

Smart Motorways Programme

M4 J3 – J12

Package 1 (J8/9 to J12) Designer's Response to Road
Safety Audit (Stage 2)

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Revision P01

REVISION SCHEDULE

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Draft

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Acronyms used within the audit report

ADS	Advance direction sign
AMI	Advance motorway indicator
CCTV	Closed circuit television
DMRB	Design Manual for Roads and Bridges
ERA	Emergency refuge area
ERT	Emergency roadside telephone
MAA	Maintenance access area
MM-ALR	Managed motorway all lane running
MSA	Motorway service area
TJR	Through junction running
VRS	Vehicle restraint system

1 Introduction

This Response Report results from a Stage 2 Road Safety Audit (RSA) carried out on the proposed upgrade of the M4 motorway to a smart motorway as part of the Smart Motorways Programme (SMP). This section of the upgrade extends between M4 junction 8/9 near Maidenhead and junction 12 near Reading.

The Road Safety Audit Report (Ref: HA514451-CHHJ-GEN-S1_ZZZZZZZZ_Z-RP-ZZ-0003) and Response Report were prepared by Arcadis / Jacobs JV (AJJV) on behalf of Highways England, they are presented based upon the checklist contained in Annex B of HD19/15 for RSA. The AJJV team has examined and reported only on the road safety implications of the design in accordance with HD 19/15.

The RSA Stage 2 report was received by the Design Team and the recommendations made in the RSA report have been reviewed accordingly.

This report is set out in the same format as the previous RSA Stage 2 report with the RSA recommendation explained by the auditor. To show the designer's response an additional grey box has been included below the auditor's recommendation as follows:

RSA RECOMMENDATION: XXX

DESIGNERS RESPONSE: XXXX

Where an exception to the auditor's recommendation is proposed by the design team then the content of the above box will be displayed as follows:

RSA RECOMMENDATION: XXX

DESIGNERS RESPONSE: Exception - XXXX

2 Items Raised in previous Road Safety Audits

2.1 Summary

The road safety aspects of the M4 Smart Motorways Programme Package 1 section, between junctions 8/9 and 12 have been subject to comment in the following RSAs. The list below indicates any issues raised in the audits that have not been addressed and remain a problem.

2.1.1 Whole scheme combined (J3-J12) Stage 1 and 2 RSA (September 2017)

The road safety aspects of the whole scheme were the subject of comment in this audit. Any outstanding issues raised in this RSA were referred to again in the Package 1 (J8/9 to 12) Road Safety Audit Stage 2 Rev P01.

2.1.2 Compound 5 Road Safety Audit Stage 2 (June 2018)

The road safety aspects of Compound 5 were the subject of comment in this audit. Any outstanding issues raised in this RSA relating to Compound 5 were referred to again in the Package 1 (J8/9 to 12) Road Safety Audit Stage 2 Rev P01.

2.1.3 Compound 3C combined Road Safety Audit Stage 1/2 (July 2018)

The road safety aspects of Compound 3C were the subject of comment in June 2018. Any outstanding issues raised in this RSA relating to Compound 3C were referred to again in the Package 1 (J8/9 to 12) Road Safety Audit Stage 2 Rev P01.

2.1.4 Package 1 (J8/9 to 12) Road Safety Audit Stage 2 Rev P01 (December 2018)

The road safety aspects of Package 1, between junctions 8/9 and 12, were the subject of comment in this audit. Any outstanding issues raised in this RSA that also relate to the Package 1 (J8/9 to 12) have been raised again (in part or full) as part of this Stage 2 RSA as below:

- Problem 3.1.1 raised in 3.3.3
- Problem 3.1.6 raised in 3.1.16
- Problem 3.1.7 raised in Various
- Problem 3.1.8 raised in 3.1.20
- Problem 3.1.11 raised in 3.1.21
- Problem 3.1.13 raised in 3.1.29
- Problem 3.1.15 raised in 3.1.33
- Problem 3.2.1 raised in 3.2.1
- Problem 3.3.1 raised in 3.3.1
- Problem 3.3.2 raised in 3.3.2
- Problem 3.3.3 raised in 3.3.3

- Problem 3.3.4 raised in 3.3.4
- Problem 3.3.7 raised in 3.3.7
- Problem 3.3.11 raised in 3.3.11
- Problem 3.3.12 raised in 3.3.12
- Problem 3.3.14 raised in 3.3.14
- Problem 3.3.16 raised in 3.3.26
- Problem 3.3.17 raised in 3.3.27
- Problem 3.3.18 raised in 3.3.31

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3 Items Raised at this Stage 2 Road Safety Audit - Mainline

3.1 General

Drainage

3.1.1 PROBLEM

Location: Existing Drainage Chambers EXC1B-002 (WB) and EXC1A-001 (EB) (Drawing No. HA514451-CHHJ-HDG-S1_DGZZZZZZZZ_Z-DR-CD-5104 Rev C03)

Summary: Drainage chambers within traffic lanes may result in slip/fall hazards for motorcyclists leading to injury

At chainage 61620 an existing drainage chamber is positioned within the nearside diverge lane for Junction 12 from the M4 westbound carriageway. A similar scenario is located at chainage 61720 on the eastbound merge lane on to the M4 from Junction 12. There is a risk that the position of these drainage chambers may result in slips/falls by motorists, particularly motorcyclists, under wet road conditions leading to injury.

Recommendation

It is recommended that the chambers are appropriately sited out of the traffic lane to remove the slip/fall hazard.

DESIGNERS RESPONSE:

Designer accept the RSA problem and recommendation made by the RSA team.

IAN 161/13 clause 11.1 states manholes in what will be Lane 1 should be avoided if possible, relocated or upgraded to ensure they meet the necessary wheel loading and skid resistance requirements. Chambers are to be moved into the verge following the same alignment as the existing pipe. Steve Burke has previously picked this up

3.1.2 PROBLEM

Location: Various Emergency Areas (Drawing No. HA514451-CHHJ-HDG-S1_DGZZZZZZZZ_Z-DR-CD-5001-5077)

Summary: Location of EA spillage containment may lead to poor skid resistance of vehicles making an emergency stop due to uneven or slippery surface leading to injury.

Throughout the scheme, spillage containments are positioned within EAs. An example of this is at the proposed westbound EA E9-A2 located at chainage 5800. The details of these containment facilities are not clear and may pose a risk should they cause an uneven surface or impact on the skid resistance of vehicles making an emergency stop within these areas. This may lead to injury through loss of control collisions.

Recommendation

It is recommended that the EA spillage containment is appropriately sited to ensure it does not impact on vehicles entering the emergency areas.

DESIGNERS RESPONSE:

Designer accepts the RSA problem raised but suggests an alternative solution.

The spillage containment facilities must be sited within the EAs due to space restrictions in the verges.

The chambers are positioned to avoid vehicle wheel track zones in the EAs.

In addition, the Specification for the 500 series states that chamber covers will comply with HA104/09 and those in the EAs are to be grade E600 with a PSRV exceeding 60 when tested in accordance with BS9124.

Technology

3.1.3 PROBLEM

Location: Scheme wide

Summary: Non-installation of stopped vehicle detection (SVD) may lead to collisions

It is not clear from the RSA Brief documentation whether SVD is included in this scheme, other than the M4 scheme will adopt SVD if it is rolled out to all SM schemes. The faster roll out of SVD, one of the commitments in the Smart Motorway Stocktake, is to be completed within 36 months. Given that this scheme is being constructed over this period it would be preferable if SVD formed part of the technology being delivered to improve the detection of stopped vehicles potentially reducing the risk of collisions involving vehicles stopped in a live lane. The risk of increased collision severity may become worse during low traffic high speed periods.

Recommendation

Incorporate SVD in accordance with the Smart Motorway Stocktake commitment.

DESIGNERS RESPONSE:

Designer accepts the RSA problem raised but suggests an alternative solution.

SVD is not currently a part of the project scope. It is planned to be retrofitted later by the SMA team to suit their national delivery programme and priorities.

Emergency Areas (EAs)

3.1.4 PROBLEM

Location: EA spacing - scheme-wide

Summary: Insufficient spacing of EAs may lead to shunt collisions

There does not appear to be enough EAs sufficiently located along the route. Should a motorist experience vehicle malfunction there is an increased likelihood that the motorist may have to stop in the carriageway and be exposed to greater risk and potentially live lane collisions. The situation may be exacerbated if SVD is not in operation or if the breakdown occurs during periods of high speed free-flowing traffic. The Audit Team does note however that the spacing of the EAs complies with Interim Advice Note 161/15 (IAN 161/15).

The recent Smart Motorway Stocktake outlined the Government's commitment to making smart motorways as safe as they can be and included a reduced distance between safe places to stop in an emergency to a maximum of a mile, applicable to new schemes. The Government is also considering a national programme of retrofitting additional EAs on existing smart motorways where places to stop are more than one mile apart.

It is not clear what the definition of a new scheme is and so the conversion of the M4 J3 to J12 to smart motorway appears to fall somewhere between being a new scheme and an existing scheme. Nevertheless, by looking at the feasibility of implementing the new spacing distance at this stage would minimise the impact on motorists in the future as temporary traffic management is currently in place. This would also provide an improved spacing distance reducing the risk of live lane stops and associated collisions such as rear shunts.

Recommendation

It is recommended that the EA spacing distance is reduced in line with the Government's Smart Motorway Stocktake commitment.

DESIGNERS RESPONSE:**Exception**

Designer disagrees with the Safety Auditor's recommendation.

Designer understands the thought process behind this. However, the spacing of the EA's comply with the spacing outlined in IAN 161/13 and 161/15 and are under no instruction to increase the spacing of the EA's. the proposed EA's meet the standards outlined in IAN 161/13 and IAN 161/15 and are considered appropriate.

3.1.5 PROBLEM

Location: EA E9-B2 (Drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1017 Rev C02 Sheet 17 of 91) M4 eastbound (chainage 57100)

Summary: Reduced visibility to EA E9-B2 may result in EA entry conflicts

Forward visibility to EA E9-B2 is potentially restricted by the parapet for Mortimer Line Railway underbridge which could also restrict visibility to the EA sign, depending on the mounting height. Drivers intending to use the EA may not appreciate its position so close behind the parapet and miss the EA increasing the risk of a live lane stop collision.



Extract from drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1017 Rev C02

Recommendation

It is recommended that the sign for the emergency area is mounted so that the bridge parapet does not obscure the sign face.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

The mounting height of the sign will be reviewed on site and, if required, adjusted to ensure visibility can be achieved.

3.1.6 PROBLEM

Location: EA E9-A2 (Drawing HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1014 Rev C02 Sheet 14 of 91) M4 westbound (chainage 58000)

Summary: Reduced visibility to emergency area E9-A2 may lead to conflicts

Forward visibility to the ½ mile EA sign for EA E9-A2 is potentially restricted by the parapet for Mortimer Line Railway underbridge depending on the mounting height of the sign. Drivers intending to use the EA may not appreciate its position increasing the risk of a live lane stop collision.

Recommendation

It is recommended that the sign for the EA is mounted so that the bridge parapet does not obscure the sign face.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

The mounting height of the sign will be reviewed on site and, if required, adjusted to ensure visibility can be achieved.

3.1.7 PROBLEM

Location: EAs E9-B2 and E8-B3 (Drawings HA514451-HGN-S1_ML000000_Z-DR-CH-1017 and 1029 Revs C02 Sheets 17 and 29 of 91) M4 eastbound (chainages 57100 and 52800)

Summary: Insufficient signing of places of relative safety may lead to collisions

An EA (E9-B2) is provided on the eastbound M4 at chainage 57000. The next place of relative safety is either the hard shoulder provided through junction 11 or the eastbound diverge slip, a spacing of approximately 1.8km. These places of relative safety are not signed and it is not clear if emergency roadside telephones (ERTs) will be provided now that the through junction running has been removed as part of the value engineering exercise. If a driver misses these opportunities to stop then the next EA sign is at chainage 54000 indicating 2/3 mile to EA E8-A1 (Ch 52800). The total distance between the two EAs E9-B2 and E8-B3 is approximately 4.2km which could result in an increase in live lane stop collisions.

Recommendation

It is recommended that additional ERTs are provided and that signing is provided to advise drivers of places of relative safety, such as the junction 11 diverge, or that hard shoulder is available intra junction at junction 11.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Awaiting confirmation of locations of additional ERTs to determine the number and type of sign required.

Signing will be provided to advise drivers of locations of additional ERTs and Places of Relative Safety at Junction 11.

3.1.8 PROBLEM

Location: EA E8-B1 and E7-B4 (Drawings HA514451-HGN-S1_ML000000_Z-DR-CH-1040 and 1055 Revs C02 Sheet 40 and 55 of 91) M4 eastbound (chainages 48800 and 43300)

Summary: Insufficient signing of places of relative safety may lead to collisions

An EA (E8-B1) is provided on the eastbound M4 at chainage 48800. The next place of relative safety is either the hard shoulder provided through junction 10 or the eastbound diverge slip, a spacing of approximately 2km. These places of relative safety are not signed and it is not clear if emergency roadside telephones will be provided now that the through junction running has been removed as part of the value engineering exercise. If a driver misses these opportunities to stop then the next EA sign is at chainage 45750 indicating 1 1/2 mile to EA E7-B4 (Ch 43300). The total distance between the two EAs E8-B1 and E7-B4 is approximately 5.5km which could result in an increase in live lane stop collisions.

