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A55 JUNCTION 15 & 16 IMPROVEMENTS STAGE 1 ROAD SAFETY AUDIT – DESIGNERS RESPONSE

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1. GENERAL DETAILS

1.1 Background

The A55 Junctions 15 and 16 are the only two roundabouts on the mainline of the Euroroute E22 Trans-European Transport Network (TEN-T). This causes problems to the traffic using the A55 travelling along the route. The purpose of the project is to remove the two roundabouts at the junctions and replace them with upgraded junctions.

The key objective for the scheme is to improve access to regional, national and international markets and employment opportunities; in addition to improving resilience and safety, and reducing delays both to local traffic as well as people travelling along the A55.

Four layout options (A to D) for the removal of the J16 roundabout were assessed using the WELTAG process to determine the preferred layout.

A Stage 1 Road Safety Audit was undertaken by WSP for Ramboll (Designer) and the Welsh Government (??) of the proposed improvements at Junctions 14, 15 and 16 on the A55 Dual Carriageway Trunk Road in North Wales. The improvements are to replace the last remaining at-grade junctions (roundabouts) with grade separated junctions.

The proposals reviewed were based on designs prepared by Ramboll for the purpose of public consultations and identification of lands to be acquired. The design reviewed had not been developed in sufficient detail to be fully compliant in all respects.

WSP provided the results of their audit in Report 62103548-108/RSA/1/0 dated October 2019.

In this report the Designer (Ramboll) provides a response to each of the identified problems. For ease of reference the paragraph numbering in Sections 2, 3 and 4 of this report, and the sequential numbering of problems, are retained in this report. The report reproduces the location, summary and recommendation text from the WSP report and the additional text by way of designers response is [highlighted in blue](#).

2. A55 JUNCTION 15 - DESIGNERS RESPONSE

2.1 General

No specific road safety problems identified

2.2 Junctions

2.2.1 Problem 1 - A55 Westbound Carriageway to the West of Junction 15

Summary

Inadequate distance between the end of the proposed A55 westbound on-slip and the existing Type B parking lay-by downstream.

An existing Type B parking lay-by is located on the A55 westbound carriageway approximately 300m downstream of the proposed westbound on-slip merge at A55 junction 15. This is less than the mandatory minimum distance of 450m between a junction and a parking lay-by, as stated in clause 3.7 in the DMRB document CD 169 for a derestricted all-purpose dual carriageway with a 120kph design speed.

The insufficient separation distance between the proposed merge slip road and the Type B parking lay-by could increase the potential for weaving conflicts between vehicles using the merge and vehicles wanting to use the parking lay-by. The location of the proposed merge slip road may result in the lay-by having inadequate advance signing (due to constraints on the possible location for signing), which could increase the potential for vehicles making late lane changing manoeuvres to access the parking lay-by and coming into conflict with other vehicles in the A55 nearside lane or joining the A55 from the proposed merge.

In addition, it was observed during the site visit that this lay-by has a 'Type B' layout (without segregation island), which under current DMRB requirements is not appropriate for a high speed dual carriageway road. It was also observed that another parking lay-by is currently provided on the A55 westbound carriageway, located approximately 1.5 km downstream of the location of the proposed westbound on-slip merge at A55 junction 15.

Recommendations

It is recommended that the existing parking lay-by (located approximately 300m downstream of the proposed westbound on-slip merge at junction 15) is removed. When considering the removal of the parking lay-by the designer should ensure that sufficient non-emergency stopping provision is provided on this section of the A55.

Designers Response

Noted, the westbound merge location is fixed due to the overall layout constraints at J15. It is understood that a review of the A55 is being undertaken with respect to Expressway Standards that considers lay-by locations. The layout of the proposed J15 has been made available to the Expressway reviewers and the findings of which are not yet known.

2.2.2 Problem 2 - A55 Eastbound Carriageway to the East of Junction 15

Summary

Proposed eastbound on-slip merge will be located where there is an existing bus stop lay-by. As shown on Photograph 1, there is an existing bus stop lay-by located just to the east of the footbridge to the east of A55 junction 15. The proposed A55 eastbound on-slip merge slip road is proposed where this bus stop lay-by is currently situated.

If the bus stop lay-by is retained in this location, this could result in conflicts between buses entering / exiting the lay-by and vehicles merging onto the A55 eastbound carriageway.

Recommendations

It is recommended that this bus stop relocated to another appropriate location.

Designers Response

Agreed, the existing Bus lay-by is to be removed

2.2.3 Problem 3 - A55 Junction 15 Westbound Off-Slip

Summary

Inadequate Stopping Sight Distance (SSD) to the give way line at the end of the slip road. The SSD along the proposed A55 junction 15 westbound off-slip will not conform with the mandatory requirements of clause 3.33 in the DMRB document CD 122 (which has recently superseded the DMRB document TD 22/06). This is in relation to the SSD along the slip road (to a 0.26m object height at the give way line at the end of the off-slip), which shall be provided for a distance in accordance with the Desirable Minimum SSD for the mainline (i.e. 295m in this location).

The proposed SSD along this slip road will be below the mainline Desirable Minimum SSD, with a minimum visibility distance of 90m. Therefore, this could increase the potential for a vehicle overshooting the give way line at the end of the off-slip (and colliding with a vehicle travelling along Penmaenmawr Road) or a vehicle colliding with an object at the location of the give way line. In addition, the proposed reduced SSD could increase the potential for a vehicle colliding into the back of a queue of traffic on the slip road.

Recommendations

It is recommended that appropriate SSD is provided along the whole length of the proposed A55 westbound off-slip, particularly towards the junction with the local road where traffic leaving the A55 will have to stop and queuing vehicles may be present. If this is not feasible with the layout currently proposed, it is recommended that the proposed layout of the slip road is amended to provide a straighter slip road alignment (towards its intersection with the local road network) that could provide the requisite SSD in accordance with CD 122 clause 3.33.

Designers Response

Noted, the SSD on the proposed J15 WB diverge is limited due to the retention of existing properties resulting in departures (Geo-005 & Geo-005A). The Alignment & Junction Strategy Report details the nature of the reduced SSD along the diverge, which at its minimum is 90m to the proposed give way line approaching the junction with the overbridge road, however, greater visibility is provided along the diverge itself.

Hazard warning signage, chevrons etc. may be used to mitigate the risk of overshooting the bend and collision with queuing vehicles.

2.2.4 Problem 4 - A55 junction 15 eastbound off-slip

Summary

Potentially inadequate SSD along the slip road On the proposed A55 eastbound off-slip at junction 15, the designer indicates that SSD of 160m will be provided along the slip road from the back of the diverge nose. However, it is unclear whether the mainline Desirable Minimum SSD of 295m will be provided into the slip road from the mainline carriageway along the diverge taper and diverge nose (in accordance with the mandatory requirements of CD 122 clause 3.33). If inadequate SSD will be provided into this slip road, it could increase the potential for a vehicle colliding into the rear of a queue of traffic or colliding with an object on the slip road carriageway.

Recommendations

It is recommended that appropriate SSD in accordance with the requirements of CD 122 is provided into the slip road.

Designers Response

Noted, the 160m SSD that was initially indicated has been reviewed and with the application of slightly amended vertical geometry on the Eastbound Diverge the Designer has determined that a compliant SSD can be provided within the Detailed Design.

2.2.5 Problem 5 - A55 Junction 15 Westbound Off-Slip

Summary

Provision of successive low radii horizontal bends in combination with reduced SSD on the slip road could increase the potential for vehicles losing control when leaving the mainline dual carriageway trunk road.

