M5 Junction 10 Improvements Scheme

Transport Assessment

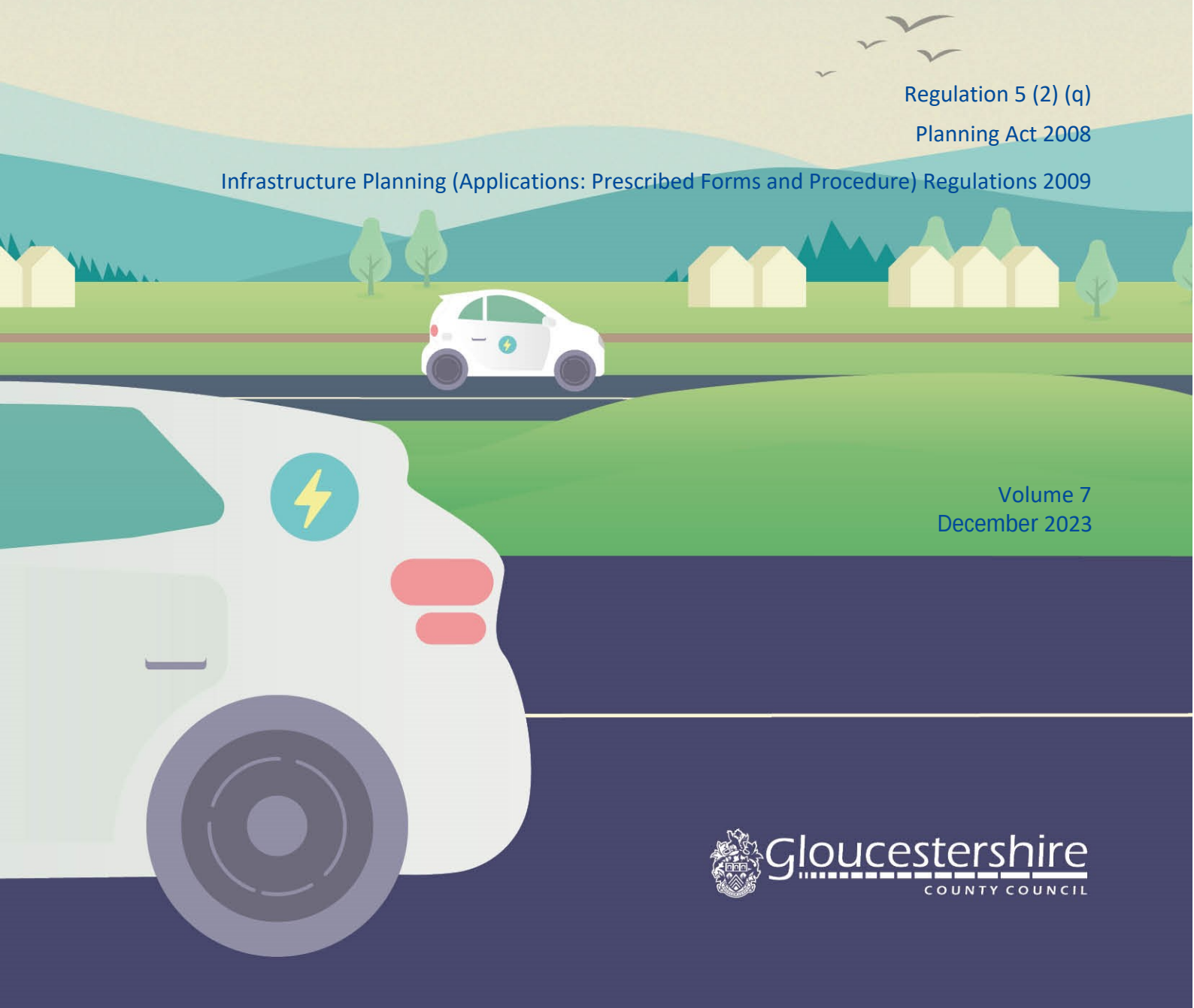
Appendix I - WCHAR

TR010063 APP 7.5

Regulation 5 (2) (q)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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Gloucestershire COUNTY COUNCIL

Infrastructure Planning
Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

M5 Junction 10 Improvements Scheme

Development Consent Order 202[x]

7.5 Transport Assessment
Appendix I – WCHAR

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Planning Inspectorate Scheme Reference	TR010063
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Author:	M5 Junction 10 Improvements Scheme Project Team

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M5 Junction 10 Improvements Scheme

GG 142 WCHAR Preliminary Design Review Report

Date: 26/05/23

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Gloucestershire COUNTY COUNCIL

Notice

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This document has 54 pages including the cover.

Document history

Revision	Status	Purpose description	Originated	Checked	Reviewed	Authorised	Date
C03	A1	Design Fix 3 - Final	RFH	SM	CCR	BM	26/05/23
C02	A1	Design Fix 3 – Final	RFH	SM	CCR	BM	01/03/23
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Client signoff

Client	**Gloucestershire County Council**
Project	**M5 Junction 10 Improvements Scheme**
Job number	**5197035**
Client signature / date	

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1 Introduction

1.1 Background

1.1.1 This review report has been produced as part of the GG 142 Walking, cycling and horse-riding assessment and review (WCHAR) process for Gloucestershire County Council (GCC) to inform the options for improvement along the A4019 corridor, including:

- M5 Junction 10;
- Widening the A4019 from west of Gallagher Retail Park to M5 Junction 10; and
- Construction of a West Cheltenham Link Road (WCLR) from the A4019 to the B4634.

1.1.2 The assessment that preceded this preliminary design review also included improvements to the signal-controlled junction of the A38 and A4019 at Coombe Hill, to the north-west of M5 Junction 10. That element of the scheme is now being progressed separately and is the subject of another preliminary design review report. Therefore the scheme extent has reduced, although the Lead Assessor has judged that the scheme remains a 'large scheme' in the context of GG 142 and there has been no material change to the study area. The overall scheme extents are shown in Figure 1-1.

1.1.3 This report has been produced in accordance with the requirements set out in the Design Manual for Roads and Bridges (DMRB) 'GG 142 Walking, cycling and horse-riding assessment and review'. Whilst the majority of the scheme is not on the trunk road and motorway network M5 Junction 10 provides the interface with the M5 and therefore this report has been prepared to be a compliant preliminary design review report.

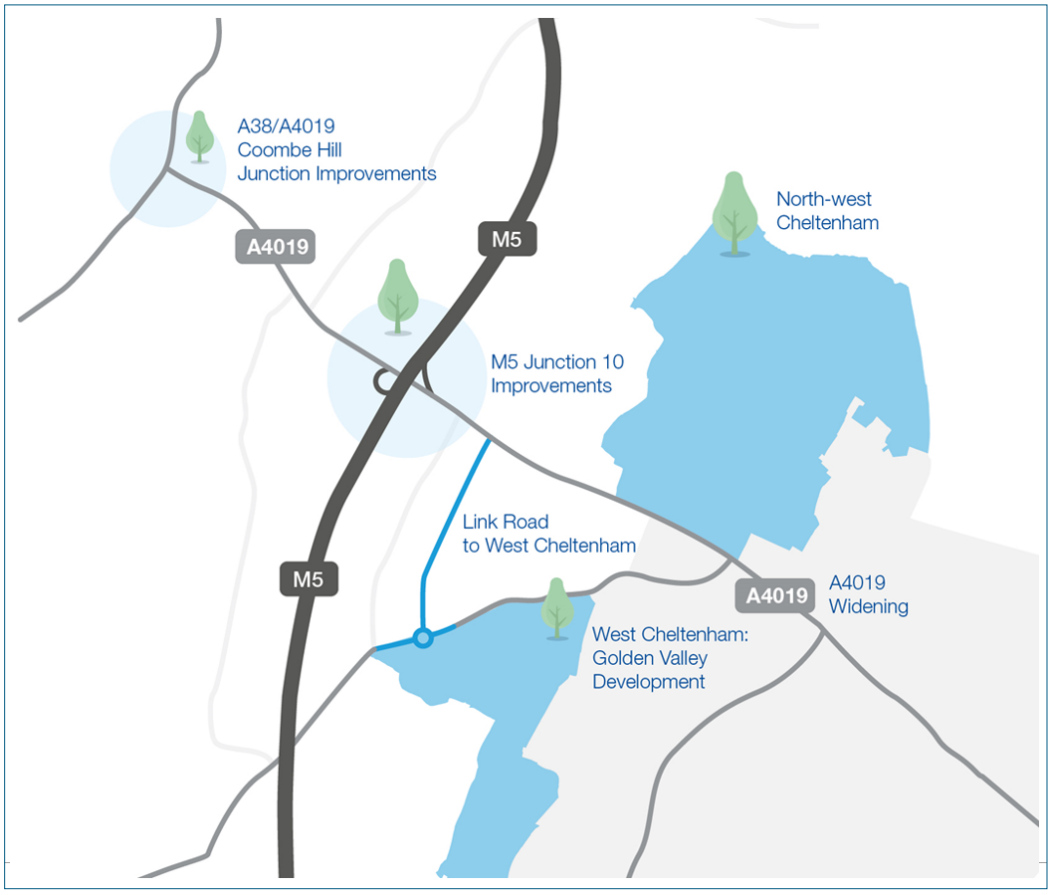

Figure 1-1 - General Scheme Extents

1.2 Proposed Highway Scheme

1.2.1 In the coming years M5 Junction 10 will serve a number of planned, large developments in west and north-west Cheltenham. To support the associated housing and employment, a highways network – including walking and cycling infrastructure – is needed that has the capacity to accommodate the increased traffic the developments will generate. Traffic modelling has indicated that without planned improvements associated with the M5 Junction 10 Scheme the local road network will become more congested resulting in significant journey time delays and associated environmental issues.