Recommendation

It is recommended that additional ERTs are provided and that signing is provided to advise drivers of places of relative safety, such as the junction 10 diverge, or that hard shoulder is available intra junction at junction 10.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Awaiting confirmation of locations of additional ERTs to determine the number and type of sign required.

Signing will be provided to advise drivers of locations of additional ERTs and Places of Relative Safety at Junction 10.

3.1.9 PROBLEM

Location: EA E7-B1 (Drawing HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1073 Rev C02 Sheet 73 of 91) M4 eastbound (chainage 36800) and the unknown next EA

Summary: Insufficient signing of places of relative safety may lead to collisions

An EA (E7-B1) is provided on the eastbound M4 at chainage 36800. The next place of relative safety is either the hard shoulder provided through junction 8/9 or the eastbound diverge slip, a spacing of approximately 2.35km. These places of relative safety are not signed and it is not clear if ERT will be provided now that the through junction running has been removed as part of the value engineering exercise. If a driver misses these opportunities to stop then the next EA sign is beyond chainage 33500 which is the extent of the Package 1 section. The gap between EAs is therefore unclear, although is likely to be in excess of 5km, which could result in an increase in live lane stop collisions.

Recommendation

It is recommended that additional emergency phones are provided and that signing is provided to advise drivers of places of relative safety, such as the junction 8/9 diverge, or that hard shoulder is available intra junction at junction 8/9.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Awaiting confirmation of locations of additional ERTs to determine the number and type of sign required.

Signing will be provided to advise drivers of locations of additional ERTs and Places of Relative Safety at Junction 8/9.

3.1.10 PROBLEM

Location: EAs E7-A4 and E8-A1 (Drawings HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1042 and 1056 Revs C02 Sheet 42 and 56 of 91) M4 westbound (chainages 43100 and 48100)

Summary: Signing of places of relative safety

An EA (E7-A4) is provided on the westbound M4 at chainage 43100. The next place of relative safety is either the hard shoulder provided through junction 10 or the westbound diverge slip, a spacing of approximately 2.3km. These places of relative safety are not signed and it is not clear if ERT will be provided now that the through junction running has been removed as part of the value engineering exercise. If a driver misses these opportunities to stop then the next

EA sign is at chainage 45600 indicating 1½ mile to EA E8-A1 (Ch 48100). The total distance between the two EAs E7-A4 and E8-A1 is approximately 5km which could result in an increase in live lane stop collisions.

Recommendation

It is recommended that additional signing is provided to advise drivers of these places of relative safety such as follow junction 10 for emergency telephone/layby, or that hard shoulder is available intra junction at junction 10.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Awaiting confirmation of locations of additional ERTs to determine the number and type of sign required.

Signing will be provided to advise drivers of locations of additional ERTs and Places of Relative Safety at Junction 10.

3.1.11 PROBLEM

Location: EAs E8-A3 and E9-A1 (Drawings HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1029 and 1019 Revs C02 Sheet 29 and 19 of 91) M4 westbound (chainages 52650 and 56200)

Summary: Signing of places of relative safety

An EA (E8-A3) is provided on the westbound M4 at chainage 52650. The next place of relative safety is either the hard shoulder provided through junction 11 or the westbound diverge slip, a spacing of approximately 2.25km. These places of relative safety are not signed and it is not clear if ERTs will be provided now that the through junction running has been removed as part of the value engineering exercise. If a driver misses these opportunities to stop then the next EA sign is at chainage 55400 indicating ½ mile to EA E9-A1 (Ch 56200). This sign is set back from the mainline carriageway behind an area of hatching and could easily be missed. The total distance between the two EAs E8-A3 and E9-A1 is approximately 4.5km which could result in an increase in live lane stop collisions.

Recommendation

It is recommended that additional emergency phones are provided and that signing is provided to advise drivers of places of relative safety, such as the junction 11 diverge, or that hard shoulder is available intra junction at junction 11.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Awaiting confirmation of locations of additional ERTs to determine the number and type of sign required.

Signing will be provided to advise drivers of locations of additional ERTs and Places of Relative Safety at Junction 11.

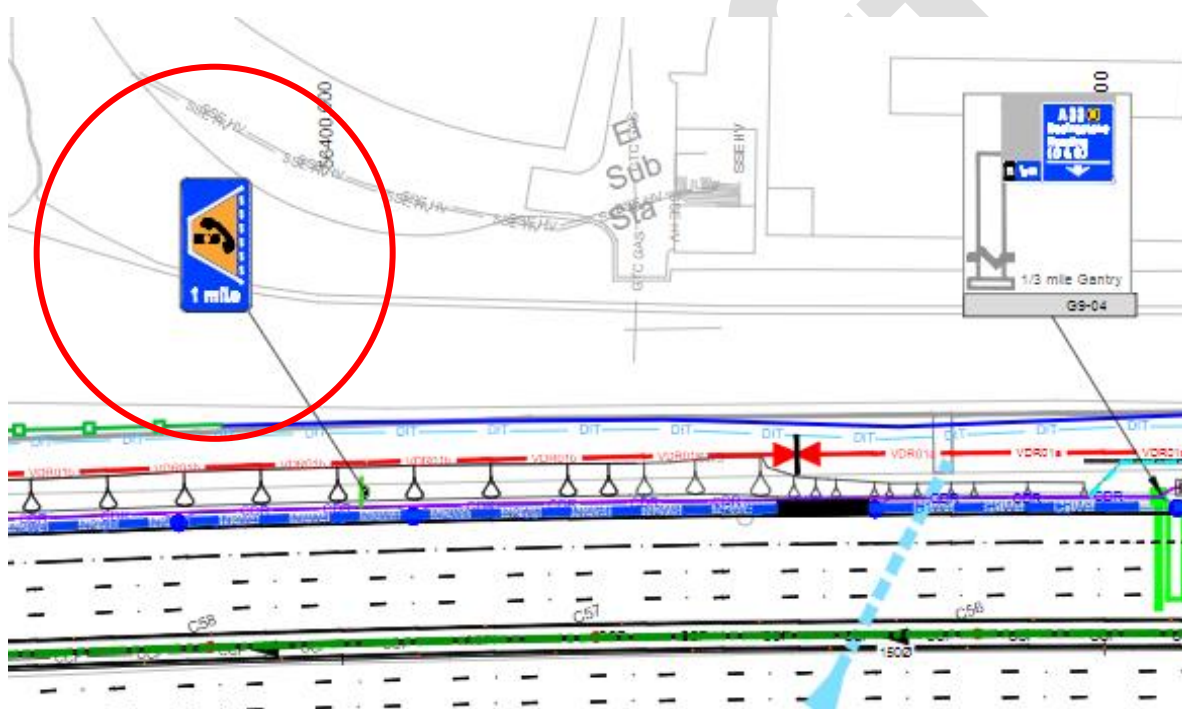
3.1.12 PROBLEM

Location: Eastbound EA sign PS-B-67/3_50 (Drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1019 Rev C02 Sheet 19 of 91) M4 westbound (chainage 556400)

Summary: EA sign provided does not correlate with an EA and may result in motorists traveling further to seek assistance

The eastbound 1 mile EA sign PS-B-67/3_50 provided at chainage 56400 does not correlate with an EA, as the next mainline EA is 2.2 miles/3.6km to the east. If the sign is intended to reference a place of relative safety at junction 11, it is not clear where this is and that drivers would have to leave the mainline carriageway. The use of an EA sign with orange colouring could also be misleading.

This increases the risk of live lane breakdowns which could result in further collisions.



Extract from drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1019 Rev C02

Recommendation

It is recommended that the referenced EA is clarified and the sign removed or replaced accordingly. If the sign is referencing a place of relative safety additional signing should be provided to advise drivers, such as 'follow junction 11 for emergency telephone/layby', or that hard shoulder is available intra junction at junction 11.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

This sign should be removed as it is for the legacy ERA underneath J11 that was removed during the VE process and change to NTJR.

3.1.13 PROBLEM

Location: EA E9-A1 (Drawing HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1019 Rev C02 Sheet 19 of 91) M4 westbound (chainage 56200)

Summary: No 1 mile EA sign provided could lead to vehicles stopping in the live carriageway.

A westbound 1 mile EA sign for EA E9-A1 has not been provided. Reduced signing for EAs could result in drivers stopping in a live lane due to lack of information increasing the risk of live lane stop collisions.

Recommendation

It is recommended that a 1 mile sign for EA E9-A1 is provided.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Prior to the change to NTJR, there was insufficient space for a 1m advanced EA sign. However it is agreed that this sign should now be provided.

3.1.14 PROBLEM

Location: EA E8-A1 (Drawings HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1056 Rev C02 Sheet 56 of 91) M4 westbound (chainage 48100)

Summary: Distance sign consistency

The distance signs provided for EA E9-A1 westbound are a 1½ mile, 2/3 mile and 1/3 mile. A close proximity yard sign has not been provided unlike EA E8-B3 eastbound where a 2/3 mile, 1/3 mile and 300 yard sign has been provided. Excluding a yard sign may confuse some drivers as to the proximity of the EA resulting in late braking/lane changing collisions.

Recommendation

It is recommended that a yard sign is provided for continuity.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Designers assume this comment is related to the WB EA on Sheet 42. In accordance with MP-66 and MP-SA02-ITLG-DGA-H-E1.14 the final yardage sign should be 400 yards. Sign can be included.

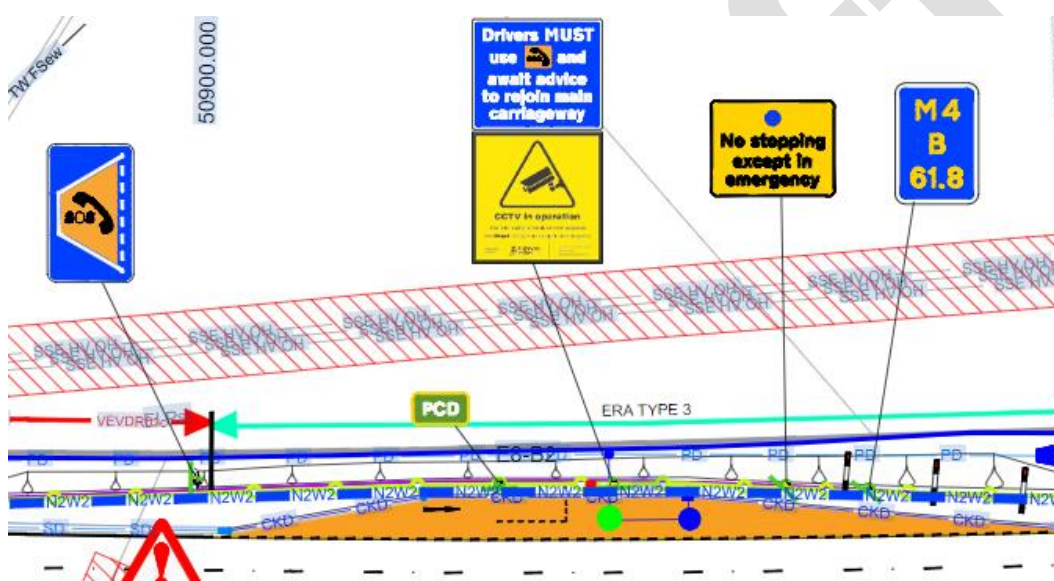
3.1.15 PROBLEM

Location: EA E8-B2 (Drawing HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1034 Rev C02 Sheet 34 of 91) M4 eastbound (chainage 50850)

Summary: Lack of safe place for pedestrians and operatives

EA E8-B2 is provided at chainage 50900 eastbound. At the rear of the EA is a combination of road restraint system (RRS), EA signing, the emergency telephone and 2.5m high environmental barrier. The area behind the RRS appears too narrow (to wait outside the barriers working width) and cluttered to represent a safe place for pedestrians/operatives to be should they have exited their vehicles.

This could result in further collisions and increase the risk of injuries to pedestrians and operatives who may attempt to seek refuge between the RRS and the environmental barrier or should they attempt to find alternative safe areas by walking onto or near the live carriageway.



Extract from drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1034 Rev C02

Recommendation

It is recommended that the environmental barrier is set back, allowing for a place of safety outside of the RRS working width.

DESIGNERS RESPONSE: Exception

Designer disagrees with the RSA problem and recommendation raised

EA's are designed in accordance with IAN 161/13, and when in operation occupants are advised to follow Highway England smart motorway guidance '<https://www.gov.uk/guidance/how-to-drive-on-a-smart-motorway#in-an-emergency-or-breakdown>'. The operational aspects of a Smart Motorway also reduce risks when occupants are using emergency refuge areas.

In this particular example, there is very limited room from the toe of earthworks to the highways boundary. There is no access requirement in IAN 161/13 Section 5.30 for pedestrians behind vehicle road restraint, so long as the ERT is accessible from the traffic side.

3.1.16 PROBLEM

Location: EA E7-B4 (Drawing HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1055 Rev C02 Sheet 55 of 91) M4 eastbound (chainage 43300)

Summary: EA on embankment with limited pedestrian restraint may put those exiting their vehicle at risk

EA E7-B4 at chainage 43300 (eastbound) is on an embankment. The RRS drawings indicate that a pedestrian restraint is provided at the top of the slope, but this only covers the area immediately behind the emergency telephone, not the EA tapers. If a vehicle occupant exits the vehicle and crosses the RRS within the tapers (for instance if this is where their vehicle came to rest) they will be vulnerable to slips/falls down the slope.