The proposed A55 westbound off-slip at junction 15 will have a relatively low radius left-hand horizontal bend just after the back of the diverge nose, and then have a significant right-hand bend just before the give way line at the junction with the local road network. This layout in a location where SSD is also reduced could increase the potential for vehicles losing control on either of these bends after leaving the mainline A55 dual carriageway trunk road (which will be subject to the national speed limit).

It is noted that the geometric dimensions of the proposed Type B 'Parallel Layout' in this location will also be substandard (i.e. the length of the auxiliary lane and the auxiliary lane taper), and

that no super elevation will be provided on the left-hand horizontal bend on the off-slip. This could exacerbate this road safety problem.

Recommendations

It is recommended that a straighter horizontal slip road alignment is provided.

Designers Response

Noted, the alignment of the proposed J15 WB diverge is constrained due to the retention of existing properties. The Alignment & Junction Strategy Report details the nature of the constraints as well as alternative options considered, some of which would provide straighter alignments. However these straighter alignments attract vertical departures and have greater visual impact on the adjacent properties and so discounted.

To mitigate the reduced distance (lack of compliant length of near straight) from the nosing to the low radius bend a parallel diverge arrangement has been used in order to provide additional distance to decelerate and anticipate queues or hazards approaching the priority junction.

Hazard warning signage and road markings may be used to mitigate the risk of overshooting / loss of control incident associated with low radius bends.

2.2.6 Problem 6 - Proposed Eastbound and Westbound Merges onto the A55 Mainline Carriageway at Junction 15

Summary

Inadequate advance warning of vehicles merging onto the mainline.

The Departures from Standards information provided to the Road Safety Audit Team indicates that the SSD will be substandard on the A55 westbound and eastbound approaches to the proposed slip road merges at junction 15. This could increase the potential for collisions involving vehicles merging onto the A55 mainline.

Recommendations

It is recommended that 'Traffic Merges From Left Ahead' advance warning traffic signs, in accordance with diagram number 508.1 in the document "The Traffic Signs Regulations and General Directions 2016" (TSRGD), are provided on the A55 westbound and eastbound mainline approaches to the proposed slip road merges.

Designers Response

Agreed, traffic signs and road markings in accordance with the TSRGD will be included in detailed design.

2.2.7 Problem 7 – A55 Junction 15 Westbound Off-Slip

Summary

Inadequate advance warning of the give way layout at the end of the slip road in a location where SSD is reduced and the horizontal alignment of the slip road includes low radii bends.

The proposed SSD to the give way line along the junction 15 westbound off-slip road will be substandard (see Problem 3). Therefore, this could increase the potential for vehicles braking too late when approaching the junction and overshooting the give way line, which could lead to a collision with a vehicle travelling along Penmaenmawr Road.

In addition, the A55 westbound off-slip at junction 15 will not be provided with a near straight downstream of the back of diverge nose, so there will be a relatively short distance between the diverge nose (where vehicles could still be travelling close to mainline speeds) and the start of the proposed left-hand horizontal bend on the slip road (with substandard superelevation). This could increase the potential for a vehicle losing control on this bend.

Also, just prior to the give way line at the end of the off-slip, there will be a significant right-hand bend in the slip road carriageway. No advance warning signs will be provided for this bend, so this could increase the potential for a vehicle losing control when negotiating this horizontal bend.

Recommendations

It is recommended that an advance 'Give Way' traffic sign to TSRGD diagram number 501 is provided on the A55 westbound off-slip with a supplementary distance plate, this should be supplemented with "SLOW" road markings. It is also recommended that the proposed 'Bend Ahead' advance warning sign on this slip road (located before the left-hand horizontal bend) is supplemented with an appropriate advisory speed limit sign plate (to TSRGD diagram number 513.2).

Designers Response

Agreed, traffic signs and road markings in accordance with the TSRGD will be included in detailed design.

2.2.8 Problem 8 - A55 Junction 15 Westbound Off-Slip

Summary

Potential for a vehicle to lose control on the low radius left-hand horizontal bend on the slip road and collide with the proposed chevron traffic signs.

The proposed A55 westbound off-slip at junction 15 will not be provided with a near straight at the back of the diverge nose, so there will be a relatively short distance between the diverge nose (where road users could be still travelling at mainline speeds) and the start of the proposed low radius lefthand horizontal bend on the slip road (with substandard super elevation). This could increase the potential for a vehicle not slowing down sufficiently when negotiating the bend, losing control and colliding with the proposed chevron signs on the outside of the bend. If these signs are not passively safe, this could increase the severity of a collision.

Recommendations

It is recommended that the proposed chevron traffic signs on the slip road are passively safe in terms of the sign posts and the mounting heights.

Designers Response

Agreed, provision of street furniture with the highway shall be passive if not protected by appropriate VRS, details agreed /confirmed at detailed design.

2.2.9 Problem 9 - A55 Eastbound On-Slip at Junction 15

Summary

Terminal national speed limit traffic sign only provided on the nearside of the slip road.

Drawing number A55J15J16-RAM-93-15-DR-J-0003 (revision P01) shows that a national speed limit traffic sign will be provided on the nearside of the A55 eastbound on-slip at junction 15. It is unclear whether this will be a terminal or repeater speed limit sign.

If it is proposed to be a terminal speed limit sign, then it could be overlooked by road users if a terminal sign is only provided on one side of the slip road. This could increase the potential for conflicts with high speed vehicles on the mainline A55 eastbound carriageway.

Recommendations

It is recommended that any proposed terminal speed limit traffic signs are provided on both sides of the carriageway.

Designers Response

Agreed, traffic signs and road markings in accordance with the TSRGD will be included in detailed design.

2.2.10 Problem 10 - Penmaenmawr Road to the South-East of A55 Junction 15

Summary

Potential for conflicts between cyclists and vehicles emerging from private accesses and driveways on the proposed shared-use footway / cycleway route.

The existing footway on the south side of Penmaenmawr Road is proposed to be converted into a shared-use footway / cycleway facility. As shown on Photograph 2, there are numerous private driveways and accesses adjacent to the existing footway, where the driver of a vehicle emerging from a driveway / access will have very restricted visibility of an approaching cyclist due to the adjacent property walls, fences and hedges. Therefore, this could increase the possibility of the driver of a vehicle emerging onto the shared-use footway / cycleway route failing to see a cyclist approaching (particularly if they are reversing out of the driveway) which could lead to a collision.

Recommendations

It is recommended that appropriate visibility is provided from all the private driveways and access to cyclist on the proposed shared use facility. This will need to take account that some users of the driveways and private access may choose to reverse onto Penmaenmawr Road.

Designers Response

Disagree, the existing footway along Penmaenmawr Road which is to be upgraded to cycleway has a number of private properties each bounded by walls typically 1m 1.2m high. The majority of the properties have driveway which inherently has potential for conflict between NMU's and vehicles.

The number of private boundaries and amount of privately owned planting /vegetation that would require removal to achieve the full visibility is not practically achieved. The existing footway typically consists of a 2m paved path with a grassed verge adjacent to the carriageway, the proposed cycleway will reduce soft verge to increase the paved with to 3.5m providing greater space for pedestrians and cyclists to manoeuvre around emerging vehicles.