1.2.2 Improvements to Junction 10 have also been identified as a key infrastructure requirement to enable the housing and economic development proposed in the LEP Strategic Economic Plan and is central to the transport network sought by the Council in the current Local Transport Plan.

1.2.3 The infrastructure works under consideration in this review comprise the following main elements which are, or are related to, changes to the strategic road network and together make up the Scheme:

- An all-movements junction at M5 Junction 10 (Scheme Element 1).
- A new West Cheltenham Link Road east of Junction 10 from the A4019 to the B4634 (Scheme Element 2).
- Widening of the A4019 to the east of Junction 10, including a bus lane on the A4019 eastbound carriageway from the West Cheltenham Fire Station to the Gallagher Junction (Scheme Element 3).

1.2.4 An important part of the increasing the capacity of Junction 10 is increasing the capacity of the local road network. Extending the dual carriageway from the Gallagher Retail Park to the upgraded Junction 10 is a fundamental part of the local road network improvements and therefore included as part of the overall Junction 10 improvements. There is a general rule that multi-modal streets have a higher capacity than those dominated by vehicles and thus the scheme is unlikely to be a success if its design is solely determined by forecast vehicle flows. In addition, an improved layout of the A38/A4019 Coombe Hill signal-controlled junction together with a new link between A4019 and B4634 – running parallel to the route of the existing Withybridge Lane – are also included in the proposals.

1.2.5 In March/April 2023 an inbound/eastbound bus lane was added along part of the A4019 to the east of Junction 10. This review report has been updated to take account of this design change.

1.3 Review Team

1.3.1 The designer for this scheme is Atkins Transportation. Chris Roberts is the design team leader for the scheme and has appointed the following Lead Assessor to undertake the walking, cycling and horse-riding review process:

Lead Assessor:

Rob Hunt *BEng, MSc (Eng), CEng, MICE, FCIHT, FSoRSA*

Managing Consultant, Atkins Transportation

1.3.2 In accordance with GG 142, Rob has conducted a review at the start of preliminary design and has concluded the original decision to categorise the scheme as a ‘large scheme’ in relation to the potential impact on walking, cycling and horse-riding is still valid. Rob has appointed John Lynn and Callan Burchell as additional assessors. Rob has judged that John and Callan have the appropriate previous experience to undertake the delegated tasks.

1.4 WCHAR Study Area

1.4.1 As the scheme has been determined by the Lead Assessor as a large scheme, GG 142 indicates the study area should typically be a 5km radius from the centre of the scheme area. However, as the scheme area is of considerable size and already has a radius of approximately 2.5km, a larger study area of approximately 7.5km has been selected. This is considered the core study area; however, proportionality is applied on the level of detail that is required for each aspect within the study area such that only information relevant to the scheme is collated and examined.

1.4.2 The indicative study area for the proposed scheme is shown in Figure 1-2 which indicates the wider study area that is relevant to this scheme within which key trip attractors and generators, and strategic links will be considered. This covers the majority of Cheltenham, including the town centre. However, it should be noted that parts of the town not closely associated with the scheme extents will need to be considered in much less detail.

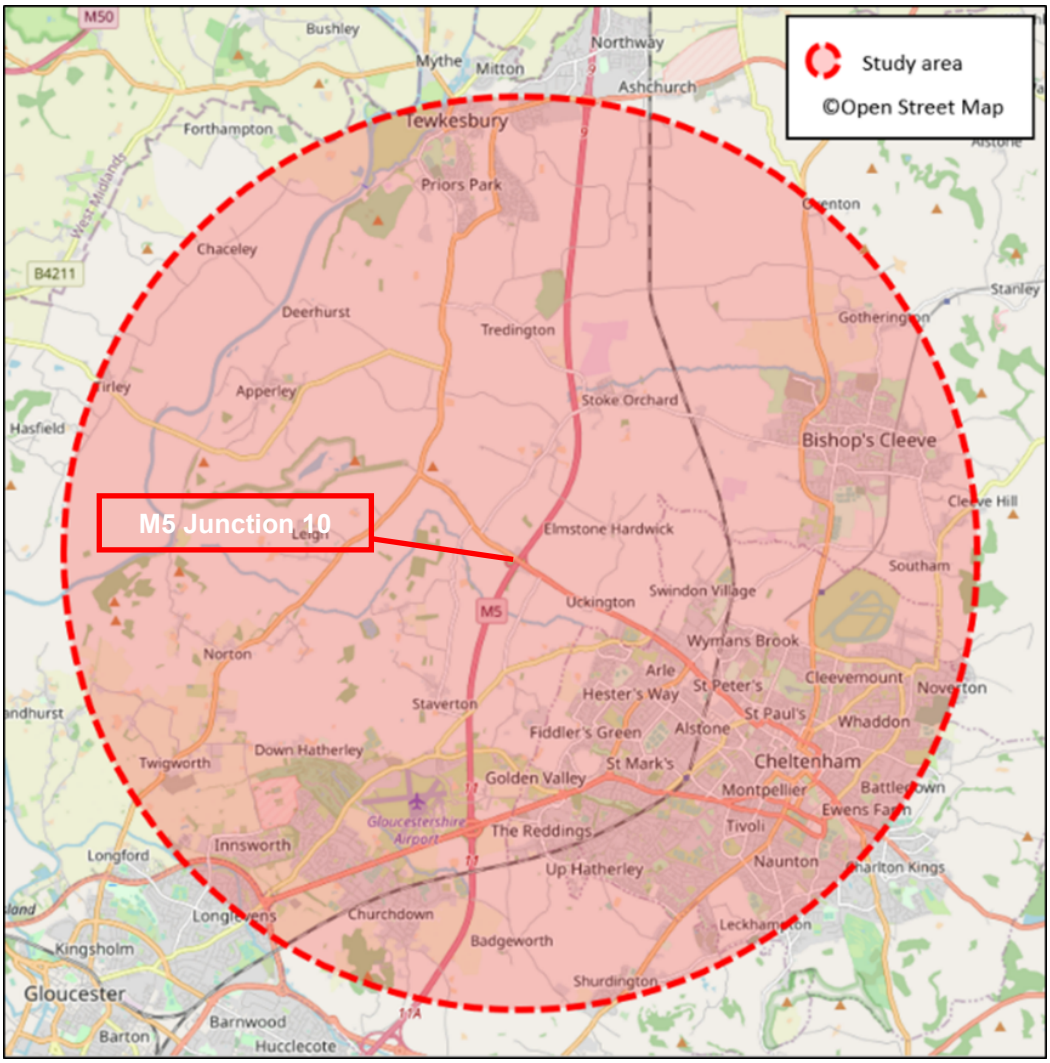

Figure 1-2 - Approximate 5km 'Large Scheme' Wider Study Area

2 Review of Walking, Cycling & Horse-Riding Assessment Opportunities

2.1 Introduction

2.1.1 Based on findings from the site visit and desktop research, the following opportunities to be considered at the scheme design stage have been recommended. The original assessment phase opportunities have been repeated here verbatim with review phase 'Action Taken/Outcome' added as responses in italics.

2.1.2 It must be stressed at this point that GG 142 encourages the identification of opportunities that are associated with the scheme but which may not be within the geographical scope of the works and thus it may not be possible to look to deliver some opportunities within the proposals. However, the identification of these further opportunities is intended to allow them to be highlighted for consideration in future works.

2.1.3 Any assessment opportunities relating to Coombe Hill have been excluded from this report due to that element of the original scheme being progressed separately.

2.2 Strategic opportunities

Opportunity 1 – Encourage Walking and Cycling

2.2.1 Improved facilities to encourage more walking and cycling in and around north-west Cheltenham has been a key feature of many policy documents.

Action Taken/Outcome:

2.2.2 The scheme is including walking and cycling facilities within the scheme extents, specifically alongside the A4019 from the eastern scheme extent towards Cheltenham as well as across M5 Junction 10 as far as the western scheme extent. In addition, the scheme will include facilities alongside the WCLR from the A4019 to the B4364 to the south.

2.2.3 A separate feasibility study has examined the potential for a link to continue alongside the A4019 to the west as far as the A38 at the Coombe Hill junction (Atkins document reference number GCCM5J10-ATK-HGN-L1-RP-CH-000001).

Opportunity 2 - Bring forward GCC's ambitions for route upgrades to create a cohesive cycle network

2.2.4 In keeping with GCC's 'Travel by-cycle around Gloucestershire' document published in Autumn 2019 which sets out the Council's commitment to improving its cycle network, a package of improvements is under development to make it easier to cycle across the county. The scheme is in close proximity to the route between Gloucester and Cheltenham, linking the primary areas of growth. The identified cycle desire lines pass around the scheme extents but within the wider scheme area.

2.2.5 There is also a key opportunity to create coherent and continuous links for pedestrians, cyclists and equestrians where there are interfaces with the Elms Park development.

