M4 Junction 28 Improvement Works, South Wales

Road Safety Audit Stage 3

on behalf of Arup

TMS reference no: 14573
M4 Junction 28 Improvements Works, South Wales

Road Safety Audit Stage 3

1. Introduction

1.1 This report describes a Stage 3 Road Safety Audit carried out on highway improvements to Junction 28 of the M4, Newport, South Wales, on behalf of Arup.

1.2 The audit team members (approved by [REDACTED] of Welsh Government) were as follows:

- **Audit Team Leader**
  - Highways England Approved RSA Certificate of Competency
  - Senior Engineer, TMS Consultancy

- **Audit Team Member**
  - Highways England Approved RSA Certificate of Competency
  - Technical Director – Engineering Services, TMS Consultancy

1.3 The audit comprised a daylight examination of the site by the Audit Team on 24th October 2018 between 1pm and 5pm. The weather was fine and dry. M4 Junction 28 was visited between 1pm and 3pm during which traffic flows were moderate to heavy and pedestrian and cycle flows were light. Bassaleg was visited between 3.20pm and 4pm during which times traffic was heavy to start with (school finishing time) then tapered off to moderate and pedestrian and cycle flows were also heavy and tapered off to light. Finally, Pont Ebbw was visited between 4.15pm and 5pm during which time traffic was moderate to heavy and pedestrian and cycle flows were also moderate.

Also present during the daylight examination were:

- [REDACTED] – Newport City Council
- [REDACTED] – Newport City Council
- [REDACTED] – WSP
The following were invited but could not or declined to attend the site visit:

- Gwent Police
- Newport City Council
- Welsh Government
- WSP
- Arup
- Arup
- Newport City Council
- Newport City Council
- Newport City Council
- Vinci Concessions

The Audit Team, together with [name redacted] of WSP, visited the site during darkness on 24th October 2018 between 6.30pm and 7.30pm. The weather was fine and dry. Traffic flows were moderate. Pedestrian and cycle flows were very light.

1.4 The terms of reference of the audit are as described in HD 19/15. The team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria. A Stage 2 Road Safety Audit was carried out by TMS Consultancy in June 2016 (TMS Report No: 12586). This, together with the designer’s response, were examined as part of this audit. The Stage 2 RSA was followed by a series of Addendums (TMS Report Nos. 12856A, 13005 and 13192). An Interim Stage 3 Road Safety Audit was carried out at Bassaleg Junction in February 2018 (TMS Report No. 14041).

1.5 All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence. The locations of specific problems are referenced on the plan in Appendix A.
1.6 The scheme consists of on highway improvements to Junction 28 of the M4, Newport, South Wales. Three junctions have been assessed as part of the audit:

- Bassaleg – increasing the size of the circulatory carriageway. Some geometry improvements and partial full-time signalisation.

- Pont Ebbw – adjustments to the circulatory carriageway to balance and manage flows and introduction of links for the A48 east and westbound. The roundabout and all approaches will be signalised.

- M4 J28 - extension of circulatory carriageway, provision of additional lanes and segregating islands and a through link for the M4 to / from Newport.

1.7 The Audit Team were asked to consider comments made by the general public in relation to the scheme (all three junctions). A number of the comments were related to temporary layouts and signage during the construction of the scheme and as such are no longer relevant. The Audit Team had discussions on-site with the other Audit Attendees Discussions with regards to issues raised with the final layouts. Any that the Audit Team feel relevant have been included within the Road Safety Problems identified in the report. The remainder are considered to be perceived or ‘settling in’ type issues and therefore not included.
2. **Items raised at the Stage 2 Road Safety Audit**

2.1 The road safety aspects of the M4 Junction 28, South Wales were the subject of comment in the June 2016 - Stage 2 Road Safety Audit Report ((TMS Report No. 12856) (Problems 2.1 and 2.6)). These items remain a problem and are referred to again in this Road Safety Audit Report (paragraph 3.3.1 / 3.1.3 and 3.3.2 respectively).