Recommendation

It is recommended that pedestrian restraint is provided (outside of RRS working widths) at the top of the slope for the length of the EA.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Pedestrian Restraint will be extended to provide protection along entire EA E7-B4 length.

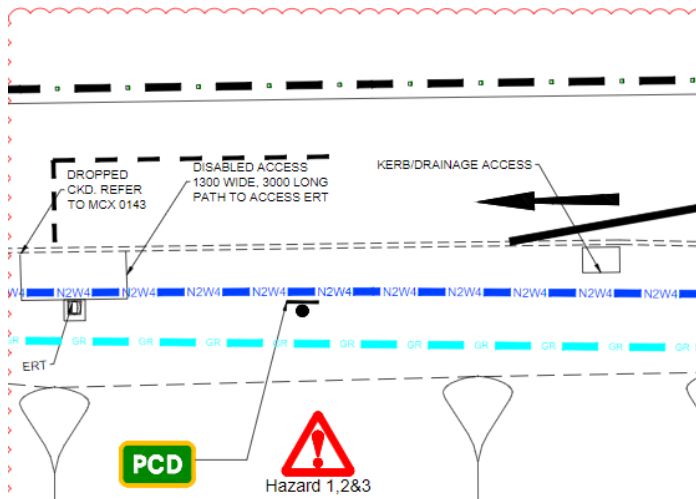
Pedestrian restraint has been located outside the working width of road restraint system, as shown on the Verge Details throughout Contract 1. 400 Series Specification will also detail instruction to locate pedestrian guardrail outside working width of the vehicle road restraint.

3.1.17 PROBLEM

Location: Emergency areas

Summary: Provision of dropped kerbs at ERTs

The police observation platform (POP) specification drawings indicate a 3m dropped kerb at the ERT to enable disabled access to the telephone following the recommendation to alight the vehicle via the passenger side. The EA markings proposed to indicate to drivers where to stop their vehicle may inadvertently block the dropped kerbs, reducing accessibility to the ERT, particularly for those with mobility impairment. It is noted that although drivers are advised to exit their vehicle via the passenger seat both able-bodied drivers and those mobility impaired are likely to struggle to exit most modern UK vehicles in that manner and are likely rather to choose to exit via the driver's side accordingly. There is a risk that in blocking access to the dropped kerbs this could result in a motorist being unable to access the phone without positioning their vehicle in a potentially more vulnerable position closer to the live carriageway.



Extract from drawing HA514451-CHHJ-HGN-S1_MLZZZZZZ_Z-DR-CH-0003 Revision C03

Recommendation

It is recommended that the markings indicating where to stop within the EA are revised to ensure that the dropped kerbs can be accessed.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Markings to be adjusted to tie in with dropped kerbs. Road Markings have been designed according to MPI-66 paragraph 2.5.100.

It is assumed that this is applicable to all EA locations. Can the audit team please advise.

Emergency Roadside Telephones (ERTs)

3.1.18 PROBLEM

Location: Intra junction ERTs

Summary: Availability of ERTs intra junction may put motorists at risk of collisions

It is not clear from the drawings if existing intra junction ERTs are being retained, specifically where TJR has been removed and hard shoulders are available as places of relative safety. If these sections of hard shoulder are considered as a place of relative safety in terms of the required spacing, ERTs are required. Drivers needing to access a place of relative safety may not be aware of these locations and could continue at slow speeds to the next signed EA, at risk of collisions with vehicles that have not acknowledged a speed differential.

Recommendation

It is recommended that clarification on the status of the intra junction hard shoulder is provided and ERTs included if necessary.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

ERT are located at intra junctions and where possible on sections of NJTR existing ERTs are to be retained. Drawings for NTJR have been updated and issued via BC.

Surfacing

3.1.19 PROBLEM

Location: Various

Summary: Inconsistent use of coloured surfacing in EAs may result in live lane collisions

Inconsistent use of coloured surfacing is provided in the EAs depending on the drawing set provided with the audit brief. Orange surfacing is shown in the sign drawings while the general arrangement drawings show no colour. In accordance with the smart motorway stocktake EAs are to be made more visible by introducing orange surfacing as standard. Omitting the orange surfacing will reduce the visibility of the EAs and may result in drivers missing them, resulting in live lane collisions.

Recommendation

It is recommended that all the EAs within the scheme are surfaced orange.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Orange surfacing are already specified for all ERAs. Series 100 GA's to be reviewed and EA colouring amended to orange where incorrect.

3.1.20 PROBLEM

Location: Scheme wide

Summary: Vegetation impacting forward visibility

Temporary vegetation clearance is detailed throughout the majority of Package 1 between the edge of carriageway and the highway boundary or environmental barriers. The drawings state that following construction of the final scheme, vegetation is to be 'reinstated as appropriate', although the type of planting is not clear.

The reallocation of carriageway space will result in vehicles in lane 1 being immediately adjacent to the edge of carriageway. It is likely that over time vegetation in the verge, or from outside the highway boundary, will reduce forward visibility to other vehicles and signs. This is likely to be exacerbated where; the carriageway bends to the left, forward visibility is impacted by bridge structures, fencing, barriers or signage, and for drivers of left-hand drive vehicles.

Reduced forward visibility could increase the risk of rear shunts and side impact collisions due to lane changing.

The Audit Team notes from the RSA Brief that there has been a historic lack of routine maintenance particularly affecting overgrown vegetation.

Recommendation

It is recommended that existing and reinstated vegetation (either from inside or outside the highway boundary) does not adversely impact forward visibility to other vehicles or signs at the time of completion and in the future. Forward visibility splays should be included within future maintenance programmes to ensure visibility is retained.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

The safety of vehicles has been considered in the design of the scheme and restrictions on the type of planting put in place accordingly as outlined in the landscape strategy to ensure that visibility is not impeded.

Road Restraint Systems (RRS)

3.1.21 PROBLEM

Location: Various - scheme wide

Summary: RRS working width impacted by pedestrian restraint barrier

Pedestrian restraint barrier is detailed within the working width of the RRS at a number of EA locations. Examples include EA E9-B3 at chainage 60350 and EA E9-B2 at chainage 57050.

This could increase the severity of a loss of control collision, result in secondary collisions and increase the risk of injuries to pedestrians and operatives who may be between the RRS and the pedestrian restraint barrier.

Recommendation

It is recommended that all pedestrian restraint barrier is located outside the working width of the RRS.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Pedestrian guard rail has been located outside the working width of road restraint system, as seen on the verge details referenced on the General Arrangement Drawings.

Section to be added to 400 Series Specification details detailing requirement to locate pedestrian guardrail outside working width of the road restraint system.

3.1.22 PROBLEM

Location: Chainage 59900 (Drawing HA514451-CHHJ-HRR-S1_ML000000_Z-DR-CH-4009 Rev C04 Sheet 9 of 91)

Summary: RRS working width impacted by environmental barrier

Environmental barrier is detailed within the working width of the RRS at chainage 59900.

This could increase the severity of a loss of control collision, result in secondary collisions and increase the risk of injuries to pedestrians and operatives who may be between the RRS and the pedestrian restraint barrier.

Recommendation

It is recommended that all environmental barrier is located outside the working width of the RRS.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Environmental barrier has been located outside the working width of road restraint system. Contract 1 details show environmental barrier outside W4 working width at ch.59900 and throughout the scheme.

3.1.23 PROBLEM

Location: Various - scheme wide

Summary: RRS impacted by gantry posts and foundations

At a number of locations, RRS drawings show gantry posts and foundations either within the working width or directly tied into RRS. Where a gantry foundation is tied into the RRS, a vehicle being contained is channelled towards the foundation. Examples include chainages 62400, 61500, 56900, 56300, 55630, 53750, 52800, 52150, 52100, 49350, 48300, 42940, 39250, 36650, 35800 and 35080.

These posts, structures or large foundations are substantial and if tied into the RRS or located within the working width, could increase the severity of a loss of control collision.

Recommendation

It is recommended that the RRS at each location has suitable properties to contain and/or channel vehicles beyond large gantry posts and foundations, rather than direct vehicles towards them.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

RRS which runs past the gantry base will be high containment and will provide the correct working width the gantry base. A RRRAP assessment has been carried out to make sure correct working width and containment levels have been provided.

The high containment road restraint which ties in to the gantry bases are designed to transition in such a way to avoid pocketing, this reduces the deflection of the barrier which ties in to the gantry base. The gantry base then acts as a barrier itself.

3.1.24 PROBLEM

Location: Various - scheme wide.

Summary: RRS working width impacted by sign posts

At various locations signs and sign posts are detailed within the working width of the RRS. Examples include:

- at the rear of EAs E7-B4, E9-B2 and E9-B3 (chainages 43300, 57100 and 60350)
- marker post B 58.7 eastbound at chainage 47700
- marker post B 50.0 eastbound at chainage 39100

This could increase the severity of a loss of control collision, result in secondary collisions and increase the risk of injuries to pedestrians and operatives who may be standing behind the RRS.

Recommendation

It is recommended that all signs are located outside the working width of the RRS.

DESIGNERS RESPONSE:

Designer accept the RSA problem raised but suggest an alternative solution.

All signs have been designed outside the working width if possible. However, those within the working width of RRS have a single post at 1.8m+ mounting height and with dimensions of no greater than: 89mm x 3.2 thickness. This ensures the post is passively safe and the sign would not impact with the windshield of the road user.

The following signs are currently within working width with a 1.5m mounting height and will be re-evaluated on site with a view to increasing the mounting height to 1.8m:

-PS-B-71/3_15

-PS-B-71/3_10A

-PS-B-68/0_16

-PS-B-68/0_07A

-PS-B-54/2_56A

-PS-B-58/6_80

Marker Post B 50.0 at 39050EB is outside the WW of the RRS and thus compliant.

3.1.25 PROBLEM

Location: Scheme wide

Summary: Identification of Emergency Crossover Points (ECPs) in the event of an incident

ECPs are provided within the central restraint system at chainages 58600, 51000, 41250 and 38400. It is unclear from the information provided how these will be marked and identifiable to traffic/police officers who may be travelling through congestion or at speed on the opposing carriageway. Issues in identifying the ECP could increase the risk of secondary collisions involving traffic/police officers.

Recommendation

It is recommended that all ECPs are clearly marked and identifiable and that relevant organisations are made aware of their locations.

DESIGNERS RESPONSE:

Designer accepts the RSA problem raised, but suggest an alternative solution, giving appropriate reasoning

Designer can confirm ECPs have been designed in compliance with Ian 161/13, TD 19/06 and GD 368, including geometric and spacing requirements. No requirement for additional markings or signage have been identified.

3.1.26 PROBLEM

Location: A329(M) westbound merge with M4 at chainage 46000 (Drawing HA514451-CHHJ-HRR-S1_ML000000_Z-DR-CH-4048 Rev C04 Sheet 48 of 91)

Summary: RRS omitted on the outside of the bend may not protect errant vehicles

At chainage 46000 the A329(M) merges with the westbound M4 carriageway via a bend with a tight radius. From the drawings provided it is unclear if the RRS on the outside of the bend is being retained and how it would tie into the proposed RRS. The omission of RRS at this location could increase the severity of loss of control collisions of errant vehicles on the radii.

Recommendation

It is recommended that RRS, which ties into the proposed mainline RRS, is provided on the outside of the bend between the A329(M) and westbound M4.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

RRS will be provided on the outside bend and tie into the mainline RRS. This will be subject to a survey of existing RRS on the bend to review its fit for purpose. New RRS will at minimum be required to tie into the mainline from the existing. RRS drawing HA514451-CHHJ-HRR-S1_ML000000_Z-DR-CH-4048 will be updated. The site clearance drawing HA514451-CHHJ-HSC-S1_MLZZZZZZZZ_Z-DR-CH-2048 will also be updated to show either removed or retained RRS on the WB outside bend.

3.1.27 PROBLEM

Location: Eastbound exit from junction 12 at chainage 62100 (Drawing No. HA514451-CHHJ-HSC-S1_MLZZZZZZZZ_Z-DR-CH-2003 Rev C01)

Summary: Removal of existing RRS may not protect errant vehicles leaving the junction

At chainage 62100 the existing RRS is to be removed on the inside of the bend on the eastbound exit from junction 12. However, it has been identified that the proposed RRS along the eastbound onslip should be tying into the existing provision. The removal of RRS at this location could increase the severity of loss of control collisions of errant vehicles on the radii, particularly for those motorists leaving the junction from the northern circulatory.

Recommendation

It is recommended that the existing RRS is retained and ties into the proposed RRS along the eastbound on-slip to the M4 mainline carriageway.

DESIGNERS RESPONSE:

Designer accepts the RSA problem raised but suggests an alternative solution. Old C02 version of drawing 2003 was linked in flatset which showed existing VRS being removed.

Updated C04 version to be replaced in document flatset, which has the existing RRS being retained and tying into proposed RRS. This ensures continuous road restraint along the slip road.