Whilst the designation of a cycleway may increase the number of NMU's using this route no significant change in risk level is perceived given that the paved areas has increased suitably to accommodate the extra usage. Consideration may be given to signage and road marking at detailed design to make NMU's aware of emerging vehicle potential along this section.

2.2.11 Problem 11 - Penmaenmawr Road Adjacent to the Junction with Tyddyn Drycin

Summary

Visibility for cyclists and pedestrians waiting to cross Penmaenmawr Road could be restricted by a stationary bus at the existing bus stop.

Photograph 2 shows that there is an existing bus stop on the south side of Penmaenmawr Road adjacent to the proposed uncontrolled pedestrian / cycle crossing facility (on the west side of the junction with Tyddyn Drycin).

A stationary bus at the bus stop could restrict the visibility of vehicles approaching from the west from the proposed crossing point on the south side of the carriageway. This could increase the potential for a pedestrian or cyclist crossing Penmaenmawr Road when a vehicle is approaching, potentially leading to a collision.

Recommendations

It is recommended that the proposed pedestrian / cycle crossing facility is provided in a location where the adequate visibility of approaching traffic (taking account of the approach speed of vehicles) can be provided (i.e. where the visibility will not be obstructed by stationary buses at bus stops or by parked vehicles). Alternatively, the existing bus stop could be relocated so that it doesn't obscure visibility from the crossing (or any other driveways or accesses).

Designers Response

Agreed, it is proposed to relocate the existing bus stop.

2.2.12 Problem 12 - Existing Bus Gate on Penmaenmawr Road, near the Junction with Pendalar

Summary

Potential for cyclists to lose control when crossing the existing bus gate facility or collide with the existing bus gate barrier.

As shown on Photograph 3, there is an existing bus gate facility adjacent to Penmaenmawr Road, near the western junction with Pendalar. The design drawings provided to the Road Safety Audit Team indicate that the proposed shared-use footway / cycleway route will cross the bus gate facility where the barrier is currently located. If the barrier is removed to provide the shared-use route, this could increase the potential for road users using the bus gate to leave the A55 westbound carriageway, which could lead to conflicts with other road users at the junction with Penmaenmawr Road.

Alternatively, the shared-use route could cross the bus gate where there is an existing feature to prevent non-bus vehicles from travelling the wrong way through the bus gate (located at the give way line). This could lead to cyclists losing control if they travel over the feature.

Recommendations

Where the proposed shared-use route will cross the existing bus gate facility, it is recommended that an appropriate crossing facility is provided away from the location of the existing barrier and that the existing feature to prevent vehicles accessing the bus gate from Penmaenmawr Road should be removed.

Designers Response

Disagree, under the proposed works the bus gate will be removed and hence there will be no conflict or risk to NMU on the cycleway.

2.2.13 Problem 13 - Shore Road East

Summary

Visibility of approaching traffic at the proposed cycle / pedestrian crossing facility could be restricted by an existing property / property boundary.

Drawing number A55J15J16-RAM-93-15-DR-J-0026 (revision P01) shows that a crossing facility will be provided across Shore Road East on the proposed shared-use footway / cycleway route in this location. The visibility northwards along Shore Road East from the proposed crossing point on the west side of the carriageway could be restricted by the existing adjacent property / property boundary. This could increase the potential for a cyclist or pedestrian crossing the carriageway when a vehicle is approaching from the north, leading to a collision.

Recommendations

It is recommended that the proposed pedestrian / cycle crossing facility on Shore Road East is provided in a location where adequate visibility of approaching traffic can be provided.

Designers Response

Noted, the exact position of the crossing will be finalised as part of detailed design.

2.2.14 Problem 14 - Eastern end of Penmaenmawr Road, Adjacent to the Eastern Junction with Pendalar

Summary

Proposed shared-use footway / cycleway facility will narrow the already insufficient carriageway width.

As shown on Photograph 4, the carriageway width at the eastern end of Penmaenmawr Road (adjacent to the eastern junction with Pendalar) is relatively narrow. The proposed shared-use route will be located on the north side of the carriageway in this location, adjacent to the existing vertical wall. This could increase the potential for vehicles overrunning the kerblines of the shared-use facility or travelling too close to the kerblines, which could increase the potential for a vehicle colliding with a cyclist or pedestrian.

Recommendations

It is recommended that the proposed highway layout in this location provides appropriate widths for the carriageway and the proposed shared-use facility.

Designers Response

Noted, in order to accommodate the cycleway the proposed works will realign the section of road outside No. 85 and widen the existing bellmouth so not to restrict vehicle movement more than the existing arrangement.

Full consideration will be given at detail design stage to signing, barriers and the like to ensure a safe detail between the proposed cycleway and road in this area.

2.2.15 Problem 15 - Penmaenmawr Road to the West of the Junction with Shore Road East

Summary

Stationary buses in the proposed westbound and eastbound bus stop lay-bys could restrict the visibility from the adjacent pedestrian crossing points.

A new traffic signal controlled pedestrian crossing facility is proposed on Penmaenmawr Road to the west of the new junction with Shore Road East. Bus stop lay-bys will be provided on either side of this crossing facility. Therefore, the visibility from the crossing points could be obstructed by buses that are stationary in these lay-bys.

In addition, buses in the bus stop lay-bys could obstruct the visibility to any offside primary traffic signal heads at the crossing facility.

This could increase the potential for a pedestrian or cyclist crossing the carriageway (without waiting for a 'green man' signal) and failing to see a vehicle approaching from the west or the east, which could result in a collision.

Recommendations

It is recommended that the proposed pedestrian crossing facility is provided in a location where clear unobstructed visibility is provided (including being located away from any bus stops).

Designers Response

Noted, the Designer would comment that the bus-laybys are positioned downstream of the crossing in both directions, and that adequate visibility is provided by this layout. The exact position of the lay-bys will be finalised at detail design, taking into consideration the auditors concerns.

3. A55 JUNCTION 16 - DESIGNERS RESPONSE

3.1 General

No specific road safety problems identified

3.2 Junctions

3.2.1 Problem 16 - A55 Westbound On-Slip Merge at Junction 16

Summary

Inadequate advance warning of vehicles merging onto the mainline.

The Departures from Standards information provided to the Road Safety Audit Team indicates that the SSD will be substandard in both mainline lanes on the immediate A55 westbound approach to the proposed slip road merge at junction 16 (with a minimum of 144m SSD in Lane 1 and a minimum of 135m SSD in Lane 2). This could increase the potential for collisions involving vehicles merging onto the A55 mainline.

Insufficient details have been provided in respect of the SSD provided on the approach (e.g. a graph with SSD plotted against chainage) or SSD available to a 1.05m object height to fully consider the geometry proposed.

Recommendations

It is recommended that appropriate SSD is provided on the A55 westbound approach to the merge at A55 junction 16.

Designers Response

Noted, additional visibility analysis to be presented with departures will confirm that SSD to the high object will be maintained, and that the reduced SSD, whilst technically within the 'immediate approach' to the junction as defined by standards, provide a safe distance for mainline drivers to anticipate merging traffic, and vice versa.

3.2.2 Problem 17 - Proposed Junction between Conway Road and the New Slip Roads at A55 Junction 16

Summary

The provision of a major / minor junction on the inside of a notable horizontal bend in the major road carriageway could restrict the visibility along the main road in both directions from the minor road give-way line.

The major / minor junction between Conway Road and the proposed slip roads at A55 junction 16 will be located on the inside of a notable horizontal bend in the Conway Road carriageway. Therefore, this could restrict the visibility along the major road in both directions from the give-way line at the end of the A55 westbound off-slip. This could increase the potential for a vehicle emerging from the slip road into the path of a vehicle travelling along Conway Road, leading to a collision.

