.2, O3.2
Fencing	D6.5.1, O4.8.1
of works personnel	O3.4.2, O8.3.8

Zone	D3.2.2, D3.2.17, D3.2.20, O3.2.7–9, O3.2.16, O3.2.21, O7.2.53, U1.5.3, U1.6.3, U2.9.2, U2.10.21
on bridges	D3.2.12, D3.7.7
Salting	D6.25.2, O8.2.1
“Salting” plate	D4.8.2, D6.25.2, O8.2.1, U4.2.3
Scaffolding	D3.43, O3.28
Scope of document	D1.2, O1.2, U1.2
Scotland, applicability	D1.3.1, D2.1.5, D2.4.2, D2.6.2, D2.9.1, D3.2.20, D3.43.2–3, D4.2.4, D5.17.4, D6.23.10, O1.3.1, O1.3.3, O2.5.3, O3.28.2–3, O3.29.1, O6.2.8, O10.5.3, O10.8.2, U1.3.1, U1.3.3
Sequentially flashing warning lights	D3.12.2, D6.8.6–8, D6.16.2, O4.7.17–19, O7.2.61
Setting out signs	O3.6.1–4, O4.1.9
Settings for signals	O3.14.7, O3.21.6
Sharp deviation of route	D3.10.7, D3.15.18, D4.8.12, D6.5.3, O4.11.12
Short-duration works	D1.6.3, D2.1.12, O3.2.14, O3.22.8, O8.3.1
Shuttle working	D5.6
Side roads within the site	D3.7.21–22, D7.9
Sign condition	O4.3, OA4.2
Sign maintenance plate	D4.8.2, U4.2, U4.3.4, U5.12.1
Signal	
all-red settings	D5.17.6, O9.10.1, O11.5.6
control	D4.8.28, D5.10
controlled junctions	D5.15
heads redundant	D4.6.1, O3.21.30
manual operation	O3.21.5
maximum green settings	O3.21.7
“priority changed” sign	D5.10.14
timing changed	D5.10.14, U3.10.1
Signals	
movement with works	O3.21.9
Portable	D4.7.3, D5.4.3, D5.17.7, O3.21, U2.7.8, A2.2
switched off	D4.6.2, D5.15.2, O3.21.30, O4.2.4
Settings	O3.14.7, O3.21.6
Signing	
Considerations	D4.2
and guarding unnecessary	D3.20, O4.1.11
and marking	O4
Accuracy	O4.2
Principles	O4.1, D4, U3, U4, U5, U6
Signs	
Authorisation	D4.2.3, O4.9

backs of	O3.13.8, O4.5.9–10
Ballast	O4.4.2
Cleanliness	O4.1.7, O4.3.1
Condition	O4.3, OA4.2
Damaged	OA4.2
Displaced	O3.7.10, O4.1.7
Illumination see Illumination of signs	
illumination at survey sites	D3.26.8
Inspection	O3.6.8
Junction in road works see Junction within road works for lane restrictions, closures and contra-flow works	D4.10
Legibility	O4.1.7
Maintenance	O4.1.14
Manufacture	O4.9.2
Mobile	D6.24, O4.2.1
mounting structures	O4.5
Police	D4.15.6–11, O4.1.3–4, U3.3
Procurement	O4.1.13
Redundant	D4.6.1
setting out	O3.6.1–4, O4.1.9
Siting	O4.5.4–6
Sizes	D4.4, U5.4.4, A1, A1.2
Stability	O4.4
Temporary	O4.1.5–8
traffic survey	D3.26.4, D3.26.19, U5.8
Single carriageway road	D5
“Single file traffic” plate	D3.26.15, D3.26.18, D4.8.26, D5.6.4, D5.7.7, D5.8.12, D5.10.16, O8.1.10
Single lane width minimum	D3.3.1, D4.2.6
Single vehicle works	D6.25, O8.1
Site	
Access	D3.21
access lane	D3.2.15, D6.7.1, O3.2.21
approval of haul route crossing	D3.23.2
Information	D2.8, O2.5
length – maximum	D3.5
personnel	O6
supervisor	O7.1.3
Siting distance of first sign	D4.4.8
Size	
of repeater signs	D4.4.4–5