3.1.28 PROBLEM

Location: A-chambers on M4 mainline (Drawing No. HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1001-1082)

Summary: Unprotected A-chambers may result in errant vehicles striking road workers

There are a number of proposed A-chambers along the scheme that do not appear to be protected by proposed or existing RRS. An example of this can be found at chainage 59720 where the A-chamber, located north of the M4 eastbound mainline carriageway, is unprotected as the proposed RRS terminates to the west of this location. Details of how these A-Chambers will be accessed have not been provided. There is a risk that operatives working within these areas would be unprotected leading to potential conflict with errant vehicles.

Recommendation

It is recommended that all A-chambers are protected by RRS.

DESIGNERS RESPONSE:

Exception

Road restraint does not need to be provided for stand-alone 'A' chambers, the A chambers are not a hazard and therefore not protected. Road restraint systems are provided at ITS locations where cabinets are provided with an 'A' chamber. The length of need only incorporates the cabinet not the A chamber. 'A' chambers are not hazards in TD19/06 and in the RRRAP assessment.

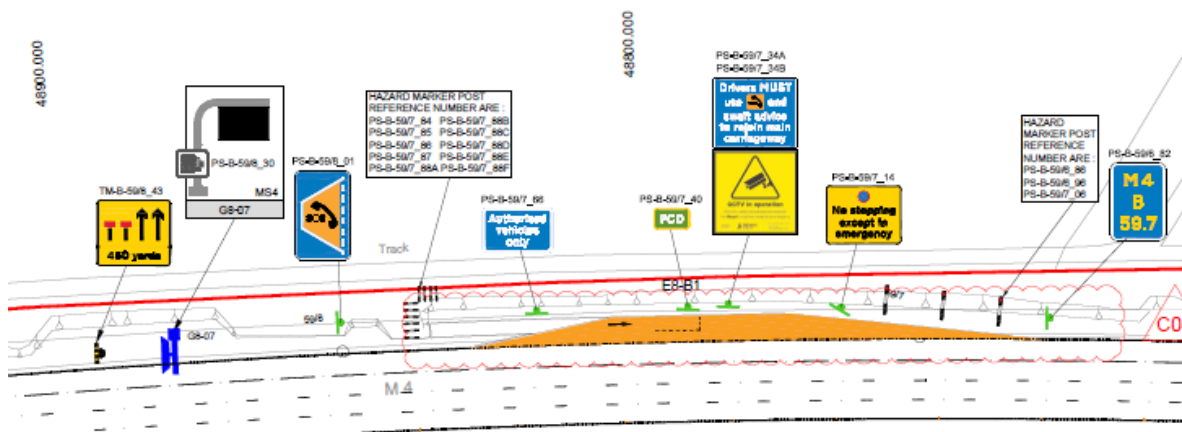
Police Observation Platforms

3.1.29 PROBLEM

Location: Various - scheme wide

Summary: Unauthorised use of Police Observation Platforms/Areas may lead to collisions

At a number of EA's an overlapped break in RRS is provided to accommodate a police observation platform or area. Examples include EA E8-B1 at chainage 48800, E7-B1 at chainage 36800 and E8-A2 at chainage 50550.



Extract from drawing HSN-S1_ZZZZZZZ_Z-DR-CH-12040 Revision C04

In addition, there is a break in the RRS at chainage 37300 eastbound that coincides with the access to an existing POP. It is unclear if the POP is to remain as part of the scheme.

Unauthorised use of these areas, by vehicles or occupants exiting a vehicle, increases the risk of collisions involving static vehicles, occupants outside of their vehicle and vehicles re-joining the carriageway.

Recommendation

It is recommended that all police observation platforms/areas are clearly signed and demarcated to discourage use by unauthorised vehicles and occupants.

DESIGNERS RESPONSE: Designer accepts the RSA problem and recommendation made by the RSA team.

'Authorised Vehicles Only' signs are provided at every POP location and is clearly visible to road users.

3.1.30 PROBLEM

Location: EA E7-B1 (Drawing HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1073 Rev C02 Sheet 73 of 91) M4 eastbound (chainage 36800)

Summary: Potential mis-use of police observation platforms

A police observation platform has been provided within eastbound EA E7-B1 and is surfaced in red. The police observation platform in westbound EA E7-A3 has not been surfaced in red and may result in misuse if it is not clear that it is only for authorised drivers.

Recommendation

It is recommended that the surfacing of police observation platforms is the same for consistency and to avoid mis-use by unauthorised drivers.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Appendix 7/1 states that Orange surfacing shall not be used on Police Observation Platforms, therefore no colour should be specified for POPs

GA drawings will be updated to reflect this.

Access

3.1.31 PROBLEM

Location: Various – scheme wide

Summary: Footways and stepped accesses impeded by rails, restraints and barriers

Footways and stepped accesses are provided through the scheme in order to facilitate future maintenance and inspections. A number of the footways and stepped accesses appear to cross through/over guard rails, restraint systems and barriers (such as environmental barrier). Chainage 61200 westbound provides an example.

This could lead to operatives having to climb over rails, restraints and barriers to get access or increase the potential for operatives within RRS working widths or the carriageway. This could lead to secondary collisions, should an errant vehicle leave the carriageway at these locations.

Recommendation

It is recommended that all footways and stepped accesses are accessible by operatives and are located outside of RRS working widths.

DESIGNERS RESPONSE: Designer accepts the RSA problem and recommendation made by the RSA team.

All pedestrian guardrail has been designed outside the working width of RRS to ensure no safety compromise for maintenance operatives.

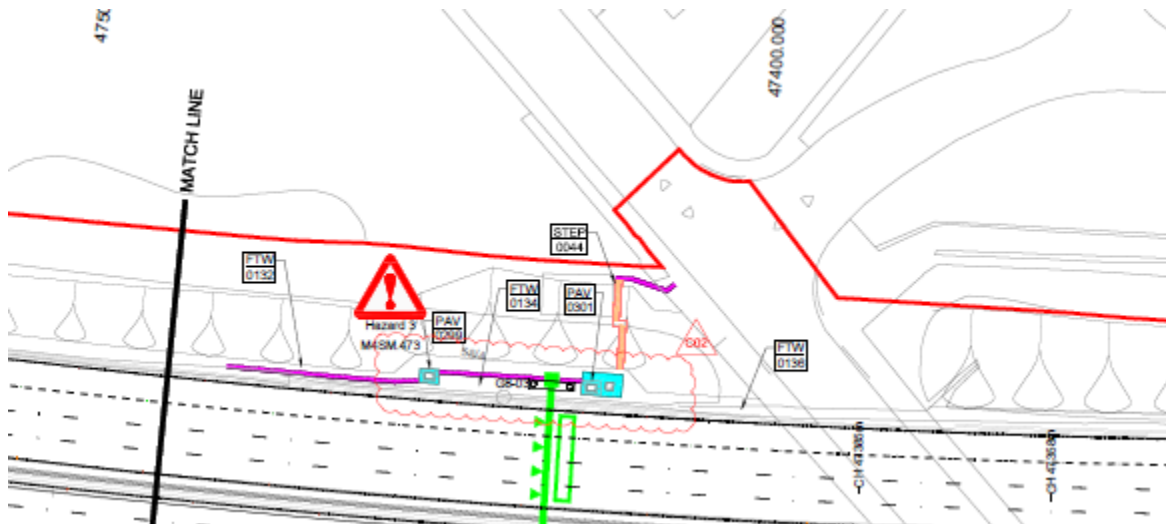
Review currently being undertaken to review Package 1 footways and steps to divert any currently within the working width of the RRS.

3.1.32 PROBLEM

Location: Reading Road (Drawing HKF-S1_ZZ000000_Z-DR-CH-11044 Rev C02 Sheet 44 of 91) M4 eastbound (chainage 47420)

Summary: Potential unauthorised access to the M4 carriageway

The kerbs and footways drawings detail a new maintenance access to the M4 carriageway, via a footway and access steps, at chainage 47420. It is unclear how the access will interact with the existing Reading Road footway and the post and rail fence. The direct, paved access to the M4 at this location could result in unauthorised use of the access and increase the potential for pedestrians to be alongside or within the M4 carriageway. In turn this increases the potential for collisions involving pedestrians.



Extract from drawing HKF-S1_ZZ000000_Z-DR-CH-11044 Revision C2

Recommendation

It is recommended that all operative access footways and steps that interact with public footways include controlled access and are clearly signed to enforce this

DESIGNERS RESPONSE: Designer accepts the RSA problem and recommendation made by the RSA team.

There is a gate proposed in the post and rail boundary fence (shown in drawing HA514451-CHHJ-HFE-S1_ZZ000000_Z-DR-CH-3044), separating the Reading Road footway with the Highways maintenance access. The gate is labelled suitably to deter pedestrians from accessing the maintenance footpath.

Skid Resistance

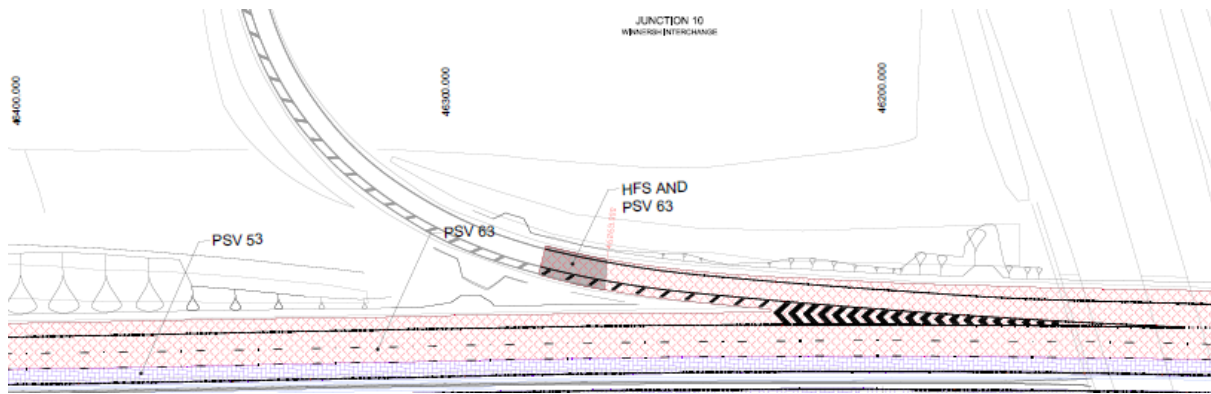
3.1.33 PROBLEM

Location: Various merge and diverge slip roads

Summary: Unintended effects of new short lengths of high friction surfacing (HFS)

HFS is provided for very short lengths on a number of junction merge and diverge slip roads. These short lengths tie in to the existing, often worn, provision. This is particularly of note on the A329 (M) northbound to eastbound merge slip (chainage 46300).

The proposed HFS is likely to have a considerably greater braking coefficient than the existing and will be much more visible. This may confuse motorists resulting in late braking and an increased risk of loss of control collisions particularly for motorcyclists.



Extract from drawing HPV-S1_ML000000_Z-DR-CH-0747 Revision C01

Recommendation

It is recommended that where HFS ties into an existing provision, new HFS is provided for the full length of the existing provision.

DESIGNERS RESPONSE:

Exception

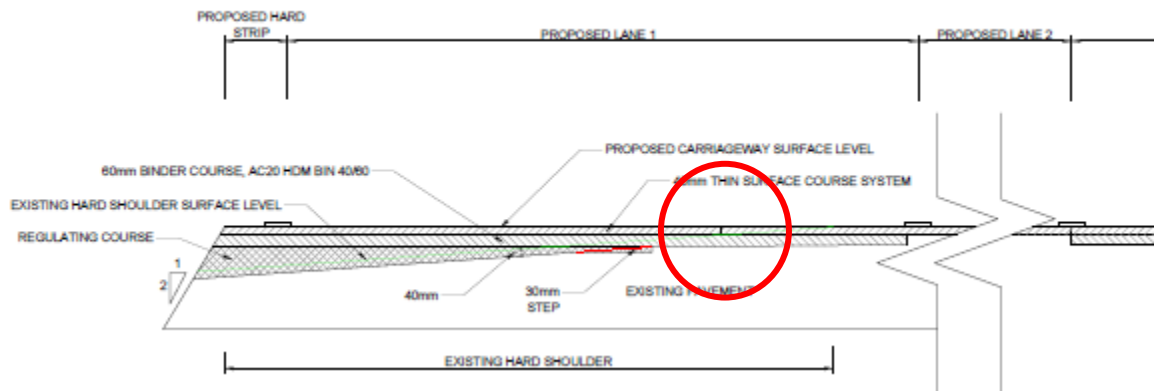
We have been instructed no pavement work should be undertaken beyond highway alignment.

3.1.34 PROBLEM

Location: Various

Summary: Surface joints in wheel tracks

Throughout the scheme there are short lengths of lane one and lane two subject to different surfacing arrangements to the surrounding lanes (most often pavement type P1 – resurfacing). The pavement and cross section drawings provided indicate that a surface course joint may be present within the lane extents and in a wheel track. Given that lanes one and two are subject to the highest volume of vehicles, particularly heavy vehicles, there is increased potential for this joint to fail over time. This can reduce the quality of the surface, effect vehicles under braking conditions and may hold standing water, increasing the risk of loss of control collisions. The Audit Team also noted that some sections of the surfacing reinstatement appeared to disturb or influence the direction of travel, and that this is likely to have a greater impact on powered-two-wheelers.