Recommendations

It is recommended that appropriate 'y' distance visibility is provided along Conway Road in both directions at this junction, in accordance with the requirements of the DMRB document CD 123 and the likely approach speed of vehicles.

Designers Response

Noted, compliant visibility splays along Conway Road will be incorporated at detailed design stage. Also, the Alignment and Junction Strategy Report also identifies potential refinement to the proposed alignment and junction type that fall within the proposed Redline Boundary and may facilitate increased SSD and better compliance with visibility standards, this potential will be investigated at detailed design stage.

3.2.3 Problem 18 - Proposed Junction between Conway Road and the New Slip Roads at A55 Junction 16

Summary

Inadequate visibility of a vehicle waiting to turn right onto the A55 westbound on-slip.

The proposed SSD on Conway Road in the vicinity of A55 junction 16 will be restricted by the horizontal alignment of the carriageway to a minimum of 56m. This could lead to inadequate forward visibility on the westbound approach of a vehicle waiting to turn right onto the A55 westbound on-slip at the proposed junction, which could lead to a rear shunt collision.

In addition, it is noted that the proposed speed limit on Conway Road in this location will be 30mph. It is considered likely that vehicles could be travelling in excess of this speed limit, as the layout /environment of Conway Road in the vicinity of A55 junction 16 will be rural and non-built-up. This could exacerbate this road safety problem.

Recommendations

It is recommended that adequate forward visibility is provided along Conway Road (taking the likely speed of vehicles into account) in the vicinity of A55 junction 16. It is also recommended that a right turn lane is provided at this junction, for vehicles turning right onto the A55 westbound on-slip.

Designers Response

Noted, in order to avoid existing constraints in this area the revised horizontal alignment of the Conway Road through the proposed priority Junction at J16 is compact in nature using a 90m radius bend. The result of the compact alignment is to restrict forward visibility, the westbound visibility is affected and is reduced to approximately 50m (one step relaxation for 50KPH design speed), as this relaxation in SSD is on approach to a junction it is identified as a departure in the Alignment and Junction Strategy Report. To mitigate this departure, a number of features such as hazard warning signs, road marking street lighting could be implemented.

However, the Alignment and Junction Strategy Report also identifies potential refinement to the proposed alignment and junction type that fall within the proposed Redline Boundary and may

facilitate increased SSD and better compliance with standards, this potential will be investigated at detailed design stage.

3.2.4 Problem 19 - A55 Junction 16 Westbound Off-Slip.

Summary

Inadequate SSD to the give-way line at the end of the slip road.

It is unclear whether adequate SSD will be provided along the A55 westbound off-slip at junction 16 to the give-way line at the end of the slip road, in accordance with the mandatory requirements of clause 3.33 in the DMRB document CD 122. If sufficient SSD is not provided, this could increase the potential for a vehicle overshooting the give-way line and colliding with a vehicle travelling along Conway Road, or a vehicle colliding into the rear of a queue of traffic on the slip road.

Recommendations

It is recommended that the SSD along the slip road is provided in accordance with the mandatory requirements of CD 122 clause 3.33. It is also recommended that an advance 'Give Way' traffic sign is provided on the slip road (to TSRGD diagram number 501).

Designers Response

Noted, the lack of near straight is mitigated by adopting a parallel diverge arrangement to provide additional length for drivers to leave the mainline, adjust speed and anticipate the upcoming priority junction, and the departure submission will demonstrate good SSD over the majority of the slip road and to anticipate queuing from the junction.

Also, the Alignment and Junction Strategy Report also identifies potential refinement to the proposed alignment and junction type that fall within the proposed Redline Boundary and may facilitate increased SSD and better compliance with standards, this potential will be investigated at detailed design stage.

3.2.5 Problem 20 - Conway Road / County Road West

Summary

Use of a 50kph design speed could be inappropriate for the highway environment resulting in actual vehicle speeds being higher than the design speed.

Conway Road and Country Road West in the vicinity of A55 junction 16 will have a 50kph design speed. This is considered to be inappropriate as the highway environment in this location is expected to be predominately rural. In addition, Conway Road to the west of A55 junction 16 has an existing posted speed limit of 40mph. This could result in the highway design being inadequate for the actual speed of vehicles travelling along these roads, which could increase the potential for speed-related conflicts and collisions.

Recommendations

It is recommended that the designer reviews the proposed design speed in this location, and considers its appropriateness in line with the highway environment.

Designers Response

Noted, at present Conway Road to the west of J16 is posted as 40MPH and Ysguorwen Road (east of J16) is posted as 30MPH all the way into Dwygyfylchi village.

The proposed County Road has sections of the alignment where a number of tight bends have been used to negotiate design constraints, that in turn require departures – see Alignment and Junction Strategy Report. The three sections of tight bends are distributed relatively evenly along the proposed link road, the eastern extents near J16, centrally near Puffin services and on the western extent at J16a, the distance between each group is 500m and 250m respectively.

The Alignment Constraint (Ac) has been calculated for the proposed link road as 22 in accordance with TD9/93. From Figure 1 in TD9 the maximum Ac value of 20 corresponds to a design speed of 70kph, as the Ac derived for this link road exceeds this maximum value then a lower design speed down was selected.

Consideration was given to posting the majority of the link road as 40MPH (70KPH) and posting the constrained areas as 30MPH (50KPH), however the distribution of the tight bends along the link does not lend itself to this change as guidance recommends a minimum distance speed limit should be applied for is 600m, which could not be achieved nor would it be desirable to change limits so frequently.

The proposed 30MPH seems the most robust limit proposal for the link road in its present form, should any constraints or layout change then a review of the Ac may identify a change in design speed is appropriate. To assist in drives adhering to the proposed the 30MPH speed limit the design (particularly the straight section east of J16) could incorporate features such as horizontal deflections and planting to remove the straight open nature of the road that may lead to exceedance.

3.2.6 Problem 21 - Proposed Junction Between Conway Road and Ysguborwen Road

Summary

The provision of a major / minor junction on the inside of a horizontal bend in the major road carriageway could restrict the visibility in both directions from the minor road give-way line.

The major / minor junction between Conway Road and Ysguborwen Road will be located on the inside of a horizontal bend in the Conway Road carriageway. Therefore, this could restrict the visibility along the major road in both directions from the give-way line on Ysguborwen Road. This could increase the potential for a vehicle emerging from the minor road into the path of a vehicle travelling along Conway Road, leading to a collision.

Recommendations

It is recommended that appropriate 'y' distance visibility is provided along Conway Road in both directions at this junction, in accordance with the requirements of the DMRB document CD 123.

Designers Response

Noted, the earthworks currently shown in the vicinity of the proposed Ysguborwen Road junction slightly impede a X=4.5m Y=70m visibility splay out of the junction. Earthworks to be set back in detailed design to facilitate the full X=4.5m Y=70m visibility splay.

3.2.7 Problem 22 - A55 Westbound On-Slip Merge at Junction 16

Summary

Provision of a Type B 'Parallel Merge' layout with inadequate geometric dimensions for the auxiliary lane.

