



General Principles & Scheme Governance
Design

GD 300

Requirements for new and upgraded all-purpose trunk roads (expressways)

Revision 2

Summary

This document provides the design requirements and advice for new and upgraded all-purpose trunk roads (expressways).

Application by Overseeing Organisations

Any specific requirements for Overseeing Organisations alternative or supplementary to those given in this document are given in National Application Annexes to this document.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

This is a controlled document.

Contents

Release notes	2
Foreword	3
Publishing information	3
Contractual and legal considerations	3
Introduction	4
Background	4
Assumptions made in the preparation of this document	4
1. Scope	5
Aspects covered	5
Implementation	5
Use of GG 101	5
2. Normative references	6

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Release notes

Version	Date	Details of amendments
2	Apr 2020	Revision 2 (April 2020) This revision is for minor administrative changes to the England NAA. See the England NAA revision release notes for more details. Revision 1 (March 2020) This revision includes updates to the Highways England National Application Annex focused on the provision of additional advice for level 1 to 4 schemes. Superseded references have also been updated. Revision 0 (May 2019) GD 300 document created to outline design requirements and advice for new and upgraded all-purpose trunk roads (expressways). This full document has been written to comply with the new Highways England drafting rules.

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Foreword

Publishing information

This document is published by Highways England.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

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Introduction

Background

This document has been created to provide the design requirements and advice for new and upgraded all-purpose trunk roads (expressways).

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

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1. Scope

Aspects covered

- 1.1 The national requirements for expressways set out in the National Application Annexes shall be followed.

Implementation

- 1.2 This document shall be implemented forthwith on all expressway schemes on the Overseeing Organisations' all-purpose trunk road network according to the implementation requirements of GG 101 [Ref 1.N].

Use of GG 101

- 1.3 The requirements contained in GG 101 [Ref 1.N] shall be followed in respect of activities covered by this document.

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2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
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General Principles & Scheme Governance
Design

GD 300

England National Application Annex to GD 300 Requirements for new and upgraded all-purpose trunk roads (expressways)

Revision 2

Summary

This National Application Annex sets out the Highways England-specific requirements for new and upgraded all-purpose trunk roads (expressways) based upon the implementation of a level 4 scheme only. Advice on levels 1 to 4 is included in Appendix E/F. Guidance should still be sought from the Overseeing Organisation for the development of level 1, 2 or 3 schemes. Delivery of a level is not a commitment to implementing another level in the future.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

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Contents

Release notes	5
Foreword	6
Publishing information	6
Contractual and legal considerations	6
Introduction	7
Background	7
Assumptions made in the preparation of this document	7
Abbreviations	8
Terms and definitions	10
E/1. Designation and delivery	11
E/2. General requirements	12
Objectives and concept of operation	12
Sustainable development and design	12
Transport integration	12
Design strategy record	12
Statutory undertakers equipment, boundary fence ownership and litter picking	13
Traffic officer and emergency services	13
E/3. Operational safety	15
Safety management system	15
Safety baseline and objectives	15
Expressway road user safety baseline	15
Expressway road user safety objective	15
Road worker safety objective	15
Road users - non-expressway roads	16
Walkers, cyclists and horse-riders (WCH) safety objective	16
E/4. Designing for maintenance	17
General	17
Maintenance access	17
Temporary traffic management (TTM) sign deployment	17
Whole life design	17
Maintenance renewal integration and existing assets	18
E/5. Highway links	19
General	19
Design speed relaxations	21
E/6. Layout of junctions	22
General	22
E/7. Cross section and vehicle restraint system	23
General	23
Vehicle restraint system (VRS)	23
Central reserve	23

E/8. Place of relative safety and roadside features	24
Place of relative safety	24
Parking lay-bys	24
Roadside facilities	24
Bus stops	24
Traffic officer outstations	24
Abnormal load bays	24
Turnaround points	25
Emergency access/egress provision	25
Tunnels	25
E/9. Signing and road marking	26
General	26
Direction signing	26
Countdown markers, marker posts and driver location signs	26
Gateway and exit signing	26
Emergency area – surfacing, road marking and signing	26
Variable speed limit and enforcement camera signing	26
Local highway authority signing	26
E/10. Roadside technology and communications	28
General	28
Infrastructure and telecommunication services	28
Control signals and VMS	28
Strategic variable message signing	28
Detection	28
Closed Circuit Television (CCTV)	29
Compliance and enforcement	29
Connected vehicle provision	29
Geographic addressing	30
E/11. Structures	31
VMS supporting structures	31
E/12. Environment	32
Better environmental outcomes	32
E/13. Walkers, cyclists and horse-riders (WCHs) and slow-moving vehicles	33
General	33
WCH assessments and alternative provision	33
Slow-moving vehicle assessments and alternative provision	33
Stakeholder engagement and enhancing community cohesion	33
E/14. Legal	35
E/15. Normative references	36
E/16. Informative references	38
Appendix E/A. Generic objectives	39
E/A1 Objectives	39
Appendix E/B. Generic layout	41
Appendix E/C. Delivery levels and design components	43
E/C1 Delivery levels	43
E/C2 Design components	44

Appendix E/D. Concept of operation	47
E/D1 Concept of operation - introduction	47
E/D2 Compliance	47
E/D2.1 Compliance issues on expressways	48
E/D2.2 Achieving compliance with expressway features	48
E/D2.3 Agreements and funding arrangements with enforcing bodies	49
E/D3 Operating regimes	49
E/D3.1 Normal operation during off-peak periods	49
E/D3.2 Normal operation during peak periods	49
E/D3.3 Operation during incidents	50
E/D3.4 Other operational aspects	51
E/D3.5 Operation during roadworks	51
E/D4 Impact of expressways on communities and the Overseeing Organisation's customers	52
E/D4.1 Equality	52
E/D4.2 WCHs and slow-moving vehicles	52
E/D4.3 Emergency services	52
E/D4.4 Vehicle recovery and repair organisations	53
E/D4.5 Communities and other parties	53
E/D4.6 Roadside facilities	53
E/D4.7 Transport integration	53
E/D5 Impact of expressway on the Overseeing Organisation's operators	53
E/D5.1 Traffic officer staffing, vehicles and outstation provision	54
E/D5.2 Operations centre space requirements	54
E/D5.3 Traffic officer procedures and work instructions for expressways	54
E/D6 Impact of expressways on the Overseeing Organisation's maintainers	54
E/D6.1 Approach to maintenance	54
E/D6.2 Meeting the road worker safety objective	54
E/D6.3 Scheduling maintenance	54
E/D6.4 Conducting maintenance	55
E/D6.5 Overseeing Organisation and MSP engagement	55
E/D7 Concept validation and continual improvement	55
E/D7.1 General	56
E/D7.2 Plan for monitoring operations and monitoring output	56
E/D7.3 Calibration and optimisation	56
Appendix E/E. Risk reduction strategies	57
E/E1 General	57
E/E2 Eliminate	57
E/E3 Reduce	57
E/E3.1 Reduce site visit requirements	57
E/E3.2 Bring forward renewal programmes	57
E/E3.3 Utilise low maintenance items	57
E/E3.4 Plan for access restrictions	57
E/E3.5 Renew 'problem' assets	57
E/E4 Isolate	57
E/E4.1 Re-positioning of existing assets	58
E/E4.2 Provision of off-network access	58
E/E4.3 Combining asset locations	58
E/E5 Control	58
E/E5.1 Improved accessibility of new assets for maintenance	58
E/E5.2 TTM sign deployment	58
E/E5.3 Improved installation / access techniques	58

Appendix E/F. Development guide	59
E/F1 Introduction and background	59
E/F1.1 Development guide scope	59
E/F1.2 Development guide structure	59
E/F1.3 Use of development guide	59
E/F2 Designation and delivery	61
E/F3 General requirements	62
E/F4 Operational safety	65
E/F5 Designing for maintenance	66
E/F6 Highway links	67
E/F7 Layout of junctions	69
E/F8 Cross section and vehicle restraint system	69
E/F9 Place of relative safety and roadside features	70
E/F10 Signing and road marking	75
E/F11 Roadside technology and communications	78
E/F12 Structures	83
E/F13 Walkers, cyclists and horse-riders (WCHs) and slow-moving vehicles	84
E/F14 Legal	85

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Release notes

Version	Date	Details of amendments
2	Apr 2020	Revision 2 (April 2020) This revision is for minor administrative changes including the correction of typographical errors and the replacement of reference IAN 161 with MPI 66 in DG/E/8.1/1, DG/E/8.1/2, DG/E/8.1/3, Figure E/F.3 and Table E/F.55. Revision 1 (March 2020) This revision provides additional advice within Appendix E/F for the development of all levels and indicates the potential for compatibility measures with other levels. Clause E/1.5 places a requirement on level 1, 2 and 3 schemes to review the additional advice provided in Appendix E/F. Revision 0 (May 2019) Highways England National Application Annex to GD 300.

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Foreword

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Introduction

Background

The Department for Transport's (DfT) Road Investment Strategy RIS 1 [Ref 9.I] states:

"Our busiest A-Roads will become expressways, providing improved standards of performance, with technology to manage traffic and mile a minute speeds. Improved design standards will give greater consideration to the needs of walkers, cyclists and local communities along with the aesthetic appearance of the network.....A-roads that can be relied upon to be as well-designed as motorways and which are able to offer the same standard of journey to users."

Expressways are a component in the delivery of the Government's vision for the future of the strategic road network, reducing the bottlenecks and congestion currently experienced on many all-purpose trunk roads. The objective of expressways is to improve safety and encourage economic growth whilst delivering better environmental outcomes and improving the quality of life for current and future generations.

Walking, cycling and horse-riding (WCH) provision aligns with GG 142 [Ref 39.N] which contains requirements for the assessment and review of WCH provision. This document reflects Government and Highways England policy to encourage walking, cycling and horse-riding.

Expressways deliver a minimum safety rating equivalent to the international road assessment programme IRAP [Ref 3.I] 3*.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 17.N] apply to this document.

Abbreviations

Abbreviations

Abbreviation	Definition
ADS	Advance direction sign
ALR	All lane running
APTR	All-purpose trunk road
CCTV	Closed circuit television
CDM	Construction, design and management
CHARM	Common Highways Agency and Rijkswaterstaat model (CHARM is a replacement for Highway Agency traffic management systems (HATMS))
DfT	Department for Transport
DSR	Design strategy record
ERIC	Eliminate, reduce, isolate, control
FWI	Fatal and weighted injury
IP	Internet protocol
iRAP	International road assessment programme
kph	Kilometres per hour
KSI	Killed or seriously injured
KPI	Key performance indicator
LGV	Large goods vehicle
MHS	Maintenance hard standing
MIDAS	Motorway incident detection and automatic signalling
MPI	Major Projects instruction
MRS	Maintenance repair statement
MSP	Maintenance service provider
NAA	National Application Annex
OMM	Operational metrics manual
PCF	Project control framework
PI	Performance indicator
RIS	Road investment strategy
ROTTMS	Remotely operated temporary traffic management sign
SCRG	Safety control review group
SRN	Strategic road network
TTM	Temporary traffic management
VMS	Variable message sign

Abbreviations (continued)

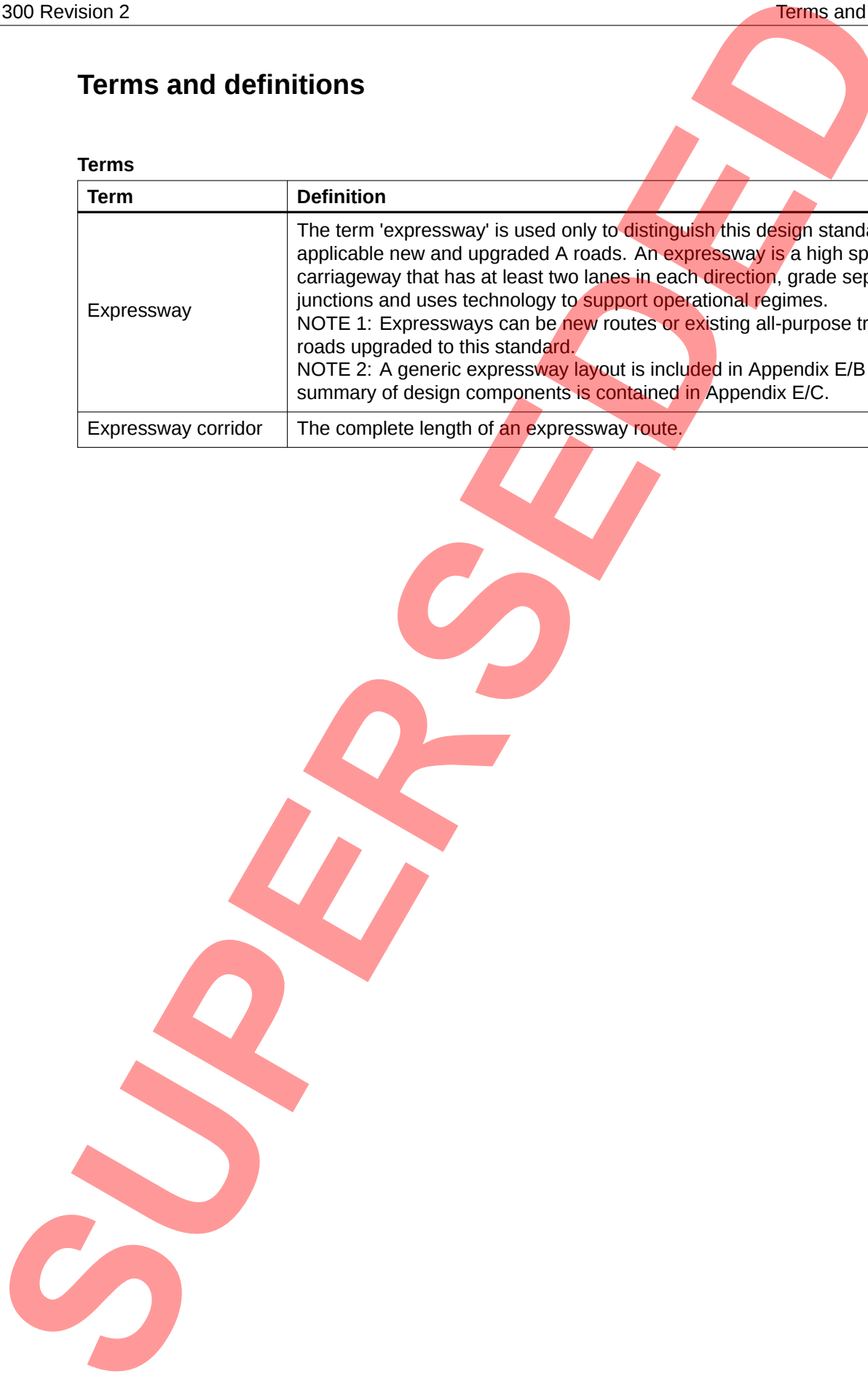
Abbreviation	Definition
VMSL	Variable mandatory speed limits
VRS	Vehicle restraint system
WCH	Walkers, cyclists and horse-riders

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Terms and definitions

Terms

Term	Definition
Expressway	<p>The term 'expressway' is used only to distinguish this design standard for applicable new and upgraded A roads. An expressway is a high speed dual carriageway that has at least two lanes in each direction, grade separated junctions and uses technology to support operational regimes.</p> <p>NOTE 1: Expressways can be new routes or existing all-purpose trunk roads upgraded to this standard.</p> <p>NOTE 2: A generic expressway layout is included in Appendix E/B and a summary of design components is contained in Appendix E/C.</p>
Expressway corridor	The complete length of an expressway route.



E/1. Designation and delivery

- E/1.1 Motorway designation of an expressway scheme or corridor shall only be implemented when:
- 1) a decision in support of motorway designation has been made by the Overseeing Organisation in conjunction with the DfT;
 - 2) the requirements of this document have been met;
 - 3) the scheme or corridor either connects to a motorway or has a length that exceeds 10 miles with terminal junctions that intersect with the edge of an urban area or major transport hub.
- E/1.2 The requirements in this document shall apply where the resulting mainline link has no more than three lanes in either direction.
- E/1.2.1 A fourth lane may be used to provide an auxiliary lane at a junction where needed to accommodate the forecast design year traffic flows.
- E/1.3 Schemes that do not meet all of the requirements of this document shall retain all-purpose trunk road designation.
- E/1.4 Where a scheme or corridor has been determined as not appropriate for motorway designation following the scheme development process, all-purpose trunk road designation shall be retained and guidance sought from the Overseeing Organisation on all requirements impacted by designation.
- NOTE 1 The requirements in this document are based upon the implementation of a level 4 scheme or corridor with motorway designation.*
- NOTE 2 Delivery levels are defined in Appendix E/C.*
- E/1.5 Level 1, 2 or 3 schemes shall review the advice in Appendix E/F.
- NOTE 1 Appendix E/F also contains some additional advice for level 4 schemes.*
- NOTE 2 Appendix E/F provides advice for the development of all levels and indicates the potential for compatibility measures with other levels.*
- E/1.6 Guidance shall be sought from the Overseeing Organisation for the development of level 1, 2 or 3 schemes.
- NOTE 1 Delivery of a level is not a commitment to implementing another level in the future.*
- NOTE 2 Implementation of a level 2, 3 or 4 scheme can be through the culmination of a number of scheme upgrades (multi-level delivery) or a single scheme (single level delivery).*

E/2. General requirements

Objectives and concept of operation

E/2.1 Expressways shall be designed to meet the objectives set out in the project control framework (PCF) client scheme requirements HE PCF [Ref 14.N].

NOTE Appendix E/A outlines generic scheme level objectives for expressways.

E/2.1.1 Reference should be made to the concept of operation document included in Appendix E/D for supporting information on the operation of expressways.

NOTE 1 The concept of operation document sets out, at a high-level, guidance around the operational elements of expressways.

NOTE 2 The intended audience of the concept of operation document is all those who are responsible for either the design or operation of expressways.

Sustainable development and design

E/2.2 Expressway design shall be in accordance with GG 103 [Ref 16.N].

NOTE 1 Design plays a key role in how places are perceived. As well as promoting sustainable development in design, GG 103 [Ref 16.N] introduces the concept of 'good road design'. Good road design aims to put people at its heart by designing an inclusive, resilient and sustainable road network; appreciated for its usefulness but also its elegance, reflecting in its design the beauty of the natural, built and historic environment through which it passes, and enhancing it where possible.

NOTE 2 GG 103 [Ref 16.N] requires evidence to be provided that demonstrates the application of the principles of good road design, with particular consideration to aesthetics. Expressways will generally be located in more rural locations, therefore the visual appearance of new and upgraded routes is a key aspect of their design. Specific care and attention needs to be given to the design and location of equipment and signage. Opportunities to combine equipment on structures and minimise infrastructure need to be sought.

Transport integration

E/2.3 Liaison with local authorities and key stakeholders shall be undertaken from HE PCF [Ref 14.N] stage 1 to determine opportunities for enhancing integration with other modes of transport.

NOTE 1 Refer to Section E/8 of this document for bus stop requirements.

NOTE 2 Refer to Section E/13 of this document for requirements for the integration of walkers, cyclists and horse riders (WCHs) and slow-moving vehicles.

E/2.3.1 Expressway design should assess the need to facilitate access to park and ride facilities.

E/2.3.2 Expressway design should assess the need to facilitate access to multi-modal interfaces.

NOTE Multi-modal interfaces can include railway stations, bus stations, airports and ports etc.

Design strategy record

E/2.4 When applying the requirements of this document, a design strategy record (DSR) shall be developed as part of the design process.

E/2.5 The DSR shall be updated and maintained during each HE PCF [Ref 14.N] stage.

E/2.6 The DSR shall record key design decisions, constraints and assessments, in support of using the relaxations within this document or cross-referenced documents.

E/2.7 The DSR shall be used to record:

- 1) a causal analysis of the local collision history to identify any performance issues or trends, comprising the most recently available 36 months of collision data;

- 2) all safety control review group (SCRG) acceptance and rejections;
- 3) the strategy for determining traffic flows to be used in the design (including data source and design year);
- 4) all items to be recorded as required in this document;
- 5) the decisions made with regards to the design and its associated specification for high quality primary resources;
- 6) the decisions made with regards to the design and its re-use of material generated within the scheme works;
- 7) the decisions made with regards to the design and the sourcing of secondary materials from other public-sector projects;
- 8) the contribution that schemes are seeking to make against the Overseeing Organisation's performance measures;
- 9) the steps taken to comply with GD 304 [Ref 3.N] and Raising the Bar 26 RtB 26 [Ref 7.I].