Extract from drawing HA514541-CHHJ-HPV-SZ_ZZZZZZZZ_Z-DE-CH-0001 Revision C01

Recommendation

It is recommended that all pavement joints are located outside of wheel tracks.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

New surface course is proposed across whole lanes and all surface joints are located under proposed road marking regardless of different pavement options type.

3.2 Junctions

3.2.1 PROBLEM

Location: Various entry slip roads

Summary: Ramp metering measures on entry slip roads could lead to collisions

Ramp metering is being retained but the ramp metering layout, markings, surfacing and signing are often unclear. Stop lines are not shown and details regarding the signal equipment have not been provided. This could lead to driver confusion, hesitation and late braking resulting in shunt type collisions.

Recommendation

It is recommended that stop lines are proposed at ramp metering locations and all details are provided to confirm the layouts and how they interface with the proposed merges.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Ramp metering has been designed in accordance with Highways England standards, the layout conforms to MCX 1008.

Appropriate signals, warning signs, stop lines and HFS and PSV 63 have been provided in the IFC design at all locations where ramp metering is being retained / proposed.

3.3 Road Signs, Carriageway Markings and Lighting

Road Signs

3.3.1 PROBLEM

Location: Scheme wide

Summary: Risk of vehicles striking street furniture

Sign post and foundation details have not been provided. There are a number of instances where signs and posts appear to be unprotected. If these sign posts are not passively safe it could increase the risk and severity of injuries should a vehicle leave the carriageway.

Recommendation

Ensure all unprotected sign posts are passively safe.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Sign posts which are not protected by VRS are passively safe by their nature at a minimum setback of 600mm, which is permitted. (TD 19/06 3.14 and 3.66-3.69.)

3.3.2 PROBLEM

Location: Remotely operated temporary traffic management signs

Summary: Lack of sign face, post and foundation details

Remotely operated temporary traffic management signs are proposed at locations throughout the Package 1 section. No details have been provided regarding the size of sign faces, posts or foundations associated with these signs. Signs of an inappropriate size could result in driver confusion (if too small), conflict with vehicle restraint systems or impact on forward visibility to other permanent signs.

Recommendation

It is recommended that all remotely operable temporary traffic management signs are of appropriate size, are positioned outside the working width of vehicle restraint systems and do not impact on forward visibility to permanent signs.

DESIGNERS RESPONSE:

Exception

ROTTM signs no longer form part of the scheme design. Some design drawings had been submitted prior to the decision to remove the ROTTM signs from the scheme and therefore there are no up-to-date location plan drawings showing their removal.

3.3.3 PROBLEM

Location: Various – scheme wide

Summary: Inconsistent provision of road layout merge/diverge signs

Informatory road layout merge/diverge signs are not provided at every junction or at Reading services. This includes merge/diverges that are somehow compromised by having short offside merging arrangements or subject to departures. As an example, informatory road layout merge/diverge signs such as PS-B-73/0A and B and PS-B-72/8_60 are provided at the J12 eastbound merge and provide information on the merge layout for drivers on the slip road and the mainline carriageways. This is repeated in part at J10, but not at J11 and J8/9, despite similar layouts. This is particularly concerning due to the short offside merge length associated with the eastbound carriageway.

This could result in driver confusion, increasing the risk of shunt or side-swipe collisions associated with vehicles immediately merging/diverging to/from the M4 carriageway.

Recommendation

It is recommended that informatory road layout merge/diverge signs are provided at each merge/diverge.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Merge signing has been included at Junction 11 and Junction 8/9 in Summer 2020 and details are included in the most recent Sign Schedule revision.

3.3.4 PROBLEM

Location: Various - scheme wide

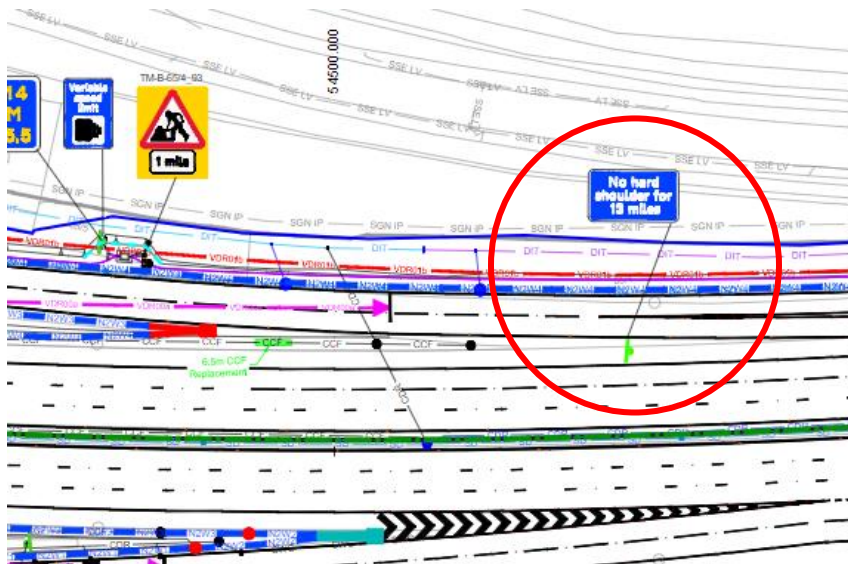
Summary: Signs located in front of the RRS or in gaps in the RRS

A number of signs are located in front of the RRS or in gaps in the RRS provision. It is unclear from the information provided whether the signs and post arrangements are passively safe. Examples include:

- sign TM-B-73/3_17 at chainage 62400
- sign PS-A-45/2_68 at chainage 34300
- marker post B 53.0 (eastbound) at chainage 42000
- 'No hard shoulder for 13 miles' sign (eastbound) at chainage 54400
- 'No hard shoulder for 5 miles' sign (westbound) at chainage 55200
- 'No hard shoulder for 4 miles' sign (eastbound) at chainage 34000
- Marker post A 45.0 (westbound) at chainage 34100
- Marker post M4 K 66.0 WB on-slip from Junction 11 at chainage 5520
- Sign PS-B-45/3_68 on EB offslip nosing to Junction 8/9

In the event of a vehicle leaving the carriageway they could strike or be led into the signs and post arrangements, potentially increasing the severity of the collision or generating a secondary collision.

With respect to marker post B 53.0 (circled below) this sign would also prevent a vehicle using the gap in the event of a breakdown in order to limit the effect of a live lane breakdown collision.



Extract from drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1024 Rev C03

Recommendation

It is recommended that all signs and post arrangements are either located behind RRS (outside of the working width) or are passively safe.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

All signs will be located behind the RRS and outside of the working width or will be passively safe if not behind the barrier

The 2D drawings provide indicative locations of signs to confirm chainage and orientation rather than offsets from edge of carriageway.

3.3.5 PROBLEM

Location: Reading Motorway Service Area (MSA) merges and diverges (Drawing HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12011 Rev C04 Sheet 11 of 91) M4 eastbound and westbound (chainage 59200)

Summary: Existing signs removed

At the merges and diverges to/from Reading MSA the existing bend warning signs, chevrons, advisory speed limits and motorway regulations signs have been removed. This could result in drivers being unaware of the tight bends, speed limits and start/end of motorway regulations increasing the potential for loss of control collisions and inappropriate speeds.

Recommendation

It is recommended that existing signing of the bends, chevrons, advisory speed limits and motorway regulations signs are retained at all of the Reading MSA merges and diverges.

DESIGNERS RESPONSE:

Designer accepts the RSA problem raised but suggests an alternative solution.

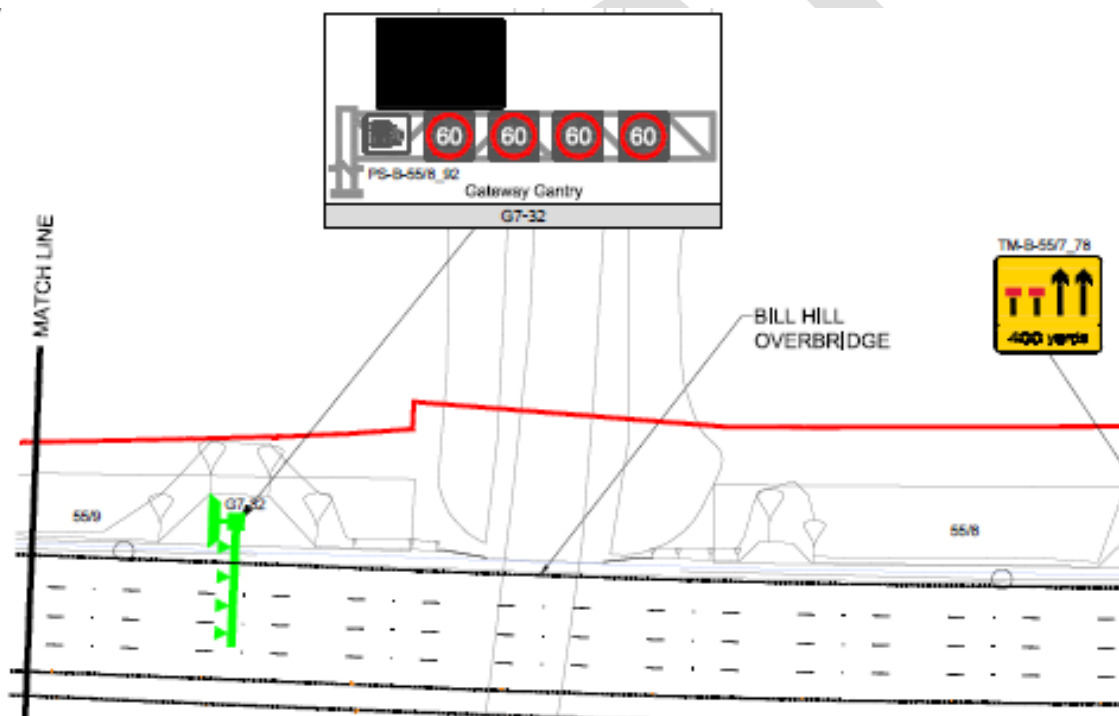
Existing signs are shown to be retained as is on the Existing sign plans. Therefore, they are not required on the proposed sign plan.

3.3.6 PROBLEM

Location: Various - scheme wide single span gantries

Summary: Gantry signs not aligned over the offside lane (lane 4)

The plans provided show gantries that appear not to extend across the whole carriageway while including signs relevant to the offside lane (LBS4 4). This includes but is not limited to eastbound gantries G7-32 (chainage 44900), G7-31 (chainage 44750) and G7-23 (chainage 41750) and westbound gantries G7-21 (chainage 41100), G7-22 (chainage 53600) and G7-31 (chainage 44750). This could result in driver confusion, particularly with regards to 'red-x' emergency lane closures and lane designation, increasing the risk of secondary and lane change collisions.



Extract from drawing showing G7-32 (chainage 44900),

Recommendation

It is recommended that all gantries cover the full carriageway width, with signs aligned over the centre of each running lane.

DESIGNERS RESPONSE:

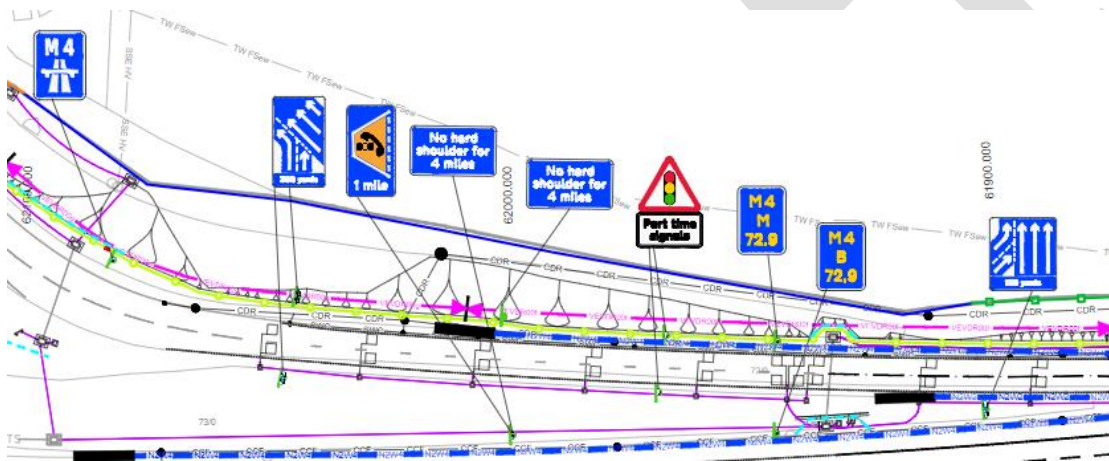
Designers recognise the issue raised by the auditors. The 2D layout plans are only indicative to confirm chainage and orientation.

3.3.7 PROBLEM

Location: Junction 12 eastbound merge (Drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1003 Rev C02 Sheet 3 of 91 chainage 62000)

Summary: Sign clutter resulting in reduced visibility to sign faces

Nine signs are provided in the nearside verge of the eastbound merge at junction 12. The number of signs and the spacing between them is likely to result in information overload and reduced visibility to sign faces. This could result in drivers being unaware of hazards or the upcoming merge layout. In turn this could lead to rear shunt type collisions at the ramp metering or side impact collisions at the merge.



Extract from drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1003 Rev C02

Recommendation

It is recommended that the number of signs is rationalised where possible and that adequate clear forward visibility is provided to all sign faces.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Signs on this approach have been reviewed with the determination that all signs are required. There are only six signs proposed within the nearside verge.