To mitigate the lack of a near straight upstream of the back of merge nose on the A55 westbound on-slip at junction 16, a Type B 'Parallel Merge' layout will be provided. However, the length of the proposed auxiliary lane (including the auxiliary lane taper) will be approximately 150m. This is less than the mandatory minimum length of 245m for an auxiliary lane (including auxiliary lane taper) at a merge on a rural all-purpose 120kph road, as stated in the DMRB document CD 122. This could increase the potential for conflicts involving merging vehicles.

Recommendations

It is recommended that the Type B merge layout is provided with appropriate geometric dimensions for this type of road.

Designers Response

Disagree, the provision of a fully compliant parallel merge is not required to cater for traffic flows, for which a simple taper merge is sufficient. The additional length mitigates for the reduced length of near-straight, such that the total length available to merging traffic, to accelerate, identify a gap in mainline traffic, and merge is at least equivalent to a simple taper arrangement.

Provision of a full parallel merge could incur significant marginal cost as it would require works to the adjacent railway bridge. It is anticipated that detail design will seek to optimise the junction and merge arrangement, to minimise the shortfall in near straight.

3.2.8 Problem 23 - A55 Westbound Off-Slip Diverge at Junction 16

Summary

Provision of a Type B 'Parallel Diverge' layout with inadequate geometric dimensions for the auxiliary lane.

To mitigate the lack of a near straight downstream of the back of diverge nose on the A55 westbound off-slip at junction 16, a Type B 'Parallel Diverge' layout will be provided. However, the length of the proposed auxiliary lane (including the auxiliary lane taper) will be approximately 140m. This is less than the mandatory minimum length of 225m for an auxiliary lane (including auxiliary lane taper) at a diverge on a rural all-purpose 120 kph road, as stated in the DMRB document CD 122.

This could increase the potential for vehicles not slowing down sufficiently when diverging off the A55 westbound carriageway and losing control on the proposed left-hand horizontal bend on the slip road.

Recommendations

It is recommended that the Type B 'Parallel Diverge' layout is provided with appropriate geometric dimensions for this type of road.

Designers Response

Disagree, the provision of a fully compliant parallel diverge is not required to cater for traffic flows, for which a simple taper diverge is sufficient. The additional length mitigates for the reduced length of near-straight, such that the total length available to diverging traffic, to decelerate and adjust to the connector road/junction is at least equivalent to a simple taper arrangement.

Provision of a full parallel diverge could incur significant marginal cost as it would require more extensive works to the adjacent County Road. However it is anticipated that detail design will seek to optimise the junction and diverge arrangement, to minimise the shortfall in near straight, and may entail some adjustment to the County Road.

3.2.9 Problem 24 – A55 westbound approach to Junction 16.

Summary

Advance direction signing for the diverge at A55 junction 16 could be provided in advance of the existing diverge for the Puffin service area.

The advance direction traffic sign for the diverge at A55 junction 16 is likely to be provided in advance of the existing diverge for the Puffin service area on the A55 westbound carriageway. This could be confusing to road users and could lead to some motorists assuming that the diverge for the service area is the diverge for A55 junction 16. This could increase the potential for late braking or late lane changing manoeuvres on the approach to the service area diverge, leading to conflicts with other road users in the nearside lane of the A55 westbound carriageway.

Recommendations

It is recommended that the diverge for the Puffin service area is removed from the A55 westbound carriageway (access to/from the service area could be provided off the adjacent proposed Country Road East link road) – also see Problem 25.

Designers Response

Noted, it is intended to provide two advance direction signs on the A55 westbound carriageway in advance of the proposed J16 Diverge. One sign will be located at the start of the proposed J16 diverge lane and the second ¼ mile (402m) in advance of diverge commencement. This second sign will be located downstream of the existing Puffin services removing the potential for diverge confusion identified.

A design that provides access to Puffin Services from the proposed link road (removing existing A55 access/egress) has been explored but has not proved economically viable to date.

3.2.10 Problem 25 - A55 Westbound Carriageway between the Puffin Service Area and Junction 16.

Summary

Short weaving length between the existing service area merge and the proposed diverge at A55 junction 16.

The weaving length between the Puffin service area merge and the proposed A55 junction 16 diverge will be approximately 420m. This is significantly shorter than the mandatory minimum weaving length of 1km (1000m) on rural all-purpose roads, as stated in the DMRB document CD 122. This could increase the potential for lane changing collisions between the service area and A55 junction 16.

Recommendations

It is recommended that the merge for the Puffin service area is removed from the A55 westbound carriageway (access to the service area could be provided off the adjacent proposed Country Road East link road) – also see Problem 24.

Designers Response

Noted, the distance from the commencement of the proposed J16 diverge to termination of the existing Puffin Services Merge is approximately 430m, which is below the recommended minimum 1km weaving length.

These services are small and have a relatively small flow as will the proposed J16 diverge, so the number of merge and diverge movement within this weaving length will be low reducing the risk associated with a short weaving length.

A design that provides access to Puffin Services from the proposed link road (removing existing A55 access/egress) has been explored but has not proved economically viable to date.

3.3 Road Markings, Traffic Signs and Street Lighting

3.3.1 Problem 26 - A55 Junction 16 Westbound Off-Slip

Summary

Inadequate chevron signing on the left-hand horizontal bend on the slip road.

Only one chevron traffic sign is proposed on the outside of the left-hand bend on the A55 westbound off-slip at junction 16. This may not highlight the presence of the bend sufficiently to road users, which could increase the potential for vehicles losing control when negotiating the bend, particularly as the slip road will not be provided with a near straight downstream of the back of nose.

In addition, the chevron sign is shown to be positioned on the carriageway side of the proposed Road Restraint System (RRS) on the outside of the bend. This could increase the potential for an errant vehicle colliding with the traffic sign, which could exacerbate the collision.

Recommendations

It is recommended that further chevron traffic signs are provided on the outside of the left-hand horizontal bend on this slip road, and that these signs should be provided behind the proposed RRS (outside the working width of the safety barrier) or be passively safe.

Designers Response

Accepted, signage will be fully considered at detail design and appropriately located.

3.4 Walking, Cycling and Horse-Riding

3.4.1 Problem 27 - Conway Road / Ysguborwen Road Junction

Summary

Visibility from the proposed pedestrian crossing point could be restricted by the adjacent verge / embankments.

A pedestrian crossing facility is proposed on the Ysguborwen Road approach to the junction with Conway Road / Country Road West. The visibility along Ysguborwen Road from the proposed crossing point on the east side of the junction could be restricted by the adjacent verge / embankment and the horizontal alignment of the carriageway. This could lead to a pedestrian crossing the carriageway when a vehicle is approaching on Ysguborwen Road, leading to a collision.

In addition, the visibility from the eastern crossing point of vehicles turning left onto Ysguborwen Road from Country Road West could also be restricted by the adjacent embankment. This could lead to a pedestrian crossing the carriageway when a vehicle is turning onto Ysguborwen Road, leading to a collision.

Recommendations

It is recommended that the proposed pedestrian crossing facility on Ysguborwen Road is located in a position where adequate visibility can be provided of vehicles approaching in all directions, and in a location where the crossing will be on the desire line for pedestrians and cyclists.

Designers Response

Noted, the position of the crossing and adjacent earthworks will be finalised at Detail Design taking into consideration the concerns raised above.

3.4.2 Problem 28 - Ysguborwen Road

Summary

Lack of a proposed pedestrian crossing facility at the end of the proposed footway.