Action Taken/Outcome:

2.2.6 The pedestrian and cyclist facilities alongside the A4019 are intended to dovetail with the changes proposed as part of the Elms Park development as well as acknowledging the Cheltenham and Gloucester Local Cycling and Walking Infrastructure Plan (LCWIP). The proposed pedestrian/cycle link alongside the WCLR would connect to the B4634 to the south which, in turn, may then in the future connect to the Gloucester-Cheltenham link along the B4063.

Opportunity 3 – Improved Signing

2.2.7 Continuity of existing pedestrian/cycle provision to include improved wayfinding signs that will identify travel time and distance to key attractors, such as the rail station and town centre. This is only likely to be successful if it is combined with signs for the entire routes to the destinations.

Action Taken/Outcome:

2.2.8 Wayfinding sign strategy and details are expected to form part of the detailed design process. This should include contact with the appropriate officers within GCC to understand how suitable signs could be included and which key messages would need to be communicated to users. Since this opportunity was raised LTN 1/20 has stated that time and distance should not be included on the same sign and therefore the proposals would be in accordance with LTN 1/20 guidance.

Opportunity 4 – Cheltenham-wide improvements to pedestrian and cyclist facilities

2.2.9 The large number of personal injury collisions involving pedestrians and cyclists in the wider Cheltenham urban area indicates there is an opportunity to improve facilities throughout the town despite it lying outside the geographical scope of this scheme. It is understood that GCC has a significant array of proposals for such improvements to the network and thus it is hoped that this opportunity will be addressed in the future. With regard to the M5 Junction 10 Improvement scheme, the key routes for improvement would be those that directly connect to the scheme extents and carry cyclists to key destinations such as the town centre, GCHQ and other key areas of employment.

Action Taken/Outcome:

2.2.10 This opportunity lies outside the geographical scope of the scheme but, given the intended pedestrian/cyclist facilities in the scheme, it is believed that the scheme will deliver a net benefit for these users. GCC is understood to be currently pursuing a number of opportunities to improve facilities for pedestrians and cyclists within Cheltenham that would be expected to help address the historical collision record.

2.3 Individual User Groups (and combined opportunities)

Pedestrians

Opportunity 5 – Improved crossing facilities along the A4019

2.3.1 Improve the crossing facilities along the A4019, particularly at bus stops and at side roads; this opportunity is supported by the four PICs that involved pedestrians crossing the A4019. One of the collisions recorded in the five-year period involved a pedestrian who was crossing the A4019 having just disembarked from a bus. A signal-controlled crossing in Uckington would help reduce the severance that would be expected to be exacerbated by the proposed dual carriageway. A crossing catering for pedestrian movements at the Withbridge Lane junction would cater for users at the bus stops as well as those following the bridleway.

Action Taken/Outcome:

2.3.2 Formal crossing points have been identified along the A4019, primarily associated with bus stops, junctions and rights of way that interface with the highway. To the west of Withybridge Lane an underpass is proposed to provide a grade separated route linking Withybridge Lane and Bridleway AUC1 connecting to Elmstone Hardwicke. At the A4019/WCLR junction a signal-controlled crossing (parallel pedestrian/cyclist) is proposed as part of the junction signalisation. At Uckington where a signal-controlled junction is proposed with The Green and Moat Lane the junction operation will include pedestrian crossing facilities.

Opportunity 6 – Improve the provision for pedestrians alongside the A4019

2.3.3 There is a significant opportunity to improve pedestrian facilities. For example, the gap in pedestrian provision at Junction 10 could be improved by signal-controlled crossings of the proposed slip roads to improve provision. Further, there are currently issues identified with limited width of the existing footway, its separation from traffic, as well as the absence of street lighting and lack of locations for rest/shelter. These problems, alongside the limited crossing facilities of side roads, accesses and the A4019 carriageway present a number of opportunities to improve pedestrian provision.

2.3.4 These improvements are promoted for the entire length of the A4019 from Coombe Hill to the junction with the B4634 with the outcome that a continuous high-quality facility can be introduced to avoid a sudden drop in provision at the scheme extents.

Action Taken/Outcome:

2.3.5 A high-quality pedestrian route is planned alongside the A4019 for the entire length of the scheme extent; this would not only provide crossing facilities at M5 Junction 10 – either grade separated or under signal control – but would also provide crossings under signal control at the WCLR junction, at Uckington, an access to the Elms Park development and the Gallagher Retail Park junction. The design would meet or exceed current DMRB standards for pedestrian (or shared) facilities.

2.3.6 A feasibility study is being progressed to explore the possibility of providing an onward pedestrian/cyclist facility alongside the A4019 to the A38/A4019 junction at Coombe Hill.

Opportunity 7 – Improve the crossing facilities for pedestrians at the Coombe Hill junction

Action Taken/Outcome:

2.3.7 Not relevant to this review report as the Coombe Hill junction now lies outside the geographical scope of this scheme and is subject to a separate project.

Opportunity 8 – Provide pedestrian facilities at all other elements of the scheme

2.3.8 There is an opportunity to provide new pedestrian facilities along the WCLR and improve connectivity to existing pedestrian facilities at all junctions and PRoWs. There is an opportunity to create a Quiet Lane on Withybridge Lane once the new WCLR is constructed and this should be designed for the benefit of pedestrians, cyclists and equestrians. Further consideration will be required when deciding upon a facility alongside the WCLR or the use of Withybridge Lane as a traffic free green lane. A separate traffic free route would be appealing to many users during daylight hours but a route alongside a carriageway may be more appealing to users during the hours of darkness when there is an element of natural surveillance to assist with personal safety.

2.3.9 The Cheltenham Circular leisure walking route crosses the A4019 at Uckington and follows public footpaths. This route should be safeguarded and improved where possible to provide improved access for pedestrians of all levels of mobility.

Action Taken/Outcome:

2.3.10 A pedestrian/cyclist facility is included in the preliminary design for the WCLR and improved connections to existing junctions and public rights of way are also included in the overall scheme design. A proposal for a quiet lane on Withybridge Lane has been assessed but is no longer being considered due to forecast traffic flows that would appear to be too high for use as a quiet lane.

Opportunity 9 – Provide/improve pedestrian facilities on connecting links

2.3.11 There is an opportunity to provide new or improved pedestrian facilities on the A38, the B4634 and other connecting links within Cheltenham at the east end of the proposed A4019 dualling and past the Gallagher Retail Park frontage. Uckington Parish Council also promoted the idea of a footway running the length of New Road covering The Green, The Orchard and Elmstone Hardwicke Lane and this should be given consideration if it can be accommodated as part of the scheme.

Action Taken/Outcome:

2.3.12 The opportunities raised fall outside the geographical scope of the scheme but it has been confirmed that many of these form part of wider GCC aspirations for the improvement of pedestrian facilities throughout the county. Where these interface with the scheme the design accommodates any existing or possible future provision where possible.

Cyclists

Opportunity 10 – To amend the road layout and provide facilities for cyclists on the A4019 corridor and, specifically, at M5 Junction 10

2.3.13 Two collisions recorded in the five-year period involved Cheltenham-bound cyclists on the A4019 being struck by a vehicle merging from the M5 J10 southbound diverge. One of the PICs resulted in a serious injury and one resulted in a slight injury to the cyclist. In the collision of serious severity, it was noted that the cyclist was wearing dark clothes and had a poor rear light; in the slight injury PIC the driver was recorded as having been affected by a low sun. These two collisions appear to highlight an opportunity to amend this road layout and provide clear facilities for the use of cyclists to negotiate traffic exiting the motorway.

2.3.14 LTN 1/20 Cycle Infrastructure Design places significant onus upon scheme designers to adequately provide for cycling with dedicated facilities. The foreword says: “Cycling must no longer be treated as marginal, or an afterthought. It must not be seen as mainly part of the leisure industry, but as a means of everyday transport. It must be placed at the heart of the transport network, with the capital spending, road space and traffic planners’ attention befitting that role”.

2.3.15 The opportunities noted below would appear to fit with the new national guidance (some of which appears to be written as requirements).

2.3.16 Cycle facilities physically segregated from motor traffic should be provided along the entire A4019 corridor from Coombe Hill and past the Gallagher Retail Park. This will require consideration whether provision is made on one or both sides of the corridor. Along this route the main challenge (of many) to route continuation is likely to be the Junction 10 slip roads and signal-controlled crossings of these – separate but alongside signal-controlled pedestrian crossings – is seen as imperative to providing a safe and attractive route.

2.3.17 Further to the item raised above, the onward route into the town centre is likely to be one of the key routes for cyclists travelling through the scheme and thus improvements to that route are key to the success of the M5 Junction 10 Improvement scheme.

2.3.18 LTN 1/20 indicates that bi-directional facilities should be 3-4m wide “depending on cycle flows”.

2.3.19 Cycle facilities should form a fully-connected network and link with any existing or planned future facilities, many of which currently cause difficulties for cyclists in their onward journeys.

2.3.20 In the urban fringe of Cheltenham the cycle facilities should be segregated from any pedestrian facilities on links as well as at junctions.

2.3.21 Segregated cycle facilities along the WCLR with connections to the residential areas on the western fringe, NCN Route 41 and other facilities wherever possible.