2.2 All other issues raised in the Stage 2 Road Safety Audit have been resolved.

2.3 All issues from the Stage 2 Addendum (12856A) have also been resolved.
3. **Items resulting from this Stage 3 Audit**

3.1 **Basseleg Junction**

_The Road Safety Problems have been listed as encountered in a clockwise direction around the junction commencing from A467 Forge Road (northbound approach to the junction)._

3.1.1 **PROBLEM**

Location – A467 Forge Road approach to the Bassaleg Junction

Summary: Potential late braking, shunt and sideswipe type vehicle collisions

The new advanced direction sign (ADS) on the nearside of the A467 Forge Road on approach to the Bassaleg Junction is partially obscured by vegetation. Potential late braking, shunt and sideswipe type vehicle collisions may occur if drivers fail to observe the ADS and have to make last minute decisions on their intended direction of travel.

**RECOMMENDATION**

Adequate forward visibility should be provided to the advanced direction sign which will require some cutting back / removal of vegetation.
3.1.2 PROBLEM

Location – Court Crescent

Summary: Potential failure to give-way type vehicle collisions

The entry angle of the Court Crescent approach to the Bassaleg Junction appears low, meaning drivers at the give-way line will have to look back over their shoulder or use mirrors to view vehicles circulating from the right. This may result in failure to give-way type vehicle collisions.

RECOMMENDATION

The alignment of the Court Crescent approach to the roundabout should be amended so that the entry angle falls between the range between 20 and 60 degrees.
3.1.3 PROBLEM

Location – A468 Forge Road; southbound

Summary: Potential hazard to pedestrians

The posts of the large advanced direction sign are within the footway and may be inconspicuous to pedestrians, particularly to those with visual impairments. This issue may be exacerbated during darkness.

RECOMMENDATION

Colour contrast bands should be placed around the posts at approximate eye height to improve the conspicuity of the posts.
3.1.4 PROBLEM

Location – A468 Forge Road

Summary: Potential vehicle collisions

At the tie in on A468 Forge Road, there is an inconsistency between the centre line of the existing and new carriageway. At the new carriageway a centre line has been provided but no ‘cats eyes’ whilst the existing carriageway has ‘cats eyes’ and no centre line. This inconsistency may make it difficult for drivers to interpret the highway layout which may result in vehicle collisions.

RECOMMENDATION

A consistent approach should be taken at this tie-in.
3.1.5 PROBLEM

Location – A468 Forge Road; southbound approach to Bassaleg junction

Summary: Potential late braking and sideswipe type vehicle collisions

The arrangement of the destination text markings on the A468 Forge Road approach to Bassaleg junction is confusing to drivers (this arm carries a significant amount of traffic from Caerphilly to the M4). Drivers cannot easily interpret their intended direction on the A467 (not helped by the north and south being displayed in small text to enable the dual language variations) and the audit team is informed that ‘Pye Corner’ is quite a colloquial destination. The combination of confusing destinations and small text may lead to potential late braking and sideswipe type vehicle collisions on approach to and on the circulatory carriageway.

RECOMMENDATION

The destination markings should be reviewed and simplified with major destinations (such as M4) being added.
3.1.6 PROBLEM

Location – A467 Forge Road and A468 Forge Road

Summary: Potential darkness related vehicle collisions

It was noted during the site visit that two lighting columns were not illuminated, one on the A467 Forge Road (western verge prior to the stop line in the northbound direction) and one on A468 Forge Road (western verge prior to the parking layby). Reduced illumination may create dark spots in the carriageway leading to darkness related vehicle collisions.

RECOMMENDATION

The lighting units should be checked and repaired as necessary.
3.2 Pont Ebbw Junction

The Road Safety Problems have been listed as encountered in a clockwise direction around the junction commencing from B4237 Cardiff Road.