Statutory undertakers equipment, boundary fence ownership and litter picking

- E/2.8 The requirements and arrangements for litter picking, sweeping, cleaning and clearance shall be consistent with those for a motorway.
- E/2.9 Engagement with local highway authorities shall commence at stage 1 of the HE PCF [Ref 14.N] process to plan for the transition in responsibility for litter picking, sweeping, cleaning and clearance to the Overseeing Organisation.
- E/2.10 The requirements and arrangements for boundary fences shall be consistent with those for a motorway.
- E/2.11 The requirements and arrangements for statutory undertakers shall be consistent with those for a motorway.
- E/2.12 Engagement with statutory undertaker companies shall commence at stage 1 of the HE PCF [Ref 14.N] process.
- E/2.13 Where the cost is not disproportionate to the overall scheme value, statutory undertaker apparatus shall be located or diverted outside of the special road boundary.
- E/2.13.1 Where the cost to locate or divert statutory undertaker apparatus outside of the special road boundary is disproportionate to the overall scheme value, the following hierarchical approach should be implemented:
- 1) locate apparatus remote from the carriageway that can be accessed via an off network access point;
 - 2) locate apparatus remote from the carriageway that can be accessed from the mainline or connector roads;
 - 3) locate apparatus under the carriageway.

NOTE 1 *Locating or diverting statutory undertaker apparatus outside of the special road boundary reduces disruption to road users and reduces road worker exposure when maintenance or renewal works are undertaken by statutory undertaker companies.*

NOTE 2 *Motorway designation places greater access restrictions on statutory undertaker companies.*

Traffic officer and emergency services

- E/2.14 On road and operations centre traffic officers shall be provided to support the operation of expressways.
- E/2.15 A traffic officer resource review shall commence at stage 1 of the HE PCF [Ref 14.N] process.
- E/2.16 Guidance shall be sought from the Overseeing Organisation for traffic officer resource requirements, service level, procedures, work instructions and processes.
- NOTE** *Traffic officer resource requirements, service level, procedures, work instructions and processes are expected to be similar to those for smart motorway all lane running schemes.*

E/2.17 Guidance shall be sought from the Overseeing Organisation on the national operations agreement and the associated emergency services procedures for expressways.

NOTE A national operations agreement and the associated emergency services procedures are in development for expressways.

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E/3. Operational safety

Safety management system

E/3.1 The level of safety risk management on expressways shall be determined and managed in accordance with GG 104 [Ref 24.N].

NOTE *A hazard log based analysis has been undertaken on the generic expressway design and is summarised in the Expressway Generic Safety Report (Expressway GSR [Ref 5.I]).*

Safety baseline and objectives

Expressway road user safety baseline

E/3.2 The road user safety baseline for existing roads shall be the current situation.

NOTE 1 *The safety baseline provides a point from which the variance in risk of introducing expressways can be estimated.*

NOTE 2 *The current situation is the operational section of road prior to the implementation of expressways.*

NOTE 3 *There is no safety baseline for new routes.*

E/3.3 The baseline data that shall be used for the safety assessment of existing roads is:

- 1) the number (averaged per annum) of fatal and weighted injury (FWI) casualties and the rate of FWIs per billion vehicle miles per annum averaged for the three years, across both carriageways, prior to the construction of an expressway;
- 2) the number of killed or seriously injured (KSI) casualties.

NOTE *FWI is defined as: (Number of fatalities) + 0.1 x (number of serious casualties) + 0.01 x (number of slight casualties).*

Expressway road user safety objective

E/3.4 The safety objective for expressway road users shall be to deliver a safety performance that is a minimum of the average performance of a dual three lane motorway without motorway incident detection and automatic signalling (MIDAS).

E/3.5 Safety risks for individual populations shall be assessed and managed in accordance with GG 104 [Ref 24.N].

E/3.6 The road user safety performance shall be measured by comparing 'before' and 'after' road safety indicators as follows:

- 1) the number of FWI casualties;
- 2) the rate of FWI casualties per billion vehicle miles;
- 3) the number of KSI casualties.

NOTE *'Before' road safety indicators are not relevant to new routes.*

E/3.6.1 Expressway schemes should work towards the goal of bringing the number of people killed or injured on the network as close as possible to zero by 2040.

E/3.6.2 Additional safety mitigation measures that have the potential to provide an improved contribution to the Overseeing Organisation's safety performance should be identified, assessed and presented to the Overseeing Organisation and the SCRG for acceptance.

Road worker safety objective

E/3.7 The risk to road workers must be managed in accordance with the requirements of the Health and Safety at Work etc Act (HASAWA 1974 c.37 [Ref 11.N]) as low as reasonably practicable.

NOTE There is no specific numerical safety objective set for road workers.

Road users - non-expressway roads

E/3.8 The road user safety baseline and safety objectives for non-expressway roads shall be agreed with the relevant local highway authority.

NOTE Non-expressway roads include designated alternative routes for users prohibited from using an expressway and routes de-trunked as part of an expressway scheme.

E/3.8.1 The road user safety baseline for non-expressway roads may be the average annual killed and seriously injured and slight injury casualty rates (national data) for similar non-trunk roads, over a period of three years prior to start of expressway works.

E/3.8.2 The road user safety objective for non-expressway roads may be met if the following road safety indicators are an improvement on the safety baseline for non-expressway roads:

- 1) the number of FWI casualties;
- 2) the rate of FWI casualties per billion vehicle miles;
- 3) the number of KSI casualties.

NOTE WCH users are covered by their own specific objective.

E/3.9 Safety risks for individual populations shall be assessed and managed in accordance with GG 104 [Ref 24.N].

Walkers, cyclists and horse-riders (WCH) safety objective

E/3.10 The WCH safety objective shall be to provide a significant contribution towards the Overseeing Organisation's key performance indicators (KPI) and performance indicators (PI) for WCH by delivering quality provision that includes the removal of severance on routes and unlocks latent demand by WCH.

NOTE Removal of severance on routes extends to expressways, local access roads constructed adjacent to an expressway and associated de-trunked roads.

E/3.10.1 Whenever a road is upgraded in accordance with the requirements of this document, the facilities for WCHs should be at least as good as they were, and preferably better than prior to the improvement scheme.

E/3.10.2 Where separated cycling, walking and horse-riding infrastructure can be installed, careful consideration should be given to doing so.

E/3.10.3 WCHs should not be disadvantaged when the requirements of the document are applied.

E/4. Designing for maintenance

General

- E/4.1 Expressways must be designed for maintenance in accordance with the Construction Design and Management (CDM) Regulations 2015 SI 2015/51 [Ref 31.N].
- E/4.2 A maintenance repair statement (MRS) shall be produced in accordance with the HE PCF [Ref 14.N] process.
- E/4.3 The MRS shall place emphasis on the elimination and reduction of maintenance activities and risks.
- E/4.4 The principles of prevention as set out in the Management of Health and Safety at Work Regulations 1999 SI 1999/3242 [Ref 10.N] must be used to identify a hierarchy of risk control measures.
- NOTE Eliminate, reduce, isolate, control (ERIC) methodology is included in GG 104 [Ref 24.N].*
- E/4.5 To identify opportunities to lower the risk exposure of road workers, an ERIC assessment shall be carried out for all maintenance activities to be undertaken on expressways.
- E/4.6 The ERIC assessment shall determine and document how frequently maintenance activities occur, how they are currently performed, and how they might be performed in the future.
- E/4.7 The ERIC assessment shall determine and document mitigation measures.
- E/4.7.1 Risk reduction strategies that may be applied to expressways are included in Appendix E/E.

Maintenance access

- E/4.8 Maintenance access arrangements shall be assessed and designed in accordance with Major Projects instruction MPI 11 [Ref 22.N].
- NOTE MPI 11 [Ref 22.N] criteria and methodology used on smart motorways all lane running schemes to determine for each asset if access can be achieved without lane closures also applies to expressways.*

Temporary traffic management (TTM) sign deployment

- E/4.9 Fixed taper points shall be designed on expressways in accordance with the taper selection requirements stated in Chapter 8 of the Traffic Signs Manual TSM Chapter 8 [Ref 36.N] and in conjunction with the control signal and variable message sign (VMS) siting requirements in Section E/10 of this document.
- E/4.10 Fixed taper point locations for TTM shall be agreed with the Overseeing Organisation and the maintenance service provider (MSP).
- E/4.11 Where requested by the Overseeing Organisation, provision shall be made in the design for fixed taper roadside identification.
- E/4.12 The approach to TTM signing for an operational expressway shall be determined as part of the design, underpinned by a GG 104 [Ref 24.N] assessment and agreed with the Overseeing Organisation and the MSP.
- NOTE Potential options for TTM signing can include the deployment of fixed TTM signs/flap signs using an impact protection vehicle and traffic management vehicle (as per existing all-purpose trunk road (APTR) operation) or the use of remotely operated temporary traffic management signs (ROTTMS).*
- E/4.13 Guidance shall be sought from the Overseeing Organisation on the signalling for roadworks project.
- NOTE The aspiration is to eventually replace Chapter 8 Traffic Sign Manual TSM Chapter 8 [Ref 36.N] approach signing for relaxed works with TTM signing provided by the permanent VMS and control signals.*

Whole life design

- E/4.14 Expressway design shall reduce the risk exposure of road workers in accordance with GD 304 [Ref 3.N] whilst increasing the longevity, maintainability and optimising the whole life costs of the assets that are specified.
- E/4.15 Expressway design shall not limit the specification requirements to solely minimise capital expenditure.

Maintenance renewal integration and existing assets

- E/4.16 Opportunities to integrate maintenance renewal works into an expressway scheme shall be assessed on existing roads.
- E/4.17 Maintenance renewal proposals shall be agreed by the Overseeing Organisation.
- E/4.17.1 Following completion of an expressway scheme, a period of 5 years free of major renewal and pavement surfacing works should be provided by the design.
- NOTE* *Designing for a period of 5 years free of major renewal works can avoid significant road user disruption soon after completion of an expressway scheme.*
- E/4.18 The process of maintenance renewal integration shall begin in HE PCF [Ref 14.N] stage 0 to:
- 1) undertake necessary surveys/data collection;
 - 2) identify the potential maintenance works;
 - 3) produce a business case or adopt existing value management work;
 - 4) agree funding in time to incorporate within the integrated design development.
- E/4.19 Existing structures, features or assets that are not fit for purpose shall be replaced.
- NOTE* *This replacement of existing assets includes assets that are unsafe or unfit in the context of expressway operation, assets that are beyond economic repair or that have been identified through the maintenance renewal integration process.*
- E/4.20 Replacement of existing assets shall be agreed by the Overseeing Organisation.
- E/4.21 Existing structures, features or assets that are redundant shall be removed to an extent as agreed with the Overseeing Organisation.

E/5. Highway links

General

- E/5.1 Highway links shall be designed in accordance with CD 109 [Ref 12.N] unless otherwise stated in this section.
- E/5.2 Expressways shall be designed in accordance with the requirements of Table E/5.2.

SUPERSEDED

Table E/5.2 Additional types of road

Additional types of road added to Table A.2 of CD 109 [Ref 12.N]						
Type of road	Sub category	Edge treatment	Direct access treatment (see CD 123 [Ref 6.N] for a definition of direct access)	Junction treatment at minor road intersection (see CD 123 [Ref 6.N] and CD 116 [Ref 8.N])	Junction treatment at major road intersection (see CD 123 [Ref 6.N], CD 122 [Ref 7.N] and CD 116 [Ref 8.N])	Previous category reference used in GD 300
Dual 2 lane expressway (D2E) – 7.3 metre carriageway	a	Nearside- 1 metre hard strip. Offside- 1 metre hard strip	Not permitted - motorway regulations	Not permitted - motorway regulations.	Full grade separation	7d
Dual 3 lane expressway (D3E) – 11 metre carriageway	a	Nearside- 1 metre hard strip. Offside- 1 metre hard strip	Not permitted - motorway regulations	Not permitted - motorway regulations	Full grade separation	8c

E/5.3 Expressways shall operate at the national speed limit.

E/5.4 The design speed for expressways shall be 120A kph.

Design speed relaxations

E/5.5 The scope for relaxations below desirable minimum on expressways shall be as defined in CD 109 [Ref 12.N] for Band A all-purpose roads.

E/5.5.1 Where an existing dual carriageway is being converted to expressway, and there will be no increase in speed limit or change to the existing geometric layout, combinations of relaxations on the existing mainline may be used in accordance with Section E/2 of CD 109 [Ref 12.N].

NOTE An example of a change to an existing geometric layout can include the introduction of a new junction, an additional running lane or a reduction in stopping sight distance.

E/5.6 All relaxations shall be recorded in the DSR.

SUPERSEDED

E/6. Layout of junctions

General

- E/6.1 Junctions on expressways shall be designed in accordance with CD 122 [Ref 7.N] unless otherwise stated in this section.
- E/6.2 Compact grade separated junctions shall not be used on expressways.
- E/6.3 The choice of junction layout shall be derived from Figure 3.12 and Figure 3.26a in CD 122 [Ref 7.N].
- E/6.4 The geometric parameters shall be derived from Table 3.21 and Table 3.31, 120kph all-purpose in CD 122 [Ref 7.N].
- NOTE Weaving lengths are as defined for all-purpose roads in CD 122 [Ref 7.N].*
- E/6.5 Connector roads shall be designed to 120kph all purpose standard as defined in Table 5.4 of CD 122 [Ref 7.N].
- E/6.6 Where junctions are provided for a single direction of travel, the geometric parameters shall be derived from Table 3.21 and Table 3.31, 120kph all-purpose in CD 122 [Ref 7.N].
- E/6.7 Junctions shall be limited to connections with A and B classified roads, motorways, services, rest areas and junctions required to support localised interaction that have been approved by the Overseeing Organisation.
- NOTE Junctions required for localised interaction and growth can include major retail outlets, significant visitor attractions, major housing developments or transport hubs.*
- E/6.8 Alternative routes to/from closed connections on existing roads shall form part of expressway schemes.
- E/6.9 Terminal junctions of expressway schemes or corridors shall be grade separated.

E/7. Cross section and vehicle restraint system

General

E/7.1 The cross section and road restraint systems for expressways shall be designed in accordance with CD 127 [Ref 1.N] and CD 377 [Ref 23.N] unless otherwise stated in this section.

Vehicle restraint system (VRS)

E/7.2 The application of a relaxation in setback shall be recorded in the DSR.

E/7.3 For the purposes of the point of measurement of set-back, an emergency area shall be treated as a hard strip.

NOTE The measurement of emergency area set-back used in this document aligns with the smart motorway requirements in CD 127 [Ref 1.N].

E/7.4 Central reserve safety barrier shall be H1 or greater containment level in accordance with BS EN 1317 [Ref 25.N].

E/7.5 Central reserve safety barrier shall be rigid, have a serviceable life of not less than 50 years and be designed such that after testing in accordance with BS EN 1317-1 [Ref 27.N] and BS EN 1317-2 [Ref 26.N], it does not require realignment, replacement or repair.

E/7.6 Full height anchorages shall only be used at emergency area locations where VRS is required and where there is insufficient room for two full length terminals.

E/7.7 Full height anchorages shall only be used at emergency area locations where they do not face oncoming traffic, unless behind another VRS (and outside of its working width and vehicle intrusion).

Central reserve

E/7.8 An assessment shall be made of the benefits/dis-benefits of both soft and paved central reserve options to establish the solution.

E/7.9 The chosen central reserve solution shall be subject to acceptance by the SCRG and recorded in the DSR.

E/8. Place of relative safety and roadside features

Place of relative safety

E/8.1 Places of relative safety, which includes emergency areas, shall be designed in accordance with MPI 66 [Ref 38.N].

NOTE 1 MPI 66 [Ref 38.N] smart motorway all lane running requirements and advice for places of relative safety also apply to expressways.

NOTE 2 Rest areas and truck stops can also be classified as places of relative safety on expressways.

E/8.2 Emergency area surfacing, road marking and signing requirements shall be provided in accordance with Section E/9 of this document.

Parking lay-bys

E/8.3 Parking lay-bys shall not be provided on expressways.

Roadside facilities

E/8.4 Guidance shall be sought from the Overseeing Organisation on roadside facilities for expressways.

NOTE Work is ongoing to determine the requirements for roadside facilities for expressways, including the approach to corridor strategies, rest areas and parking for large goods vehicles (LGVs) on an expressway corridor.

E/8.5 The maximum distance between services and rest areas shall be provided in accordance with Annex B of DFT Circular 2/13 Annex B [Ref 34.N].

E/8.6 Services and truck stops shall be provided in accordance with Annex B of DFT Circular 2/13 Annex B [Ref 34.N].

E/8.7 Provision of service and rest areas on a scheme shall form part of an overall corridor strategy agreed by the Overseeing Organisation and recorded in the DSR.

Bus stops

E/8.8 Bus stops shall not be provided on expressways.

NOTE Bus stops are not provided on expressways due to the prohibition of WCHs.

E/8.9 Pro-active stakeholder engagement shall be undertaken from HE PCF [Ref 14.N] stage 1 to determine the required changes to bus stop provision.

Traffic officer outstations

E/8.10 The need for additional traffic officer outstations shall be identified through liaison with the Overseeing Organisation commencing at HE PCF [Ref 14.N] stage 1.

NOTE The extension of the traffic officer coverage and level of service can generate the need for additional outstations.

Abnormal load bays

E/8.11 The corridor shall be assessed for existing abnormal load bay provision.

E/8.12 Where abnormal load bay provision exists, the need to retain the facility shall be agreed with the Overseeing Organisation.

E/8.13 The proposed location, layout and operating procedures for abnormal load bays shall be subject to acceptance by the SCRG.

NOTE Traffic signs for abnormal load bays can require non-prescribed signs authorisation.

Turnaround points

- E/8.14 The potential time for traffic officers and core responders to reach live lane incidents shall be assessed in the design.
- E/8.15 The incident response time assessment and any additional turnaround provision shall be accepted by the SCRG.
- NOTE Additional turnaround provision can be needed for traffic officers to meet their incident response targets.*

Emergency access/egress provision

- E/8.16 Emergency access/egress provision and removable barrier shall be determined in accordance with GD 368 [Ref 15.N], CD 377 [Ref 23.N] and through liaison with the Overseeing Organisation and the emergency services.
- E/8.17 Emergency crossing points shall be supplemented by hardened verges where required to support vehicles with a large turning circle.
- E/8.17.1 Emergency crossing points may be co-located with emergency areas to provide the required turning area.
- NOTE The Overseeing Organisation is continuously seeking to clear incidents more quickly. Part of the toolkit to help clear incidents more quickly is emergency access/egress provision.*

Tunnels

- E/8.18 Tunnels on expressways shall be designed in accordance with CD 352 [Ref 2.N].
- E/8.19 CD 352 [Ref 2.N] shall take precedence over the requirements in this document unless otherwise agreed with the Overseeing Organisation.
- E/8.20 Where a conflict arises between CD 352 [Ref 2.N] and this document, this shall be raised with the Overseeing Organisation for a decision.

E/9. Signing and road marking

General

E/9.1 Junction signing on expressways shall be positioned in accordance with CD 146 [Ref 21.N].

NOTE *This amends Note 1 for clause 1.1 in CD 146 [Ref 21.N].*

E/9.2 Where the decision has been taken to designate as a motorway, traffic signs and road markings must be provided to comply with TSRGD [Ref 35.N] requirements for a motorway.

Direction signing

E/9.3 A signing and junction numbering strategy shall be agreed with the Overseeing Organisation and adjacent local highway authorities and recorded in the DSR.

E/9.4 Advance direction signs (ADS) shall be verge mounted on posts unless overhead direction signing is justified in accordance with CD 146 [Ref 21.N].

NOTE 1 *In some complex situations, ahead signage can be beneficial on the primary and secondary ADS, but non-prescribed sign authorisation can be required where the primary and secondary ADS are verge mounted.*

NOTE 2 *Overhead signing is mounted on a cantilever or portal gantry.*

E/9.5 Junction numbers shall be provided on ADS.

Countdown markers, marker posts and driver location signs

E/9.6 Countdown markers and driver location signs shall be provided in accordance with CD 193 [Ref 4.N] and TSM (Guidance) [Ref 9.N].