2.3.22 Withybridge Lane converted to a quiet lane with additional facilities provided on the B4634 between Withybridge Lane and the proposed cycle facility on the B4063.

2.3.23 Segregated cycle facilities on the connecting routes such as the A4019 towards Cheltenham town centre, the A38 to the north and south of the Coombe Hill junction and Princess Elizabeth Way. These routes are critical to the success of facilities within the scheme extent as they are likely to be the onward routes for most cyclists on the A4019.

2.3.24 Segregated crossing facilities at junctions throughout the scheme extents such as signal-controlled junctions at Coombe Hill and the B4634, the roundabouts at M5 Junction 10 and WCLR and the northern end of Withybridge Lane.

2.3.25 High quality direction and route designation signing for cyclists.

2.3.26 Connections to other facilities for use by cyclists such as bridleways or cycleways away from the carriageway should not have physical access barriers.

Action Taken/Outcome:

2.3.27 There are a number of opportunities brought together and the following actions relate to Opportunity 10.

2.3.28 Opportunity 10 is being designed in accordance with DMRB design standards which includes the requirements for cycling facilities included in CD 143 and CD 195. The guidance provided in LTN 1/20 is also being followed wherever this can be achieved.

2.3.29 In addition, there are a number of options that were considered to safely allow cyclists to cross the M5 at Junction 10, either under signal control or grade separated from traffic. In addition, facilities for cyclists have been included alongside the A4019 for the entire extent of the scheme as well as alongside the WCLR. Meanwhile, connections to other existing or planned cycling facilities at the scheme extents have been provided where possible and, where these are public rights of way, there will be no physical barriers to access.

2.3.30 A feasibility study investigated the possibility of providing an onward route for cyclists (and pedestrians) alongside the A4019 as far as the A38 at Coombe Hill. In addition, a strategy should be devised at detailed design to provide clear wayfinding signs for users that are consistent in style and message with other wayfinding signs in the area.

Opportunity 11 – Improved crossing facilities along the A4019

2.3.31 Improve the crossing facilities along the A4019, particularly at Withbridge Lane junction to allow cyclists to access Withybridge Lane and the bridleway opposite without coming into conflict with traffic on the dual carriageway.

Action Taken/Outcome:

2.3.32 Formal crossing points have been identified along the A4019, primarily associated with bus stops, junctions and rights of way that interface with the highway. To the west of Withybridge Lane an underpass is proposed to provide a grade separated route linking Withybridge Lane and Bridleway AUC1 connecting to Elmstone Hardwicke. At the A4019/WCLR junction a signal-controlled crossing is proposed as part of the junction signalisation.

Opportunity 12 – Introduce provision for cyclists alongside the A4019

2.3.33 There is a significant opportunity to improve the provision for cyclists due to the lack of facilities along the A4019, the limited crossing opportunities along the side roads and access to the A4019 carriageway itself. There is also severance created by Junction 10 which could be improved by signal-controlled crossings of the proposed slip roads

2.3.34 These improvements are promoted for the entire length of the A4019 from Coombe Hill to the junction with the B4634 with the outcome that a continuous high-quality facility can be introduced to avoid a sudden drop in provision at the scheme extents. Ideally these should be segregated off-carriageway facilities.

Action Taken/Outcome:

2.3.35 A high-quality cycling route is planned alongside the A4019 for the entire length of the scheme extent; this would not only provide crossing facilities of M5 Junction 10 – either grade separated or under signal control – but would also provide crossings under signal control at the WCLR junction and at Uckington. The design would meet current DMRB standards for cycling (or shared) facilities and Local Transport Note (LTN) 1/20 Cycling Infrastructure Design.

2.3.36 A feasibility study has been prepared to explore the possibility of providing an onward pedestrian/cyclist facility alongside the A4019 to the A38/A4019 junction at Coombe Hill.

Opportunity 13 – Improve the crossing facilities for cyclists at the Coombe Hill junction

Action Taken/Outcome:

2.3.37 Not relevant to this review report as this part of the scheme is being progressed separately.

Opportunity 14 – Provide cycling facilities at all other elements of the scheme

2.3.38 There is an opportunity to provide new cycling facilities along the WCLR and improve connectivity to existing facilities at all junctions and PRoWs that allow for cyclists. There is an opportunity to create a Quiet Lane on Withybridge Lane once the new WCLR is constructed and this should be designed for the benefit of pedestrians, cyclists and equestrians. Further consideration will be required when deciding upon a facility alongside the WCLR or the use of Withybridge Lane as a traffic free green lane. A separate traffic free route would be appealing to many users during daylight hours but a route alongside a carriageway may be more appealing to users during the hours of darkness when there is an element of natural surveillance to assist with personal safety.

Action Taken/Outcome:

2.3.39 A pedestrian/cyclist facility is included in the preliminary design for the WCLR and improved connections to existing junctions and public rights of way are also included in the overall scheme design. A proposal for a quiet lane on Withybridge Lane has been assessed but is no longer being considered due to forecast traffic flows that would appear to be too high for use as a quiet lane.

Opportunity 15 – Provide/improve cycling facilities on connecting links

2.3.40 There is an opportunity to provide new or improved cyclist facilities on the A38, the B4634 and other connecting links within Cheltenham at the east end of the proposed A4019 dualling and past the Gallagher Retail Park frontage. Ideally these should be segregated off-carriageway facilities but it is acknowledged this is unlikely to be possible in many locations. It is important that where a facility has to end due to constraints, there is a clear and safe transition.

Action Taken/Outcome:

2.3.41 The opportunities raised fall outside the geographical scope of the scheme but it has been confirmed that many of these form part of wider GCC aspirations for the improvement of cycling facilities throughout the county. Where these interface with the scheme the design will accommodate any existing or possible future provision where possible.

Opportunity 16 – Improving the cycling network to the north of the A4019 connecting villages and the wider countryside

2.3.42 Stakeholder liaison has helped highlight the importance of cycling routes to the settlements to the north of the A4019. At this stage the initial options would appear to be either discouraging traffic from using certain roads to make them more appealing and safer for cyclists or to improve the quality of existing off-carriageway PRoWs.

Action Taken/Outcome:

2.3.43 No further action has been taken on this opportunity as part of the design process as it lies outside the geographical extent of the scheme and thus could affect the planning process for the scheme. However, GCC are aware of this opportunity and it may be progressed separately.

Equestrians

Opportunity 17 – Improving the network of facilities available to equestrians to the north of the A4019

2.3.44 The existing equestrian provision to the north of the A4019 includes a number of bridleways as well as a stable, although these routes are disjointed and do not form a cohesive network. Improvements to the network of equestrian facilities at this location would improve connectivity between villages and the wider countryside. This should include improvements to the route and connections of the bridleway that commences opposite the northern end of Withybridge Lane. A crossing designed to accommodate equestrians crossing the A4019 between Withybridge Lane and the bridleway to the north would be of benefit east of Junction 10.

2.3.45 As well as this dedicated opportunity, improvements to shared use facilities could provide benefits if their use is legally permitted by equestrian users at each location.

Action Taken/Outcome:

2.3.46 A crossing of the A4019 that caters for equestrian users is being incorporated into the scheme in close proximity to Withybridge Lane where a bridleway connects to the north of the A4019 leading to Elmstone Hardwicke. The final preliminary design includes an underpass below the A4019 between Withybridge Lane and Junction 10, connected to Withybridge Lane and the bridleway by links not open to the public for vehicular use. Heights, widths, lighting and surfacing are among the many design features that have been considered at the preliminary design stage.

Opportunity 18 – Improvements to the existing bridleway network

2.3.47 There is an opportunity to build on the existing network of bridleways, which, while rather disjointed, provide one of the only ways in which local equestrians can ride safely off road. There are a large number of equestrian facilities in the study area and equestrians are understood to use the quiet local road network to link these riding routes – mainly bridleways and restricted byways - together into coherent rides. All works to upgrade or accommodate PRoWs within the development should be compliant with the principles of BS5709 (Gates, steps and stiles) with opportunities taken to improve access for people with restricted mobility.

Action Taken/Outcome:

2.3.48 No further action has been taken on this opportunity as part of the design process as it lies outside the geographical extent of the scheme and thus could affect the planning process for the scheme. However, GCC are aware of this opportunity and it may be progressed separately. Where the single bridleway interfaces with the scheme (there is a bridleway linking to Elmstone Hardwicke) the connections will follow best practice for access.

2.4 Public Transport

Opportunity 19 – Improved bus stop facilities along the A4019

2.4.1 Allowing easier access from properties onto buses, with improved connectivity to pedestrian facilities and allowing separation between bus users waiting at stops and passing pedestrians / cyclists. Where residential properties lie further from bus stops it would be beneficial for cycle stands to be provided to encourage multi-modal journeys.

2.4.2 The proposed improved crossing facilities along the A4019 (Opportunity 4) will also see access to bus stops improved.

Action Taken/Outcome:

2.4.3 A technical note has been created to cover the anticipated locations of bus stops along the A4019 and this has also covered access arrangements for passengers. The findings of the technical note (Atkins document reference GCCM5J10-ATK-HGN-L1_ML-TN-CH-000002_C01) are being incorporated into the scheme design.

Opportunity 20 – New, high-quality bus stop facilities on any bus routes throughout or connected to the scheme

2.4.4 Allowing easier access from properties onto buses, with improved connectivity to pedestrian facilities and allowing separation between bus users waiting at stops and passing pedestrians / cyclists.