At the time of the Stage 3 Road Safety Audit site visit, the traffic island that was proposed on B4239 at Stage 2 had not been installed.

3.2.1 PROBLEM

Location – B4237 Cardiff Road; eastbound

Summary: Potential collisions between vehicles and pedestrians / cyclists

Where the B4237 Cardiff Road has been resurfaced to the tie in point with the exiting carriageway, the zig zag markings have not been reinstated. This may result in a lack of awareness of the crossing for approaching drivers.

It may also result in drivers parking in what should be the controlled area with stationary vehicles reducing visibility to the signal heads for approaching drivers and inter-visibility between pedestrians / cyclists and approaching drivers.

Both issues may lead to late braking and shunt type vehicle collisions or overshoot collisions between vehicles and pedestrians / cyclists.

RECOMMENDATION

As part of the resurfacing work, the zig zags on approach to the toucan crossing should be fully re-instated.
3.2.2 PROBLEM

Location – B4237 Cardiff Road

Summary: Potential merge, sideswipe and shunt type vehicle collisions

There is a large distance of the B4237 Cardiff Road that is wide and features no road markings (following the end of the centre line markings). The wide carriageway and lack of markings and guidance may result in potential merge, sideswipe and shunt type vehicle collisions.

RECOMMENDATION

The centre line markings should be continued.

*It was noted at the site visit that on exit from Pont Ebbw onto B4237 Cardiff Road, there is an imbalance of lane widths (the nearside lane is significantly wider than the offside). It may be prudent adjust the centre line markings so that both lanes have equal width.*

*Finally, there is a short section of edge line missing at the tie in between the new and existing surfacing on B4237 Cardiff Road on the westbound approach to Pont Ebbw junction. The edge line should be tied in correctly.*
3.2.3 PROBLEM

Location – B4237 Cardiff Road; westbound approach to Pont Ebbw junction

Summary: Potential late braking, shunt and circulatory type vehicle collisions

The chevron boards and left turn sign on the central island are offset some distance to the left for drivers on the B4237 Cardiff Road on approach to the give way line at the Pont Ebbw roundabout (drivers will not see the chevrons until they start manoeuvring around the left-hand band to the stop line). Also, the chevrons are partially obscured by traffic signal heads and signs. Failure to appreciate the road layout, type of junction and the need to turn left onto the circulatory carriageway may lead to late braking, shunt and circulatory type vehicle collisions.

RECOMMENDATION

The chevron boards should either be extended or relocated to the right so that they are more in line with drivers on their approach to the junction.
3.2.4 PROBLEM

Location – A48 Southern Distributor Road

Summary: Potential skid hazard to vehicles

There is a drainage gully in the A48 Southern Distributor Road where an asphalt ‘lip’ appears to have been created which may reduce the efficiency of surface water drainage at the gully. Surface water ponding resulting from poor drainage may cause a potential skid hazard to vehicles, particularly two wheeled vehicles. This issue may be exacerbated during wet or icy conditions.

RECOMMENDATION

Localised drainage should be checked and if necessary improvements made to the carriageway to ensure that the gully drains efficiently.
3.2.5 PROBLEM

Location – A48; central lanes through Pont Ebbw junction

Summary: Potential head on vehicle collisions

No ‘no entry’ signs have been provided at the eastern end of the A48 central eastbound lanes through the Pont Ebbw junction. Due to the complex nature of the junction, drivers may get confused and attempt to turn into these lanes with the risk of head on vehicle collisions.

RECOMMENDATION

No entry signs should be provided similar to those provided at the western end of the A48 westbound lanes.

3.2.6 PROBLEM

Location – Pont Ebbw; western circulatory

Summary: Potential shunt type collisions

It was observed during the site visit that drivers on the circulatory (heading clockwise on the south western quadrant) are regularly making right turn manoeuvres into the A48 eastbound central lanes rather than circulating the junction to avoid queuing at the lights on the northern quadrant. This unexpected manoeuvre may result in shunt type collisions.