On the north side of Ysguborwen Road, in the vicinity of the junction with Conway Road / Country Road West, there will be a short section of footway. No crossing facility will be provided at the eastern end of the footway. This could lead to pedestrians crossing the carriageway where there are full height kerbs provided on both sides of the road and where appropriate visibility is not provided, which could lead to a pedestrian tripping over the kerbs or crossing the road into the path of an oncoming vehicle.

Recommendations

It is recommended that the section of footway on the north side of Ysguborwen Road (to the east of the proposed pedestrian crossing facility at the Conway Road junction) is not provided and the footway should terminate at the crossing point near the junction bellmouth.

Designers Response

Noted, the extent of footway to the north side of Ysguborwen Road will be finalised at Detail Design taking into consideration the concerns raised above.

3.4.3 Problem 29 - Conway Road to the West of A55 Junction 16.

Summary

Visibility along Conway Road from the proposed pedestrian / cycle crossing points could be restricted by stationary buses at the adjacent existing bus stops.

A new shared-use footway / cycleway route is proposed on Conway Road to the west of junction 16, which will cross the Conway Road carriageway adjacent to the Penmaenmawr Phoenix Football Club access. Bus stops in both directions are currently provided directly adjacent to the location of this crossing facility. Therefore, stationary buses at these bus stops could restrict the visibility along Conway Road in both directions from the crossing points. This could increase the potential for a pedestrian or cyclist to cross the carriageway when a vehicle is approaching, leading to a collision.

Recommendations

It is recommended that the adjacent bus stops are relocated to positions where stationary buses will not restrict the visibility from the proposed pedestrian / cycle crossing facility.

Designers Response

Noted, the position of bus stops will be finalised at Detail Design taking into consideration the concerns raised above.

3.5 Alignment

No specific road safety problems identified.

4. A55 JUNCTION 16A - DESIGNERS RESPONSE

4.1 General

4.1.1 Problem 30 - Country Road East, adjacent to Maes-Y-Llan

Summary

Potential for an errant vehicle colliding into the end of one of the proposed retaining walls.

On Country Road East, adjacent to Maes-Y-Llan, there will be retaining walls provided at chainages 70m and 150m which will be perpendicular to the carriageway. An errant vehicle leaving the carriageway on the south side could collide head-on with one of these retaining walls, increasing the severity of the incident.

Recommendations

It is recommended that the sides of these retaining walls are provided with tapers that are angled away from the carriageway, rather than at 90° to the carriageway, or alternatively the ends of the retaining walls should be protected with a suitable road restraint system.

Designers Response

Noted, appropriate road restraint to be incorporated following relevant risk assessment at detail design.

4.2 Junctions

4.2.1 Problem 31 - A55 Westbound Off-Slip at Junction 16A

Summary

Inadequate SSD to the traffic signal stopline at the end of the slip road.

The SSD along the proposed A55 westbound off-slip at junction 16A will not conform with the mandatory requirements of clause 3.33 in the DMRB document CD 122. This is in relation to the SSD along the slip road (to a 0.26m object height at the stopline at the end of the off-slip), which shall be provided for a distance in accordance with the Desirable Minimum SSD for the mainline (i.e. 295m in this location).

The proposed SSD along this slip road will be below the mainline Desirable Minimum SSD, with a minimum visibility distance of 60m. Therefore, this could increase the potential for a vehicle overshooting the stopline at the end of the off-slip (and colliding with a vehicle travelling along Country Road East) or a vehicle colliding with an object at the location of the stopline. In addition, the proposed reduced SSD could increase the potential for a vehicle colliding into the back of a queue of traffic on the slip road.

Recommendations

It is recommended that appropriate SSD is provided along the whole length of the proposed A55 westbound off-slip, particularly towards the junction at the end of the slip road where queuing vehicles may be present.

Designers Response

Agreed, the Designer has confirmed that the vertical alignment can be adjusted at detail design to ensure the requisite SSD is provided to the Stop Line.

4.2.2 Problem 32 - A55 Eastbound On-Slip at Junction 16A

Summary

Difficulties relating to the provision of a merging taper layout for maintenance vehicles to turn onto the slip road.

At the location of the merge nose for the A55 eastbound merge at junction 16A, a maintenance access is proposed on the connector road, which will be provided with a 40m long nearside merging taper adjacent to the on-slip.

The provision of a merging taper layout would result in the drivers of maintenance vehicles merging onto the connector road by looking in their mirrors to check for any vehicles approaching on the slip road whilst not providing sufficient merge length to undertake this type of manoeuvre fully. This could increase the potential for a conflict involving a merging maintenance vehicle.

The merge arrangement from the maintenance access also results in a successive merge arrangement (with the downstream merge onto the A55 in close proximity), this double merge will be a difficult manoeuvre for road users to make, particularly users of large vehicles.

Recommendations

It is recommended that this maintenance access is provided with give-way layout (rather than a merge) to allow the driver of a maintenance vehicle to clearly see whether other vehicles are approaching on the slip road. (See also Problem 34).

Designers Response

Agreed, the Designer would suggest a Give-way arrangement can be provided as road marking, rather than by way of kerbs, and reinforced by signage if necessary. This slip road does not include a hard shoulder, and in mitigation for this it is proposed to keep the immediate verge and accesses clear of signage or other features which might lead to immobilised vehicles obstructing the road.

4.2.3 Problem 33 - A55 Eastbound On-Slip at Junction 16A

Summary

Potential for maintenance vehicles to mistakenly turn right onto the A55 eastbound on-slip and come into conflict with opposing traffic on the slip road.

The proposed maintenance access on the A55 eastbound on-slip will not be provided with a splitter island (either a physical island or a road marking ghost island). This could increase the potential for a driver not being aware that they cannot turn right onto the connector road from the access, which could increase the potential for a maintenance vehicle to turn right onto the connector road where they will come into conflict with eastbound vehicles travelling towards A55 mainline.

Recommendations

It is recommended that some form of appropriate triangular splitter island is provided within the bellmouth of this access, to encourage maintenance vehicles to turn left onto the connector road when leaving the access.

Designers Response

Agreed, the Designer would suggest this can be provided as road marking, rather than by way of kerbs, and reinforced by signage if necessary. This slip road does not include a hard shoulder, and in mitigation for this it is proposed to keep the immediate verge and accesses clear of signage or other features which might lead to immobilised vehicles obstructing the road.

4.2.4 Problem 34 A55 Eastbound On-Slip at Junction 16A

Summary

Short distance between the maintenance access on the connector road and the merge layout with the A55 mainline.

The proposed maintenance access on the A55 eastbound on-slip will only be provided approximately 20m in advance of the merge onto the A55 eastbound mainline carriageway. This will only provide maintenance vehicles with a very short distance to accelerate up to a sufficient speed before merging onto the A55 mainline. This could lead to conflicts with faster vehicles on the mainline due to speed differentials between merging traffic and mainline traffic.

Recommendations

It is recommended that the proposed maintenance access is either removed or relocated further west along the connector road.

Designers Response

Disagree, it should be noted that mainline traffic will be reducing speed to 30mph (as it is at present) to negotiate the A55 headland road. Further it is proposed that the change in speed limit be moved west to avoid any confusion over the speed limits in the vicinity of this merge. In this case the merge length provided is adequate for 30mph.

Moving the access further west will incur additional cost to accommodate level differences and re-siting of other equipment.

4.2.5 Problem 35 - A55 Westbound Carriageway between Junction 16A and the Puffin Service Area

Summary

Short weaving length between the proposed A55 westbound merge at junction 16A and the existing Puffin service area diverge.