3.3.8 PROBLEM

Location: Various – scheme wide

Summary: Signs impacting visibility to downstream sign faces

At a number of locations it appears that signs impact the visibility to other sign faces downstream. Examples include;

- EA 1½ miles sign PS-B-70/4_97 at chainage 59540 which is masked by the existing Reading Services sign
- TM sign TMA47/4_84 at chainage 36500 which is masked by EA sign PS-A-47/4_70
- various signs around chainage 53400 eastbound
- ½ mile EA sign(westbound) at chainage 35200 could obscure downstream route confirmatory sign
- 1 mile EA sign (westbound) at chainage 58700 could be obscured by preceding 200 yard sign
- TTM 850yds lane closure sign masked by EA 300yds sign PS-A-63/2_45 at chainage 52300

This could result in drivers missing information, increasing the potential for collisions.

Recommendation

It is recommended that adequate clear forward visibility is provided to all sign faces.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Signs have been positioned in the best available locations based on the number of other signs, distance between junctions, other street furniture and to provide as much visibility as possible.

3.3.9 PROBLEM

Location: Various – scheme wide

Summary: Visibility to sign faces reduced if mounted too low

The mounting heights of signs are unknown. At certain locations signs are proposed downstream of vertical features such as barriers, pedestrian barriers, bridge parapets etc. This could result in sign faces being fully or partially obscured if mounted too low, increasing the potential for a wide range of collisions due to drivers missing information. Locations include:

- PS-B-71/3_50 at chainage 60400
- PS-B-68/0_58 at chainage 51700
- EA sign (westbound) at chainage 50500.

Recommendation

It is recommended that all signs are mounted at suitable heights to ensure adequate forward visibility is provided.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Mounting heights of all signs have been checked and visibility checks have been undertaken to ensure that signs are not obscured. Mounting heights are included in the Contract 1 sign schedules:

(HA514451-CHHJ-HSN-S1_ZZZZZZZZ_A-SH-CH-0001/0002/0003

HA514451-CHHJ-HSN-S1_ZZZZZZZZ_B-SH-CH-0001/0002/0003)

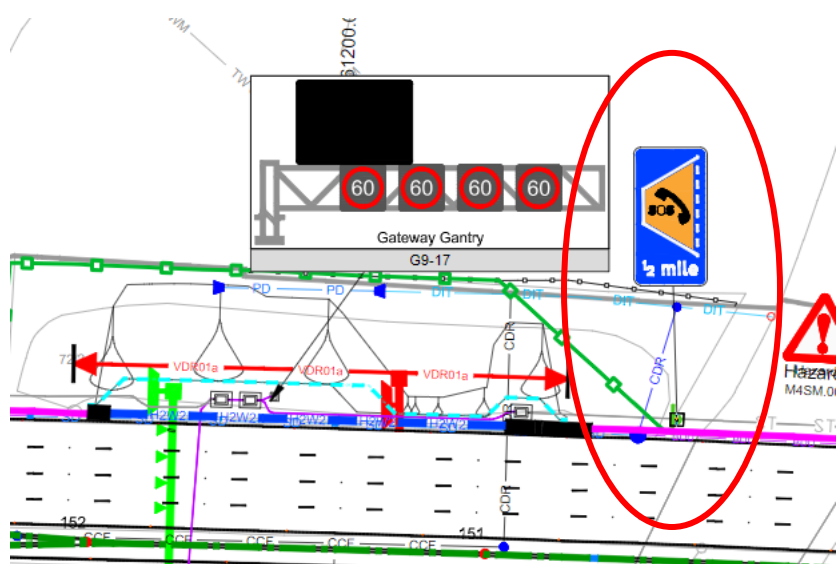
3.3.10 PROBLEM

Location: Various – scheme wide

Summary: Visibility to sign faces partially or fully obscured by orientation of environmental barrier and other fencing

At certain locations the alignment of environmental barrier or other fencing could result in sign faces being partially or fully obscured, increasing the potential for a wide range of collisions due to drivers missing information. These locations include:

- Lane merge sign (eastbound) at chainage 62000
- No hard shoulder sign (eastbound) at chainage 62000
- Lane merge sign (eastbound) at chainage 61750
- ½ mile EA sign (eastbound) at chainage 61200 (shown below)
- Deer warning sign and services distance sign (eastbound) at chainage 61000
- 1 mile EA sign (eastbound) at chainage 56400
- 1 mile EA sign (eastbound) at chainage 52500
- ½ mile EA sign (eastbound) at chainage 51650
- EA sign (eastbound) at chainage 48900
- 500 yards EA sign (eastbound) at chainage 39300
- Lane designation sign (eastbound) at chainage 35500
- 300 yards EA sign (westbound) at chainage 38000
- Deer warning sign (westbound) at chainage 47000
- Route confirmatory sign (westbound) at chainage 47200
- Services 6 mile sign (westbound) at chainage 48700
- 1 mile EA sign (westbound) at chainage 48900
- TTM 1 mile road works warning sign (westbound) at chainage 55100
- EA sign (westbound) at chainage 50500
- ½ mile EA sign (westbound) at chainage 51800
- Motorway and merge 100 yards on the junction 11 westbound merge slip chainage 55000
- Variable speed limit sign (westbound) at chainage 55200
- 300 yard EA sign (westbound) at chainage 57700.



Extract from drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1005 Rev C02

Recommendation

It is recommended that signs are either relocated so that sign faces are not obscured or mounted at suitable heights to ensure adequate forward visibility is provided.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Mounting heights of all signs are included in the sign schedules which should identify that signs are mounted above the environmental barriers and other fencing.

Signs have been positioned in the best available locations based on the number of other signs, distance between junctions, other street furniture and to provide as much visibility as possible.

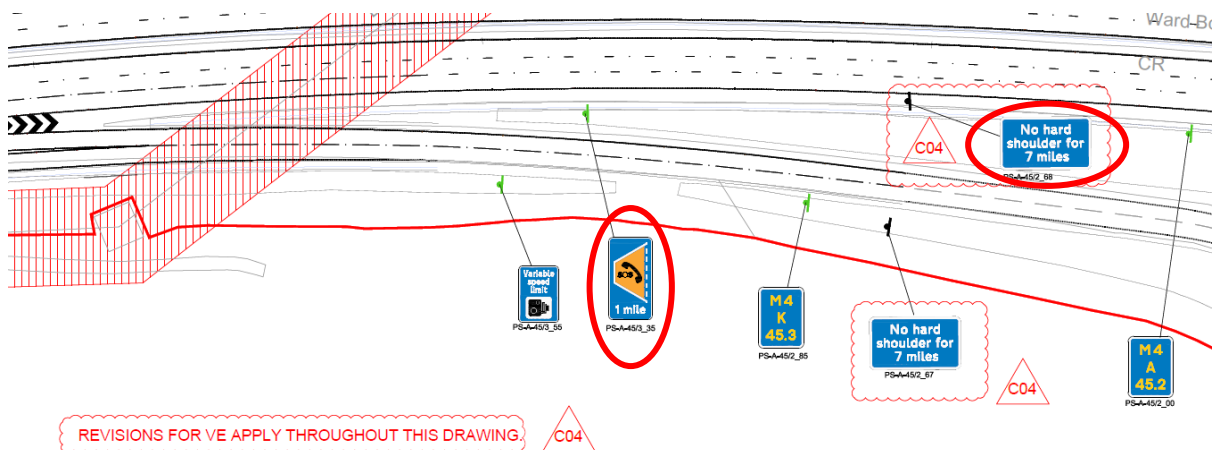
Furthermore, mounting heights of all signs have been checked and visibility checks have been undertaken to ensure that signs are not obscured.

3.3.11 PROBLEM

Location: Junction 8/9 westbound merge (Drawing HSN-S1_ZZZZZZZZ_Z-DR-CH-12080 Revision Rev C04 Sheet 80 of 91 chainage 34400)

Summary: Proposed signs may restrict visibility for merging vehicles

An emergency telephone one mile ahead sign (PS-A-45/3_35) is provided on the westbound merge nosing and a no hard shoulder sign (PS-A-45/2_68) is provided to the east of this. Given the alignment of the carriageway, these signs may reduce visibility to the mainline for merging vehicles, resulting in increased collisions at the merge.



Extract from drawing HSN-S1_ZZZZZZZZ_Z-DR-CH-12080 Revision C04

Recommendation

It is recommended that these signs are relocated out of the visibility splays of merging vehicles

DESIGNERS RESPONSE: Exception

Designer disagrees with the safety auditor recommendation.

PS-A-45/3_35 is a mainline road sign and both signs are offset sufficiently to allow for merging traffic to see upstream through their rear-view mirrors. Visibility checks have been undertaken to confirm that signs are not obscured.

3.3.12 PROBLEM

Location: Junction 10 eastbound diverge (Drawing HSN-S1_ZZZZZZZZ_Z-DR-CH-12046 Rev C04 Sheet 46 of 91 chainage 46700)

Summary: Position and orientation of bend warning sign may lead to confusion

A bend warning sign (PS-B-57/6_28) is provided on the nosing between the M4 carriageway and the eastbound diverge on to the A329 (M) Reading. The position and orientation of the sign face may result in driver confusion as to which route is subject to the warning, increasing the risk of rear shunts on the M4 if vehicles slow or loss of control collisions on the bend.

Recommendation

It is recommended that the bend warning sign is relocated and orientated away from the mainline carriageway.

DESIGNERS RESPONSE:

Designer accepts the RSA problem but suggests an alternative solution.

Would the audit team accept the removal of the offside bend warning sign. There is no requirement to have both signs under TSM Chapter 4.

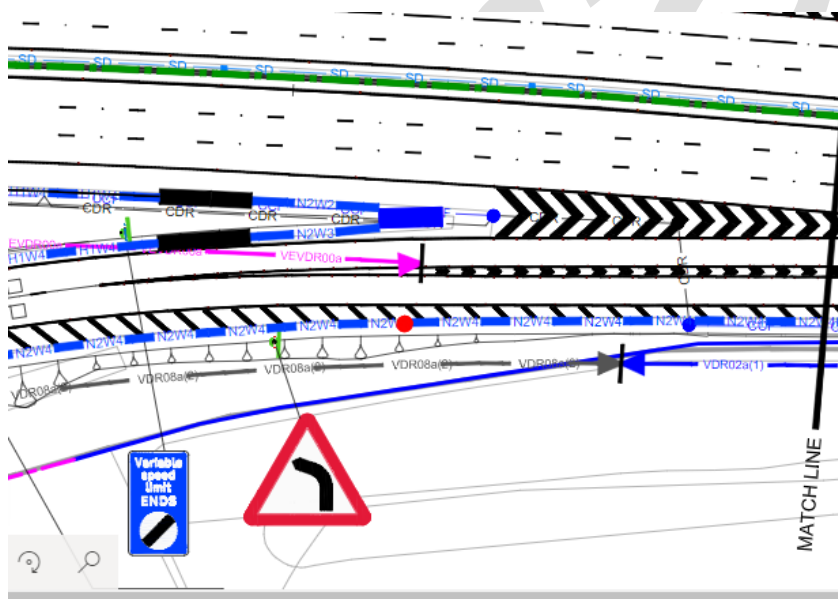
3.3.13 PROBLEM

Location: Junction 8/9 east and westbound diverge (Drawing HSN-S1_ZZZZZZZZ_Z-DR-CH-12081 Rev C04 Sheet 81 of 91 chainage 33900) and junction 10 westbound diverge (Drawing HSN-S1_ZZZZZZZZ_Z-DR-CH-12049 Rev C04 Sheet 49 of 91 chainage 45400)

Summary: Position and orientation of variable speed limit ends sign may lead to confusion

Variable speed limit ends sign is provided on the nosing between the M4 carriageway and the junction 8/9 east and westbound diverges. The position and orientation of the sign face may result in driver confusion as to which route is subject to the end of the variable speed limit, increasing the risk of inappropriate speeds and collisions.

At the junction 10 westbound diverge the same sign provision is shown.



Extract from drawing HA514451-HGN-S1_ML000000_Z-DR-CH-1049 Rev C02

Recommendation

It is recommended that the variable speed limit ends sign is relocated to the nearside and orientated away from the mainline carriageway.

DESIGNERS RESPONSE: Exception

Designer disagrees with the safety auditor's recommendation. At the location of the VMSL end signs, the verge width is approximately 12m. It is considered that the sign shall also be at a considerable level difference and downstream enough of the mainline that the designers do not think these signs would be misinterpreted by mainline drivers. At Junction 10, the sign would not be visible if located on the nearside due to the bend warning sign. Contractors to ensure that the orientation of the signs is towards the slip roads.