E/9.7 Countdown markers shall not be provided at lane drop junctions.

E/9.8 Marker posts shall be provided on expressways.

Gateway and exit signing

E/9.9 Where the decision has been taken to designate as a motorway, motorway regulation signing shall be provided on expressways.

E/9.10 An information sign 'No hard shoulder for XX miles' to Diagram 820.1 in TSRGD [Ref 35.N] shall be provided in accordance with IAN 161 [Ref 30.N].

NOTE *IAN 161 [Ref 30.N] smart motorway all lane running requirements and advice for the 'No hard shoulder for XX miles' information sign also apply to expressways.*

Emergency area – surfacing, road marking and signing

E/9.11 Emergency area surfacing, road markings and signing shall be provided in accordance with MPI 66 [Ref 38.N].

NOTE *MPI 66 [Ref 38.N] smart motorway all lane running requirements and advice for emergency area surfacing, road marking and signing also apply to expressways.*

Variable speed limit and enforcement camera signing

E/9.12 Variable speed limit and enforcement camera signing shall be provided in accordance with IAN 161 [Ref 30.N].

NOTE *IAN 161 [Ref 30.N] smart motorway requirements and advice for variable speed limit and enforcement camera signing also apply to expressways.*

Local highway authority signing

E/9.13 Liaison with adjacent local highway authorities shall commence in HE PCF [Ref 14.N] stage 1 to identify changes that are required to their road signing.

NOTE Where the decision has been taken to designate as a motorway, local highway authority signing changes are expected to include the provision of motorway route signing.

E/9.14 The design shall include for the provision of off network diversion routes using symbol signs agreed with the Overseeing Organisation and adjacent local highway authorities.

SUPERSEDED

E/10. Roadside technology and communications

General

E/10.1 Liaison with the Overseeing Organisation shall be undertaken to identify opportunities to optimise roadside technology and communications provision.

NOTE The Overseeing Organisation has a long-term objective to optimise roadside technologies across the strategic road network. Optimisation could include a more proportionate approach to technology deployment that reduces the capital and operational costs and minimises the environmental impact.

E/10.2 Guidance shall be sought from the Overseeing Organisation on optimised technology options for expressways.

NOTE Work is ongoing to develop optimised technology requirements for expressways.

Infrastructure and telecommunication services

E/10.3 Infrastructure and telecommunication services shall be designed in accordance with TD 131 [Ref 29.N].

NOTE The majority of APTRs do not have an existing longitudinal communications cable network and therefore a new communications network is expected to be required to support the on-road technology. This can comprise hard wired communications or wireless (including microwave, C band WiFi, satellite communications etc) or both.

Control signals and VMS

E/10.4 Guidance shall be sought from the Overseeing Organisation on the evolving requirements for control signals and VMS.

NOTE Work is ongoing to finalise the control signal and VMS requirements including:

- 1) the potential to remove lane signalling at gateway and intermediate positions;*
- 2) the potential to reduce VMS sizes.*

E/10.5 Control signals and VMS shall be provided in accordance with the smart motorway all lane running (ALR) control signal requirements in CD 146 [Ref 21.N].

NOTE CD 146 [Ref 21.N] smart motorway - all lane running requirements and advice for control signals and VMS also apply to expressways. This amends Note 1 for clause 1.1 in CD 146 [Ref 21.N].

E/10.6 Reference to 'lane 4' in clause E/1.22 of CD 146 [Ref 21.N] shall be amended to 'outside lane' for expressways.

E/10.7 Entry slip signals shall be provided in accordance with CD 146 [Ref 21.N].

NOTE CD 146 [Ref 21.N] smart motorway - all lane running requirements and advice for entry slip signals also apply to expressways.

Strategic variable message signing

E/10.8 Where strategic VMS signs are already in place they shall be retained or re-positioned in accordance with CD 146 [Ref 21.N].

E/10.9 New strategic VMS shall not be provided on expressways.

Detection

E/10.10 Detection design to support MIDAS-based incident detection, variable mandatory speed limits, traffic counting sites and stopped vehicle detection shall be in accordance with TD 131 [Ref 29.N] and this document.

E/10.11 Detection equipment shall be positioned to minimise the number of sites that are located remotely from an emergency area/maintenance hard standing (MHS) site or an off-network access point.

E/10.12 Where detection equipment is located remotely from an emergency area/MHS site or an off-network access point, a maintenance strategy shall be produced and be subject to acceptance by the SCRG and recorded in the DSR.

Closed Circuit Television (CCTV)

- E/10.13 CCTV requirements and advice in TD 131 [Ref 29.N] shall not apply to expressways.
- E/10.14 Pan-tilt zoom cameras shall enable operators to see places of relative safety (located within the motorway boundary), maintenance hard standings and in excess of 95% of the main carriageway in all ambient light levels.
- E/10.15 A 1.75 metre cube target, shall represent a minimum of 5% of the image height at maximum zoom.
- E/10.16 CCTV coverage shall enable views of the ERT in emergency areas to represent a minimum of 10% of the image height.
- E/10.17 CCTV coverage of an ERT located at a new short section of hard shoulder or hard shoulder defined as a place of relative safety shall represent a minimum of 10% of the image height.
- E/10.18 CCTV cameras associated with a place of relative safety shall include a pre-set position to view and zoom into the place of relative safety in addition to the home position and any other positions agreed with the Overseeing Organisation.
- E/10.19 CCTV cameras shall be located and mounted so that they provide the required coverage.
- E/10.19.1 The location and mounting of CCTV cameras should take coverage, environmental conditions, image stability and whole life costs into account.
- E/10.19.2 CCTV cameras should be co-located with other roadside technology equipment, for efficient construction and ongoing maintenance, including calibration.
- E/10.20 CCTV equipment shall be positioned to minimise the number of sites that are located remotely from an emergency area/MHS site or an off-network access point.
- E/10.21 Where CCTV equipment is located remotely from an emergency area/MHS site or an off-network access point, a maintenance strategy shall be produced and be subject to acceptance by the SCRG and recorded in the DSR.

Compliance and enforcement

- E/10.22 A compliance strategy shall be developed to identify any requirements that need to be included in expressway schemes in addition to the speed and red x enforcement requirements outlined in this section.
- NOTE Refer to Appendix E/D.2 for advice on compliance.*
- E/10.23 Speed and red X enforcement shall be provided on expressways.
- E/10.24 Guidance shall be sought from the Overseeing Organisation on the generic compliance strategy that is being developed for the expressway concept.
- NOTE A generic compliance strategy is being developed for expressways.*
- E/10.25 Guidance shall be sought from the Overseeing Organisation on the deployment, funding and operational arrangements for enforcement systems.
- E/10.26 To enable operation of variable mandatory speed limits (VMSL), expressway schemes shall have the necessary legal framework in place.
- NOTE Refer to Section E/14 of this document for legal requirements for expressways.*

Connected vehicle provision

- E/10.27 Guidance shall be sought from the Overseeing Organisation on the future provision for connected vehicles on expressway schemes.

NOTE Work is ongoing to determine the requirements for connected vehicles.

Geographic addressing

E/10.28 Guidance shall be sought from the Overseeing Organisation on geographic addressing on expressways.

NOTE Work is ongoing to determine the requirements for geographic addressing on expressways.

SUPERSEDED

E/11. Structures

VMS supporting structures

- E/11.1 The design of VMS supporting structures shall be in accordance with CD 365 [Ref 20.N].
- E/11.2 An assessment of VMS access arrangements shall be undertaken in accordance with CD 365 [Ref 20.N].
- E/11.3 Where VMS locations are aligned on both carriageways, super-span gantry structures shall not be used as an alternative to two cantilever structures.
- E/11.4 A VMS shall only be mounted on a super-span gantry if a portal gantry is already required for ADS signing on the opposing carriageway and this has been justified in accordance with Section E/9 of this document.
- E/11.5 Guidance shall be sought from the Overseeing Organisation on the potential requirement to mount wireless equipment on structures.
- E/11.5.1 Wireless mounting arrangements may include future proofing for connected vehicle systems.
- E/11.5.2 The need for mobile elevated working platform access for wireless equipment maintenance should be minimised.

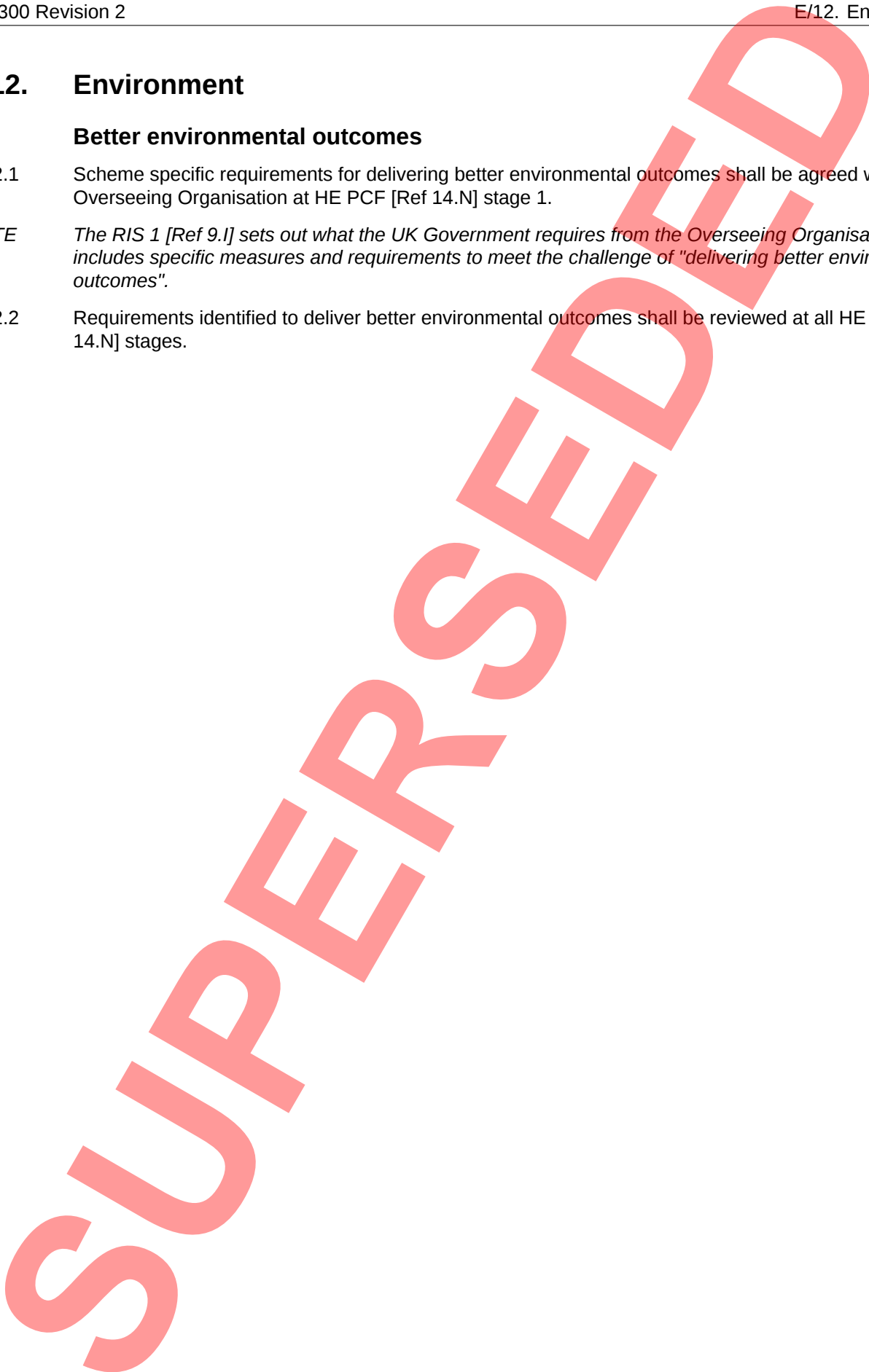
E/12. Environment

Better environmental outcomes

E/12.1 Scheme specific requirements for delivering better environmental outcomes shall be agreed with the Overseeing Organisation at HE PCF [Ref 14.N] stage 1.

NOTE The RIS 1 [Ref 9.I] sets out what the UK Government requires from the Overseeing Organisation; and includes specific measures and requirements to meet the challenge of "delivering better environmental outcomes".

E/12.2 Requirements identified to deliver better environmental outcomes shall be reviewed at all HE PCF [Ref 14.N] stages.



E/13. Walkers, cyclists and horse-riders (WCHs) and slow-moving vehicles

General

E/13.1 Where the decision has been taken to designate as a motorway, motorway regulations and the associated road user prohibitions shall apply to expressways.

NOTE Prohibited users for expressway are the same as motorways to support road user understanding and behaviour and to enhance safety and operational performance.

WCH assessments and alternative provision

E/13.2 Alternative provision for WCHs shall be included in the client scheme requirements HE PCF [Ref 14.N] product.

E/13.3 Alternative provision for WCHs shall be assessed in accordance with GG 142 [Ref 39.N] from HE PCF [Ref 14.N] stage 1.

E/13.3.1 Alternative WCH provision requirements identified through assessment can include 'off line' or a parallel segregated facility within the highway boundary and this should be the preferred option wherever practicable.

E/13.3.2 Segregated facilities should include a physical barrier that prevents easy access from a WCH facility to expressway carriageway.

E/13.4 Where a parallel segregated facility is to be provided within the highway boundary adjacent to an expressway cross section, the special road boundary shall be located between the expressway cross section and the segregated WCH facility.

NOTE As part of the development consent order process, positioning the special road boundary between the expressway cross section and the WCH facility removes the prohibitions to enable WCH use of their segregated facility.

E/13.5 The level of WCH provision shall reflect the range of potential users, key destinations, latent demand and severance of routes.

NOTE A generic expressway GG 104 [Ref 24.N] risk assessment for WCHs has been produced and can be obtained from the Overseeing Organisation.

E/13.6 GG 142 [Ref 39.N] WCH assessment and review report and alternative provision proposals shall be accepted by the SCRG.

Slow-moving vehicle assessments and alternative provision

E/13.7 Alternative provision for slow-moving vehicles shall be included in the client scheme requirements HE PCF [Ref 14.N] product.

E/13.8 Alternative provision for slow-moving vehicles shall be assessed using a GG 104 [Ref 24.N] risk assessment from HE PCF [Ref 14.N] stage 1.

NOTE A generic expressway GG 104 [Ref 24.N] risk assessment for slow-moving vehicles has been produced and can be obtained from the Overseeing Organisation.

E/13.9 The GG 104 [Ref 24.N] risk assessment and alternative provision proposals for slow-moving vehicles shall be accepted by the SCRG.

Stakeholder engagement and enhancing community cohesion

E/13.10 Where identified in the WCH and slow-moving vehicle provision assessments, expressway schemes shall include new bridges, underpasses and parallel routes to make sure community cohesion is enhanced and not eroded.

- E/13.11 Where 'off line' provision works for WCHs and slow-moving vehicles is required, the adopting local highway authority shall be engaged to determine the design standards to be applied to this provision, with the preference being given to best practice standards for separate WCH dedicated infrastructure.

SUPERSEDED

E/14. Legal

- E/14.1 Where the decision has been taken to designate as a motorway, the Motorways Traffic (England and Wales) Regulations 1982 MT(E&W) 1982 [Ref 18.N] and The Motorways Traffic (Speed Limit) Regulations 1974 MT(SL) 1974 [Ref 33.N] shall apply to expressways.
- E/14.2 Guidance shall be sought from the Overseeing Organisation from HE PCF [Ref 14.N] stage 1 to determine the approach to legislative changes required to support expressways.

SUPERSEDED

E/15. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. CD 127, 'Cross-sections and headrooms'
Ref 2.N	Highways England. CD 352, 'Design of road tunnels'
Ref 3.N	Highways England. GD 304, 'Designing health and safety into maintenance'
Ref 4.N	Highways England. CD 193, 'Driver location signs'
Ref 5.N	TSO. EPA 1990, 'Environmental Protection Act'
Ref 6.N	Highways England. CD 123, 'Geometric design of at-grade priority and signal-controlled junctions'
Ref 7.N	Highways England. CD 122, 'Geometric design of grade separated junctions'
Ref 8.N	Highways England. CD 116, 'Geometric design of roundabouts'
Ref 9.N	The National Archives. Department for Transport. TSM (Guidance), 'Guidance. The Traffic Signs Manual'
Ref 10.N	The National Archives. legislation.gov.uk . SI 1999/3242, 'HEALTH AND SAFETY - The Management of Health and Safety at Work Regulations 1999'
Ref 11.N	The National Archives. legislation.gov.uk . HASAWA 1974 c.37, 'Health and Safety at Work etc. Act 1974'
Ref 12.N	Highways England. CD 109, 'Highway link design'
Ref 13.N	The National Archives. legislation.gov.uk . Highways Act 1980, 'Highways Act 1980'
Ref 14.N	HE PCF, 'Highways England's Project Control Framework'
Ref 15.N	Highways England. GD 368, 'Infrastructure requirements for emergency access and egress from motorway and all-purpose trunk roads'
Ref 16.N	Highways England. GG 103, 'Introduction and general requirements for sustainable development and design'
Ref 17.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 18.N	gov.uk . MT(E&W) 1982, 'Motorways Traffic (England and Wales) Regulations 1982'
Ref 19.N	The National Archives. legislation.gov.uk . NRSWA 1991, 'New Roads and Street Works Act 1991'
Ref 20.N	Highways England. CD 365, 'Portal and cantilever signs/signals gantries'
Ref 21.N	Highways England. CD 146, 'Positioning of signalling and advance direction signs'
Ref 22.N	Highways England. MPI 11, 'Provision of Access Arrangements to Equipment on SM-ALR Schemes'
Ref 23.N	Highways England. CD 377, 'Requirements for road restraint systems'
Ref 24.N	Highways England. GG 104, 'Requirements for safety risk assessment'
Ref 25.N	BSI. BS EN 1317, 'Road restraint systems.'
Ref 26.N	BSI. BS EN 1317-2, 'Road restraint systems. Performance classes, impact test acceptance criteria and test methods for safety barriers including vehicle parapets '

Ref 27.N	BSI. BS EN 1317-1, 'Road restraint systems. Terminology and general criteria for test methods.'
Ref 28.N	RTRA 1984, 'Road Traffic Regulation Act 1984'
Ref 29.N	Highways England. TD 131, 'Roadside technology and communications'
Ref 30.N	Highways England. IAN 161, 'Smart Motorways'
Ref 31.N	The National Archives. legislation .gov.uk. SI 2015/51, 'The Construction (Design and Management) Regulations 2015'
Ref 32.N	Highways England. CD 169, 'The design of lay-bys, maintenance hardstandings, rest areas, service areas and observation platforms'
Ref 33.N	gov.uk. MT(SL) 1974, 'The Motorways Traffic (Speed Limit) Regulations 1974'
Ref 34.N	Department for Transport. DFT Circular 2/13 Annex B, 'The strategic road network and the delivery of sustainable development. Annex B '
Ref 35.N	The Stationery Office. TSRGD, 'The Traffic Signs Regulations and General Directions 2016'
Ref 36.N	TSO. Department for Transport. TSM Chapter 8, 'Traffic Signs Manual Chapter 8 - Road works and temporary situations'
Ref 37.N	Highways England. SMP-SA02-ITLG-DGA-E-E1.10, 'Turnarounds (and other facilities that aid operations)'
Ref 38.N	Highways England. MPI 66, 'Updated requirements to IAN 161/15'
Ref 39.N	Highways England. GG 142, 'Walking, cycling and horse-riding assessment and review'

E/16. Informative references

The following documents are informative references for this document and provide supporting information.