of signs	D4.4, A1, A1.2
and siting of signs	D4.4
of supplementary plates	D4.8.2
Skips, builders'	O3.29
(Markings) Regulations	O3.29.2
permission for	O3.29.1
specification for	O3.29.4, OA4.1
Slip road	
Closure	D6.21, U7.2
Entry	D3.17.3, O11.7.6–8, O11.18.1, A1.4–5
Exit	D6.10.9, D6.20.4, D6.20.8, O10.16.3, U5.9.4, U7.6.5
Merges	O9.11.3
Slippery road sign	D3.18.8, D4.8.22, O3.16.11
“SLOW CENSUS POINT” sign	D3.26.10, D3.26.18, U5.8
“SLOW WET TAR” sign	D4.8.31, U5.12.1
Small light arrow sign	O8.1
“Smoke” plate	D4.8.9
“Snow ploughing” plate	D4.8.2, U4.2.3
Soil mounds	O4.11.3
“Sorry for any delay” sign	D4.14.5
Spacing of cones see Cones, spacing	
Speed	
check area/cameras	D4.15.6–11
control/temporary speed limits	D3.7, D4.14.3–4, O4.1.6, U2.9
Limit	D3.7.5, U2.9, U5.16
Regulations	D3.7.19
Signs	D3.7.20, D4.1.5, D4.14.4, D4.15.8–9, D6.10.8, D6.16.3, D7.5.3, D7.8.5, O4.1.6, O4.3.4, O9.6.4, O9.6.8, U2.9, U2.16.2, U3.4, U5.12.1
Spraying white lines	D3.30.4–5
Stability of signs	O4.4
Standard works	D1.6, O1.6, U1.6
Static traffic management	D6.14, O3.6–8, U5.2.1, U7.3.17, U7.3.20
Statutory undertakers	D2.7, O1.1.3, O3.26.1, O5.9.3, O6.2.6
“STAY IN LANE” sign	D3.26.17, U5.8.2
“STAY IN LANE” panel	D4.10.14, D6.16, D6.17, D6.29.9–10, U3.5.2, U3.7
Stepped taper	D6.8.5, D6.16.2
“STOP/GO”	D5.8
“STOP/GO” sign	D4.7.1
“STOP-WORKS” sign	D5.4.3, D5.9, O3.23
Stop	

authority to	O6.1.2
line marking	O4.12.4
“STOP AT CENSUS POINT” sign	D3.26.10, D4.8.29, U5.8.2
“STOP POLICE” sign	O7.1.6
Storage of materials	D3.24, O2.3.2, O3.18
Street lighting maintenance	D4.8.2, U5.1.1
Structure and scope of the Chapter	D1.2, O1.2, U1.2
Studs	D3.18.2, O4.12
temporary reflecting road	D3.11, O4.12.15–17
Supervisor vehicles	O5.5.2
Supervision by police	O7.2.6
Surface	
Condition	D3.18, D6.2.6, O3.16
Dressing	D3.29.1–2, O3.17
Surfacing	D3.29, O9.1.4
Surveillance/use of CCTV	D3.35.13, D3.37, D6.2.11, O7.5
Survey see Traffic survey	
“Surveying” plate	D3.26.11, D4.8.2, O8.3.11, U4.2.3
“Road sweeping” plate	D4.8.2, U4.2.3
Symbolic diversion sign	D3.15.20–22, D3.15.24, O4.3.3, U7.2.3-4
Systems of work – safe	D2.1.3, D2.1.6, O1.4.2, O2.1.2, O3.5.7
Tank recharging	O10.14.8
Taper	
of cones	D3.8.2, D3.9.2, D3.26.4, O3.3.1, U7.5.3-4
Entry	U7.5
Exit	D5.4.5, D6.8, O7.2.54
lead-in	D3.6, D5.4.6, D5.5.3, D5.7.7, D5.8.12, D5.10.16, D6.8, O3.2, O7.2.47–48
stepped/direct	D6.8.5, D6.16.2
Telephone	O7.5.1
Emergency	D3.19.1, D3.35.4, D4.10.36, D6.2.4, O3.20.1, O3.25.9, O10.5.6, U5.15.3
Facilities	D3.35.25, O7.3.8
at level crossings	O3.25.9, O3.25.16
Temporary	
Footway	O3.13.5, O3.13.9–10, U5.12.1, U5.13.1
give way markings	D3.15.13
height restriction	D4.10.25–26, O3.2.19, U5.12.1, U8.6.5
Lighting	D3.41.8, O4.8
police signs	D3.15.13, U3.3.1
reflecting road studs	D2.1.8, D3.11, D3.14.1, O3.4.1, O4.12.15–17