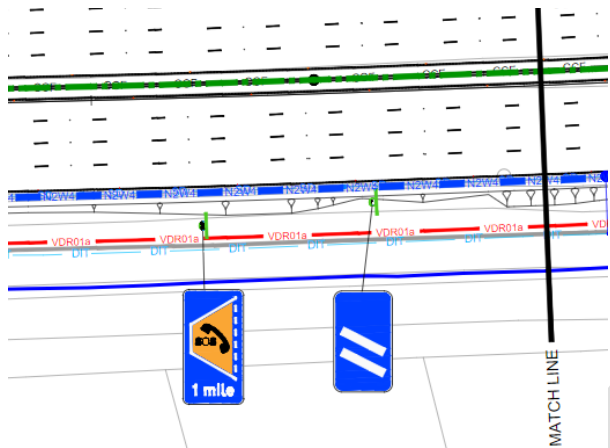
Draft

3.3.14 PROBLEM

Location: Chainage 58650 westbound (Drawing HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12012 Rev C04 Sheet 12 of 91)

Summary: Visibility to EA/emergency roadside telephone sign compromised

EA/emergency roadside telephone sign PS-A-69/6_45 is provided in the nearside verge but is positioned approximately 25m in front of the countdown marker sign PS-A-69/6_19. Visibility to the EA sign is likely to be compromised which could lead to drivers being unaware of the next EA. This may result in drivers seeking alternative refuge in the diverge increasing the risk of shunt collisions and collisions with drivers outside of their vehicle.



Extract from drawing HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12012 Rev C04

Recommendation

It is recommended that the signs are repositioned ensuring adequate forward visibility is provided.

DESIGNERS RESPONSE:

Exception

Designer disagrees with the safety auditor's recommendation. Countdown marker is only 700mm wide and the EA sign is offset further back from the carriageway than the countdown marker to ensure visibility. Visibility checks have been undertaken to ensure that signs are not obscured.

3.3.15 PROBLEM

Location: Chainage 38350 eastbound (Drawing HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12069 Rev C04 Sheet 69 of 91)

Summary: Visibility to EA/ERT sign compromised

EA/ERT one mile sign PS-B-49/2_98 is provided in the nearside verge but is likely to be obscured by the substantial footing for gantry sign G7-15 40m to the west. This could lead to drivers being unaware of the next EA and result in drivers seeking alternative refuge increasing the risk of shunt collisions and collisions with drivers outside of their vehicle.

Recommendation

It is recommended that the sign is repositioned ensuring adequate forward visibility is provided.

DESIGNERS RESPONSE:

Exception

Designer disagrees with the safety auditor's recommendation. The EA would be offset sufficiently from the edge of carriageway to ensure visibility between the gantry leg and edge of carriageway. Visibility checks have been undertaken to ensure that signs are not obscured.

3.3.16 PROBLEM

Location: Chainage 48850 eastbound (Drawing HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12040 Rev C04 Sheet 40 of 91)

Summary: Visibility to EA/ERT sign compromised

EA sign PS-B-59/8_01 is provided in the nearside verge at the nosing of EA E8-B1 but is likely to be obscured by the substantial footing/post for MS sign G8-07 30m to the west. This could lead to drivers being unaware of the EA and result in drivers missing the EA and seeking alternative refuge. This increases the risk of shunt collisions and collisions with drivers outside of their vehicle.

Recommendation

It is recommended that the sign is repositioned ensuring adequate forward visibility is provided.

DESIGNERS RESPONSE: Exception

Designer disagrees with the safety auditor's recommendation. The EA would be offset sufficiently from the edge of carriageway to ensure visibility between the gantry leg and edge of carriageway. Visibility checks have been undertaken to ensure that signs are not obscured.

3.3.17 PROBLEM

Location: Chainage 53400 eastbound (Drawing HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1027 Rev C02 Sheet 27 of 91)

Summary: Visibility to route confirmatory sign compromised

Forward visibility to the eastbound route confirmatory sign could be affected by the substantial footing/post for MS sign G8-19 at chainage 53400. This could reduce visibility to the sign and increase the likelihood of shunt collisions.

Recommendation

It is recommended that the sign is repositioned ensuring adequate forward visibility is provided.

DESIGNERS RESPONSE:

Designer accepts the RSA problem raised, but suggests an alternative solution

Sign has been positioned here during the VE exercise. Design team to review whether the sign can be positioned closer to the merge of the previous junction.

3.3.18 PROBLEM

Location: Junction 12 westbound diverge (Drawing HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12003 Rev C04 Sheet 3 of 91)

Summary: Lack of lane designation signs and carriageway markings

The junction 12 westbound diverge consists of two lanes. Neither lane designation signs or carriageway markings have been provided on the two lane approach, which then flares to four lanes at the circulatory. This may result in the potential for late lane changing manoeuvres and result in side impact or shunt collisions.

Recommendation

It is recommended that sufficient carriageway markings and lane destination signage is provided to inform motorists of the road layout ahead.

DESIGNERS RESPONSE:

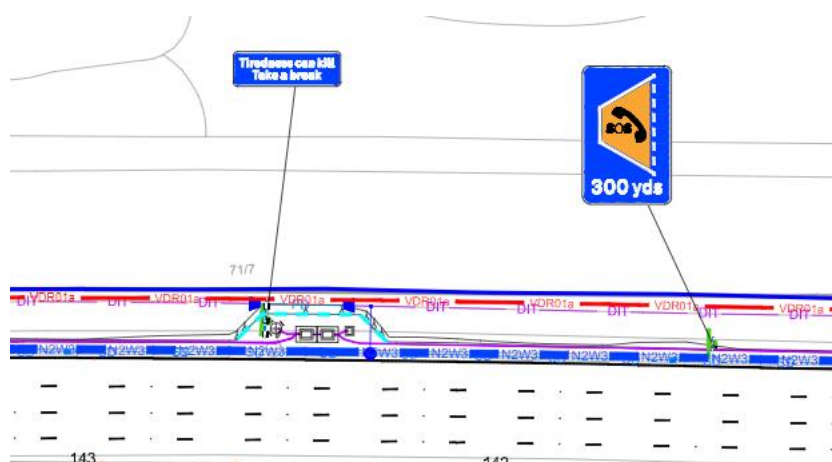
Designer accepts the RSA problem raised, but suggests an alternative solution. The westbound diverge nose at Junction 12 is the end of the scheme extents for new road markings and new signing. There is an existing map type ADS being retained on the approach to the roundabout and a pair of existing left turn arrows in lanes 1 and 2 to confirm that these are left turn only lanes. This is an existing issue that is unaffected by the scheme proposals.

3.3.19 PROBLEM

Location: Chainage 60700 eastbound (Drawing HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12007 Rev C04 Sheet 7 of 91) and 58000 westbound (Drawing HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12014 Rev C04 Sheet 14 of 91)

Summary: Position of '*Tiredness can kill take a break*' signs

A '*Tiredness can kill take a break*' sign is located immediately before the 300 yard sign for EA E9-B3 and immediately before EA E9-A2. Drivers may be tempted or consider the EAs as suitable places in which to stop rather than continuing on to Reading MSA. Unauthorised use of the EAs without use of the ERT will result in drivers having to re-join the live carriageway merging with fast traffic increasing the risk of lane changing collisions.



Extract from drawing HA514451-CHHJ-HSN-S1_#####_Z-DR-CH-12007 Rev C04

Recommendation

It is recommended that the 'Tiredness can kill take a break' signs are repositioned to avoid confusion with the EA.

It is recommended that lane designation signs and carriageway markings are provided on the diverge.

DESIGNERS RESPONSE: Exception

Designer disagrees with the safety auditor's recommendation. The 'Tiredness can kill take a break signs' are located in the appropriate positions relative to the motorway services signing. The motorway services signing can clearly be seen by motorists as they approach the EA, therefore, the designers do not see fit to relocate these signs.

Lane designation signs are not suitable as both diverges to the services are taper only diverges. Designers are unclear on what additional markings would be required.

3.3.20 PROBLEM

Location: Various

Summary: Signs located at vulnerable locations, such as diverge nosings and the carriageway

A number of signs are located at vulnerable locations and it is not clear if the signs and post arrangements are passively safe. Examples include:

- 'No hard shoulder for 13 miles' sign eastbound at chainage 54400.
- 'No hard shoulder for 4 miles' sign eastbound at chainage 34000
- 1 ½ mile EA sign (eastbound) J10 nosing at chainage 45800.
- A404(M) and A308(M) sign (eastbound) J8/9 diverge at chainage 34400.
- Route direction sign junction 12 (eastbound) chainage
- 'No hard shoulder for 5 miles' sign (westbound) at chainage 55200.
- 'No hard shoulder for 7 miles' sign (westbound) at chainage 34300.

In the event of vehicle leaving the carriageway they could strike the signs and post arrangements, potentially increasing the severity of the collision.

With respect to marker post B 53.0 this sign would also prevent a vehicle using the gap in the event of a breakdown in order to limit the effect of a live lane breakdown collision.

Recommendation

It is recommended that all signs and post arrangements are either located behind RRS (outside of the working width) or are passively safe.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

Sign post and foundation information is provided in the sign schedule and Structures discipline deliverables. All signs not located behind the RRS and outside of the working width will be passively safe.

3.3.21 PROBLEM

Location: Chainage 62000 westbound (Drawing HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12003 Rev C04 Sheet 3 of 91)

Summary: No variable speed limit ends sign at junction 12 westbound diverge

A variable speed limit ends sign is not provided on the westbound diverge at junction 12. A national speed limit sign is provided at the top of the westbound diverge slip but orientated towards circulatory traffic rather than traffic approaching the junction on the diverge. Drivers may not be aware of the end of variable speed limit or the speed limit at the junction potentially increasing driver confusion and potential for collisions on the diverge.

Recommendation

It is recommended that variable speed limit ends signs are provided and the speed limit on the local highway network is clearly shown.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

The VMSL ends sign is required on the WB offslip. The designers confirm that the national speed limit sign is a repeater meant for circulatory traffic.

3.3.22 PROBLEM

Location: Chainage 55400 (westbound)

Summary: Visibility of ½ mile EA sign

The ½ mile EA sign at chainage 55400 is located adjacent to the merge from junction 11 where there is a wide hatched area to the nearside. This results in the ½ mile sign being set back from the mainline and approximately 20m from LBS4. Drivers could miss the sign and be unaware of the proximity of the next EA potentially resulting in unnecessary live lane stops.

Recommendation

It is recommended that the sign is relocated as far west as the tolerance in terms of distances permits to maximise its target value from the mainline

DESIGNERS RESPONSE:

Designer accepts the RSA problem raised, but suggests an alternative solution. Sign is already located as far west as possible in accordance with the design standards tolerances for a 1/2m. The presence of the hardshoulder to the west of the hatch means that visibility would only be improved very slightly. Furthermore, there would be a negative impact on the DLS sign visibility further downstream.

3.3.23 PROBLEM

Location: West of EA E7-A4 at chainage 43100 (Drawing No. HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12056 Rev C04)

Summary: Vehicle located within EA may impact on forward visibility of downstream TTM sign

At chainage 43150 a '450 yards lane closure' TTM sign (TM-A54/0_88) is located at the western end of EA E7-A4. Should the EA be in use, particularly by a large sized vehicle, this may mask the TTM sign to oncoming westbound motorists. This could result in drivers missing information, causing late lane changing on the approach to the lane closures and increasing the potential for collisions.

Recommendation

It is recommended that adequate clear forward visibility is provided to the TTM sign as far west as the tolerance in terms of distances permits.

DESIGNERS RESPONSE: Exception

ROTTM signs no longer form part of the scheme design. Some design drawings had been submitted prior to the decision to remove the ROTTM signs from the scheme and therefore there are no up-to-date location plan drawings showing their removal.

3.3.24 PROBLEM

Location: Eastbound M4 mainline at chainage 39300 (Drawing No. HA514451-CHHJ-HSN-S1_ZZZZZZZZ_Z-DR-CH-12066 Rev C04)

Summary: EA sign may be missed by oncoming motorists.

At chainage 39300 an EA '500 yards' sign (PS-B-50/2_07) is located directly adjacent to gantry G7-17 on the eastbound M4 mainline. There is a risk that this sign may be missed by approaching motorists given it is set back away from the carriageway, and could lead to drivers being unaware of the next EA. This may result in drivers seeking alternative refuge increasing the risk of shunt collisions and collisions with drivers outside of their vehicle.

Recommendation

It is recommended that the sign is repositioned ensuring adequate forward visibility is provided, as far as the tolerance in terms of distances permits.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

The EA '500 yds' sign should be repositioned. The proposed best alternative location would be in advance of the gantry. Alternative location would need to be agreed with the highways team due to the location of the culvert.

Carriageway Markings

3.3.25 PROBLEM

Location: Eastbound M4 mainline at chainage 39300 (Drawing No. HA514451-CHHJ-HSN-S1_ZZZZZZZ_Z-DR-CH-12066 Rev C04)

Summary: EA sign may be missed by oncoming motorists.

At chainage 39300 an EA '500 yards' sign (PS-B-50/2_07) is located directly adjacent to gantry G7-17 on the eastbound M4 mainline. There is a risk that this sign may be missed by approaching motorists given it is set back away from the carriageway, and could lead to drivers being unaware of the next EA. This may result in drivers seeking alternative refuge increasing the risk of shunt collisions and collisions with drivers outside of their vehicle.