Ref 1.l	Highways England. MCH 2584, 'Guidance for the calibration and optimisation of Smart Motorway systems'
Ref 2.l	Highways England. H&S 5yr, 'Health and Safety 5 year Action Plan, May 2017'
Ref 3.l	IRAP.org. IRAP, 'International road assessment programme'
Ref 4.l	Highways England. Expressway EqIA, 'Motorways: Expressway Standard Generic EqIA'
Ref 5.l	Highways England. Expressway GSR, 'Motorways: Expressway Standard Generic Safety Report'
Ref 6.l	Highways England. OMM, 'Operational Metrics Manual'
Ref 7.l	Highways England. RtB 26, 'Raising the bar 26'
Ref 8.l	gov.uk. STATS19, 'Reported road casualties in Great Britain'
Ref 9.l	Department for Transport. RIS 1, 'Road Investment Strategy'
Ref 10.l	Department for Transport. Highway Code, 'The Highway Code'
Ref 11.l	gov.uk. RDV(TO)E 2008, 'The Removal and Disposal of Vehicles (Traffic Officers) (England) Regulations 2008'

Appendix E/A. Generic objectives

E/A1 Objectives

No specific programme level objectives have been set for expressways as they are covered by the KPIs and PIs detailed in the operational metrics manual OMM [Ref 6.I]. Generic scheme level objectives for expressways are derived from the KPIs and PIs as detailed in the OMM and are provided in Table E/A.1. Where 'no additional scheme objective' is stated the performance should be as detailed in the OMM.

Table E/A.1 Expressway – generic scheme level objectives

Performance specification	Objectives
Making the network safer	<p>The safety objective for expressway road users is to deliver a safety performance that is a minimum of the average performance of a dual three lane motorway without motorway incident detection and automatic signalling. Safety risks for individual populations should be assessed and managed in accordance with GG 104 [Ref 24.N]</p> <p>The risk to road workers are managed in accordance with the requirements of the Health and Safety at Work etc Act HASAWA 1974 c.37 [Ref 11.N] as low as reasonably practicable. There is no specific numerical safety objective set for road workers.</p> <p>IRAP [Ref 3.I] minimum Star Rating of 3 (or equivalent Overseeing Organisation rating system).</p> <p>Expressway schemes should work towards the goal of bringing the number of people killed or injured on the network as close as possible to zero by 2040.</p> <p>Refer to Section E/3 of this document for further details on operational safety.</p>
Improving user satisfaction	No additional scheme objectives.
Supporting the smooth flow of traffic	<p>Incidents cleared. Target: At least 85% of all lane impact closures between 0600 and 2200 are cleared within one hour.</p> <p>Planning time index (reliability of journeys). The ratio of the 95th percentile journey time of all journeys and the free-flow journey time. Target: To match or exceed the averaged performance of the Overseeing Organisation's motorway network (based upon the latest available data averaged over 1 year).</p> <p>Acceptable journeys. Proportion of journeys faster than 4/3 of the free flow journey time. Target: To match or exceed the averaged performance of the Overseeing Organisation's motorway network (based upon the latest available data averaged over 1 year).</p> <p>Average speed. The flow weighted average speed of car journeys. Target: To match or exceed the averaged performance of the Overseeing Organisation's motorway network (based upon the latest available data averaged over 1 year).</p>
Encouraging economic growth	Enhance the connectivity of economic hubs and induce economic growth.

Table E/A.1 Expressway – generic scheme level objectives (continued)

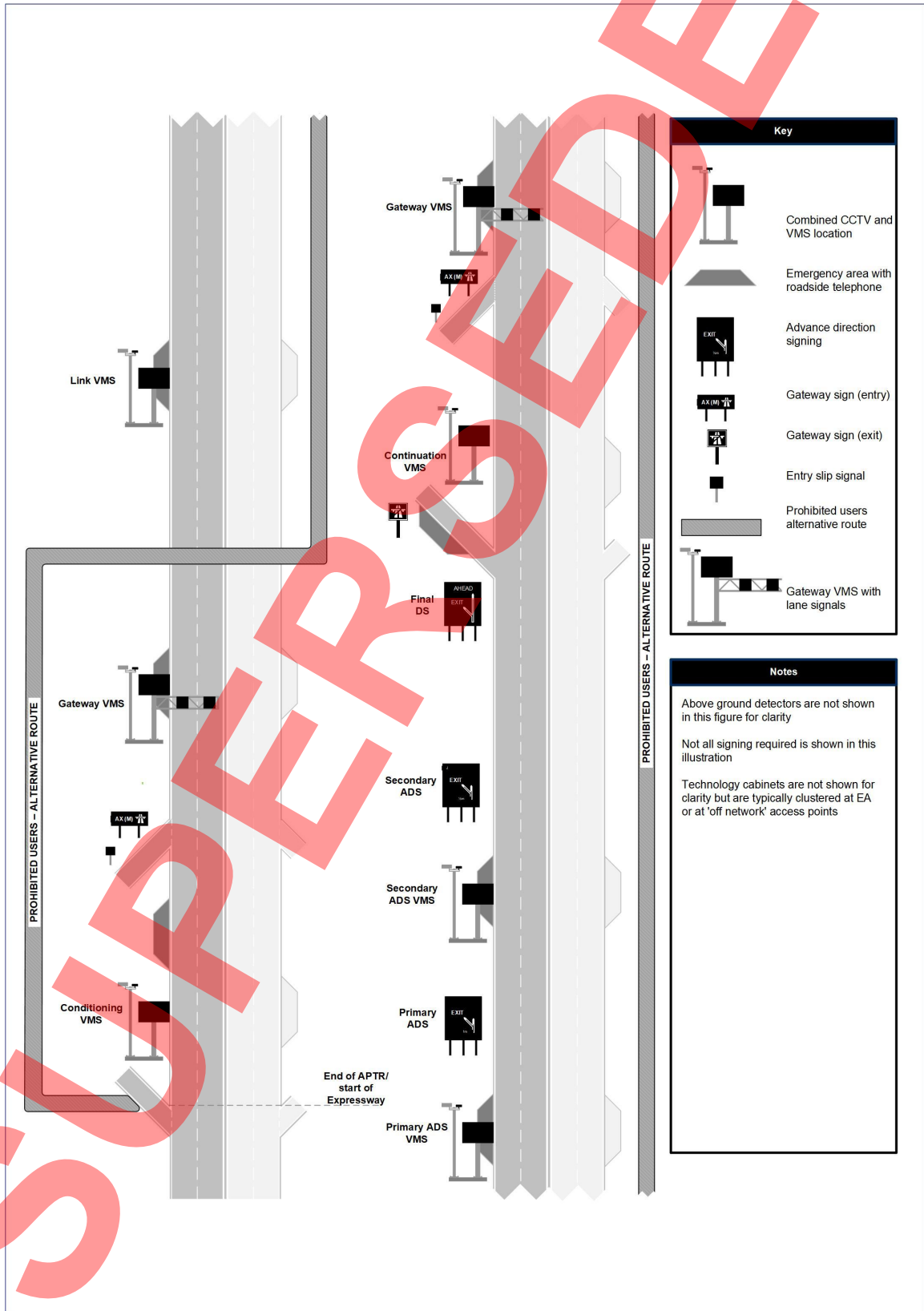
Performance specification	Objectives
Delivering better environmental outcomes	<p>Mitigate noise important areas wherever practicable. Deliver improved biodiversity as set out in the Overseeing Organisation's biodiversity plan. Monitor carbon dioxide equivalents. Demonstrate activities undertaken and how effective they have been at improving environmental outcomes.</p> <p>Sustainable development and design undertaken in accordance with GG 103 [Ref 16.N].</p>
Helping cyclists, walkers and other vulnerable users	<p>Community and WCH enhancements to positively transform the WCH journey experience. The level of WCH provision is to reflect the range of potential users, key destinations and latent demand. The facilities for WCHs should be at least as good as they were and preferably better than prior to the improvement scheme.</p>
Achieving real efficiency	No additional scheme objectives.
Keeping the network in good condition	5 years major renewal free period following operational handover.

Appendix E/B. Generic layout

A generic layout for expressways is illustrated in Figure E/B.1 (where the decision has been taken to designate as a motorway).

SUPERSEDED

Figure E/B.1 Generic design for expressways (illustrative purposes only) [NOTE: Refer to section E/10 of this document regarding optimised technology for expressways]



Appendix E/C. Delivery levels and design components

E/C1 Delivery levels

Four delivery levels are outlined in Table E/C.1 to Table E/C.4. Table E/C.5 summarises the design components in greater detail. Level 1 and 2 schemes are high performing all-purpose dual carriageways that are compatible for level 3 or 4 schemes should the decision be made to convert in the future. Level 1 and 2 schemes do not fully meet the objectives defined in Appendix E/A. Level 3 and 4 schemes meet the objectives defined in Appendix E/A.

Table E/C.1 Level 1 design components

<ol style="list-style-type: none"> 1) Dual 2/3 lane carriageway (with emergency crossing points) at national speed limit 2) No direct access or central reserve gaps 3) Emergency lay-bys and parking lay-bys as required 4) Alternative provision for walkers, cyclists and horse-riders/slow-moving vehicles (refer to Section E/3 and E/13 of this document) 5) Grade separated junctions. 6) Design components to facilitate compatibility with other levels 7) APTR designation 8) Aesthetic/environmental enhancements.
<p>NOTE 1: Delivery of a level 1 scheme is not a commitment to implementing another level in the future.</p> <p>NOTE 2: Appendix E/F provides advice for the development of all levels and indicates the potential for compatibility measures with other levels.</p>

Table E/C.2 Level 2 design components

<ol style="list-style-type: none"> 1) Level 1 design components plus: 2) Central reserve safety barrier with an H1 or greater containment level with a serviceable life of not less than 50 years. 3) Design components to facilitate compatibility with other levels 4) APTR designation 5) Aesthetic/environmental enhancements.
<p>NOTE 1: Delivery of a level 2 scheme is not a commitment to implementing another level in the future.</p> <p>NOTE 2: Appendix E/F provides advice for the development of all levels and indicates the potential for compatibility measures with other levels.</p>

Table E/C.3 Level 3 design components

<ol style="list-style-type: none"> 1) Level 1 (excluding lay-bys and parking lay-bys) and 2 design components 2) Technology: Traffic detection, CCTV, Variable speed limits 3) Walkers, cyclists and horse-riders/slow-moving vehicle prohibitions (refer to Section E/3 and E/13 of this document) 4) Junction numbering 5) Infill APTR Emergency Areas/conversion of lay-bys to APTR Emergency Areas 6) Traffic officer on road and operations centre operators 7) Rest/service area provision 8) A minimum of 10 miles in length 9) APTR designation 10) Aesthetic/environmental enhancements 11) Design components to facilitate compatibility with other levels.
<p>NOTE 1: Delivery of a level 3 scheme is not a commitment to implementing another level in the future.</p> <p>NOTE 2: Appendix E/F provides advice for the development of all levels and indicates the potential for compatibility measures with other levels.</p> <p>NOTE 3: Guidance to be sought from the Overseeing Organisation regarding the legal approach and design requirements for a level 3 scheme, Appendix E/F provides some additional advice.</p>

Table E/C.4 Level 4 design components

<ol style="list-style-type: none"> 1) Level 1 (excluding emergency lay-bys and parking lay-bys), 2 and 3 design components 2) Aesthetic/environmental enhancements 3) Motorway designation, signing and effected design components where a decision in support of motorway designation has been made by the Overseeing Organisation in conjunction with the DfT.

Implementation of a level 2, 3 or 4 scheme can be through the culmination of a number of scheme upgrades (multi-level delivery) or a single scheme (single level delivery).

Consideration may be given to bringing forward the delivery of design components to an earlier level where the benefits of doing so can be clearly demonstrated.

E/C2 Design components

Refer to Table E/C.5 for a summary of design components. Detailed requirements are contained in the main body of this document and take precedence over Table E/C.5. Refer to Table E/C.1 to E/C.4 for level definitions.

Table E/C.5 Summary of design components

Ref	Level	Design component
1	Level 4	<p>Motorway designation where a decision in support of motorway designation has been made by the Overseeing Organisation in conjunction with the DfT.</p> <p>Only applied where the designated route either connects to a motorway or has a length that exceeds 10 miles with terminal junctions that intersect with the edge of an urban area or major transport hub (such as an airport).</p> <p>NOTE: The requirements and arrangements for litter picking, sweeping, cleaning and clearance; statutory undertaker restrictions and boundary fences are consistent with those for a motorway.</p>
2	Levels 1 to 4	<p>Improved environmental outcomes, through delivery and implementation of activities set out in the Overseeing Organisation's environmental and sustainable development strategies and action plans.</p>
3	Level 3 Level 1	<p>Walkers, cyclists, horse-riders (WCH) and slow-moving vehicles are prohibited.</p> <p>Alternative provision for WCHs is assessed in accordance with GG 142 [Ref 39.N]. Alternative provision requirements identified through the assessments may include 'off line' or a segregated facility within the highway boundary. The level of alternative provision reflects the range of potential users, key destinations and latent demand.</p> <p>At level 1 and level 3 refer to Section E/3 and E/13 of this document.</p> <p>NOTE: Alternative WCH provision is not solely driven by expressway requirements and is substantially covered by existing requirements and advice documents.</p>
4	Level 1	<p>2 or 3 lane all-purpose dual carriageway to CD 109 [Ref 12.N] operating at national speed limit with CD 122 [Ref 7.N] compliant junctions and no central reserve gaps.</p> <p>There is no direct public access/egress to/from an expressway other than at junctions.</p> <p>Junctions are limited to connections with A and B classified roads, services and motorways unless a junction is required to support localised interaction to facilitate growth e.g. at major retail outlets, significant visitor attractions, major housing developments or transport hubs, but this has to be agreed with the Overseeing Organisation.</p>
5	Level 2	<p>Central reserve safety barrier with an H1 or greater containment level with a serviceable life of not less than 50 years.</p>
6	Level 1/2	<p>Emergency crossing points are provided in the central reserve in accordance with GD 368 [Ref 15.N] and are supplemented by hardened verges (where required) to support vehicles with a large turning circle.</p>
7	Level 3	<p>VMS for incident/traffic management and information are provided in accordance with CD 146 [Ref 21.N].</p> <p>Provision of variable mandatory speed limits (VMSL) for congestion management.</p> <p>VMS are co-located with an emergency area or off network access point to facilitate maintenance access wherever practicable.</p>

Table E/C.5 Summary of design components (continued)

Ref	Level	Design component
8	Level 1 Level 3	Emergency lay-bys and parking lay-bys as required. Emergency areas.
9	Level 3	Provision of a traffic detection and stopped vehicle detection system that is consistent with smart motorway requirements.
10	Level 3	Pan-tilt-zoom CCTV cameras providing comprehensive coverage.
11	Level 3	Technology assets integrated into the Overseeing Organisation's operations centre.
12	Level 3	Traffic Officer 'On road' and operations centre support.
13	Level 3	Off network rest/service areas at not more than 28 mile intervals and no more than 30 minutes driving time apart in accordance with DFT Circular 2/13 Annex B [Ref 34.N] "The strategic road network and the delivery of sustainable development."
14	Level 3	Junction numbering and 'on road' reference system.

Appendix E/D. Concept of operation

E/D1 Concept of operation - introduction

The concept of operation document sets out, at a high-level, guidance around the operational elements of expressways designed to the requirements in this document.

The intended audience of the concept of operation document is all those who are responsible for either the design or operation of expressways; including those performing incident management or maintenance activities on these sections once built, as well as those involved with customer and stakeholder communications.

The concept of operation document demonstrates that expressway schemes or corridors designed to the requirements in this document can be effectively operated and maintained. Detailed work instructions, operational procedures and processes should be in place and training given on their use in advance of expressway schemes becoming operational. These work instructions, procedures and processes are not covered in depth within this document.

The concept of operation document covers the following areas.

- 1) compliance (E/D2) – describes the importance of a compliant environment;
- 2) operating regime (E/D3) – describes how a generic expressway scheme or corridor is operated under 'normal' conditions, during both the peak and off-peak periods and also should an incident or heightened situation occur;
- 3) impact on communities and the Overseeing Organisation's customers (E/D4) – describes the impacts of expressways on all the Overseeing Organisation's customers, including: motorists, WCHs, emergency services, local communities and other parties;
- 4) impact on the Overseeing Organisation's operators (E/D5) – describes the impacts of expressways on all the Overseeing Organisation's network operators, including; on-road traffic officers and operations centre operators;
- 5) impact on the Overseeing Organisation's maintainers (E/D6) – describes the impacts of expressways on all the Overseeing Organisation's network maintainers;
- 6) concept validation and continual improvement (E/D7) – describes how validation of the expressway concept is undertaken and applied to enable continual improvement.

E/D2 Compliance

The aim of expressways is to significantly improve the current road user experience, providing free flowing journeys and safety levels at least comparable to the average performance of a dual three lane motorway without motorway incident detection and automatic signalling. These outcomes are achieved partly by improved infrastructure and partly by creating a 'controlled environment' where an intuitive network of roadside signs and signals, combined with an appropriate compliance strategy, is employed to inform, influence and control traffic. This approach builds upon the experience gained by the Overseeing Organisation through operating smart motorways. One of the fundamental outcomes of the controlled environment is suitably compliant driver behaviour.

It should be clear to road users when they enter and exit expressways. This is achieved by the presence of recognisable features and signing. Refer to Section E/9 of this document for gateway and exit signing requirements.

As part of the Operating Regime (combined) HE PCF [Ref 14.N] product, each expressway is required to have a compliance strategy; this defines the actions to be taken so that an appropriate level of compliance is achieved. It includes a requirement to assess the potential for non-compliance with specific rules; identifying any safety hazards that non-compliance may affect, in order to determine the overall impact on achieving the safety and operational objectives for expressways.

The compliance strategy should be to take account of aspects such as: the physical characteristics of the road; the proportion of different vehicle types expected to use the expressway; and levels of road user familiarity with expressways, recognising that the latter two may vary by time and day. The strategy should identify where engineering, education, encouragement and enforcement measures may be deployed to improve compliance. It is worth noting that compliance with signs and signals improves when road users understand the specific reasons as to why they have been set. Wherever appropriate, supporting information (pictograms or text) are set on the message signs to explain why lane closures and/or reduced speed limits have been implemented.

Assessment of a compliant environment includes consideration of the carriageway immediately upstream (entry) and downstream (exit) of the scheme extents and interaction with the local road network.

E/D2.1 Compliance issues on expressways

Expressways include a number of features that if not appropriately designed and/or managed may be subject to unacceptable levels of non-compliance; Table E/D.1 outlines these.

Table E/D.1 Identification of expressway features that may be subject to non-compliance

Expressway feature	Description of potential non-compliance	Additional comments
VMSL	Exceeding the speeds stated on the variable mandatory signals	
Prohibition of WCHs and slow-moving vehicles	WCHs and slow-moving vehicles utilise expressway despite the introduction of legal changes prohibiting them.	This could be more likely just after the opening of an expressway as an WCH/slow-moving vehicle may be familiar with the previous status of the road. This could be more likely if an alternative route is longer than the prohibited route.
Emergency areas	Emergency area misuse (non-emergency stops)	Routes with a high percentage of LGVs may be more susceptible to emergency area misuse. This could be more likely just after expressway opening where existing lay-bys are converted to emergency areas.
Lane closures	Road users ignoring lane closure red X aspects on a VMS.	

E/D2.2 Achieving compliance with expressway features

E/D2.2.1 Variable mandatory speed limits and lane closures

An automatic speed and red x enforcement system is provided on expressways. Refer to Section E/10 of this document.

E/D2.2.2 Prohibition of WCHs and slow-moving vehicles

WCHs and slow-moving vehicles are prohibited from using expressways. The design should include how WCH and slow-moving vehicle compliance is to be monitored and managed. This should be included in the compliance strategy and the plan for monitoring operations and monitoring output HE PCF [Ref 14.N] product.

E/D2.2.3 Non-emergency stops in emergency areas

Engineering design has a particular impact on the appropriate use of emergency areas, given their potential attractiveness to road users as a place to make short duration stops. Observed examples of non-emergency (and therefore illegal) use include road users stopping for phone calls, comfort breaks, map reading, tachograph breaks etc.

The demographics of users expected on an expressway should be assessed to understand the likely type of non-emergency stops to focus education (where appropriate) to help mitigate this. For example, evidence suggests that where freight users constitute a high proportion of traffic, emergency areas may be used more frequently for tachograph breaks. Education of road users is an important way of reminding them of the lawful purposes of emergency areas, and of the inherent dangers in making stops in emergency areas for non-emergency use. These issues should be addressed in the communications plan HE PCF [Ref 14.N] product.

Roadside facilities can reduce the number of non-emergency stops. Refer to Section E/8 of this document.

Refer to Section E/8 of this document for emergency area design requirements.

E/D2.3 Agreements and funding arrangements with enforcing bodies

Guidance should be sought from the Overseeing Organisation.

E/D3 Operating regimes

The following section describes, in broad terms, how a generic expressway scheme operates. It sets out the principles of a response to operational occurrences.