removable road marking materials	O4.12.11
road markings	D3.11, O4.12.11–12
safety fencing as barrier	D3.2.2
Signs	D3.7.18, D3.7.21, O4.1.5–8, U3, U5, U6, U8
speed limits	D3.7
Traffic control	D4.7
traffic management vehicle specifications	D4.7, O5.5, U4
traffic management design	D2.1, U2
traffic regulation orders	D3.39, D4.3
traffic signals	D3.41.5, D3.41.10, D4.7.3, D5.4.3, D5.6.3, D5.8.3, D5.15.5, D5.17.7, O3.21, O3.22.5
waiting restrictions	D3.15.13, O5.9.3
“TEMPORARY ROAD SURFACE” sign	D3.18.3, D4.8.31, O3.16.4, U5.12.1
Three-minute check count	O10.14.13
Tidal flow	D6.28–29, O7.1.7, O7.3.17, U8.7.5-6
Timber baulks	D3.14.3, O4.10.11
Traffic	
cones see Cones	
count	D6.1.3, O10.13.6, O10.14.13, O11.6.1
cylinders see Cylinders	
disruption	D2.10
Diverted	D3.15.3, D3.15.7
Flows	D7.2
convoy working	D7.2
monitoring	O2.3.5
management design	D2.1, D2.2.2, D2.12, U2.2
management/maintenance vehicles	O5.5, O5.9
officer	D2.6.2, D3.35.6, O7, A2.2
Traffic control	
at aircraft taxiway crossings	O3.26
“Give and take”	D5.6
minor roads	D5.4
options	D5.4.3
priority signs	D5.7
“STOP/GO”	D5.8
at railway level crossings	D5.17.6–7, U3.9.1
traffic signal	D5.10
“TRAFFIC CONTROL AHEAD” sign	D3.29.3, D4.8.31, D5.8.12, D5.9.6, O3.21.22, O3.21.27, O3.22.12, O8.1.21, O9.8.2, U5.12.1
“TRAFFIC SIGN MAINTENANCE” sign	D4.8.31, U5.12.1
Traffic signals	

Control	D5.10
equipment at haul route	D3.23.3
on haul route	D3.23
Junctions	D5.14
Maintenance	D3.25, D5.10.13, O3.21.21
Portable	D4.7.3, D5.4.3, D5.17.7, O3.21
Traffic signals ahead sign	D3.23.5, D5.10.11, D5.10.16, O3.21.16
“TRAFFIC SIGNAL MAINTENANCE” sign	D4.8.31, D5.15.10, U5.12.1
“TRAFFIC UNDER SIGNAL CONTROL” sign	D4.8.2, D5.15.7, D5.15.9, O3.21.17
Traffic surveys	D3.26, U5.8
sign spacing	D3.26.4, D3.26.19
Training	O6.2, O7.2.15, O10.3, O11.9, U2.7
Transition sections	D3.42
“Tree cutting” plate	D4.8.2, U4.2.3
Tunnels	D3.41
Turn left/right sign	D4.8.14
Turn left/right ahead sign	D4.8.15
Two-way operation installation	D6.4.1
Two-way traffic	D3.3.2, D5.4.3, D5.5
Two-way traffic sign	D3.42.10, D4.8.25
Uneven road sign	D3.18.6, O3.16.5
“USE HARD SHOULDER” panel	D4.10.14, D6.2.14, D6.16, D6.17, D6.18, U3.8.2-3, U5.7.1, U8.3.1
Utility identification sign	D4.15.5
Variable message signs (VMS)	D3.37.3, D3.38, D4.12.6, O2.5.3, O3.6.3, O3.7.4, O3.20.5, O7.2.32–36, O10.1.8, O10.5.1, O10.5.8, O11.20.1, U5.16
Vehicle	
Checks	D3.27, O10.11, U3.5
Issues	O5, O7.2.73
Beacons	O5.3
conspicuity	O5.2, O7.2.40, O7.2.73, O8.3.7
general	O5.1
impact protection	O5.4
recovery	D3.35, D4.10.37–38, D6.2.11, O7.3
at road works, use of	D5.2, O3.19.4, O5.9
weight and condition checks	D3.27
Vehicle-mounted signs	D3.30.4, O4.1.10, O11.7.1–5, U4
Verge works	D3.2.19, D3.20.2–3
Vertical clearance	D3.2.23–24, O3.2.19–20, O3.2.22
Visibility	