RECOMMENDATION

Although acknowledged that there are no appropriate locations for upright signs to prohibit this right turn manoeuvre, it would be prudent to provide a ‘no right turn’ marking on the carriageway.
3.2.7 PROBLEM

Location – A48 Southern Distributor Road; eastbound approach to Pont Ebbw Junction

Summary: Potential late braking, shunt and sideswipe type vehicle collisions

The advanced direction signs on the A48 Southern Distributor Road on the eastbound approach to Pont Ebbw junctions is partially obscured by vegetation. A lack of appreciation of the road layout ahead and more importantly the intended lane for a drivers’ destination, may result in potential late braking, shunt and sideswipe type vehicle collisions.

RECOMMENDATION

Adequate forward visibility should be provided to the sign which will require some cutting back of vegetation.

3.2.8 PROBLEM

Location – A48 Southern Distributor Road; eastbound approach to Pont Ebbw Junction

Summary: Potential hazard to vehicles

No illuminated or reflective bollard has been provided on the nosing of the splitter island on the A48 Southern Distributor Road. Poor conspicuity of the island, particularly during darkness or adverse weather conditions, may lead to vehicles striking the island, with resultant loss of control vehicle collisions.

RECOMMENDATION

A reflective or illuminated bollard with ‘keep left’ aspect should be installed on the nosing of the splitter island.
3.2.9 PROBLEM

Location – A48 Southern Distributor Road; controlled pedestrian crossings

Summary: Potential hazard to cyclists

The light controlled pedestrian crossings on the A48 Distributor Road have been installed as puffin crossings, however there appears to be a cycle demand to use these crossings and there are adjacent designated cycle routes. Collisions between cyclists and pedestrians may occur if pedestrians do not expect cyclists to be present and in addition cyclists may be vulnerable to passing traffic if their front wheels enter the carriageway when attempting to activate push button units.

RECOMMENDATION

The local cycle routes (and strategy) should be reviewed and the feasibility of upgrading the light-controlled crossings to toucan crossings should be investigated.
3.2.10 PROBLEM

Location – A48 Distributor Road; controlled pedestrian crossings

Summary: Potential collisions between vehicles and pedestrians / cyclists

Not withstanding Problem 2.2.9 above, the puffin crossing on the A48 Southern Distributor Road east bound lane has a long crossing distance (four lanes and central refuge island). It is assumed that the intention is for pedestrians to complete the crossing in one movement. However, upon seeing a green aspect (invitation to cross) and entering the carriageway, pedestrians will then see a red aspect within the central refuge area and assume that they are to stop and await another green to complete the crossing. Confusion may lead to long and unnecessary delays to pedestrians or will lead to pedestrians entering the carriageway to cross at inappropriate times, with the risk of being struck by live vehicular traffic.

RECOMMENDATION

It should be ensured that there is adequate time incorporated into the signal timings to allow a pedestrian to complete the crossing before the end of the pedestrian phase. Given the length of crossing, countdown timers should be installed to give pedestrians confidence in how much time they have to complete the crossing.
3.2.11 PROBLEM

Location – Tregedar Park entrance

Summary: Potential hazard and obstruction to pedestrians and cyclists

There is an ‘End of (cycle) Route’ sign located within the footway adjacent to the entry to Tredegar park on the northern side of the Pont Ebbw junction. The sign is superfluous as the cycle route continues past this point and therefore represents an unnecessary obstruction in the footway to pedestrians and cyclists. The sign may also result in cyclists dismounting unnecessarily.

RECOMMENDATION

The sign should be removed.
3.3  **M4 Junction 28**

_The Road Safety Problems have been listed as encountered in an anti-clockwise direction around the junction commencing from A467 Forge Road (northbound)._  

3.3.1 **PROBLEM**

**Location** – A467 Forge Road; northbound on exit from the junction  
**Summary:** Potential hazard to vehicles  

A ramped concrete terminal has been provided at the start of the safety barrier on A467 Forge Road (northbound) on exit from the junction. The concrete ramped end may be a potential launch hazard to errant vehicles.