E/D3.1 Normal operation during off-peak periods

The off-peak period is expected to occur typically on weekdays; starting in the late evening, and continuing overnight. Off-peak conditions may also apply throughout the weekends; or between the morning and afternoon peak periods (the "inter-peak"), depending on the location and traffic patterns. Traffic flow profiles should be recorded in the operating regime (combined) HE PCF [Ref 14.N] product.

During off-peak operation, traffic volumes will generally be at their lowest. With all lanes available for traffic to use, headways will be larger, with traffic flowing freely. The national speed limit(s) will apply without any signalling in operation.

VMS will not be required for purposes relating to the operation of an expressway, and will therefore remain blank (if not required for queue protection or other purposes such as journey time messages or to support maintenance operations).

Strategic traffic information is provided by the national traffic information service and typically covers strategic diversions and journey time information including planned closures and events. Where strategic VMS signs are already in place they are retained or repositioned. There is no requirement to provide new strategic VMS for expressways as other media via smart phones and satellite navigation systems are available for road users to access this information. The national traffic information service may be granted permission to make use of VMS that are not provided specifically for strategic signing purposes.

The off-peak period provides the most appropriate conditions to perform maintenance requiring traffic management or other activities that may impact network availability, without unduly compromising network performance.

E/D3.2 Normal operation during peak periods

The peak period will usually occur on weekdays: typically with a morning and evening peak. Certain locations may routinely experience peak conditions outside of these times. Peak conditions may also be caused by planned events that increase demand (e.g. concerts, sporting events, etc). Traffic flow profiles should be recorded in the operating regime (combined) HE PCF [Ref 14.N] product.

As in the off peak, VMS will not be required for purposes relating to the operation of an expressway, and will therefore remain blank unless required for queue protection, journey times messages, maintenance operation or if the speed or flow thresholds are reached for congestion management (VMSL).

E/D3.3 Operation during incidents

Operations will respond to incidents in accordance with the agreed level of service. On-road and operations centre based staff will be provided with (and trained in the use of) suitable procedures and work instructions.

The expressway requirements have been developed to deliver a reduction in both the frequency and the severity of collisions when compared to an APTR.

The level of emergency area provision is typically expected to increase the likelihood of road users being able to reach a place of relative safety in an emergency.

The increased deployment of technology on the network provides operations centre staff with greater knowledge of what is happening during an incident, as well as the opportunity to assist the on-road response by setting supporting VMS. This necessitates clear communication between the 'Overseeing Organisation' and 'core responders'. In this context, the term 'Overseeing Organisation' is used to include the operations centre and on-road traffic officers as well as maintenance service providers and any other parties employed or contracted by the Overseeing Organisation. The term 'core responders' is used to refer to the emergency services, vehicle recovery services and private motorist assistance organisations involved in responding to or otherwise managing an incident. Incident management has four distinct phases.

- 1) incident detection and verification;
- 2) initial response and access;
- 3) scene management;
- 4) network restoration.

E/D3.3.1 Incident detection and verification

Once an operations centre operator is made aware of an incident (for example: through a stopped vehicle detection alert, an automated queue protection setting, or reports from a core responder organisation or road users) they are able to confirm the location and key aspects of the incident using the pan tilt zoom CCTV coverage provided throughout the extents of an expressway.

E/D3.3.2 Initial response and access

The operations centre operator mobilises the traffic officers and, depending on the incident severity, arranges for the emergency services to also attend. A combination of technology and traffic officer presence on an expressway network enables incidents to be accessed more quickly than on an APTR. VMS may be set to facilitate responder access to an incident. Nearside and offside 1m hardstrips create additional pavement width to help the passage of response vehicles through congested sections of expressway. Incident management techniques such as reverse running (if adopted) may also facilitate a more rapid response to incidents.

E/D3.3.3 Scene management – lane and carriageway closures

The operations centre operator will have the ability to set a lane or carriageway closure with supporting information messages and an appropriate reduced mandatory speed limit. This will warn approaching road users of the hazard, enabling them to reduce their speed safely to appropriate levels to protect those involved in managing the incident as well as other road users.

Where available elsewhere on the SRN, strategic VMS may be used to warn road users of the incident and give them the opportunity to re-route.

E/D3.3.4 Network restoration

Traffic officer resources, core responders and the MSP facilitate the restoration of the carriageway back to 'normal conditions'.

E/D3.4 Other operational aspects**E/D3.4.1 Emergency areas**

Road users are instructed by signs at an emergency area to use the emergency roadside telephone provided "Driver must use SOS phone and await advice to re-join main carriageway". Where appropriate the operations centre may set the VMS to support road users re-joining the main carriageway.

E/D3.4.2 Broken down or abandoned vehicles

Traffic officers have powers under the Removal and Disposal of Vehicles (Traffic Officers) (England) Regulations 2008 RDV(TO)E 2008 [Ref 11.] that enable them to deal with vehicles that have broken down and are either causing an obstruction or danger to others; are in contravention of a restriction or prohibition; or appear to have been abandoned without lawful authority. Traffic officers will clear broken down vehicles to the nearest place of relative safety, likely to be an emergency area. Alternative locations may include service/rest areas.

Consideration may be given to using motorcycles with a fold down towing bracket to facilitate the recovery of cars. This could be beneficial on expressways as there is typically a narrower cross section than compared to a standard motorway.

If traffic officers are unable to clear the vehicle (for example due to it being overweight, or damaged), they will set out emergency traffic management and follow the statutory removal process. Once in attendance they remain with the vehicle until it is removed or otherwise protected. Traffic officer powers and duties in relation to removal of broken down vehicles are also subject to compliance with the Traffic Officer Manual and associated risk assessments.

VMS is used to support the protection and subsequent removal of broken down or abandoned vehicles in accordance with agreed procedures and work instructions.

E/D3.4.3 Debris

VMS is used to highlight the presence of debris and support the subsequent removal in accordance with agreed procedures and work instructions. Traffic officer powers and duties in relation to removal of debris are also subject to compliance with the Traffic Officer manual and associated risk assessments.

E/D3.4.4 Severe weather

VMS provide the operator with a useful tool to mitigate the impacts of severe weather by displaying information to road users.

Information regarding the use of message signs to communicate abnormal weather information is contained within the Overseeing Organisation's policy for the use of variable signs and signals.

The severe weather plan produced by each MSP describes the procedures and operational arrangements required for severe weather events. Risks associated with delivering the expressway requirements should be identified (such as high altitude) so that the design can eliminate or mitigate those risks.

E/D3.4.5 Interaction with local road network and integrated transport

Traffic officer incident management procedures and work instructions include interaction with the local road network and local diversion routes.

E/D3.5 Operation during roadworks

The expressway concept reduces the need for TTM by the provision of MHS areas combined with emergency areas; off network access; clustering of technology and where justified in accordance with CD 365 [Ref 20.N], gantries with permanent maintenance access. When TTM is required, roadworks will generally be scheduled to take place at times that minimise the impact on road users. This means works will generally be programmed for periods having low traffic flows and will typically be at night, in the middle of the day or at weekends. As these periods are dependent on traffic flows, these

arrangements should be agreed for each expressway, adopting the principles of intelligence based road space management.

During road works, a request is made to the operations centre to set VMS to support the setup, modification or removal of traffic management.

The current policy governing requests for signal settings is set out within the Overseeing Organisation's policy for the use of variable signs and signals. The Overseeing Organisation's 5 year Health & Safety Plan H&S 5yr [Ref 2.I] is anticipated to drive significant developments regarding TTM design and advance signing provision.

E/D4 Impact of expressways on communities and the Overseeing Organisation's customers

E/D4.1 Equality

An equality impact assessment has been undertaken on the generic expressways design and is reported in the generic expressways equality impact assessment Expressway EqIA [Ref 4.I].

E/D4.2 WCHs and slow-moving vehicles

The definition of WCHs and slow-moving vehicles is in accordance with the Highway Code [Ref 10.I] rule 253: pedestrians, riders of motorcycles under 50cc, cyclists, equestrians, certain slow-moving vehicles and those carrying oversized loads (except by special permission), agricultural vehicles, and mobility scooters. Where the decision has been taken to designate as a motorway, all of these users are prohibited from using an expressway to further enhance the safety and operational performance. These prohibitions are set out in legislation.

Where the decision has been taken to designate as a motorway, holders of provisional motorcycle are also prohibited from using an expressway. Learner drivers of cars with a provisional license may drive on a motorway where accompanied by an approved driving instructor and driving a car fitted with dual control.

Where the decision has been taken to designate as a motorway, prohibited users for an expressway are the same as motorways to support road user understanding and behaviour.

Refer to Section E/13 of this document regarding the assessment and alternative provision for WCH and slow-moving vehicles.

E/D4.3 Emergency services

The ability of the emergency services to function in an efficient and safe manner is critical to the operation of an expressway.

Emergency services currently operate on APTRs and have operating procedures specifically adapted to function on these roads. Expressways introduce a number of changes to the layout, infrastructure and operational procedures that are expected to have a positive impact on emergency service operation. For example, by improving the safety performance and providing enhanced incident detection and management facilities. However, there may be some negative impacts where the removal of right turning movements and entry points to the route introduce longer journey times to/from an incident. The emergency services should be consulted at an early stage regarding these proposals and contribute to finalising the requirements for emergency access/egress and turnaround provision – refer to Section E/8 of this document.

The Overseeing Organisation is seeking to continuously improve their capability to clear incidents more quickly. Part of the toolkit to help facilitate this is emergency access/egress provision. Emergency access/egress provision for expressways is in accordance with GD 368 [Ref 15.N] and developed through liaison with the Overseeing Organisation and core responders.

Confirmation should be sought from the emergency services that relevant emergency services personnel have been adequately trained in working on expressways prior to an expressway becoming operational in a region.

Nationally consistent emergency services procedures should be in place for expressway operations. These procedures should be implemented along with any specific local factors for each expressway, this includes the implementation of a memorandum of understanding and/or detailed local operating agreement where appropriate. Specific local factors should be included in the Operating Regime (combined) HE PCF [Ref 14.N] product.

E/D4.4 Vehicle recovery and repair organisations

Recovery and repair organisations currently operate independently on the APTR network, however an upgrade to expressway standard requires the on-road presence of a traffic officer. Vehicle recovery and repair organisations should be consulted at an early stage in the development of an expressway.

E/D4.5 Communities and other parties

The requirement to convert all junctions to a grade separated junction or left only movement could result in a change to access provision and impact on the local environment for receptors, communities, stakeholders and road users, including:

- 1) the farming community;
- 2) local businesses;
- 3) residents;
- 4) local highway authorities.

Any impact on these communities should be mitigated and enhanced wherever practicable. Where access to the network is to be restricted or removed, alternative provision is assessed. This could mean the provision of new access roads, crossing points and enhancements to the local highway authority network.

Where the decision has been taken to designate as a motorway, the requirements and arrangements for litter picking, sweeping, cleaning and clearance; statutory undertaker restrictions and boundary fences is to be consistent with those for a motorway.

E/D4.6 Roadside facilities

The maximum distance between service/rest areas is no more than 28 miles. Services and truck stops are provided in accordance with Annex B of 'The strategic road network and the delivery of sustainable development' DFT Circular 2/13 Annex B [Ref 34.N]. Provision of service/rest areas are to form part of an overall corridor strategy.

E/D4.7 Transport integration

E/D4.7.1 Interaction with local road network

Local highway authority liaison is required early in the development stage to determine the opportunities for enhancing integration with public transport, providing well-designed routes along desire lines for walking and cycling, and with the local road network.

E/D4.7.2 Bus stops

Refer to Section E/8 of this document.

E/D4.7.3 Park and ride services

Refer to Section E/2 of this document.

E/D4.7.4 Other multi-modal interfaces

Refer to Section E/2 of this document.

E/D5 Impact of expressway on the Overseeing Organisation's operators**E/D5.1 Traffic officer staffing, vehicles and outstation provision**

An assessment should be carried out to determine the operations centre and 'on road' staffing and equipment needs, at least 24 months prior to an expressway becoming operational in a region of the Overseeing Organisation. The assessment should take in to account the agreed service level requirements that should be met to safely and effectively operate an expressway.

The operating regime (combined) HE PCF [Ref 14.N] product for each expressway scheme should record that this assessment has been completed, and that the resource requirements to operate the expressway have been agreed with the Overseeing Organisation.

E/D5.2 Operations centre space requirements

The implementation of an expressway may need additional space within an operations centre due to the increase in technology to be installed on the network. Additional space may be required in both the equipment room and/or operations room. Allowances for the migration from Highways England's traffic management system to the Common Highways Agency and Rijkswaterstaat Model (CHARM) should form part of the design.

E/D5.3 Traffic officer procedures and work instructions for expressways

Operating procedures and work instructions for expressways are yet to be finalised and guidance should be sought from the Overseeing Organisation.

Any specific aspects of the design of an expressway schemes that require a "non-standard" work instruction should be determined. In particular, any hazards that have not been included in the generic hazard assessment that require an operational mitigation. The implementation of CHARM should be part of this assessment.

Liaison with the Incident Management Requirements team may be needed to develop any "non-standard" work instructions to cover scheme specific requirements and to gain the necessary approvals. Where applicable these should form part of a set of regional work instructions that are prescribed for each Operations region.

E/D6 Impact of expressways on the Overseeing Organisation's maintainers**E/D6.1 Approach to maintenance**

The approach to maintenance on expressways provides a 'step change' in improving the safety and efficiency of maintenance operations by:

- 1) minimising the need to access technology equipment on network by providing remote access facilities;
- 2) clustering technology at emergency area/MHS sites or adjacent off network access points where practicable to reduce the need for TTM;
- 3) where justified in accordance with CD 365 [Ref 20.N], providing gantries with permanent maintenance access reducing the need for TTM for most VMS maintenance operations;
- 4) providing a high containment safety barrier in the central reserve.

E/D6.2 Meeting the road worker safety objective

Refer to Section E/3 of this document for details of the generic safety report and roadworker safety objectives.

A specific review of the hazards associated with maintenance should be undertaken, so that the scheme is designed in such a way that it can be operated and maintained safely and that the risks are mitigated as low as reasonably practicable.

E/D6.3 Scheduling maintenance

The expressway concept reduces the need for TTM by the provision of MHS areas, off network access, clustering of technology and where justified in accordance with CD 365 [Ref 20.N], gantries with permanent maintenance access. However, when TTM is required, the high traffic volumes that expressway schemes are expected to experience during peak periods means that the main opportunity to conduct maintenance works in live lanes will be overnight and weekends. Closing lanes during peak periods is likely to create significant congestion and delays to road users. Weekday, inter-peak closures may not be feasible (except for emergency works). Therefore the majority of maintenance activities that require TTM are likely to take place at night, with additional temporary task lighting provided as appropriate.

E/D6.3.1 Scheduling planned maintenance activities

It is necessary to minimise the number of occasions when TTM is in place, to minimise the safety risks to both road workers and road users, to reduce network disruption and to improve the efficiency of maintenance activities.

The maintenance requirements plan introduces the need to minimise network occupancy, meaning the number of activities that are carried out during a single installation of TTM should be increased wherever possible.

The ability to group maintenance activities together is subject to maintainers having adequate resources available to conduct the work, and there being no adverse impacts on safety associated with the undertaking of a number of activities within the same area. The intent is also to provide a period of 5 years free of major renewal following completion of the expressway works – refer to Section E/4 of this document.

The safety risk to road users of delaying the intervention of separate maintenance activities into a single TTM intervention is to be assessed.

E/D6.3.2 Scheduling reactive maintenance

Defects and equipment failures are inevitable. The approach to clustering of technology at emergency area/MHS sites and off network access can enable safe and instant access to equipment for reactive maintenance, other defects remote from an emergency area/MHS site or without off network access are likely to require TTM. Both the frequency with which faults or defects occur, and the time needed to make a repair are key factors in determining the need for TTM.

E/D6.4 Conducting maintenance**E/D6.4.1 Maintenance access**

Technology equipment should be clustered at emergency area/MHS sites or adjacent to an off network access point wherever practicable.

Maintenance access for assets is to be assessed and provided in accordance with MPI 11 [Ref 22.N].

E/D6.4.2 VMS utilisation

VMS should be used to support the deployment and removal of TTM.

E/D6.4.3 Remote access to technology assets

Remote access facilities are used to minimise visits to the roadside. Permission should be obtained from the operations centre to take over control of a piece of equipment, so that the equipment is not simultaneously required for operational purposes.

E/D6.5 Overseeing Organisation and MSP engagement

Engagement with the Overseeing Organisation and the MSP should commence at HE PCF [Ref 14.N] stage 1 and continue regularly throughout the development and implementation phases.

E/D7 Concept validation and continual improvement

E/D7.1 General

Expressway schemes should be monitored to allow the Overseeing Organisation to validate the expressway concept and continually improve expressway design and operation. This should include specific monitoring of those features and/or measures taken to avoid, prevent or offset significant adverse effects on the environment.

Broader measurement of environmental performance, linked with appraisal and evaluation processes, should be undertaken to allow demonstration of the activities undertaken and how effective these have been in improving environmental outcomes.

The monitoring of initial operations allows the Overseeing Organisation to determine whether the scheme is operating in an effective and safe manner and whether the operational outcomes are as anticipated. It allows validation of safety assumptions and a response to stakeholder issues. The monitoring should also support the determination of whether the schemes are delivering the environmental and sustainable development objectives and identify opportunities for better delivery of such outcomes.

E/D7.2 Plan for monitoring operations and monitoring output

A plan for monitoring operations and monitoring output should be prepared in accordance with the requirements of HE PCF [Ref 14.N] The objectives of the plan for monitoring operations are to document the monitoring requirements for the scheme, identify monitoring methods to be used, specify the timescale and frequency of monitoring and define the roles and responsibilities.

E/D7.3 Calibration and optimisation

Expressway are subject to the same requirements for calibration and ongoing optimisation as smart motorways. Refer to MCH 2584 [Ref 1.I].

Other scheme specific technology assets may also need to be optimised, for example ramp metering installations. These assets should be calibrated and optimised in accordance with the Overseeing Organisation's requirements.

Appendix E/E. Risk reduction strategies

E/E1 General

The following sections provide examples of principles of prevention with risk reduction strategies under each of the four ERIC headings. Note that these items do not constitute an exhaustive list, as each scheme will have specific local issues; and this guidance does not detract from the Principal Designer's responsibilities under the CDM regulations SI 2015/51 [Ref 31.N].

E/E2 Eliminate

Assets that are currently installed within the scheme boundary should be catalogued. All redundant or potentially redundant infrastructure should be identified and assessed for removal. As is the policy for the rest of the SRN, non-essential infrastructure or technology, should be removed.

E/E3 Reduce

If a particular maintenance activity cannot be eliminated, it may be possible to reduce the frequency with which maintenance access is required, or reduce the length of time the maintenance activity takes. Opportunities include:

E/E3.1 Reduce site visit requirements

The design should reduce or eliminate the need for roadside maintenance activities for new and existing equipment. Maintenance and repair should be undertaken away from the network unless there is no other alternative.

Roadside technology should be equipped with remote access capabilities.

E/E3.2 Bring forward renewal programmes

Refer to Section E/4 of this document.

E/E3.3 Utilise low maintenance items

The design should identify where the use of longer life and/or lower maintenance items and assets will need to be replaced or installed as part of the scheme. The design should include assets that have extended reactive maintenance periods (e.g. curing of concrete on bridge repairs) to reduce planned and reactive maintenance requirements. Refer to whole life design requirements in Section E/4 of this document.

E/E3.4 Plan for access restrictions

MSPs should take advantage of the TTM installed for the construction period of the scheme to undertake maintenance activities where agreed with the Overseeing Organisation. This may enable MSPs to reduce the time spent performing maintenance activities once the expressway scheme becomes operational.

E/E3.5 Renew 'problem' assets

Existing assets should be identified that are reaching the end of their life, or have short maintenance intervals that are incompatible with the Overseeing Organisation's health and safety policies regarding exposure of road workers at the roadside. The design should include the replacement of these products with more compatible products.