Action Taken/Outcome:

2.4.5 In discussion with the GCC public transport team high-quality bus stop facilities are being incorporated into the design to meet GCC requirements. The features of these bus stops are yet to be finalised.

3 Preliminary Design Walking, Cycling & Horse-Riding Review Opportunities

3.1.1 Clause 5.2 of GG 142 states “The assessment and review team shall record the design decisions relating to the provision of walking, cycling and horse-riding facilities.” This section covers the record of the design deliberations and decisions taken during the preliminary design stage and prior to the commencement of the detailed design stage.

3.1.2 Whilst a review report template provided as advice in GG 142 Appendix C includes a series of Opportunities and Action Taken/Outcome statements this section of the current report has been prepared throughout the preliminary design phase. Due to the extensive deliberations about design issues affecting walking, cycling and horse-riding facilities this section provides significantly greater detail than might have possible by following the template. It is intended that this section will clarify the reasoning behind the decisions taken that might otherwise not have been fully captured.

3.1.3 At the end of this section there is a summary of the actions taken to accommodate the needs of pedestrians, cyclists and equestrians. The subsequent section highlights areas where further benefits may be realised during the detailed design process.

3.2 Initial Notes – Design Development

3.2.1 In parallel to this review report a series of technical notes on specific issues has been prepared. Where these technical notes are relevant they have been summarised in this section in chronological order unless there is a case for topic continuity.

3.3 Technical Note 1: M5 J10 design – WCH Routes Through Junction 10 (December 2020)

3.3.1 The technical note *(Atkins document reference number GCCM5J10-ATK-HML-J1_JN-TN-CH-000002)* evaluated a number of at grade and grade separated crossing options to provide continuity through M5 Junction 10 of the pedestrian and cycle facilities proposed along the A4019, whilst also considering provision for equestrians crossing over the M5 at Junction 10.

3.3.2 The at-grade options consisted of signal-controlled crossings. Option 1 proposed signal-controlled crossings of the A4019 entries and circulatory carriageway whilst Option 2 proposed traffic signal crossings of the slip roads to the north of the M5 J10 roundabout.

3.3.3 Several grade separated options were considered. Option 3 explored two overbridges over the northern slip roads whilst Option 4 proposed a single overbridge crossing the slip roads and M5 mainline to the north of the roundabout. The final option, Option 5, explored underpasses to the central island of the roundabout with ramps to utilise the northern roundabout bridge to cross the M5.

3.3.4 The technical note explored the following factors of each option as detailed below.

3.3.5 Option 1 identified that storage length would be required on the circulatory carriageway in addition to the possibility of queuing on the circulatory carriageway caused by the signals, subsequently resulting in exit blocking. Finally, this option identified a number of equestrian issues, notably the need to wait within the central reserve splitter islands to cross and requirement for splitter islands to be widened to accommodate holding areas for equestrians.

3.3.6 Option 2 would result in queuing on the circulatory carriageway, slip roads and the A4019 westbound entry. Further, equestrians would require a considerable increase in the size of the verges adjacent to the crossing points to accommodate holding areas whilst the requirement to enter the carriageway to cross would also be undesirable for equestrians.

3.3.7 Option 3 (two overbridges) is the most indirect route due to the requirement for users to travel up and down two sets of ramps. In addition, Option 3 presents the highest risk of users choosing to avoid the dedicated route and crossing the slip road carriageways.

3.3.8 Option 4 (single overbridge) is identified as the most direct and straight-forward route of the grade-separated options. This option presents much lower risk as users would choose to cross the slip road carriageways instead of using the separate pedestrian/cyclist/equestrian bridge. There are also opportunities to provide approaches to the bridge within the embankment slopes.

3.3.9 Option 5 (underbridges) was noted as the most favourable option for equestrians. However, the option is the least favourite grade separated option for pedestrians and cyclists due to the reduced perception of personal security associated with underbridges/subways. Further, the ramps on Option 5 (underbridges) would exceed the minimum desirable 5% gradient within the central island of the roundabout.

3.3.10 Option 4 was identified as the preferred option and would provide the most acceptable route for all users (i.e. pedestrians, cyclists and equestrians), but changes to the junction layout, including a larger area within the enlarged roundabout may result in Option 5 being a viable alternative.

3.3.11 The anticipated demand for equestrians to cross the M5 and the extent of the equestrian routes to be provided either side of M5 Junction 10 would need to be determined to inform the design requirements of the overbridge, ramps and paths either side of the junction, and ensure adequate continuity for equestrians. Further work was recommended regarding the need for provision for equestrians, including consideration of the appropriateness of formally providing for these users alongside a high-speed dual carriageway and through a motorway junction.

Subsequent Considerations

3.3.12 The layouts of ramps/approach routes to the bridge have not been fully addressed: these could either be alongside the carriageway to provide natural surveillance and lighting or could stay closer to ground level and take a more direct route to the bridge away from the road. The former would be more attractive at night and the latter would be more attractive during daylight hours.

3.3.13 The underpass option could become more viable with a larger area within the roundabout to accommodate ramps with compliant gradients, wider underpasses and larger visibility splays to allay personal security fears.

3.3.14 GCC client feedback: the underpass options were dismissed too easily and issues could be addressed by good design elements. There was also doubt about the need for equestrian provision at the junction and that it may be more appropriate to focus upon a route elsewhere across the M5 for example near Elmstone Hardwicke. The Lead Assessor subsequently liaised with the Principal Rights of Way Officer at GCC for an opinion and also made further approaches to stakeholder/user groups for their opinions. No equestrian users were recorded travelling along the A4019 at Junction 10 during the user surveys and thus that snapshot information does not provide evidence to support the inclusion of equestrians.

3.4 Technical Note 2: M5 J10 design – WCH Routes Through Junction 10 – subsequent design deliberations (September 2021)

3.4.1 The purpose of this technical note *(Atkins document reference number GCCM5J10-ATK-HGN-J1-TN-CH-000002)* was to evaluate the alternative options available to provide cycleway and footway facilities on the A4019 through the proposed layout for M5 Junction 10. As there are no cycle facilities and only limited pedestrian facilities along the existing A4019 the introduction of new facilities at Junction 10 does not guarantee continuity of facilities beyond the junction.

3.4.2 The current proposal for the A4019 is a segregated cycle track greater than 3m wide and footway 2m wide. As such, the conceptual option drawings included as part of this note show continuation of the cycleway and footway through the motorway junction.

3.4.3 Consideration will, however, also be given to how each option could provide for equestrians and this technical note also summarises the evidence for and against the inclusion of equestrians in the proposals. This includes assessing any onward connections for equestrian users either side of M5 Junction 10.

3.4.4 When evaluating the options, the suitability for all users including pedestrians, cyclists and equestrians, will be considered. The following options were considered:

- At grade **Option A** would follow the northern perimeter of the roundabout with signal-controlled crossings of the slip roads to the north of the M5 J10 roundabout (previously Option 2). An indicative layout (the junction configuration has changed since the figure was produced) is shown in Figure *3-1*;

- Grade separated **Option B** would provide a single overbridge crossing the slip roads and M5 mainline to the north of the roundabout (previously Option 4) An indicative layout (the junction configuration has changed since the figure was produced) is shown in Figure *3-2*; and

- Grade separated **Option C** would include underbridges/underpasses to provide a route through the central island of the roundabout. Ramps would be used to access the southern side of the northern roundabout bridge to cross the M5 (previously Option 5) An indicative layout (the junction configuration has changed since the figure was produced) is shown in Figure *3-3*.