**RECOMMENDATION**

A compliant terminal end should be provided.
3.3.2 PROBLEM

Location – Circulatory (between M4 EB diverge slip and A467 Forge Road)

Summary: Potential hazard to errant vehicles

Within the nearside verge of the circulatory carriageway (between M4 EB diverge slip and A467 Forge Road) there is a lane destination sign (on three closely spaced posts) located adjacent to a lighting column and a works sign. Although the circulatory is subject to a 40mph speed limit, in the event that an errant vehicle leaves the carriageway, the combination of these items is likely to bring the vehicle to an abrupt halt with resultant injuries to the occupant(s) of the vehicle.

RECOMMENDATION

It is understood that the ‘works’ sign will be removed imminently as soon as the works are complete. However, the lane destination sign should be risk assessed and the sign mounted on passively safe posts if necessary.
3.3.3 PROBLEM

Location – M4 eastbound diverge slip

Summary: Potential collisions between vehicles and pedestrians

The push button units at the toucan crossing on the north side of the toucan crossing at the M4 eastbound diverge slip appear to be too close to the carriageway, such that a mounted cyclist attempting to access the push button unit may find that the front wheel of the bike is within the carriageway. Cyclists may be at risk of being struck by passing vehicles.

RECOMMENDATION

The set back of the push button units should be checked and if necessary repositioned so that they are more favourable to cyclists.
3.3.4 PROBLEM

Location – A48 Cardiff Road; northbound approach to the junction

Summary: Potential hazard to occupants of errant vehicles

To the offside of the A48 Cardiff Road (northbound) the concrete retaining wall at the foot of the M4 eastbound diverge overbridge is likely to be within the working width of the safety barrier. In the event that an errant vehicle leaves the carriageway to the offside, the barrier will displace and the vehicle will strike the concrete wall bringing the vehicle to an abrupt stop. Serious injury may result to the occupant(s) of the vehicle.

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RECOMMENDATION

The working width of the barrier at this location should be checked. If inadequate, measures should be taken to increase the stiffness of the barrier to reduce the working width required.
3.3.5 PROBLEM

Location – A48 Cardiff Road; northbound approach to the junction

Summary: Potential hazard to occupants of errant vehicles

There is an advanced direction sign to the offside of the A48 Cardiff Road (northbound) that appears to be within the working width of the safety barrier. If located within the working width of the barrier, should a vehicle strike the barrier, the barrier will displace and the vehicle may strike the sign post. Injury may result to the occupant(s) of the vehicle.

RECOMMENDATION

The sign should be checked for road edge clearance and for its position within the working width of the barrier. The sign should be repositioned if necessary.
3.3.6 PROBLEM

Location – A48 Cardiff Road

Summary: Potential hazard to vehicles

There is an advanced direction signs located on the offside verge on the A48 Cardiff Road on the northbound approach to the junction that appears to be located too close to the carriageway edge. The sign may be at risk of being struck by passing vehicles.

RECOMMENDATION

The road edge clearance of the sign should be checked. The sign (including the sign face) should have a minimum of 450mm road edge clearance.
3.3.7 PROBLEM

Location – A48 Cardiff Road; northbound approach to the junction

Summary: Potential speed related vehicle collisions

The 40mph repeater sign within the nearside verge on the A48 Cardiff Road on the northbound approach to the junction is partially obscured by vegetation. A lack of awareness of the speed limit may result in speed related vehicle collisions throughout the junction.

RECOMMENDATION

Foliage should be cut back to ensure that the 40mph speed limit repeater sign is clearly visible to approaching drivers.
3.3.8 PROBLEM

Location –  A48 Cardiff Road (southbound to Castleton)

Summary:  Potential speed related vehicle collisions

The whole of the M4 Junction 28 is subject to a 40mph speed limit, however, there is an existing 40mph speed limit terminal that remains on A48 Cardiff Road southbound to Castleton. This may invalidate the speed limit around the junction making it unenforceable, which in turn may result in speed related vehicle collisions around the junction.