E/E4 Isolate

A risk can be isolated by separating the hazardous activity from the individuals exposed to it, either by physical protection (e.g. through the provision of guarding) or by limiting access (e.g. through the

requirement for maintenance activity to only occur within predetermined 'working windows'). Examples include:

E/E4.1 Re-positioning of existing assets

Designs should include the assessment of existing assets to ascertain whether any may be repositioned to enable their maintenance activities to be conducted via an off network access point, or from within a designated area for maintenance. The capital cost and risk exposure of moving the items should be weighed against the operational costs and risks of maintenance, and the associated loss of capacity over the life of the scheme. Proposals should be agreed with the Overseeing Organisation and the MSP.

E/E4.2 Provision of off-network access

It may be possible to provide safe maintenance access to both new and existing assets without recourse to the network (for example by locating the asset near to an overbridge with pedestrian access). Refer to MPI 11 [Ref 22.N]. However, locations which may be easily accessed by maintainers may also increase the opportunity for use by non-authorised users, along with asset theft. A metal theft risk assessment should be prepared.

E/E4.3 Combining asset locations

When positioning new assets, assess co-location options to enable multiple maintenance activities to be undertaken from the same location. This is particularly important for technology assets which should be co-located at emergency area/MHS sites or adjacent 'off network' access points wherever practicable. The capital cost and risk exposure of co-locating items should be weighed against the operational costs and risks of maintenance and the associated loss of capacity over the life of the scheme.

E/E5 Control

Control measures make it safer for the MSP to perform each maintenance activity, for example by providing a greater degree of protection, or by reducing the exposure time. Examples of controls include:

E/E5.1 Improved accessibility of new assets for maintenance

Designs should include the positioning of new assets to facilitate maintenance access. This may include locating technology components adjacent to emergency area/MHS sites, or within a designated area for maintenance immediately adjacent to an 'off network' access point. This may mean additional assets are required in certain circumstances, but improving maintenance access is expected to deliver an overall safety and operational benefit. Where justified in accordance with CD 365 [Ref 20.N], gantries with permanent maintenance access are provided to reduce TTM requirements and roadworker exposure. Access arrangements for soft estate maintenance should also be determined.

E/E5.2 TTM sign deployment

Refer to Section E/4 of this document.

E/E5.3 Improved installation / access techniques

Review the technology assets to be installed, and identify methods to enable easier/quicker/safer swap out of faulty equipment to reduce the time spent performing maintenance actions.

Appendix E/F. Development guide

E/F1 Introduction and background

Appendix E/C provides high level advice on the delivery levels (level 1 to level 4) and design components. This development guide provides additional supporting advice for the levels identified in Appendix E/C.

E/F1.1 Development guide scope

This development guide provides information on the following aspects:

- 1) applicability of requirements and advice (excluding notes) from the main body of this GD 300 National Application Annex (NAA) to levels 1, 2, 3 and 4;
- 2) additional guidance against specific GD 300 requirements and advice where appropriate

Specific requirements from the main body of this GD 300 NAA are repeated in the appendix for ease of reading and use of 'shall' in this appendix does not constitute a requirement as the appendix contains advice only.

E/F1.2 Development guide structure

The order of this appendix corresponds to the requirements in the main body of this GD 300 NAA. The environment section from the main body of this GD 300 NAA is not included as it applies to all levels. The order is summarised below:

Table E/F.1 Development guide structure

Appendix section	Description
E/F2	Designation and delivery
E/F3	General requirements
E/F4	Operational safety
E/F5	Designing for maintenance
E/F6	Highway links
E/F7	Layout of junctions
E/F8	Cross section and vehicle restraint system
E/F9	Place of relative safety and roadside features
E/F10	Signing and road marking
E/F11	Roadside technology and communications
E/F12	Structures
E/F13	Walkers, cyclists and horse-riders (WCHs) and slow-moving vehicles
E/F14	Legal

E/F1.3 Use of development guide

The applicability of each requirement and advice clause (excluding notes) from the main body of this GD 300 NAA to a particular level is detailed according to the classifications shown in Table E/F.2.

Table E/F.2 Applicability definitions

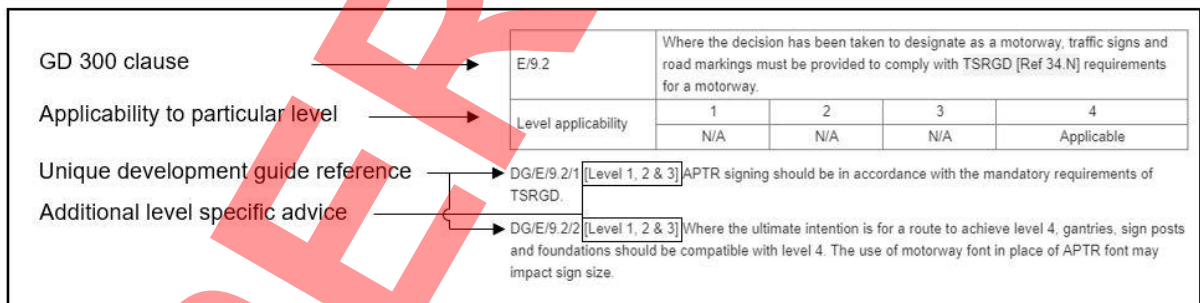
Text	Definition
Applicable	Fully applicable to the level implemented
Partial	Applies in part/or potential measures to facilitate compatibility with other levels
Not applicable (N/A)	Not applicable unless a scheme specific decision is made to include the requirement

Implementation of a level 2, 3 or 4 scheme can be through the culmination of a number of scheme upgrades (multi-level delivery) or a single scheme (single level delivery). The clause applicability assumes single level delivery. In some scenarios where multi-level delivery is used not all identified clauses may be applicable as some will already have been implemented at an earlier level. In these circumstances a scheme should contact the Overseeing Organisation to agree any changes to clause applicability.

Where appropriate additional guidance is provided within this development guide relevant to a particular requirement or advice clause. This is referenced by repeating clause number from the main body of this GD 300 NAA but with the inclusion of a "DG" prefix and "/number" suffix. The start of the additional advice clause identifies the relevant level(s). Clauses within this appendix should be read in conjunction with the clause from the main body of this GD 300 NAA to which they relate as not all provide standalone advice.

A worked example is shown below.

Figure E/F.1 Development guide working example



Where a requirement or advice clause in the main body of this GD 300 NAA applies to all levels these clauses have not been repeated within this appendix unless additional advice has been provided. Notes from the main body of this GD 300 NAA are also not included within this appendix. The main body of this GD 300 NAA should therefore be used as the primary reference supported by advice in this appendix.

Where SCRG is referred to within this appendix it is acknowledged that some Level 1 and 2 schemes may be categorised as a Type A scheme (in accordance with GG 104 [Ref 24.N]) and a SCRG is not therefore mandated. In these circumstances a scheme should set up a SCRG specifically for the issues that need to be accepted by SCRG or agree with the Overseeing Organisation a similar governance mechanism to accept safety related mitigation measures.

In addition to the supporting information referenced elsewhere in GD 300 the following analysis has been undertaken at a generic GD 300 concept level. All schemes should undertake their own specific assessments but these concept documents may provide useful information:

- 1) VfM assessment – reported in the Quantified Value for Money Assessment which includes a concept value for money statement and analytical assurance statement which can be sought from the Overseeing Organisation.

- 2) Concept Estimate – reported in the Expressway Concept Design: CAPEX & OPEX Cost per KM Estimates which can be sought from the Overseeing Organisation.

E/F2 Designation and delivery

This section details the level applicability of clauses relating to designation and delivery.

Table E/F.3 Clause E/1.1 level applicability

E/1.1	Motorway designation of an expressway scheme or corridor shall only be implemented when: 1) a decision in support of motorway designation has been made by the Overseeing Organisation in conjunction with the DfT; 2) the requirements of this document have been met; 3) the scheme or corridor either connects to a motorway or has a length that exceeds 10 miles with terminal junctions that intersect with the edge of an urban area or major transport hub.			
Level applicability	1	2	3	4
	N/A	N/A	N/A	Applicable

Table E/F.4 Clause E/1.2 level applicability

E/1.2	The requirements in this document shall apply where the resulting mainline link has no more than three lanes in either direction.			
Level applicability	1	2	3	4
	Partial	Partial	Partial	Applicable

DG/E/1.2/1 [Level 1, 2 & 3] Requirements apply as applicable to each level as detailed in this development guide.

DG/E/1.2/2 [Level 1, 2 & 3] No more than three lanes in either direction applies.

Table E/F.5 Clause E/1.3 level applicability

E/1.3	Schemes that do not meet all of the requirements of this document shall retain all-purpose trunk road designation.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	N/A

Table E/F.6 Clause E/1.4 level applicability

E/1.4	Where a scheme or corridor has been determined as not appropriate for motorway designation following the scheme development process, all-purpose trunk road designation shall be retained and guidance sought from the Overseeing Organisation on all requirements impacted by designation.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	N/A

DG/E/1.4/1 [Level 3] This development guide provides additional guidance for implementation of level 3.

DG/E/1.4/2 [Level 1 & 2] Guidance should be sought from the Overseeing Organisation to determine whether there are future plans to implement Level 4 on the corridor (motorway designation) as this will help to inform some compatibility activities undertaken (this information should be contained in the expressway corridor strategy). It will for example inform whether gantries/sign posts and foundations should be made compatible with introduction of motorway signing (DG/E/9.13/2 & DG/E/9.13/3).

Table E/F.7 Clause E/1.5 level applicability

E/1.5	Level 1, 2 or 3 schemes shall review the advice in Appendix E/F.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Partial

Table E/F.8 Clause E/1.6 level applicability

E/1.6	Guidance shall be sought from the Overseeing Organisation for the development of level 1, 2 or 3 schemes.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	N/A

DG/E/1.6/1 [Level 1, 2 & 3] This development guide provides additional guidance for implementation of levels 1 to 4 but level 1 to 3 schemes still need to contact the Overseeing Organisation for guidance on the application of this advice.

E/F3**General requirements**

This section details the level applicability of clauses relating to general requirements.

Table E/F.9 Clause E/2.1 level applicability

E/2.1	Expressways shall be designed to meet the objectives set out in the project control framework (PCF) client scheme requirements HE PCF [Ref 14.N].			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/2.1/1 [Level 3 & 4] The generic scheme level objectives for expressways (listed in Appendix E/A) apply.

DG/E/2.1/2 [Level 1 & 2] Schemes should contribute towards some or all of the generic scheme level objectives for expressways but are not expected to meet all objectives.

DG/E/2.1/3 [Level 1 & 2] Schemes should not implement features which will impact the ability of a route to meet expressway objectives (listed in Appendix E/A). This facilitates compatibility should a decision be made to convert a route in the future to level 3 or 4.

Table E/F.10 Clause E/2.1.1 level applicability

E/2.1.1	Reference should be made to the concept of operation document included in Appendix E/D for supporting information on the operation of expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Partial	Applicable

DG/E/2.1.1/1 [Level 1 & 2] Schemes should have an appreciation of operational arrangements at other levels as this may inform compatibility design decisions.

DG/E/2.1.1/2 [Level 3] Design features differ between level 3 and 4 schemes and this will impact the applicability of some areas of the concept of operations. For example, user prohibitions will be signed differently at level 3 and this may affect compliance.

Table E/F.11 Clause E/2.2 level applicability

E/2.2	Expressway design shall be in accordance with GG 103 [Ref 16.N].			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/2.2/1 [Level 1, 2, 3 & 4] The 'Good design for smart roads' document can be sought from the Overseeing Organisation and provides additional guidance in the application of good road design principles.

Table E/F.12 Clause E/2.8 level applicability

E/2.8	The requirements and arrangements for litter picking, sweeping, cleaning and clearance shall be consistent with those for a motorway.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/2.8/1 [Level 3] Consistency with motorways is included to contribute to the delivery of the generic scheme level objectives for expressways (listed in Appendix E/A).

Table E/F.13 Clause E/2.9 level applicability

E/2.9	Engagement with local highway authorities shall commence at stage 1 of the HE PCF [Ref 14.N] process to plan for the transition in responsibility for litter picking, sweeping, cleaning and clearance to the Overseeing Organisation.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/2.9/1 [Level 1 & 2] If the duty for undertaking these tasks has already been transferred to the Overseeing Organisation these responsibilities should be retained.

Table E/F.14 Clause E/2.10 level applicability

E/2.10	The requirements and arrangements for boundary fences shall be consistent with those for a motorway.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/2.10/1 [Level 1 & 2] On existing routes if Overseeing Organisation boundary fence is already in place these arrangements should be retained.

DG/E/2.10/2 [Level 1 & 2] The benefits of the Overseeing Organisation provision of boundary fence should be assessed. This should include assessment of whether there are any proposals to implement level 3 or 4 and if so likely timescales, design life of boundary fence, network security/control, legal ownership, operational and capital costs and future disruption.

DG/E/2.10/3 [Level 3] Consistency with motorways is included to contribute to the delivery of the generic scheme level objectives for expressways (listed in Appendix E/A).

Table E/F.15 Clause E/2.11 level applicability

E/2.11	The requirements and arrangements for statutory undertakers shall be consistent with those for a motorway.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/2.11/1 [Level 1 & 2] On existing routes if there are additional controls on statutory undertakers above those of a typical APTR these should be retained.

DG/E/2.11/2 [Level 1 & 2] The benefits of motorway-style arrangements for statutory undertakers should be assessed. This should include assessment of whether there are any proposals to implement level 3 or above and if so likely timescales, the amount of statutory undertaker infrastructure affected and the likely impact on scheme objectives.

DG/E/2.11/3 [Level 3] Consistency with motorways is included to contribute to the delivery of the generic scheme level objectives for expressways (listed in Appendix E/A).

Table E/F.16 Clause E/2.13 level applicability

E/2.13	Where the cost is not disproportionate to the overall scheme value, statutory undertaker apparatus shall be located or diverted outside of the special road boundary.			
Level applicability	1	2	3	4
	Partial	Partial	Partial	Applicable

DG/E/2.13/1 [Level 1, 2 & 3] In cases where special road designation is not in place it should be assumed that any future special road boundary, is equivalent to the highway boundary.

DG/E/2.13/2 [Level 1] The requirements for location or diversion outside the highway boundary apply at this level. It is likely that this stage will include the most significant civil infrastructure works. Relocation of statutory infrastructure apparatus at this stage will likely realise efficiency savings and introduce operational benefit.

Table E/F.17 Clause E/2.14 level applicability

E/2.14	On road and operations centre traffic officers shall be provided to support the operation of expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/2.14/1 [Level 1 & 2] Where existing routes already have on road and operations centre traffic officer provision this should be retained.

Table E/F.18 Clause E/2.15 level applicability

E/2.15	A traffic officer resource review shall commence at stage 1 of the HE PCF [Ref 14.N] process.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.19 Clause E/2.16 level applicability

E/2.16	Guidance shall be sought from the Overseeing Organisation for traffic officer resource requirements, service level, procedures, work instructions and processes.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.20 Clause E/2.17 level applicability

E/2.17	Guidance shall be sought from the Overseeing Organisation on the national operations agreement and the associated emergency services procedures for expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/2.17/1 [Level 1, 2, 3 & 4] Where local agreements are in place with emergency services for particular locations the impact of a scheme on these should be reviewed and agreements updated where appropriate.

DG/E/2.17/2 [Level 3] National operational core responder agreements are not currently in place for dual carriageway roads. Guidance should be sought from the Overseeing Organisation.

DG/E/2.17/3 [Level 4] National Smart Motorway agreements are in place, it is expected that these will be applicable to expressways.

E/F4**Operational safety**

This section details the level applicability of clauses relating to operational safety.

Table E/F.21 Clause E/3.1 level applicability

E/3.1	The level of safety risk management on expressways shall be determined and managed in accordance with GG 104 [Ref 24.N].			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/3.1/1 [Level 4] A generic safety plan, generic safety report, GD 300 safety risk assessment report and generic hazard elimination and management schedule demonstrate that the safety objectives are likely to be achieved at a generic concept level. These documents can be sought from the Overseeing Organisation. These will help to inform scheme specific safety analysis.

Table E/F.22 Clause E/3.4 level applicability

E/3.4	The safety objective for expressway road users shall be to deliver a safety performance that is a minimum of the average performance of a dual three lane motorway without motorway incident detection and automatic signalling (MIDAS).			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/3.4/1 [Level 1 & 2] The safety objective should be as detailed in the HE PCF [Ref 14.N] safety plan.

DG/E/3.4/2 [Level 3, & 4] The average performance statistics detailed within the 'Reported Road Casualty Statistics SRN' STATS19 [Ref 8.I] should be used.

Table E/F.23 Clause E/3.8 level applicability

E/3.8	The road user safety baseline and safety objectives for non-expressway roads shall be agreed with the relevant local highway authority.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/3.8/1 [Level 1 & 2] Applies only if a section of the scheme includes de-trunking. The road user safety baseline and safety objectives for de-trunked sections should be documented within the scheme specific de-trunking memorandum of understanding.

Table E/F.24 Clause E/3.10 level applicability

E/3.10	The WCH safety objective shall be to provide a significant contribution towards the Overseeing Organisation's key performance indicators (KPI) and performance indicators (PI) for WCH by delivering quality provision that includes the removal of severance on routes and unlocks latent demand by WCH.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/3.10/1 [Level 1, 2, 3, & 4] Generic safety risk assessment for walkers, cyclists and horse riders can be sought from the Overseeing Organisation which provides additional guidance to inform achieving this objective.

E/F5 Designing for maintenance

This section details the level applicability of clauses relating to designing for maintenance.

Table E/F.25 Clause E/4.7.1 level applicability

E/4.7.1	Risk reduction strategies that may be applied to expressways are included in Appendix E/E.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/4.7.1/1 [Level 1 & 2] Schemes should have an appreciation of the additional assets and operational arrangements in other levels to facilitate design decisions that are compatible with other levels.

Table E/F.26 Clause E/4.9 level applicability

E/4.9	Fixed taper points shall be designed on expressways in accordance with the taper selection requirements stated in Chapter 8 of the Traffic Signs Manual TSM Chapter 8 [Ref 36.N] and in conjunction with the control signal and variable message sign (VMS) siting requirements in Section E/10 of this document.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.27 Clause E/4.10 level applicability

E/4.10	Fixed taper point locations for TTM shall be agreed with the Overseeing Organisation and the maintenance service provider (MSP).			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.28 Clause E/4.11 level applicability

E/4.11	Where requested by the Overseeing Organisation, provision shall be made in the design for fixed taper roadside identification.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.29 Clause E/4.12 level applicability

E/4.12	The approach to TTM signing for an operational expressway shall be determined as part of the design, underpinned by a GG 104 [Ref 24.N] assessment and agreed with the Overseeing Organisation and the MSP.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.30 Clause E/4.13 level applicability

E/4.13	Guidance shall be sought from the Overseeing Organisation on the signalling for roadworks project.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

E/F6 Highway links

This section details the level applicability of clauses relating to highway links.

Table E/F.31 Clause E/5.2 level applicability

E/5.2	Expressways shall be designed in accordance with the requirements of Table E/5.2.				Table E/5.2 Additional types of road		
	Additional types of road added to Table A.2 of CD 109 [Ref 15.N]						
	Type of road	Sub category	Edge treatment	Direct access treatment (see CD 123 [Ref 9.N] for a definition of direct access)	Junction treatment at minor road intersection (see CD 123 [Ref 9.N] and CD 116 [Ref 11.N])	Junction treatment at major road intersection (see CD 123 [Ref 9.N], CD 122 [Ref 10.N] and CD 116 [Ref 11.N])	Previous category reference used in GD 300
Dual 2 lane expressway (D2E) – 7.3 metre carriageway	a	Nearside- 1 metre hard strip. Offside- 1 metre hard strip	Not permitted - motorway regulations	Not permitted - motorway regulations.	Full grade separation	7d	
Dual 3 lane expressway (D3E) – 11 metre carriageway	a	Nearside- 1 metre hard strip. Offside- 1 metre hard strip	Not permitted - motorway regulations	Not permitted - motorway regulations	Full grade separation	8c	
Level applicability	1		2		3		4
	Applicable		Applicable		Applicable		Applicable

DG/E/5.2/1 [Level 1 & 2] The requirements in Table E/5.2 apply. If requirements in Table E/5.2 are not applied in accordance with this it prevents future compatibility with level 3 and 4 without further major interventions.

DG/E/5.2/2 [Level 1, 2 & 3] Implementing motorway standard access treatment on an all-purpose trunk road is not prevented by legislation.

Table E/F.32 Clause E/5.3 level applicability

E/5.3	Expressways shall operate at the national speed limit.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/5.3/1 [Level 3] The impact of maximum speed limit differences between dual carriageway (all-purpose trunk road) and a motorway should be assessed within the hazard log.