Recommendation

It is recommended that the sign is repositioned ensuring adequate forward visibility is provided, as far as the tolerance in terms of distances permits.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

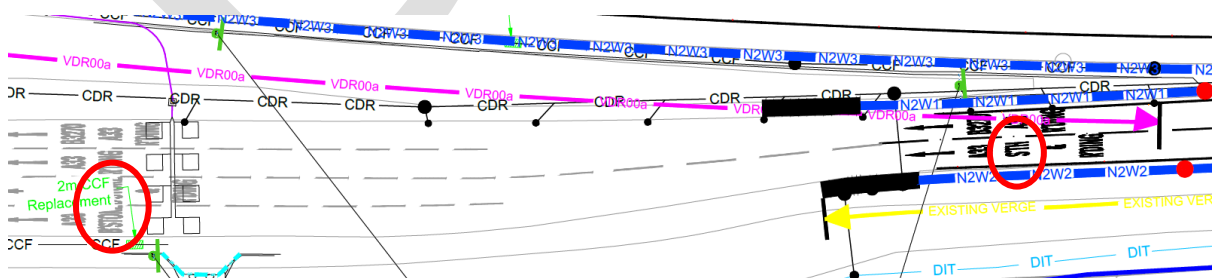
Designers suggest amending existing road marking to ensure that the lane drop leads in to both lanes 1 and 2 on the slip road rather than just lane 1.

3.3.26 PROBLEM

Location: Junction 11 westbound diverge chainage 54500 (Drawing HA514451-CHHJ-HGN-S1_ML000000_Z-DR-CH-1024 Rev C03 Sheet 24 of 91)

Summary: Inconsistency between lane designation carriageway markings

On the westbound approach to junction 11, proposed carriageway markings in lane one of the two lane diverge includes the use of 'A33 STH & R'DING', but the existing carriageway markings within the four lane section of the diverge use 'A33 B'STOKE' or 'A33 B'STOKE & R'DING'. The use of A33 South carriageway markings could be confusing and result in lane changes on the diverge, increasing the risk of collisions.



Extract from drawing HGN-S1_ML000000_Z-DR-CH-1024 Revision C03

Recommendation

It is recommended that the carriageway markings in lane one of the two lane diverge are revised to include reference to Basingstoke, which provides consistency between the approach signage and existing markings on the diverge.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

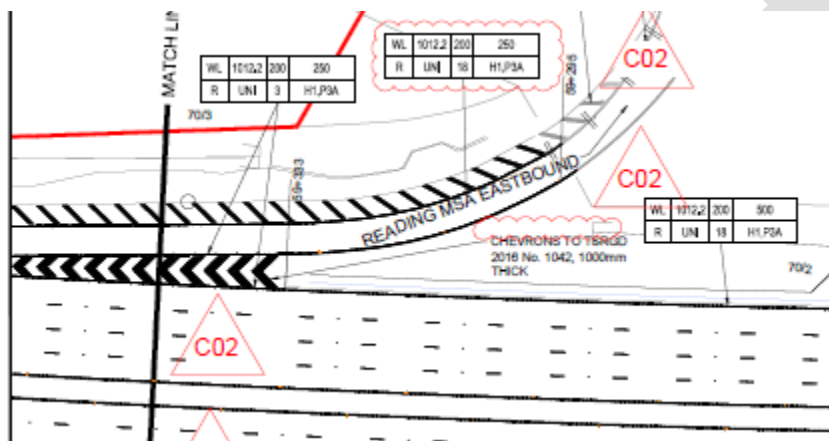
Existing road markings in lane one of the two lane diverge reads 'A33 S'TH & R'DING'. Proposed road markings have been designed to replicate existing road markings. However, the designer agrees that for consistency the markings should say 'A33 B'STOKE & R'DING'.

3.3.27 PROBLEM

Location: Reading MSA chainage 52900 (Drawing HA514451-CHHJ-HMK-S1_ML000000_Z-DR-CH-1211 Rev C02 Sheet 11 of 91)

Summary: Removal of 'SLOW' carriageway markings

The eastbound and westbound diverge lanes to the Reading MSA are to be resurfaced. The existing 'SLOW' markings are not detailed to be reinstated following the resurfacing. Given the short diverge length and tight left-hand bends the removal of the 'SLOW' markings could result in late braking and vehicle loss of control.



Extract from drawing HMK-S1_ML000000_Z-DR-CH-1211 Revision C02



Reading Motorway Services eastbound diverge lane - image captured October 2018

Recommendation

It is recommended that 'SLOW' carriageway markings to TSRGD Diagram 1024 are provided on the diverge lanes to the Reading MSA.

DESIGNERS RESPONSE:

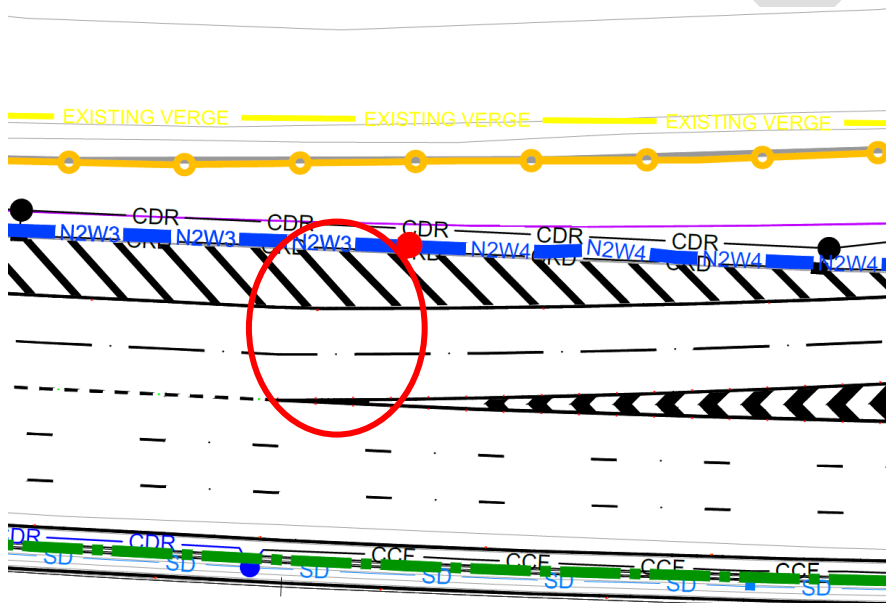
Designers agree that the diverges would benefit from the reinstatement of the 'SLOW' markings.

3.3.28 PROBLEM

Location: Junction 11 eastbound diverge (Drawing HGN-S1_ML0000000_Z-DR-CH-1022 Rev C03 Sheet 22 of 91) chainage 55300

Summary: Lane carriageway making configuration may lead to side-swipe collisions

The lane warning markings separating the nearside and offside eastbound offslip approach to junction 11 consists of a notable localized deviation opposite the diverge nosing arrangement. There is a risk that motorists exiting the M4 mainline carriageway and negotiating the localized deviation at speed may lead to poor lane discipline and side-swipe collisions (see excerpt).



Extract from drawing HGN-S1_ML0000000_Z-DR-CH-1022 Rev C03

Recommendation

Ensure that the warning markings provide a smooth left-hand bend transition.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

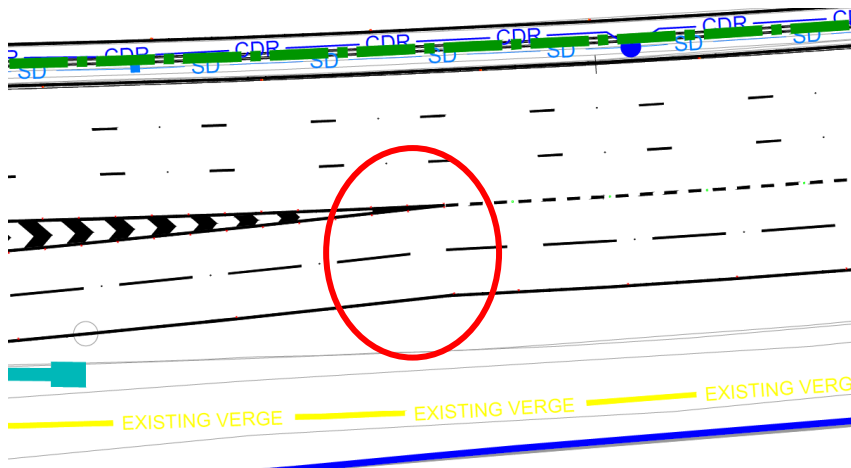
This appears to be a very minor drawing/ PDF presentation issue. The laid road markings shall be smooth and tie in correctly.

3.3.29 PROBLEM

Location: Junction 11 westbound diverge (Drawing HGN-S1_ML0000000_Z-DR-CH-1024 Rev C03 Sheet 24 of 91) chainage 54400

Summary: Lane carriageway making configuration may lead to side-swipe collisions

The lane warning markings separating the nearside and offside westbound offslip approach to junction 11 consists of a notable localized deviation. There is a risk that motorists exiting the M4 mainline carriageway and negotiating the localized deviation at speed may lead to poor lane discipline and side-swipe collisions (see excerpt).



Extract from drawing HGN-S1_ML0000000_Z-DR-CH-1024 Rev C03

Recommendation

Ensure that the warning markings provide a smooth left-hand bend transition.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

This appears to be a very minor drawing/ PDF presentation issue. The laid road markings shall be smooth and tie in correctly.

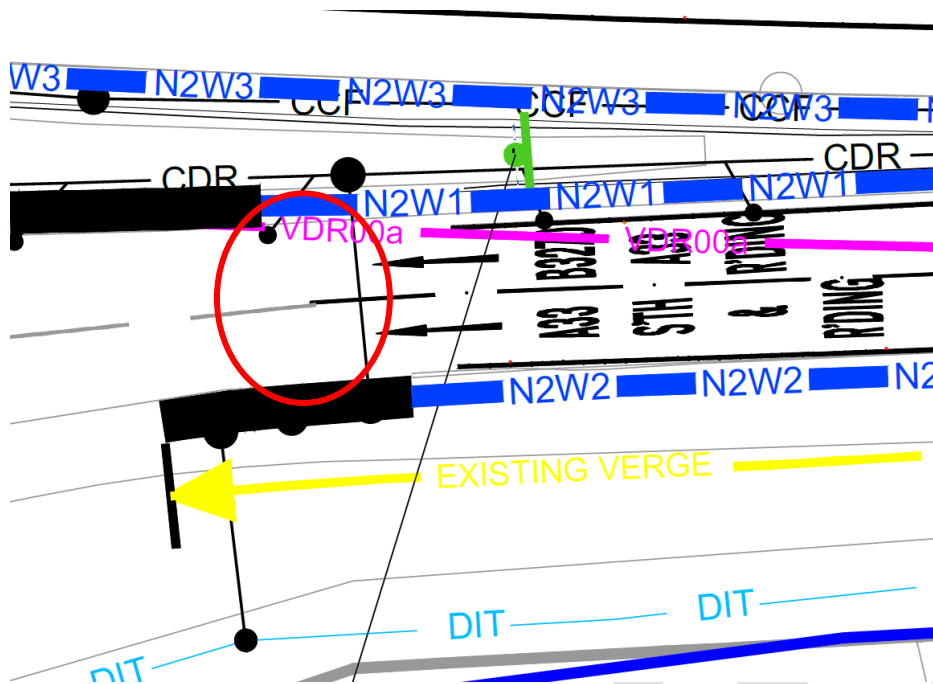
3.3.30 PROBLEM

Location: M4 Junction 11 westbound diverge (Drawing HGN-S1_ML0000000_Z-DR-CH-1024 Rev C03 Sheet 24 of 91) chainage 54560

Summary: Lane carriageway making configuration may lead to side-swipe collisions

The lane warning markings separating the nearside and offside westbound offslip approach to junction 11 prior to the two lanes merging into four consists of a notable localized double-bend deviation. There is a risk that motorists exiting the M4 mainline carriageway and

negotiating the localized double-bend deviation at speed may lead to poor lane discipline and side-swipe collisions (see excerpt).



Extract from drawing HGN-S1_ML0000000_Z-DR-CH-1024 Rev C03

Recommendation

Ensure that the warning markings where they expand from two lanes to four provide a smooth transition.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

This appears to be a very minor drawing/ PDF presentation issue. The laid road markings shall be smooth and tie in correctly.

3.3.31 PROBLEM

Location: Gantry signs

Summary: Lighting of signs

It is unclear how a number of irregularly shaped gantry signs faces, such as G7-31 at junction 10, are to be lit. Inappropriate illumination could result in the sign faces being difficult to read, resulting in late vehicle movements and increased risk of side impact collisions. If the lighting provided is visible on the opposing carriageway this could result in glare and/or driver confusion, leading to collisions.

Recommendation

It is recommended that gantry signs are suitably lit and do not impact on the opposing traffic lanes.

DESIGNERS RESPONSE:

Designer accepts the RSA problem and recommendation made by the RSA team.

We can confirm that correct illuminance and uniformity is achieved across the whole blue sign plate area

Glare measurements are based on the luminous intensity of the light source towards the observer and dependent on the apparent area of the light source, distance from the observer and position of the luminaire.

The viewing position of the road user is constantly changing - thus so does the apparent area of the light source.

4 Conclusion

All recommendations made within the Stage 2 RSA Report have been reviewed and considered accordingly.

12 No. exceptions have been identified and these relate to the following paragraphs:

1. Paragraph 3.1.4
2. Paragraph 3.1.15
3. Paragraph 3.1.28
4. Paragraph 3.1.33
5. Paragraph 3.3.2
6. Paragraph 3.3.11
7. Paragraph 3.3.13
8. Paragraph 3.3.14
9. Paragraph 3.3.15
10. Paragraph 3.3.16
11. Paragraph 3.3.19
12. Paragraph 3.3.23