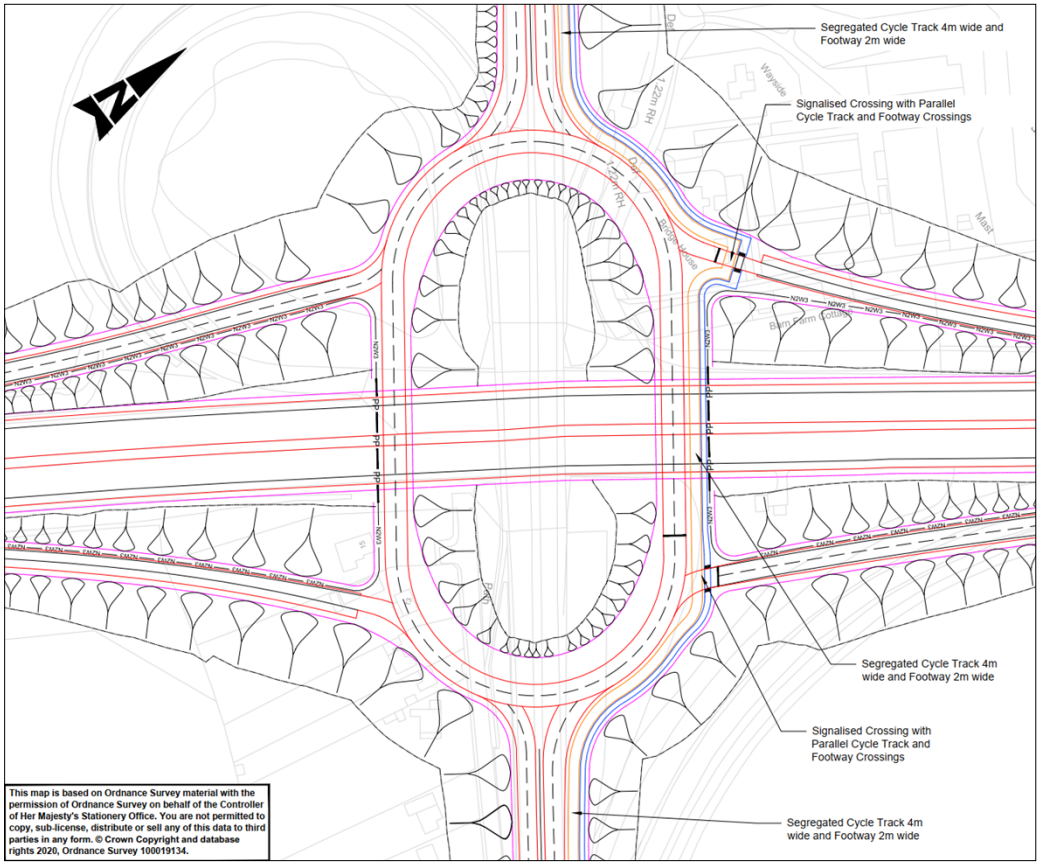

Figure 3-1 - Indicative layout for Option A - at grade slip road crossings

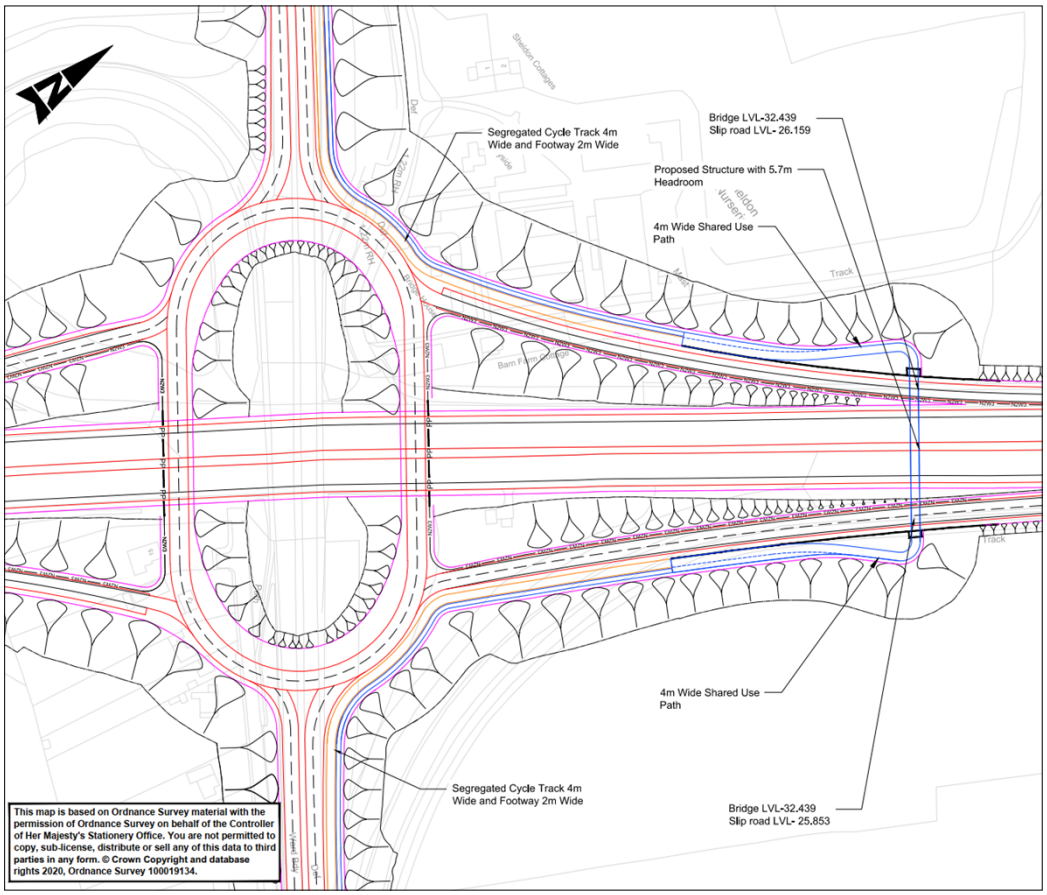

Figure 3-2 - Indicative layout for Option B overbridge to the north of Junction 10

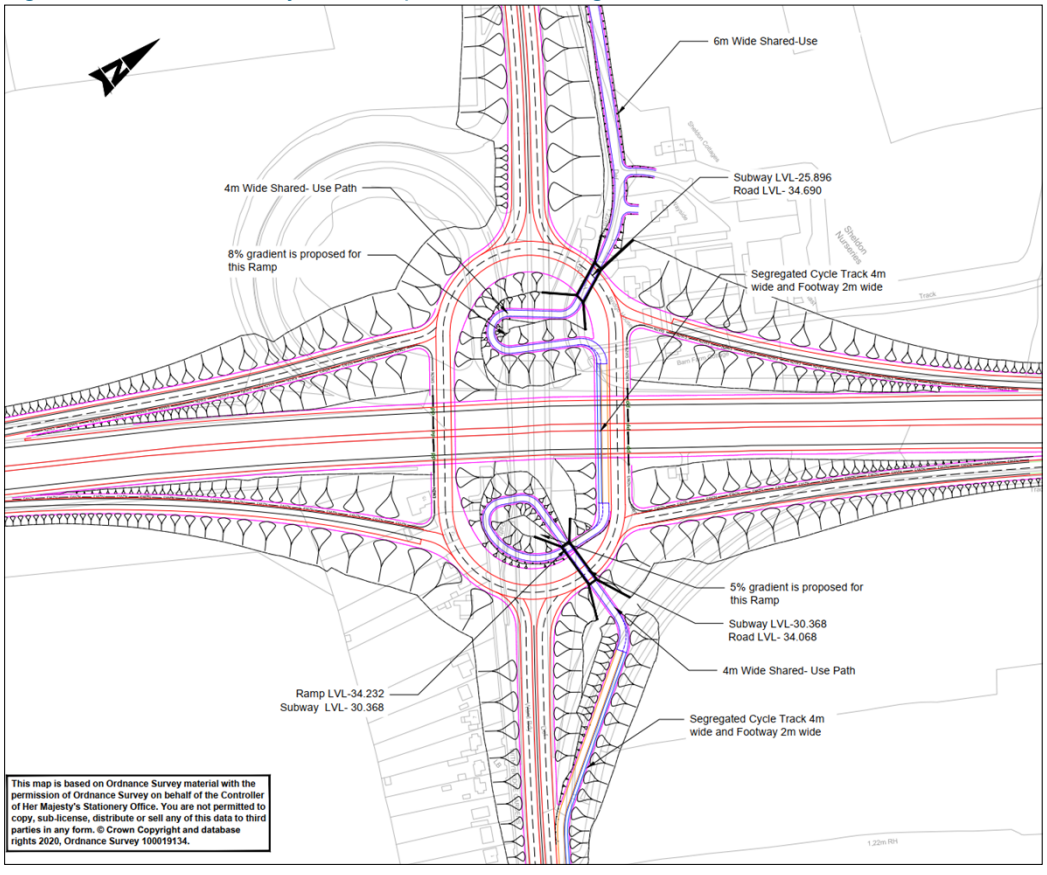

Figure 3-3 - Indicative layout for Option C - underpasses and route over northern bridge

3.4.5 The previous Options 1 and 3 are no longer considered to be viable; Option 1 was discounted due to the lack of proposed signal control at the roundabout and to avoid causing stacking/blocking problems whilst Option 3 has previously been discounted due to the additional distance users would be required to travel.

3.4.6 A further option has been considered and discounted that would provide a grade separated route requiring no level change for active travel. This option was discounted due to the need for the M5 to be lowered or the roundabout to be raised further making it prohibitive in terms of cost, land take and possibly flooding risk.

3.4.7 Due to the scores being relatively similar when a scoring system was first being devised, three scoring systems have been included to assist in identifying the most advantageous option and where there is little difference in the subjective scoring assessment between options they share the higher score. Scores for each of the scoring systems are provided in the next section.

3.4.8 For the first scoring system, which ranks the three options for every criterium, the numbers in the top left of each cell indicate the following:

3 – Best option for the criterium

2 – Second-best option for the criterium

1 – Least favourable option for the criterium

3.4.9 The second scoring system doubles the scores for each of the five key criteria for cycling but otherwise remains the same; this is intended to focus the scoring on the needs of users instead of wider considerations.

3.4.10 The third scoring system uses scores of 3 for a green cell, 2 for an amber cell and 1 for a red cell. The colours indicate:

Green – meets the criterium with few or no drawbacks

Amber – some notable drawbacks when judged against this criterium

Red – significant drawbacks against this criterium.