E/F7 Layout of junctions

This section details the level applicability of clauses relating to the layout of junctions.

Table E/F.33 Clause E/6.3 level applicability

E/6.3	The choice of junction layout shall be derived from Figure 3.12 and Figure 3.26 a in CD 122 [Ref 7.N].			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/6.3/1 [Level 1, 2, 3 and 4] The choice of junction layout derived from CD 122 [Ref 7.N] should be documented within the HE PCF [Ref 14.N] combined operations product including justification of choice. This will also need to be presented to the operations technical leadership group as per the HE PCF [Ref 14.N] requirements.

E/F8 Cross section and vehicle restraint system

This section details the applicability clauses relating to cross section and vehicle restraint system.

Table E/F.34 Clause E/7.3 level applicability

E/7.3	For the purposes of the point of measurement of set-back, an emergency area shall be treated as a hard strip.			
Level applicability	1	2	3	4
	Partial	Partial	Partial	Applicable

DG/E/7.3/1 [Level 1 & 2] Lay-bys (including emergency lay-bys) should be treated in the same way as emergency areas.

DG/E/7.3/2 [Level 3] APTR emergency areas should be treated in the same way as emergency areas.

Table E/F.35 Clause E/7.4 level applicability

E/7.4	Central reserve safety barrier shall be H1 or greater containment level in accordance with BS EN 1317 [Ref 25.N].			
Level applicability	1	2	3	4
	Partial	Applicable	Applicable	Applicable

DG/E/7.4/1 [Level 1] Where level 2, 3 or 4 is expected to be implemented in the future an assessment should be made of the benefits/dis-benefits of providing H1 or greater containment level barrier at Level 1.

DG/E/7.4/2 [Level 1] Where level 2, 3 or 4 is expected to be implemented in the future the design should assess measures to facilitate potential future compatibility with central reserve safety barrier of H1 or greater containment level.

Table E/F.36 Clause E/7.5 level applicability

E/7.5	Central reserve safety barrier shall be rigid, have a serviceable life of not less than 50 years and be designed such that after testing in accordance with BS EN 1317-1 [Ref 27.N] and BS EN 1317-2 [Ref 26.N], it does not require realignment, replacement or repair.			
Level applicability	1	2	3	4
	N/A	Applicable	Applicable	Applicable

Table E/F.37 Clause E/7.6 level applicability

E/7.6	Full height anchorages shall only be used at emergency area locations where VRS is required and where there is insufficient room for two full length terminals.			
Level applicability	1	2	3	4
	Partial	Partial	Partial	Applicable

DG/E/7.6/1 [Level 1, 2 & 3] Lay-bys (including emergency lay-bys) should be treated in the same way as emergency areas.

DG/E/7.6/2 [Level 3] APTR emergency areas should be treated in the same way as emergency areas.

Table E/F.38 Clause E/7.7 level applicability

E/7.7	Full height anchorages shall only be used at emergency area locations where they do not face oncoming traffic, unless behind another VRS (and outside of its working width and vehicle intrusion).			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/7.7/1 [Level 1, 2 & 3] Lay-bys (including emergency lay-bys) should be treated in the same way as emergency areas.

DG/E/7.7/2 [Level 3] APTR emergency areas should be treated in the same way as emergency areas.

Table E/F.39 Clause E/7.8 level applicability

E/7.8	An assessment shall be made of the benefits/dis-benefits of both soft and paved central reserve options to establish the solution.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/7.8/1 [Level 1, 2, 3 & 4] The assessment should as a minimum evaluate the impact of each option on safety, build-ability, construction programme (including delays to customers), operation, maintenance, environment and cost (operational and capital).

E/F9 Place of relative safety and roadside features

This section details the applicability of clauses relating to places of relative safety and roadside features.

Table E/F.40 Clause E/8.1 level applicability

E/8.1	Places of relative safety, which includes emergency areas, shall be designed in accordance with MPI 66 [Ref 38.N].			
Level applicability	1	2	3	4
	Partial	Partial	Partial	Applicable

DG/E/8.1/1 [Level 1 & 2] An assessment should be undertaken to determine if the level of off-network rest areas and services can be enhanced so that the guidance sought from the Overseeing Organisation in relation to E/8.4 is met. New routes may have particular opportunities to enhance rest provision. If the guidance is met the approach to stopping provision detailed DG/E/8.1/2 should be applied.

DG/E/8.1/2 [Level 1 & 2] Where the guidance sought from the Overseeing Organisation in relation to E/8.4 is met, emergency lay-bys should be provided. The following advice should be followed to determine their location and layout:

- 1) A design for places of relative safety should be undertaken in accordance with MPI 66 [Ref 38.N].
 - a) The location of existing lay-bys should be assessed as conversion of these facilities may realise efficiency savings. Reuse of existing pavement may give savings in terms of construction cost, time, hazard exposure and environmental impact.
- 2) Emergency lay-bys should be provided at every other mainline emergency area site identified in the MPI 66 [Ref 38.N] compliant design (excluding emergency areas on diverge connector roads).
- 3) Any existing lay-bys outside of the above design should be closed.
- 4) Emergency lay-bys should have an entry taper of 45m, a stopping area of 30m and a width of 4.6m as measured from the traffic side of the road markings and an exit taper of 25m. The footprint should facilitate compatibility with emergency area tapers - as shown below in the pink area in Figure E/F.2.

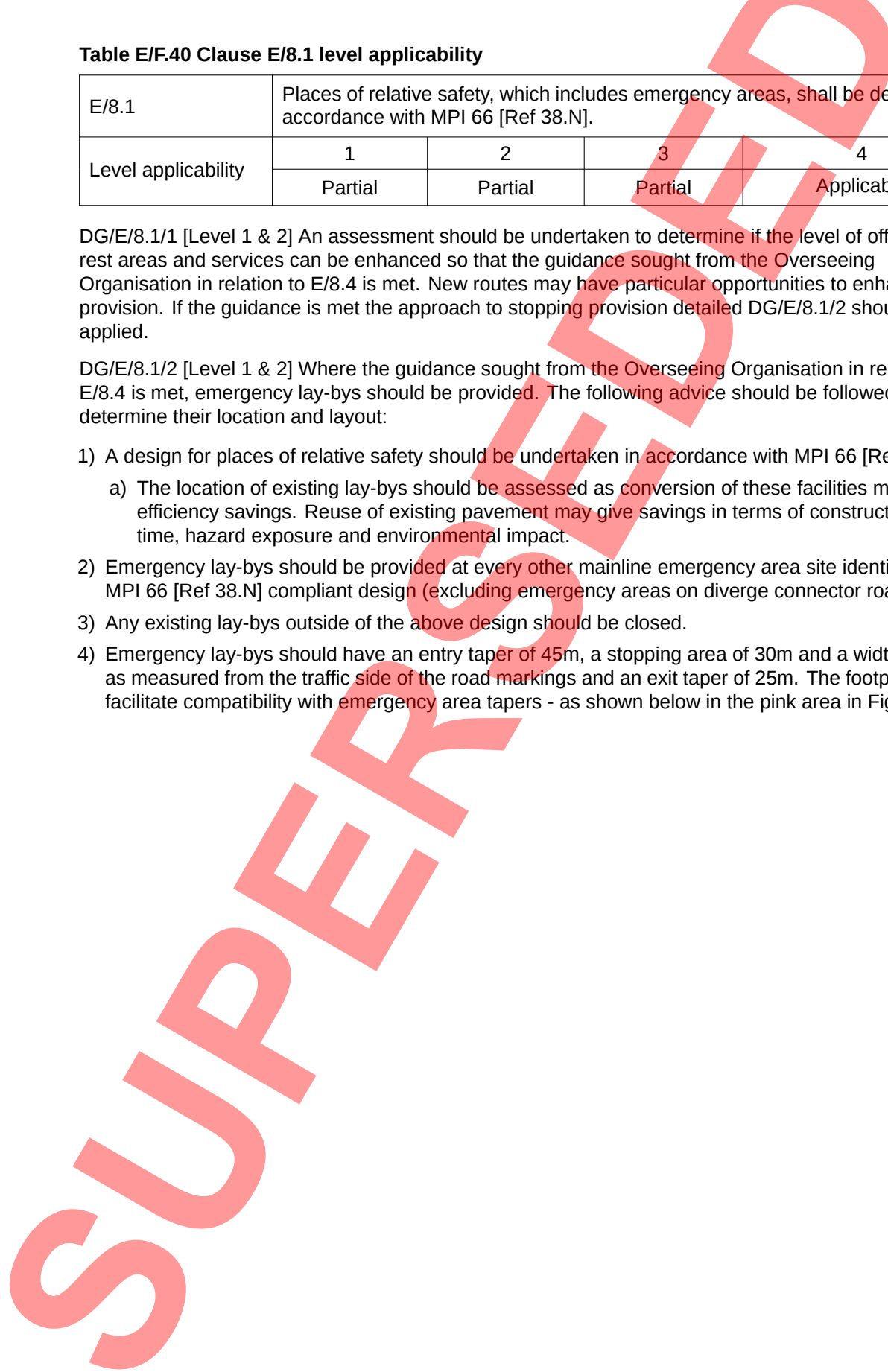


Figure E/F.2 Emergency area/type B layout



DG/E/8.1/3 [Level 1 & 2] Where the assessment detailed in DG/E/8.1/1 concludes that it is not practicable to comply with the guidance then type A lay-bys should be provided. The following advice should be followed to determine their location:

- 1) If type A lay-bys are already present, are in accordance with CD 169 [Ref 32.N] and can be retained as part of the upgrade works these should be retained.
- 2) If type A lay-bys are already present, but are not in accordance with CD 169 [Ref 32.N] and could be retained as part of the upgrade works, guidance should be sought from the Overseeing Organisation on the suitability of retaining these lay-bys. Retention should be subject to acceptance by the SCRG and recorded in the DSR.
- 3) If type A lay-bys are not present, cannot be retained or are not in accordance with CD 169 [Ref 32.N] and deemed un-suitable for retention a design for spacing requirements of places of relative safety should be undertaken in accordance with MPI 66 [Ref 38.N].
 - a) The location of existing lay-bys should be assessed as conversion of these facilities may realise efficiency savings. Reuse of existing pavement may give savings in terms of construction cost, time, hazard exposure and environmental impact.
- 4) Type A lay-bys should be provided at every other mainline emergency area site identified in the MPI 66 [Ref 38.N] compliant design (excluding emergency areas on diverge connector roads).
- 5) Emergency lay-by may be more appropriate at some locations due to operational or road safety problems regardless of suitable provision of off-network rest areas. This should be subject to acceptance by the SCRG and recorded in the DSR.

DG/E/8.1/4 [Level 3] APTR emergency areas should be provided in place of emergency areas. These features should have the same dimensions as emergency areas.

DG/E/8.1/5 [Level 4] Where type A lay-bys need to be converted to emergency areas guidance should be sought from the Overseeing Organisation.

Figure E/F.3 Flow chart to show provision of service / rest areas, lay-bys and emergency areas

Applies to level 1 and level 2 scheme only

Applies to level 3 and level 4 scheme only

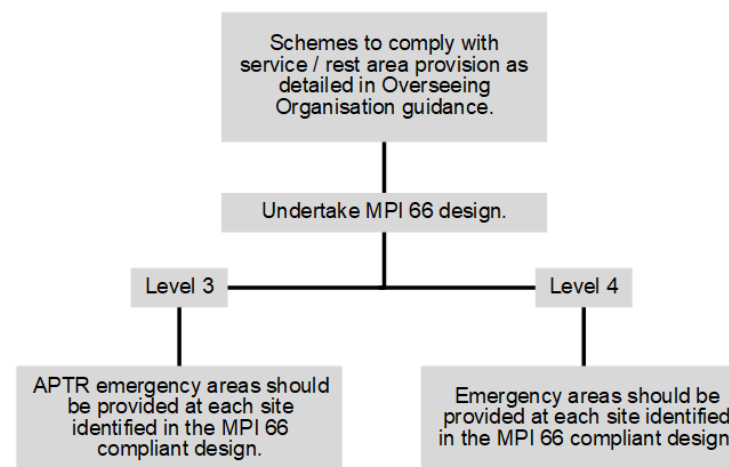
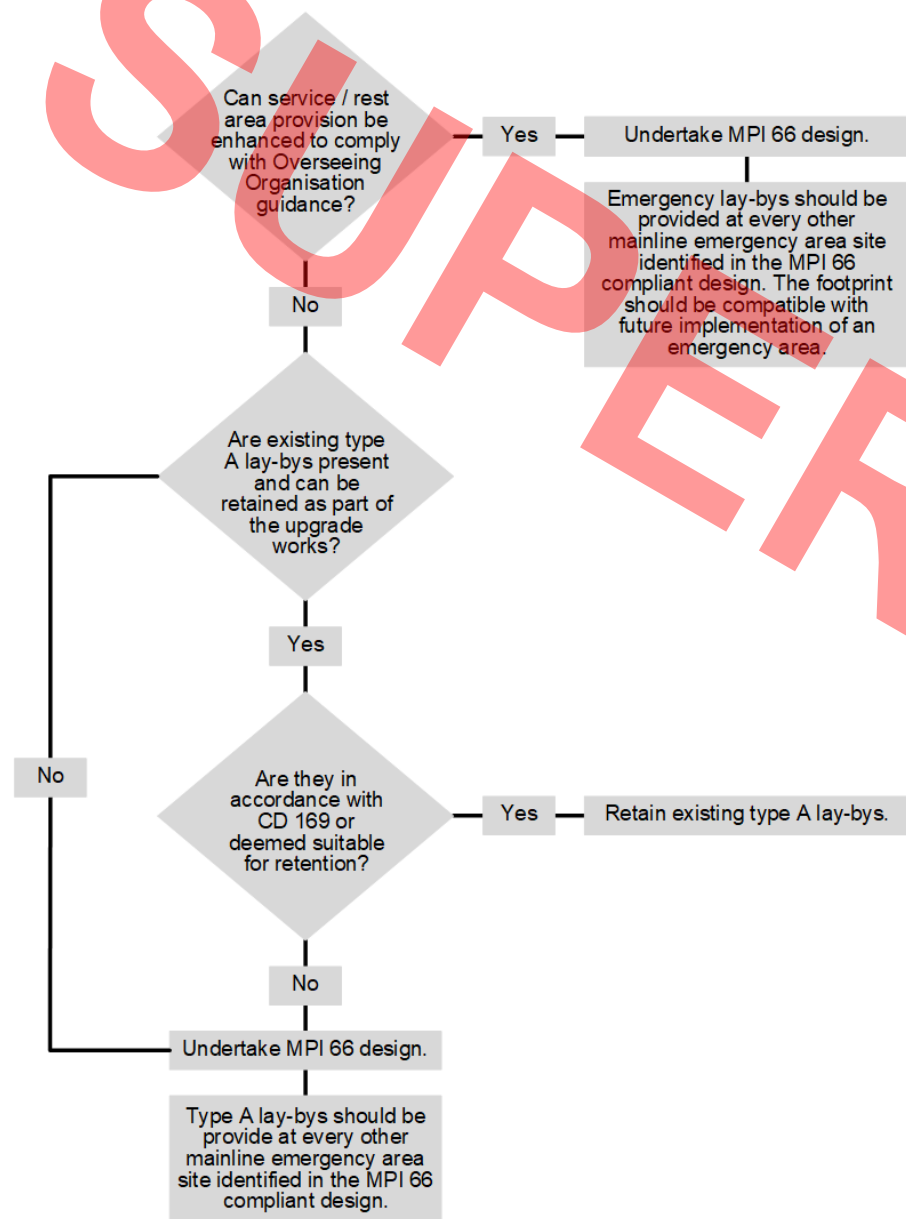


Table E/F.41 Clause E/8.2 level applicability

E/8.2	Emergency area surfacing, road marking and signing requirements shall be provided in accordance with Section E/9 of this document.			
Level applicability	1	2	3	4
	N/A	N/A	N/A	Applicable

DG/E/8.2/1 [Level 1, 2] Emergency lay-by road marking and signing requirements should be provided in accordance with Section DG/E/9.11/1.

DG/E/8.2/2 [Level 3] APTR emergency area road marking and signing requirements should be provided in accordance with Section DG/E/9.11/2 and DG/E/9.11/3.

Table E/F.42 Clause E/8.3 level applicability

E/8.3	Parking lay-bys shall not be provided on expressways.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/8.3/1 [Level 1 & 2] If the guidance sought from the Overseeing Organisation in relation to E/8.4 is met parking lay-bys should not be provided.

Table E/F.43 Clause E/8.4 level applicability

E/8.4	Guidance shall be sought from the Overseeing Organisation on roadside facilities for expressways.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/8.4/1 [Level 1, 2] Where practicable the guidance sought from the Overseeing Organisation on roadside facilities for expressways should be met.

DG/E/8.4/2 [Level 3, & 4] The guidance sought from the Overseeing Organisation applies.

Table E/F.44 Clause E/8.8 level applicability

E/8.8	Bus stops shall not be provided on expressways.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/8.8/1 [Level 1 & 2] To maximise compatibility with levels 3 and 4 opportunities to relocate bus stops should be assessed particularly where additional works would be required to maintain online provision.

DG/E/8.8/2 [Level 1 & 2] If prohibitions of walkers, cyclists and horse riders are brought forward (see DG/E/13.1/1) bus stops should not be provided on the mainline.

Table E/F.45 Clause E/8.9 level applicability

E/8.9	Pro-active stakeholder engagement shall be undertaken from HE PCF [Ref 14.N] stage 1 to determine the required changes to bus stop provision.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/8.9/1 [Level 1 & 2] Where bus stops are retained (subject to DG/E/8.8/1 and DG/E/8.8/2) engagement is not required.

Table E/F.46 Clause E/8.10 level applicability

E/8.10	The need for additional traffic officer outstations shall be identified through liaison with the Overseeing Organisation commencing at HE PCF [Ref 14.N] stage 1.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/8.10/1 [Level 1 & 2] If additional off-network rest areas are provided an assessment should be undertaken to determine whether this should include provision for any later use as a traffic officer outstation to facilitate compatibility with level 3 and 4.

Table E/F.47 Clause E/8.13 level applicability

E/8.13	The proposed location, layout and operating procedures for abnormal load bays shall be subject to acceptance by the SCRG.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/8.13/1 [Level 1 & 2] Proposed locations should avoid a conflict with infrastructure required at levels 3 and 4 to facilitate compatibility.

DG/E/8.13/2 [Level 1, 2, 3, & 4] Locations off the mainline for example at a junction are likely to minimise the operational impact of abnormal loads.

DG/E/8.13/3 [Level 1, 2, 3 & 4] The location and layout should be appropriate for all levels.

Table E/F.48 Clause E/8.14 level applicability

E/8.14	The potential time for traffic officers and core responders to reach live lane incidents shall be assessed in the design.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/8.14/1 [Level 1 & 2] Traffic Officers may not currently be present. An assessment should still be undertaken for traffic officers and core responders in accordance to the methodology detailed in SMP-SA02-ITLG-DGA-E-E1.10 [Ref 37.N].

Table E/F.49 Clause E/8.16 level applicability

E/8.16	Emergency access/egress provision and removable barrier shall be determined in accordance with GD 368 [Ref 15.N], CD 377 [Ref 23.N] and through liaison with the Overseeing Organisation and the emergency services.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/8.16/1 [Level 1, 2, 3 & 4] In situations where existing junctions along a route are closed for general use (see E/6.7) they may offer an opportunity to provide emergency access/egress provision by providing a connection to a parallel road. Factors identified within GD 368 [Ref 15.N] should be considered.

E/F10 Signing and road marking

This section details the applicability clauses relating to signing and road marking.

Table E/F.50 Clause E/9.1 level applicability

E/9.1	Junction signing on expressways shall be positioned in accordance with CD 146 [Ref 21.N].			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/9.1/1 [Level 1, 2 & 3] The methodology in CD 146 [Ref 21.N] should be used for ADS distance combinations. The location of ADS for Levels 1, 2 and 3 should align with the locations of ADS in Level 4.

Table E/F.51 Clause E/9.2 level applicability

E/9.2	Where the decision has been taken to designate as a motorway, traffic signs and road markings must be provided to comply with TSRGD [Ref 35.N] requirements for a motorway.			
Level applicability	1	2	3	4
	N/A	N/A	N/A	Applicable

DG/E/9.2/1 [Level 1, 2 & 3] APTR signing should be in accordance with the mandatory requirements of TSRGD.