RECOMMENDATION

The 40mph speed limit terminal should be removed.
3.3.9 PROBLEM

Location – A48 Cardiff Road

Summary: Potential late lane changing, shunt and sideswipe type vehicle collisions

Where the gyratory splits for the A48 Cardiff Road and the M4 westbound merge slip, a confirmatory finger post sign has been provided for the M4 west. Drivers wishing to access the M4 east may be confused as to which lanes to take, which may result in late lane changing, shunt and sideswipe type vehicle collisions.

RECOMMENDATION

A sign should be added at the nosing for M4 east (London) and local direction to A48 Castleton.
3.3.10 PROBLEM

Location – A48 Cardiff Road (from Pont Ebbw)

Summary: Potential trip hazard to pedestrians

A highway drainage gully is present within the shared use footway / cycleway on the east side of A48 Cardiff Road (from Pont Ebbw). The gully with wide apertures may be a trip hazard to pedestrians.

RECOMMENDATION

The gully should be changed for a pedestrian friendly type gully with narrower apertures.
3.3.11 PROBLEM

Location – A48 Cardiff Road (from Pont Ebbw)

Summary: Potential collisions between cyclists and pedestrians

On the east side of A48 Cardiff Road (from Pont Ebbw) it is assumed that the shared use footway / cycleway heads south alongside the gyratory and the footway heading northwards to Pont Ebbw is footway only. This is not clear to pedestrian or cyclists and may result in cyclists using the footway inappropriately, leading to potential collisions with pedestrians.

RECOMMENDATION

An ‘End of route’ sign should be provided to highlight to cyclists that they cannot continue northbound and corduroy paving should be provided to highlight to visually impaired pedestrians that they are transitioning between a footway and shared use facility. Alternatively, the cycle facility should be extended.
3.3.12 PROBLEM

Location – A48 Cardiff Road (from Pont Ebbw)

Summary: Potential shunt and sideswipe type vehicle collisions

On the A48 Cardiff Road westbound approach (from Pont Ebbw) to the junction, the kerb line appears to follow what is assumed an old bus layby. Drivers approaching the junction may pull over into this section of carriageway believing that they are entering the left turn lane for the junction, then are moved back over abruptly where the kerb line ties back in. Sudden and unexpected vehicle manoeuvres may result in potential shunt and sideswipe type vehicle collisions.

RECOMMENDATION

A carriageway edge line should be provided to deter drivers from moving into the old layby.
3.3.13 PROBLEM

Location – A48 Cardiff Road (from Pont Ebbw)

Summary: Potential hazard to occupant(s) of errant vehicles

There are numerous safety issues in relation to the lane destination sign and safety barrier that is in situ to protect the stream that runs into the Ebbw River. All issues may result in injury to the occupant(s) of an errant vehicle.

1) The Safety barrier features a concrete ramped terminal (see Problem 2.3.1);
2) The sign posts and lighting column are located in front of the barrier, so if a vehicle strikes the barrier they may be guided into the obstacles;
3) The length of the barrier in advance of the hazard is insufficient, meaning the containment level of the barrier may not be as designed, increasing the risk of an errant vehicle striking the hazard.

RECOMMENDATION

This section of safety barrier should be reviewed. The sign and lighting column should be relocated behind the safety barrier (and out of the working width). The length of the barrier should be increased and a compliant terminal end should be provided.
### 3.3.14 PROBLEM

Location – M4 J28 (between M4 WB diverge slip and A48 Cardiff Road to Pont Ebbw)

Summary: Potential hazard to occupant(s) of errant vehicles

There are a number of issues with the safety barrier provided around the radius between M4 WB diverge slip and A48 Cardiff Road to Pont Ebbw, that may result in injury to occupant(s) of errant vehicles that may strike the barrier.