Distance	D1.6.3, D3.8, D5.7.1, O1.6.3, O2.3.6
to first sign	D4.4.7
Visually impaired people	D3.10.4, O3.11.2, O3.13.6, O3.25.10, O3.28.2, O4.11.6, O4.11.8, O7.1.9
Waiting restrictions	D3.15.13, D3.39.4, O5.9.3
Wales, applicability	D1.3.1, D2.6.2, D4.2.4, D5.17.4, D6.23.10, O1.3.1, O2.5.3, O6.2.8, O10.5.3, O10.8.2, U1.2.3, U1.3.1, U2.7.3
Warning lights	D3.2.2, D3.12, D6.8.5–6, O4.7, U2.14
high intensity flashing	O3.9.3, O4.7.14–16, O7.2.62
“WEAK BRIDGE” sign	D4.8.30
Weather see Adverse weather conditions	
“Weed spraying” plate	D4.8.2, U4.2.3
Weight restriction sign	D4.8.30, D4.10.22, D6.12.2
Wheel washing equipment	O3.16.10
Wheelchairs	D5.5.3, O3.16.6, O3.13.6
“WHEN QUEUING USE BOTH LANES” sign	D6.23.7–8
“WHEN RED LIGHT SHOWS WAIT HERE” sign	D5.10.16, O3.21.14, O3.21.25
“WHEN STOP SIGN SHOWS WAIT HERE” sign	O3.21.25, O3.21.27
White lines	D3.14.1, D3.30.5, D4.6, D4.8.19, O4.2.5, O4.12.5, O4.12.10
on cones	O4.10.6
Wide loads	D3.10.11, D4.10.31–36, O2.3.7, U5.15.3
White-lining	D3.30.4–5, O10.14.8–9
Wider carriageways on motorways	D6.13
Width of running lane	D3.3
“WORKFORCE IN ROAD – SLOW” sign	D4.8.10, O3.6.3, O3.7.4, O3.8.2, O3.20.2
Workforce issues	O6
training	O6.2
Working hours	D2.4.1, O6.5
Working in the hours of darkness	O3.9
Working space	D3.2, O3.2, U2.10.7, U7.6
Works	
Access	D3.21, D6.22, O3.11, U8.2.1
off the carriageway not requiring guarding and/or signs	D3.20
carried out from a vehicle	D5.2
close to level crossing	D5.17, O3.25
Delineation	D3.14, O3.4
Exit	D3.21, D6.22
Personnel	O6
protection by works vehicle	O5.9.2, U7.3
undertaken at or near normal road speed	O8.2

vehicle in attendance	O3.19.4
Vehicles	O5, U2.15.7, U6.2.2
zone	D6.18, D6.29.19
“WORKS ACCESS” sign	D3.21.2
“WORKS ACCESS ONLY 100 yds” sign	D6.10.9, D6.22.3-5
“WORKS EXIT” sign	D3.21.2, D6.22.3-6
“WORK IN CENTRE OF ROAD” sign	D4.8.31, U5.12.1
“WORKS TRAFFIC” sign	D3.21.3, O3.11.7
“WORKS TRAFFIC ONLY” sign	D3.21.4, D6.22.3–5, O3.11.11
Xenon discharge lamps	O10.8.3

LIST OF FIGURES

4.1	Rear mounted chevron markings	65
5.1	Schedule 13.10 colour combinations	68
5.2	Example 1050 x 750 mm standard sign plates	70
5.3	Telephone number supplementary plate	80
5.4	Multi-use version of works access sign	82
7.1	Diversion route signing for a closed entry slip	90
7.2	Diversion route signing for a closed exit slip	91
7.3	Advanced signing for a closed exit slip road	92
7.4	Normal levels of signing provision for relaxation schemes	99
7.5	Example of reduced levels of signing provision for relaxation schemes, with the removal of 200 and 600 yds signs	100
7.6	Example of reduced levels of signing provision for relaxation schemes, with the removal of the offside signs	101
7.7	Example of reduced levels of signing provision for relaxation schemes, with the removal of the nearside signs	102
7.8	Relaxation scheme entry taper layout (from Plan DZB3)	104
7.9	Alternative layout for an entry taper for relaxation scheme works on a dual carriageway	104
8.1	Works Traffic sign	107
8.2	Non-police incident management signs	108
8.3	Typical Diagram 7202.1 signs	109
8.4	Typical Diagram 7243 sign	109
8.5	Typical Diagram 7244 sign	110
8.6	Typical Diagram 7245 sign	111