DG/E/9.2/2 [Level 1, 2 & 3] Where the ultimate intention is for a route to achieve level 4, gantries, sign posts and foundations should be compatible with level 4. The use of motorway font in place of APTR font may impact sign size.

Table E/F.52 Clause E/9.8 level applicability

E/9.8	Marker posts shall be provided on expressways.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/9.8/1 [Level 1, 2, 3, & 4] Marker posts provide useful reference points for traffic officers and core responders.

Table E/F.53 Clause E/9.9 level applicability

E/9.9	Where the decision has been taken to designate as a motorway, motorway regulation signing shall be provided on expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Partial	Applicable

DG/E/9.9/1 [Level 3] The following should be prohibited; pedestrians, riders of motorcycles under 50 cc, cyclists, horse riders, agricultural vehicles (except certain agricultural tractors which meet specific requirements, have undergone roadworthiness testing and are used for haulage (these 'fast' tractors are not deemed as agricultural and are therefore permitted as they are on motorways)) and powered wheelchairs/powering mobility scooters.

DG/E/9.9/2 [Level 3] Where the mainline link has three lanes, vehicles with an operating weight exceeding 7.5 tonnes, should be prohibited from entering or proceed in lane 3. This does not apply where a third lane is used to provide an auxiliary lane at a junction.

DG/E/9.9/3 [Level 3] Signing is required to communicate prohibitions in place at level 3. Schemes should consult the Overseeing Organisation.

Table E/F.54 Clause E/9.10 level applicability

E/9.10	An information sign 'No hard shoulder for XX miles' to Diagram 820.1 in TSRGD [Ref 35.N] shall be provided in accordance with IAN 161 [Ref 30.N].			
Level applicability	1	2	3	4
	N/A	N/A	N/A	Applicable

Table E/F.55 Clause E/9.11 level applicability

E/9.11	Emergency area surfacing, road markings and signing shall be provided in accordance with MPI 66 [Ref 38.N].			
Level applicability	1	2	3	4
	N/A	N/A	N/A	Applicable

DG/E/9.11/1 [Level 1, 2] The road markings and signing for emergency lay-bys where provided should be provided in accordance with CD 169 [Ref 32.N].

DG/E/9.11/2 [Level 3] The road markings in APTR emergency areas should be provided in accordance with emergency lay-bys in CD 169 [Ref 32.N] but adjusted to align with the taper dimensions in DG/E/8.1/4.

DG/E/9.11/3 [Level 3] The signing in and on the approach APTR emergency areas should be in accordance with emergency lay-by signing detailed in CD 169 [Ref 32.N].

Table E/F.56 Clause E/9.12 level applicability

E/9.12	Variable speed limit and enforcement camera signing shall be provided in accordance with IAN 161 [Ref 30.N].			
Level applicability	1	2	3	4
	N/A	N/A	Partial	Applicable

DG/E/9.12/1 [Level 3] Variable speed limit and enforcement camera signing is currently only authorised for use on Motorways. Guidance should be sought from the Overseeing Organisation.

Table E/F.57 Clause E/9.13 level applicability

E/9.13	Liaison with adjacent local highway authorities shall commence in HE PCF [Ref 14.N] stage 1 to identify changes that are required to their road signing.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/9.13/1 [Level 1, 2, 3, & 4] Signing changes may result from closure of local accesses, new routes, de-trunking of routes and road designation.

DG/E/9.13/2 [Level 1, 2 & 3] Where the Overseeing Organisation is funding any changes and the ultimate intention is for a route to achieve level 4, sign posts and foundations should be compatible with level 4.

DG/E/9.13/3 [Level 1, 2 & 3] Where the local highway authority is funding any changes and the ultimate intention is for a route to achieve level 4, the Overseeing Organisation should encourage that sign posts and foundations should be compatible with level 4.

Table E/F.58 Clause E/9.14 level applicability

E/9.14	The design shall include for the provision of off network diversion routes using symbol signs agreed with the Overseeing Organisation and adjacent local highway authorities.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/9.14/1 [Level 4] There may be an opportunity to amend off network diversion routes to include motorways as all level 4 traffic will be permitted to use these diversions.

E/F11 Roadside technology and communications

This section details the applicability clauses relating to technology.

Table E/F.59 Clause E/10.1 level applicability

E/10.1	Liaison with the Overseeing Organisation shall be undertaken to identify opportunities to optimise roadside technology and communications provision.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.60 Clause E/10.2 level applicability

E/10.2	Guidance shall be sought from the Overseeing Organisation on optimised technology options for expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.61 Clause E/10.3 level applicability

E/10.3	Infrastructure and telecommunication services shall be designed in accordance with TD 131 [Ref 29.N].			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/10.3/1 [Level 1 & 2] Longitudinal ducting should be installed in both verges in areas where new structures constrain the verge.

DG/E/10.3/2 [Level 1 & 2] Cross carriageway ducts should be installed across new or significantly modified slip roads.

Table E/F.62 Clause E/10.4 level applicability

E/10.4	Guidance shall be sought from the Overseeing Organisation on the evolving requirements for control signals and VMS.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.63 Clause E/10.5 level applicability

E/10.5	Control signals and VMS shall be provided in accordance with the smart motorway all lane running (ALR) control signal requirements in CD 146 [Ref 21.N].			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.64 Clause E/10.6 level applicability

E/10.6	Reference to 'lane 4' in clause E/1.22 of CD 146 [Ref 21.N] shall be amended to 'outside lane' for expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.65 Clause E/10.7 level applicability

E/10.7	Entry slip signals shall be provided in accordance with CD 146 [Ref 21.N]			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.66 Clause E/10.8 level applicability

E/10.8	Where strategic VMS signs are already in place they shall be retained or re-positioned in accordance with CD 146 [Ref 21.N].			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/10.8/1 [Level 1 & 2] Where existing strategic VMS signs need to be relocated the new position should assess compatibility with level 3 and 4 VMS design to minimise the potential for any future location conflicts should a decision be made to implement level 3 or 4.

DG/E/10.8/2 [Level 1 & 2] Any new VMS equipment should comply with clauses E/10.27 and E/11.1 to E/11.5.2.

Table E/F.67 Clause E/10.9 level applicability

E/10.9	New strategic VMS shall not be provided on expressways.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

Table E/F.68 Clause E/10.10 level applicability

E/10.10	Detection design to support MIDAS-based incident detection, variable mandatory speed limits, traffic counting sites and stopped vehicle detection shall be in accordance with TD 131 [Ref 29.N] and this document.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/10.10/1 [Level 1 & 2] The requirements for traffic counting sites should be in accordance with TD 131 [Ref 29.N].

Table E/F.69 Clause E/10.11 level applicability

E/10.11	Detection equipment shall be positioned to minimise the number of sites that are located remotely from an emergency area/maintenance hard standing (MHS) site or an off-network access point.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.70 Clause E/10.12 level applicability

E/10.12	Where detection equipment is located remotely from an emergency area/MHS site or an off-network access point, a maintenance strategy shall be produced and be subject to acceptance by the SCRG and recorded in the DSR.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.71 Clause E/10.13 level applicability

E/10.13	CCTV requirements and advice in TD 131 [Ref 29.N] shall not apply to expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/10.13/1 [Level 1 & 2] The requirements for CCTV should be in accordance with TD 131 [Ref 29.N].

Table E/F.72 Clause E/10.14 level applicability

E/10.14	Pan-tilt zoom cameras shall enable operators to see places of relative safety (located within the motorway boundary), maintenance hard standings and in excess of 95% of the main carriageway in all ambient light levels.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.73 Clause E/10.15 level applicability

E/10.15	A 1.75 metre cube target, shall represent a minimum of 5% of the image height at maximum zoom.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.74 Clause E/10.16 level applicability

E/10.16	CCTV coverage shall enable views of the ERT in emergency areas to represent a minimum of 10% of the image height.			
Level applicability	1	2	3	4
	N/A	N/A	Partial	Applicable

DG/E/10.16/1 [Level 3] APTR emergency areas should be treated in the same way as emergency areas.

Table E/F.75 Clause E/10.17 level applicability

E/10.17	CCTV coverage of an ERT located at a new short section of hard shoulder or hard shoulder defined as a place of relative safety shall represent a minimum of 10% of the image height.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.76 Clause E/10.18 level applicability

E/10.18	CCTV cameras associated with a place of relative safety shall include a pre-set position to view and zoom into the place of relative safety in addition to the home position and any other positions agreed with the Overseeing Organisation.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.77 Clause E/10.19 level applicability

E/10.19	CCTV cameras shall be located and mounted so that they provide the required coverage.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.78 Clause E/10.19.1 level applicability

E/10.19.1	The location and mounting of CCTV cameras should take coverage, environmental conditions, image stability and whole life costs into account.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.79 Clause E/10.19.2 level applicability

E/10.19.2	CCTV cameras should be co-located with other roadside technology equipment, for efficient construction and ongoing maintenance, including calibration.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.80 Clause E/10.20 level applicability

E/10.20	CCTV equipment shall be positioned to minimise the number of sites that are located remotely from an emergency area/MHS site or an off-network access point.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/10.20/1 [Level 3] Equipment may also be accessed from APTR emergency area/MHS.

Table E/F.81 Clause E/10.21 level applicability

E/10.21	Where CCTV equipment is located remotely from an emergency area/MHS site or an off-network access point, a maintenance strategy shall be produced and be subject to acceptance by the SCRG and recorded in the DSR.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.82 Clause E/10.22 level applicability

E/10.22	A compliance strategy shall be developed to identify any requirements that need to be included in expressway schemes in addition to the speed and red x enforcement requirements outlined in this section.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/10.22/1 [Level 1 & 2] The enforcement strategy should be discussed and agreed with the local enforcement authority and Overseeing Organisation at the earliest opportunity.

DG/E/10.22/2 [Level 1 & 2] Red X enforcement will not apply. Speed enforcement may apply.

Table E/F.83 Clause E/10.23 level applicability

E/10.23	Speed and red X enforcement shall be provided on expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/10.23/1 [Level 1 & 2] Enforcement should be provided where required by the compliance strategy.

Table E/F.84 Clause E/10.24 level applicability

E/10.24	Guidance shall be sought from the Overseeing Organisation on the generic compliance strategy that is being developed for the expressway concept.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.85 Clause E/10.25 level applicability

E/10.25	Guidance shall be sought from the Overseeing Organisation on the deployment, funding and operational arrangements for enforcement systems.			
Level applicability	1	2	3	4
	Partial	Partial	Applicable	Applicable

DG/E/10.25/1 [Level 1 & 2] Applies only where enforcement is proposed.

Table E/F.86 Clause E/10.26 level applicability

E/10.26	To enable operation of variable mandatory speed limits (VMSL), expressway schemes shall have the necessary legal framework in place.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.87 Clause E/10.28 level applicability

E/10.28	Guidance shall be sought from the Overseeing Organisation on geographic addressing on expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

DG/E/10.28/1 [Level 3 & 4] Updates are proposed to the format of geographic location references to be used, guidance should be sought from the Overseeing Organisation.

E/F12 Structures

This section details the applicability clauses relating to structures.

Table E/F.88 Clause E/11.1 level applicability

E/11.1	The design of VMS supporting structures shall be in accordance with CD 365 [Ref 20.N].			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.89 Clause E/11.2 level applicability

E/11.2	An assessment of VMS access arrangements shall be undertaken in accordance with CD 365 [Ref 20.N].			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.90 Clause E/11.3 level applicability

E/11.3	Where VMS locations are aligned on both carriageways, super-span gantry structures shall not be used as an alternative to two cantilever structures.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.91 Clause E/11.4 level applicability

E/11.4	A VMS shall only be mounted on a super-span gantry if a portal gantry is already required for ADS signing on the opposing carriageway and this has been justified in accordance with Section E/9 of this document.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.92 Clause E/11.5 level applicability

E/11.5	Guidance shall be sought from the Overseeing Organisation on the potential requirement to mount wireless equipment on structures.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.93 Clause E/11.5.1 level applicability

E/11.5.1	Wireless mounting arrangements may include future proofing for connected vehicle systems.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

Table E/F.94 Clause E/11.5.2 level applicability

E/11.5.2	The need for mobile elevated working platform access for wireless equipment maintenance should be minimised.			
Level applicability	1	2	3	4
	N/A	N/A	Applicable	Applicable

E/F13 Walkers, cyclists and horse-riders (WCHs) and slow-moving vehicles

This section details the applicability clauses relating to WCHs and slow-moving vehicles.

Table E/F.95 Clause E/13.1 level applicability

E/13.1	Where the decision has been taken to designate as a motorway, motorway regulations and the associated road user prohibitions shall apply to expressways.			
Level applicability	1	2	3	4
	N/A	N/A	Partial	Applicable

DG/E/13.1/1 [Level 1 & 2] Appendix E/C recognises that there is potential to bring forward the delivery of design components to an earlier level where the benefits of doing so can be clearly demonstrated. Bringing forward prohibitions may contribute towards the Overseeing Organisation's KPIs and PIs.

DG/E/13.1/2 [Level 3] The prohibitions in Section DG/E/9.9/1 should apply.

Table E/F.96 Clause E/13.3 level applicability

E/13.3	Alternative provision for WCHs shall be assessed in accordance with GG 142 [Ref 39.N] from HE PCF [Ref 14.N] stage 1.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/13.3/1 [Level 1 & 2] The GG 142 [Ref 39.N] assessment should be compatible with prohibition of WCHs from the mainline where the ultimate intention is for a route to achieve level 3 or 4.

DG/E/13.3/2 [Level 3 & 4] Any previous GG 142 [Ref 39.N] assessment should be revisited to ensure that the assessment and WCH provision is appropriate for prohibition of WCHs from the mainline.

Table E/F.97 Clause E/13.4 level applicability

E/13.4	Where a parallel segregated facility is to be provided within the highway boundary adjacent to an expressway cross section, the special road boundary shall be located between the expressway cross section and the segregated WCH facility.			
Level applicability	1	2	3	4
	N/A	N/A	N/A	Applicable

Table E/F.98 Clause E/13.8 level applicability

E/13.8	Alternative provision for slow-moving vehicles shall be assessed using a GG 104 [Ref 24.N] risk assessment from HE PCF [Ref 14.N] stage 1.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/13.8/1 [Level 1, 2, 3, & 4] The generic safety risk assessment for slow-moving vehicles can be sought from the Overseeing Organisation provides additional guidance to inform appropriate alternative provision.

E/F14 Legal

This section details the applicability clauses relating to legal.

DG/E/14/1 [Level 1, 2, 3 & 4] Guidance should be sought from General Counsel as this section is not exhaustive.

Table E/F.99 Clause E/14.1 level applicability

E/14.1	Where the decision has been taken to designate as a motorway, the Motorways Traffic (England and Wales) Regulations 1982 MT(E&W) 1982 [Ref 18.N] and The Motorways Traffic (Speed Limit) Regulations 1974 MT(SL) 1974 [Ref 33.N] shall apply to expressways.			
Level applicability	1	2	3	4
	N/A	N/A	N/A	Applicable

Table E/F.100 Clause E/14.2 level applicability

E/14.2	Guidance shall be sought from the Overseeing Organisation from HE PCF [Ref 14.N] stage 1 to determine the approach to legislative changes required to support expressways.			
Level applicability	1	2	3	4
	Applicable	Applicable	Applicable	Applicable

DG/E/14.2/1 [Level 3] The requirements and arrangements for litter picking, sweeping, cleaning and clearance should be consistent with those for a motorway (clause E/2.8). Responsibility for litter on APTRs can be transferred from a local authority to the Overseeing Organisation as a highway authority by an order made under Section 86(11) of the Environmental Protection Act 1990 EPA 1990 [Ref 5.N].

DG/E/14.2/2 [Level 3] The requirements and arrangements for boundary fences should be consistent with those for a motorway (clause E/2.10). Section 80 of the Highways Act 1980 [Ref 13.N] allows a highway authority to erect and maintain fence posts and alter or remove a fence or post erected by them for the purpose of preventing access to a highway. This definition of highway includes an APTR. The highway authority would erect fencing along the boundary, either alongside existing landowner's fences, instead of, with the landowners permission or as new where no boundary fence exists.

DG/E/14.2/3 [Level 3] The requirements and arrangements for statutory undertakers specified in clause DG/E/2.11/3 should be achieved by designating as a protected street under Section 61 of the New Roads and Street Works Act NRSWA 1991 [Ref 19.N].

DG/E/14.2/4 [Level 1, 2 & 3] Emergency lay-bys, where provided (clause DG/E/8.1/2 & DG/E/8.1/3) should follow the traffic regulation order requirements of CD 169 [Ref 32.N].

DG/E/14.2/5 [Level 3] APTR emergency areas, where provided (clause DG/E/8.1/4) should follow the traffic regulation order requirements of CD 169 [Ref 32.N].

DG/E/14.2/6 [Level 3] The prohibition of vehicles specified in clause DG/E/9.9/1 of this document should be achieved by the following hierarchical approach:

- 1) If a Development Consent Order is required any prohibition and restrictions should be included within the Development Consent Order. A separate Road Traffic Regulation Order should not be made alongside the Development Consent Order where it could be included.
- 2) A Road Traffic Regulation Order should be made under Section 1 of the Road Traffic Regulation Act 1984 RTRA 1984 [Ref 28.N]. The Road Traffic Regulation Act 1984 RTRA 1984 [Ref 28.N] requires this this is only used if it appears to the Overseeing Organisation that it would meet the criteria under Section 1 of the act.
- 3) A Road Traffic Regulation Order should be made by the Secretary of State under Section 20 of the Road Traffic Regulation Act 1984 RTRA 1984 [Ref 28.N].

DG/E/14.2/7 [Level 3] The prohibition of vehicles specified in clause DG/E/9.9/2 of this document should be achieved by the following hierarchical approach:

- 1) If a Development Consent Order is required any prohibition and restrictions should be included within the Development Consent Order. A separate Road Traffic Regulation Order should not be made alongside the Development Consent Order where it could be included.
- 2) A Road Traffic Regulation Order should be made under Section 1 of the Road Traffic Regulation Act 1984 RTRA 1984 [Ref 28.N]. The Road Traffic Regulation Act 1984 RTRA 1984 [Ref 28.N] requires this this is only used if it appears to the Overseeing Organisation that it would meet the criteria under Section 1 of the act.
- 3) A Road Traffic Regulation Order should be made under Section 20 of the Road Traffic Regulation Act 1984 RTRA 1984 [Ref 28.N].

DG/E/14.2/8 [Level 3] Variable mandatory speed limits should be implemented by a Road Traffic Regulation Order under Section 84(1)(c) of the Road Traffic Regulation Act 1984 RTRA 1984 [Ref 28.N]. Schedule 9 of the Road Traffic Regulation Act 1984 RTRA 1984 [Ref 28.N] requires the consent of the Secretary of State before it can be made by Overseeing Organisation.

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General Principles & Scheme Governance
Design

GD 300

Northern Ireland National Application Annex to GD 300 Requirements for new and upgraded all-purpose trunk roads (expressways)

Revision 0

Summary

There are no specific requirements for Department for Infrastructure, Northern Ireland supplementary or alternative to those given in GD 300.

Feedback and Enquiries

Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated team in the Department for Infrastructure, Northern Ireland. The email address for all enquiries and feedback is: dcu@infrastructure-ni.gov.uk

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Contents

Release notes

2

SUPERSEDED

Release notes

Version	Date	Details of amendments
0	May 2019	Department for Infrastructure, Northern Ireland National Application Annex to GD 300.

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General Principles & Scheme Governance
Design

GD 300

Scotland National Application Annex to GD 300 Requirements for new and upgraded all-purpose trunk roads (expressways)

Revision 0

Summary

There are no specific requirements for Transport Scotland supplementary or alternative to those given in GD 300.

Feedback and Enquiries

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Contents

Release notes

2

SUPERSEDED

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General Principles & Scheme Governance
Design

GD 300

Wales National Application Annex to GD 300 Requirements for new and upgraded all-purpose trunk roads (expressways)

Revision 0

Summary

There are no specific requirements for Welsh Government supplementary or alternative to those given in GD 300.

Feedback and Enquiries

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Contents

Release notes

2

SUPERSEDED

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