1) Several lighting columns are located in front of the barrier (below, left). If a vehicle leaves the carriageway and strikes the barrier the vehicle may be guided to the lighting column where the vehicle will come to an abrupt halt;

![Image of lighting columns and barrier](image1.png)

2) There is insufficient clearance (above, right) under the barrier (earth from the adjacent bund), which may increase the risk of a vehicle being 'launched'.

RECOMMENDATION

The lighting columns should be relocated behind the barrier (and out of the working width).

The earth should be cleared to ensure that there is the required clearance under the barrier.
3.3.15 PROBLEM

Location – A48 Cardiff Road (from Pont Ebbw); puffin crossing

Summary: Potential hazard to cyclists

The light controlled pedestrian crossings on the A48 Cardiff Road (from Pont Ebbw) have been installed as puffin crossings; however there appears to be a cycle demand to use these crossings and there are adjacent designated cycle routes. Collisions between cyclists and pedestrians may occur if pedestrians do not expect cyclists to be present and in addition cyclists may be vulnerable to passing traffic if their front wheels enter the carriageway when attempting to activate push button units.

RECOMMENDATION

The local cycle routes (and strategy) should be reviewed and the feasibility of upgrading the light-controlled crossings to toucan crossings should be investigated.
3.3.16 PROBLEM

Location – A48 Cardiff Road (from Pont Ebbw); puffin crossing

Summary: Potential hazard to pedestrians

Notwithstanding Problem 2.3.17 above, there are a number of issues in relation to the puffin crossings on A48 Cardiff Road (from Pont Ebbw).

1) At the time of the site visit the surface within the refuge island between the westbound approach lanes and the exit lanes from the gyratory was incomplete. This results in potential trip hazards at the edging kerbs around the tactile paving. This may be a potential trip hazard to pedestrians.

2) Because the crossings are unconventional in the sense of the direction that traffic approaches, pedestrians may become confused and step out into the crossing into the path of oncoming vehicles.

3) There appears to be a significant delay between a pedestrian crossing demand being activated and the pedestrian crossing phase going live. This long delay may result in pedestrians attempting to cross during live traffic phases. Potential collisions between vehicles and pedestrians may result.

RECOMMENDATION

The following remedial measures should be carried out:

1) The surface works at the refuge island should be complete;
2) ‘Look left’ and ‘look right’ markings should be provided to advise pedestrians as to which way traffic is approaching;
3) The signal timings should be reviewed and if possible waiting times for pedestrians reduced.
3.3.17 PROBLEM

Location – M4 westbound diverge lane

Summary: Potential hazard to occupant(s) of errant vehicles

There is a sign that is located within the working width of the safety barrier on the nearside of the M4 westbound diverge lane. In the event that an errant vehicle strikes the barrier, the vehicle may be guided to and ‘pocketed’ by the sign posts.

RECOMMENDATION

The sign should be repositioned outside of the working width of the safety barrier.
3.3.18 PROBLEM

Location – A467 Forge Road; eastbound approach to the junction

Summary: Potential hazard to occupant(s) of errant vehicles

There are a number of issues identified in relation to the safety barrier on the nearside of A467 Forge Road on the approach to the junction that may result in injury to occupant(s) of errant vehicles that may strike the barrier.

1) A lighting column is located in front of the safety barrier. If a vehicle leaves the carriageway and strikes the barrier the vehicle may be guided to the lighting column where the vehicle will come to an abrupt halt;

2) There are missing posts from the safety barrier which means that the barrier will not operate to its designed containment level;

3) There is insufficient clearance underneath the barrier due to high verge levels which may increase the risk of a vehicle being ‘launched’.