3.4.11 Careful selection of mitigation measures may be required Using the scoring system of numbers included in the table, where the options score 3, 2 or 1 points depending upon their relative merits for each criterium, gives the following scores:

- Option A – 26
- Option B – 22
- Option C – 22

3.4.12 Doubling the scores for the five cycling criteria to provide a weighted score in favour of cyclists and pedestrians gives the following scores:

- Option A – 40
- Option B – 31
- Option C – 29

3.4.13 Using a scoring system where a green box is worth three points, an amber box is worth two points and a red box is worth one point, the scores are:

- Option A – 28
- Option B – 23
- Option C – 26

3.4.14 It can be seen that all three scoring systems result in a variety of scores that are generally close for the three options, hence the attempts to find a scoring system that might provide greater clarity between the options. However, it should be noted that Option A has the highest scores in each of the scoring systems and thus it is recommended that Option A – at grade route utilising signal-controlled crossings of the slip roads – is progressed. This conclusion is supported by the larger margin in the second scoring system where the scores are weighted towards users of the facility. Overall Option A is judged to provide

benefits for directness, user comfort, cohesion and personal safety but is least preferred for road safety and user environment/attractiveness.

3.4.15 Each user group has different needs and each user group – as well as users within each group – will view such a scoring exercise differently. The scoring exercise is intended to provide some clarity about the decision-making process even if it is subjective and not all users would agree with all elements of the scoring. For example, some cyclists may prefer grade-separated crossings to avoid possible conflicts with traffic whilst other cyclists may prefer the most direct route which would include at grade crossings. Whilst different cyclists may not agree on the best option for passing through the junction, equally those in other user groups are likely to have different opinions. The ideal solution would be to provide both at grade and grade separated facilities to provide a choice, but the additional cost of this is unlikely to be justifiable.

Provision for Equestrians

3.4.16 There is as yet no conclusive evidence regarding the need for provision for equestrians. The BHS has provided evidence to show that there are significant levels of equestrian activity and interest in the area surrounding the scheme and has expressed a strong desire for facilities to be included in the design of the M5 Junction 10 scheme. There are other locations to the north of Junction 10 where equestrians can cross the M5 and, should efforts be made to significantly improve the permeability of the network available to these users, more appropriate alternative facilities could render facilities alongside the A4019 unnecessary. However, the lack of permeability and connectivity in the existing network should not be a defining factor in the inclusion/exclusion of equestrians in the design process as exclusion could cause a long-term challenge for network improvement. The work on this Technical Note has not resulted in evidence to support a clear recommendation.

3.4.17 The scores for the three options might be different if provision for equestrians were to be included in the design ethos although it is expected that Option A would retain the highest scores.

3.5 Technical Note 3: Bus Stop Facilities/Location Along A4019 (January 2021)

3.5.1 The technical note *(Atkins document reference GCCM5J10-ATK-HGN-L1_ML-TN-CH-000002_C01)* recorded considerations and decisions made on the public transport strategy for the scheme.

3.5.2 Strategy: the strategy for proposed provision of bus stops assumes that additional bus stop provision will be included directly within the new development sites. It was considered that no new bus stops would be required on the WCLR or B4634.

3.5.3 On the A4019, replacement bus stops will be provided at suitable locations which will be determined by safety, proximity to original bus stop, proximity to retained dwellings and connectivity to footways and crossings.

3.5.4 The technical note made a number of recommendations including re-providing two bus stops near Stanboro Lane as well as two bus stops near Cooks Lane, but slightly to the east to minimise land/property impacts. In addition, the two bus stops at Uckington should be re-provided in combination with the relocated Cooks Lane bus stops as these would be close to Uckington. The final recommendation included not re-providing the two bus stops near Withybridge Gardens due to the removal of the properties that these serve.

3.5.5 Since the TN was produced consultation feedback has been received from Stagecoach. The design has been updated to remove the proposed bus stops at Stanboro Lane as the few remaining properties in this location will be close to the Gloucester Old Spot bus stops. The design has also been amended to relocate the proposed combined Cooks Lane/Uckington bus stops further towards Uckington so that they better serve Uckington and are close to the proposed signalised crossing. There is limited demand for these bus stops from west of Uckington. At the Elms Park development bus stops have been changed to lay-by stops whilst the existing bus stops east of the Gallagher Retail Park junction are to be re-provided but the exact location is yet to be confirmed.

3.5.6 All proposed bus stops should consider lay-by arrangements to minimise safety risks and road user delays. However, the arrangement and exact locations of the bus stops will need to be discussed and agreed with the bus operator. Adequate shelter facilities should also be provided and consideration given to the provision of cycle stands to encourage multi-modal journeys.

3.6 Other Elements of Design Development – February 2021

3.6.1 The A4019/WCLR junction may be either enlarged (140m instead of 70m ICD) or signal-controlled crossroads. An alternative of a hamburger/throughabout is also being considered. The GG 142 review team raised concerns for on carriageway cyclists for the roundabout option (which also applies to a lesser degree to the hamburger option). The current sketches show a reverse stagger at the signal-controlled crossings but this would be expected to be addressed as design progresses. The large arm to the north to the likely development also poses a significant barrier to cyclists and pedestrians. This development also brings into question how the bridleway to the north of Withybridge Lane is to be treated in the proposed development.

3.6.2 The GG 142 review team were advised on 4th February that the design of A4019/WCLR junction is expected to change from an at grade roundabout to signal-controlled crossroads with a stub on the northern arm to cater for the future development. This accords with an earlier request from the GG 142 review team for a signal-controlled crossroads to benefit on-carriageway cyclists who are generally at much greater risk when using roundabouts.

3.6.3 A design development meeting on 25th February advised that traffic forecasts may increase and therefore there are several design changes expected including enlargement of the M5 Junction 10 roundabout to 3 lanes and 140m ICD.

3.6.4 The design changes to the M5 Junction 10 roundabout have several implications for WCH including further space inside roundabout to accommodate a route using the underpasses and the opportunity to incorporate signal-controlled crossings into junction. It was noted that the bridge option to the north of Junction 10 would be largely unaffected. However, the design changes to the M5 Junction 10 roundabout would result in higher circulatory speeds, thereby creating higher risk for on-carriageway cyclists.

3.6.5 The GG 142 review team had considered the connectivity of the walking and cycling facilities at either end of the WCLR and had concerns reqarding the use of a roundabout on the B4634 Old Gloucester Road at the southern end of the WCLR. It was understood that the roundabout layout had been inherited from the developer of a plot of land to the south of the B4634 (access to the highway via the roundabout). The roundabout was felt to be inconsistent with the other junctions in the surrounding road network and also presented a hazard to on-carriageway cyclists that could be avoided or minimised by the use of a signal-controlled crossroads. Following a request from the GG 142 review team the signal-controlled crossroads layout has now been adopted into the design.

3.6.6 With respect to onward connections for walking, cycling and horse-riding, the GG 142 review team made a suggestion that the facility alongside the WCLR is moved from the west to the east side to better connect with access to the developments to the north of the A4019 and south of the B4634. However, the facility remains on the west side in the current design due to other design and project considerations.

3.6.7 It was re-iterated that the standard of the facility on the bridge over motorway will need to take account of the height of parapets, width and radii. All standards and guidance, e.g. different DMRB sources, BHS design guides, LTN 1/20, should be reviewed.

3.6.8 Equestrian provision: whilst there are a couple of bridleways to the north of and interfacing with the A4019 either side of the M5 (one to the east opposite Withybridge Lane and one to the west emerging at Knightsbridge) the provision of an equestrian route alongside the A4019 may not be that appealing to horse-riders and, given the exceptional challenges of creating a walking/cycling route alongside the A4019 due to severe width restrictions, the opportunity to also provide for equestrian use is a significant challenge. The facility would almost certainly need to be a sealed surface alongside a highway and for primary use by pedestrians and cyclists which would be unappealing to horses as hooves would have

limited grip on the surface. There would be unlikely to be width within the highway boundary for anything more than short lengths of an intermittent separate facility and if an option to provide a permissive path were pursued, this would also lead to only intermittent lengths of equestrian facility.

3.6.9 It is therefore likely that the best option would be to seek to provide as high a quality walking and cycling facility as possible alongside the A4019 and then seek to support improvements to the existing rights of way network in the area, through liaison with GCC Rights of Way team and stakeholders such as the BHS. This may involve the development of a local circular route or longer 'there-and-back' routes. However, for the current stage of design development it has been decided that the approach will be to include a 6m wide corridor for 'non-vehicle' use allowing for either a segregated cycleway and footway or an unsegregated shared cycleway/footway and an adjacent unsealed equestrian route. This allows for the decision on the nature of the facility to be delayed in case further evidence comes to light although it does not address the lack of onward facilities for equestrians (and to a lesser degree, cyclists).

3.7 Gloucestershire Cycling Advisory and Liaison Group (CALG) February 2021

3.7.1 A presentation to the CALG by GCC officers and the Lead Assessor on 1st February 2021 came away with a single message relating to the needs of cyclists from John Franklin (Cheltenham and Tewkesbury Cycling Campaign): grade separated routes are the clear preference based upon safety considerations. As noted earlier in this report, this factor has been taken into account in the assessment of the options for crossing M5 Junction 10 along with a number of other factors.

3.8 Equestrian provision evidence gathering completed in March 2021

3.8.1 This work brought together evidence gathered from contact with the British Horse Society (BHS), the Principal Rights of Way Office at GCC, direction from the GCC M5 Junction 10 project team, user survey data gathered in December 2020 as part of the GG 142 walking, cycling & horse-riding assessment and information from the Gloucestershire Rights of Way and Countryside Access Improvement Plan.