The weaving length between the proposed A55 westbound merge at junction 16A and the existing Puffin service area diverge will be approximately 100m. This is notably shorter than the mandatory minimum weaving length of 1km (1000m) on rural all-purpose roads, as stated in the DMRB document CD 122. This could increase the potential for lane changing collisions between the proposed junction and the service area.

Recommendations

It is recommended that the diverge for the Puffin service area is removed from the A55 westbound carriageway (access to the service area could be provided off the adjacent proposed Country Road East link road via the new Junction 16A).

Designers Response

Noted, the distance from the termination of the proposed J16A merge to the commencement of the existing Puffin Services diverge is approximately 100m, which is below the recommended minimum 1km weaving length and is identified as a departure in the Alignment and Junction Strategy Report, this report also acknowledges that the potential to develop a more suitable weaving arrangement between the proposed J16A WB merge and Puffin Services Merge.

Provision of a Lane Gain / Lane Drop arrangement (Figure 4/10 TD22/06) which combines the proposed J16A WB merge and Puffin Services Merge would provide a more appropriate weaving arrangement, providing a weaving length of approximately 250m. For comparison the Lane Gain / Lane Drop on the WB carriageway of the A55 at J33B has a weaving length of 260m and has considerably greater flows than expected at J16A.

A design **that provides access** to Puffin Services from the proposed link road (removing existing A55 access/egress) has been explored but has not proved economically viable to date.

4.2.6 Problem 36 A55 Eastbound Off-Slip at Junction 16A

Summary

Inappropriate merging taper layout for the proposed sewage works access located on the slip road.

An access junction for the existing sewage works is proposed on the A55 eastbound off-slip at junction 16A. This access will be provided with a short merging taper for vehicles to merge onto the slip road. The provision of a merging taper layout would result in the driver of a vehicle merging onto the connector road would need to look in their mirrors to check for any vehicles approaching on the slip road. This could increase the potential for a conflict involving a merging vehicle travelling from the sewage works and a vehicle on the slip road slowing or stopping for the traffic signals or to make the right turn at the top of the slip road.

Recommendations

It is recommended that this access is provided with give-way layout (rather than a merge) to allow the driver of a vehicle (travelling from the sewage works) to clearly see whether other vehicles are approaching on the slip road.

Designers Response

Agreed, the Designer would suggest this can be provided as road marking, rather than by way of kerbs, and reinforced by signage if necessary. This slip road does not include a hard shoulder, and in mitigation for this it is proposed to keep the immediate verge and accesses clear of signage or other features which might lead to immobilised vehicles obstructing the road.

4.2.7 Problem 37 - A55 Westbound Diverge at Junction 16A

Summary

Provision of a Type B 'Parallel Diverge' layout with inadequate geometric dimensions for the auxiliary lane.

To mitigate the lack of a near straight downstream of the back of nose on the A55 westbound off-slip at junction 16A, the designer indicates that a Type B 'Parallel Diverge' layout will be provided. However, the proposed layout of the diverge as shown on the design drawings is similar to a Type A diverge layout, rather than a Type B diverge layout. This could increase the potential for vehicles not slowing down sufficiently when diverging off the A55 westbound carriageway and losing control on the horizontal alignment of the slip road

Recommendations

It is recommended that the Type B 'Parallel Diverge' layout is provided with appropriate geometric dimensions for this type of road.

Designers Response

Noted, in order to mitigate the lack of near straight an increased length of parallel diverge can be provided. However in this instance the Designer has confirmed that a compliant arrangement can be achieved, including provision of near straight and SSD ton the stop line. This arrangement will be incorporated at Detailed Design.

4.2.8 Problem 38 - A55 Westbound and Eastbound On-Slip Merges at Junction 16A

Summary

Provision of Type B 'Parallel Merge' layouts with inadequate geometric dimensions for the auxiliary lane.

To mitigate the lack of a near straight upstream of the back of nose on the A55 westbound and eastbound on-slips at junction 16A, the designer indicates that Type B 'Parallel Merge' layouts will be provided. However, the proposed layouts of the merges as shown on the design drawings are similar to Type A merge layouts, rather than Type B merge layouts. This could increase the potential for conflicts involving merging vehicles.

Recommendations

It is recommended that the Type B merge layouts are provided with appropriate geometric dimensions for this type of road.

Designers Response

Noted, in order to mitigate the lack of near straight an increased length of parallel diverge can be provided. In this instance the Designer has confirmed that a compliant arrangement can be achieved for the westbound on-slip, including provision of near straight and SSD from the upstream junction. This arrangement will be incorporated at Detailed Design.

Similarly, the Designer has confirmed that a compliant arrangement can be achieved for the eastbound on-slip, including provision of near straight and SSD from the upstream junction. This arrangement will be incorporated at Detailed Design.

4.2.9 Problem 39 - A55 Eastbound Off-Slip Diverge at Junction 16A

Summary

Provision of a Type B 'Parallel Diverge' layout with inadequate geometric dimensions for the auxiliary lane.

To mitigate the lack of a near straight downstream of the back of nose on the A55 westbound off-slip at junction 16, a Type B 'Parallel Diverge' layout will be provided. However, the length of the proposed auxiliary lane (including the auxiliary lane taper) will be approximately 150m. This is less than the mandatory minimum length of 225m for an auxiliary lane (including auxiliary lane taper) at a diverge on a rural all-purpose 120 kph road, as stated in the DMRB document CD 122.

This could increase the potential for vehicles not slowing down sufficiently when diverging off the A55 westbound carriageway and losing control on the proposed left-hand horizontal bend on the slip road.

Recommendations

It is recommended that the Type B 'Parallel Diverge' layout is provided with appropriate geometric dimensions for this type of road.

Designers Response

Disagree, the provision of a fully compliant parallel diverge is not required to cater for traffic flows, which are low, and for which a simple taper diverge is sufficient. The additional length mitigates for the reduced length of near-straight and presence of Welsh Water access, such that the total length available to diverging traffic, to decelerate and adjust to the connector road/junction is at least equivalent to a simple taper arrangement.

Provision of a full parallel diverge length could incur significant marginal cost as it would require more extensive works to the adjacent cycleway in an area which is constrained by the presence of the railway. However, it is anticipated that detail design will seek to optimise the junction and diverge arrangement, to minimise the shortfall in near straight.

4.2.10 Problem 40 - Country Road East

Summary

Potentially inappropriate location for a pedestrian / cycle crossing facility.

Drawing number A55J15J16-RAM-93-16-DR-J-0044 (revision P01) indicates that a new shared-use footway / cycleway facility will cross the proposed Country Road East at Chainage 180m, just to the east of a horizontal bend in the carriageway (with a 90m radius).

If a crossing facility is provided in this location, the visibility westwards along the road could be restricted by the horizontal alignment of the carriageway / verge and embankment, as well as the adjacent proposed retaining walls on the south side of the carriageway. This could increase the potential for a pedestrian or cyclist crossing the carriageway when a vehicle is approaching from the west, leading to a collision.

It is noted that drawing number A55J15J16-RAM-93-16-DR-J-0044 also shows that a pedestrian crossing facility will be provided on Country Road East at Chainage 220m, although it is unclear whether this will be a traffic signal controlled or uncontrolled crossing facility.

Recommendations

It is recommended that a pedestrian / cycle crossing facility on this section of Country Road East is provided at a location where appropriate visibility of vehicles approaching in both directions can be provided from both crossing points.

Designers Response

Noted, the exact location of the crossing will be finalised as part of Detail Design taking into consideration the concerns raised.