RECOMMENDATION

The following mitigation measures should be carried out:

1) The lighting column should be relocated behind (and out of the working width of the barrier);
2) The missing posts should be installed;
3) The verge should be removed from under the barrier.
3.3.19 PROBLEM

Location – A467 Forge Road

Summary: Potential shunt and sideswipe type vehicle collisions

Southeast bound drivers on A467 Forge Road on approach to the M4 J28 junction intending to travel to A48 Cardiff Road to Pont Ebbw have to make an unnatural manoeuvre to negotiate the splitter island to enter the correct lanes on the gyratory. The natural alignment may force drivers across to the circulatory lanes (for A48 Castleton or M4 west). This alignment may result in late lane changing, shunt and sideswipe type vehicle collisions.

RECOMMENDATION

The splitter island should be reshaped to allow for a more natural alignment for drivers wishing to travel to A48 Cardiff Road for Pont Ebbw.
3.3.20 PROBLEM

General – street lighting

Summary: Potential darkness related vehicle collisions

At the time of the night visit there was a single lighting column not illuminated (annotated on Appendix A). Reduced illumination may create dark spots in the carriageway leading to darkness related vehicle collisions.

RECOMMENDATION

The lighting unit should be checked and repaired as necessary.

3.3.21 PROBLEM

General – Directional signage

Summary: Potential late lane changing, shunt and sideswipe type vehicle collisions

There is an inconsistent approach to the destination signage around the scheme, particularly for the M4 merge slips. Some signs explicitly state M4 east and west in conjunction with London and Cardiff respectively, whilst other signs simply display M4 with east and west (in small text due to the presence of the dual language). Drivers, especially when faced with a complex layout can easily become confused by compass points and prefer destinations such as London and Cardiff. Driver confusion may lead to potential late lane changing, shunt and sideswipe type vehicle collisions.

RECOMMENDATION

The signage strategy around the junction should be reviewed and a consistent approach to signage provided, such as ensuring that destinations such as London and Cardiff are included where the M4 signs are displayed.
3.3.22 PROBLEM

General – signage in the footway / cycleway

Summary: Potential hazard to pedestrians and cyclists

There are numerous items of street furniture (lighting columns and sign posts) around the site that are located within the middle of the footway. These items of street furniture may be inconspicuous to pedestrians, particularly to those with visual impairments and cyclists. This issue may be exacerbated during darkness.

RECOMMENDATION

A colour contrast band should be placed around the lighting columns and sign posts at approximate eye height to improve the conspicuity of the posts.

3.3.23 PROBLEM

General – Shared footway / cycleway routes

Summary: Potential collisions between cyclists and pedestrians

There are long sections of shared footway / cycleway routes where no signage is provided. Pedestrians may not be aware that the footway is a shared facility. A lack of awareness may result in collisions between cyclists and pedestrians.

RECOMMENDATION

Shared use footway / cycleway repeater signs should be provided at regular intervals along these routes.
3.3.24 PROBLEM

General – Redundant signage

Summary: Potential hazard to all road users

There are a number of road signs around the scheme that are either redundant, do not offer any benefit to drivers or are unnecessary obstruction on the footway to pedestrians. The signs identified are as follows:

- Traffic signal ahead sign on A48 Cardiff Road northbound approach to the junction. The sign is obscured by foliage but at this location drivers have very good forward visibility to the traffic signal heads;

- An old 50mph terminal sign is located within the footway on the nearside of the A48 Cardiff Road (northbound). The junction is subject to a 40mph speed limit.

RECOMMENDATION

Redundant, superfluous and unnecessary signs should be removed.
4. **Audit Team Statement**

We certify that the terms of reference of the road safety audit are as described in HD 19/15.

**Audit Team Leader**

Highways England Approved RSA Certificate of Competency
Senior Engineer, TMS Consultancy

Signed
Date 6th November 2018

**Audit Team Member**

Highways England Approved RSA Certificate of Competency
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Signed
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Appendix A

Please refer to the following page for a plan illustrating the locations of the problems identified as part of this audit (location numbers refer to paragraph numbers in the report).

The location of the scheme is shown below