4.2.11 Problem 41- Sewage Works Access on the A55 Eastbound Off-Slip at Junction 16A

Summary

Potentially inadequate visibility along the sewage works access road for pedestrians and cyclists.

A shared-use footway / cycleway route currently crosses the existing sewage works access road. The layout of the shared-use route is proposed to be amended as part of the scheme works. Therefore, the visibility northwards along the sewage access road from the crossing points could be restricted by the existing bridge parapets for the bridge over the adjacent railway. This could result in a pedestrian or cyclist crossing the access road when a vehicle is approaching from the sewage works, potentially leading to a collision.

Recommendations

It is recommended that appropriate visibility along the sewage works access road is provided at both crossing points on either side of the access road.

Designers Response

Disagree, the access is used by a very low number of vehicles, which would be apparent to cyclists and walker over the top of bridge parapets. The removal of vegetation on approach to the bridge and provision of signage, markings is considered adequate mitigation. Realignment of the cycleway and/or modification of the bridge parapets are not considered justifiable.

4.3 Alignment

4.3.1 Problem 42 - Country Road East Exit from A55 Junction 16A

Summary

Potential for vehicles to lose control when negotiating the proposed horizontal bend in the carriageway with a 50m radius.

On the Country Road East exit from A55 junction 16A there will be a horizontal bend in the carriageway with a 50m radius. Road users who have just left the high speed A55 trunk road may negotiate this bend in the carriageway at inappropriate speeds, if they do not appreciate the significant horizontal radius on the bend, which could lead to vehicles losing control.

Recommendations

It is recommended that chevron traffic signs are provided on the outside of this horizontal bend in the carriageway.

Designers Response

Agreed, appropriate signage and markings to be incorporated at Detail Design Stage.

4.3.2 Problem 43 - Country Road East Exit from A55 Junction 16A

Summary

Lack of advance warning to road users in relation to the series of horizontal bends in the carriageway after exiting A55 junction 16A.

On the Country Road East exit from A55 junction 16A there are three successive horizontal bends in the carriageway. No advance warning traffic signs are proposed to warn road users of this layout, which could increase the potential for a vehicle losing control when negotiating these bends.

Recommendations

It is recommended that a 'Series of Bends Ahead' advance warning traffic sign (to TSRGD diagram number 513) is provided on the Country Road East exit from A55 junction 16A.

Designers Response

Agreed, appropriate signage and markings to be incorporated at Detail Design Stage.

4.3.3 Problem 44 - Glan-Yr-Afon Road

Summary

Incorrect advance warning sign for the junction layout downstream.

On the northbound Glan-Yr-Afon Road approach to the junction with Country Road East, an advance warning traffic sign to TSRGD diagram number 505.1 will be provided. This type of traffic sign is incorrect as it should only be used when approaching a junction where the left turn movement does not have to give way to traffic approaching from the right. This could lead to a vehicle turning left at the junction without stopping or slowing down, and being struck by a vehicle travelling westbound along Country Road East.

Recommendations

It is recommended that this traffic sign is replaced with an advance 'Give Way' traffic sign to TSRGD diagram number 501.

Designers Response

[Agreed, appropriate signage and markings to be incorporated at Detail Design Stage.](#)

4.4 Road Markings, Traffic Signs and Street Lighting

4.4.1 Problem 45 - Country Road East Northbound Approach to A55 Junction 16A

Summary

Proposed traffic sign could obstruct the SSD to the junction.

Drawing number A55J15J16-RAM-93-16-DR-J-0049 (revision P01) shows that a traffic sign with two posts will be provided on the west side of the Country Road East approach to A55 junction 16A. It is unclear what type of traffic sign will be provided in this location. The sign could restrict the SSD to the junction / traffic signals on this approach, which has a significant left-hand horizontal bend when approaching the stopline. This could increase the potential for a vehicle colliding into the rear of another vehicle waiting at the stopline or road users failing to stop at a red traffic signal.

Recommendations

It is recommended that any traffic signs provided on the Country Road East approach to the A55 junction 16A are located where they will not obstruct the forward visibility to the junction.

Designers Response

[Agreed, appropriately located signage to be incorporated at Detail Design Stage.](#)

4.4.2 Problem 46 - A55 Westbound Approach to Junction 16A

Summary

Difficulties providing appropriate advance signing for the proposed diverge at junction 16A within the adjacent tunnel.

The proposed westbound diverge at A55 junction 16A will be located approximately 200m downstream of the existing tunnel portal on the A55 westbound carriageway. Therefore, the advance direction signing for the diverge will need to be provided within the tunnel, which will be difficult due to the constraint of the cross-section in the tunnel and various equipment already provided in the tunnel.

If the first advance direction sign for the diverge is provided on the verge adjacent to the exit from the tunnel, this will not provide sufficient advance warning for the junction. Consequently, this could result in conflicts involving vehicles making late lane changing manoeuvres to diverge off the mainline carriageway.

Recommendations

It is recommended that appropriate advance direction signing for the diverge is provided on the A55 westbound approach to junction 16A.

Designers Response

Agreed, appropriately located signage to be incorporated on the westbound approach to Junction 16A at Detail Design Stage.

4.4.3 Problem 47 -A55 Westbound Approach to the Puffin Service Area

Summary

Inadequate advance signing for the service area.

An advance traffic sign is currently provided just before the existing A55 westbound diverge at junction 16A, where the new diverge layout will be located. It is unclear where the advance signing for the service area will be provided. If the signs will be positioned too close to the service area diverge, this could result in conflicts involving vehicles making late lane changing manoeuvres to diverge off the mainline carriageway into the service area.

Recommendations

It is recommended that appropriate advance direction signing for the service area diverge is provided on the A55 westbound carriageway. Alternatively, in accordance with Problems 24 and 25, it is recommended that the Puffin service area diverge / merge on the A55 westbound carriageway is closed.

Designers Response

Agreed, appropriately located signage to be incorporated on the westbound approach to Puffin Services, and to avoid any confusion with junction 16A diverge.

A design that provides access to Puffin Services from the proposed link road (removing existing A55 access/egress) has been explored but has not proved economically viable to date.

4.4.4 Problem 48 - Country Road East, just to the West of the Puffin Service Area

Summary

Inappropriate locations of the proposed chevron traffic sign and the 'Series of Bends Ahead' advance warning sign.

The section of Country Road East, just to the west of the Puffin service area, will have a horizontal bend in the carriageway with a 90m radius. The proposed chevron traffic sign on the outside of this bend (facing west) will be positioned where road users approaching from the west may not clearly see the sign in front of them.

In addition, the proposed 'Series of Bends Ahead' advance warning traffic sign (to TSRGD diagram number 513) on the eastbound approach to the bend will be located only 25m in advance of the right-hand horizontal bend in the carriageway (and the proposed sign plate shows that a left-hand bend will be encountered first by eastbound road users).

Therefore, these traffic signs may not provide road users with sufficient advance warning of this bend in the carriageway, which could increase the potential for a vehicle losing control on the bend.

Recommendations

It is recommended that the chevron sign is positioned where it will be clearly visible to road users approaching the bend from the west, and that the proposed 'Series of Bends Ahead' traffic sign is located at an appropriate distance on the eastbound approach in advance of the first bend in the carriageway (and shows the correct layout of the bends downstream on the eastbound carriageway).

Designers Response

Agreed, appropriately located signage to be incorporated at Detail Design Stage.