3.8.2 The key findings of the review of evidence were:

- the key routes for equestrians within the sphere of influence of the scheme were the north-south route from Hayden Lane to Elmstone Hardwicke via Withybridge Lane and Bridleway AUC1 and along the A4019 from Cheltenham/Uckington towards Coombe Hill;
- Despite low surveyed use by horses, there are a number of stables in the area and a high density of BHS members;
- Justification for a dedicated equestrian facility alongside the A4019 seemed to be limited and there is a general concern for encouraging use alongside a high-speed and heavily-trafficked primary route when the facility would terminate to the west of the M5;
- An alternative crossing of the M5 further to the north of Junction 10 would appear to be more in keeping with the local network available to equestrian users; and
- A formal crossing of the A4019 near to Withybridge Lane would have significant benefits for equestrians when travelling between Hayden Lane and Elmstone Hardwicke.

3.9 Equestrian crossings at Withybridge and Uckington (meeting held 12th January 2022)

3.9.1 On Wednesday 12th January 2022 the M5 J10 Improvement Scheme design team met with the GG 142 review team to discuss the current proposals for equestrian crossings of the A4019 as part of the M5 J10 Improvement Scheme.

3.9.2 The current options under consideration are:

- a Pegasus crossing to the west of the A4019 / Moat Lane / The Green junction at Uckington or a single phase on road crossing between Moat Lane and The Green; and
- a Pegasus crossing next to a Toucan crossing at the Withybridge Lane junction with the A4019.

3.9.3 The conclusion of the discussion regarding Uckington was that, whilst the demand is expected to be extremely low (due to the condition of the bridleway to the south of Moat Lane) a single-stage equestrian movement across the signal-controlled junction would best serve equestrians. Further consideration needs to be given to the method of calling demand/detection.

3.9.4 There are some operational concerns with the Pegasus crossing to the west of Withybridge Lane, most notably the space required for a holding area in the central reserve which might benefit from high fences to shield horses from passing traffic. Overall, an underpass would be the most advantageous crossing option for equestrians.

3.10 A4019: Junction 10 to Coombe Hill Link Feasibility Study (March 2021)

3.10.1 A feasibility study *(Atkins document reference number GCCM5J10-ATK-HGN-L1-RP-CH-000001)* was prepared documenting the investigation of a walking, cycling & horse-riding link between M5 Junction 10 and the Coombe Hill junction including the consideration of PRoWs and how connections between these might be made using a facility alongside the A4019.

3.10.2 The purpose of this note was to evaluate the feasibility of options to provide walking, cycling and horse-riding (WCH) facilities along the A4019, running north-west from M5 Junction 10 to the junction with the A38 at Coombe Hill, referred to throughout this report as the A4019 link. These facilities would tie in with the WCH infrastructure designed into both the upgraded M5 Junction 10 and the Coombe Hill junction, helping contribute to a continuous WCH network in the area. When evaluating the options, the suitability for all users including pedestrians, cyclists and equestrians, were considered.

3.10.3 Five route options were reviewed, all of which attempted to incorporate pedestrians, cyclists and equestrians. Each route option was also reviewed against different WCH infrastructure types at differing widths.

3.10.4 The options assessment process highlighted Options 1 and 5 as being the highest scoring options, with Option 1 (mix of cycle path sections located next to the carriageway and permissive path on the northern side of the A4019 carriageway) scoring slightly higher than Option 5.

3.10.5 On carriageway cycle facilities were explored and discounted as per LTN 1/20 due to speed limits and vehicle flows along the A4019.

3.10.6 Due to the restricted space within the highway boundary along sections of the route and the low expected flow of users per hour an unsegregated shared use path (SUP) conforming to CD 143 width requirements of 3.5m (route width plus separation in a 50mph zone) and 2.5m (route width plus separation in a 40mph zone and along permissive paths) were seen as the most appropriate facility.

3.10.7 Due to the significant constraints identified at several locations along the route and the lack of a detailed topographical survey, the feasibility of providing a compliant walking and cycling facility along the A4019 is in significant doubt. The OS data provided for use in this

study indicates there are several locations where the least wide compliant layout cannot be accommodated and land ownership information would appear to support this conclusion.

3.10.8 The potential for including equestrian users in any design considerations is even more challenging. Equestrian facilities could be made available on the permissive path sections but would pose substantial issues at points restricted by the highway boundary and residential buildings through Knightsbridge and Coombe Hill junction as greater separation from traffic is required for equestrians than cyclists and pedestrians. In addition, a bituminous surface is likely to pose challenges for horse hooves. Therefore, continuous equestrian facilities are expected to be very difficult to deliver alongside the proposed SUP without significant land purchase.

3.10.9 Alternative approaches such as realigning the carriageway – which is likely to be very expensive – or upgrading Elmstone Hardwicke Bridleway 11 to the north of the A4019 – which would not meet the criteria of a link from M5 Junction 10 to Coombe Hill – may need to be considered. As the most restricted sections of highway are only just over 11m wide this would leave very little space to accommodate a verge, a full-width carriageway and a shared use path (with separation from the carriageway) together with a boundary fence and any drainage features.

3.10.10 In the first instance a detailed topographical survey and utility search would at least provide greater certainty about the likely challenges to providing a facility along the A4019.

3.11 Design Discussion 23rd April 2021

3.11.1 A discussion was held between the design team and the GG 142 review team to cover all aspects of the M5 Junction 10 scheme design relating to pedestrians, cyclists and equestrians. The following bullet points summarise the key issues:

3.11.2 At the west end of the scheme the tie-in point/termination of any walking and cycling facilities would be best arranged at the Gloucester Old Spot junction. At this point cyclists could continue on the local road to the north or along the A4019. Pedestrians would be able to continue along the A4019 footway.

3.11.3 West of the M5 the change in nature of the off-carriageway facility from segregated to unsegregated/shared might best be located at the Stanford Lane junction instead of specifying a point away from any highway feature.

3.11.4 The westbound bus stop close to Stanford Lane would prompt the need for a crossing of the A4019. The eastbound bus stop would be better located in the unsegregated section of shared use path to the west of Stanford Lane such that pedestrians would not need to cross the cycleway to access the bus stop.

3.11.5 A lengthy discussion took place about the method for pedestrians and cyclists (equestrians have been removed from the design thinking based upon current evidence) to cross the M5 at Junction 10. These deliberations are recorded in a separate technical note.

3.11.6 The forecast traffic flows on Withybridge Lane appeared to be too high for it to be appropriate for use as a quiet lane. Methods for discouraging vehicle users were briefly discussed but no clear options were identified.

3.11.7 The access road (and indicative footway) to the south-east of the A4019 and WCLR junction were discussed and it was concluded that removing the footway was the most appropriate approach. The provision of a footway might encourage pedestrians to walk towards the WCLR but no crossing provision is proposed at this point. Access to the proposed pedestrian network would be provided to the east of the properties instead of to the west.

3.11.8 The inclusion or omission of a footway along Moat Lane and no clear preferred option was chosen due to inconsistency with Moat Lane either side of the improved section but also the benefit of a new facility given the opportunity. Therefore it was concluded that the design should include a footway so the land is secured and then, once residents and others are consulted, it can be retained or removed.

3.11.9 The crossing of The Green at Uckington has been set as a single straight-across movement to assist ease of movement for pedestrians and cyclists. The use of the access roads by cyclists was discussed and it was concluded to be a suitable option given the low vehicle speeds – generally by users familiar with the layout and presence of cyclists – and likely low severity of any collision, if they couldn't be avoided by those involved. The transitions from the access roads to the shared unsegregated sections would be better for cyclists than crossing the Green between the proposed access roads.

3.12 Design Deliberations 7th May 2021

3.12.1 A query was received from the design team regarding the A4019 to the west of the M5. There was a challenge regarding the short section of dual carriageway and whether the change from dual carriageway to single carriageway might be better achieved at the Junction 10 roundabout. The GG 142 review team concluded on balance this would be a good idea in order to suit traffic flows and be more in keeping with the A4019 to the west to which it ties in. The use of a single carriageway straight from the roundabout might be expected to avoid the problem of higher westbound vehicle speeds exiting the dual carriageway onto the single carriageway.

3.12.2 It was noted that the two obvious reasons for crossing the A4019 to the west of Junction 10 are accessing the westbound bus stop and also the footpath to the south of the A4019 that proceeds to Boddington. This is currently very overgrown on the A4019 embankment but underneath all the vegetation there is some evidence of a tarmacked path leading down from the fingerpost sign to the stile into the farmer's field. This could form part of a 'circular' route – the site visit indicated it was extremely lightly used but the route might become more popular with all the development to the north of the A4019.

3.12.3 Crossing a dual carriageway initially appears easier as pedestrians are only crossing a single direction of flow at a time but the speeds would be expected to be higher than on a single carriageway and two traffic lanes can pose problems if a large, slower vehicle masks a faster vehicle. On balance the single carriageway crossing may be easier and safer. A refuge island is not permitted by DMRB CD 143 (the design standard being adopted for this section of the A4019) if the speed limit is 50mph or greater.

3.12.4 A query was raised with the design team regarding the wishes of the bus company/companies – are lay-bys actually required/sought? A GCC policy may also direct the inclusion or omission of lay-bys. Lay-bys on high-speed routes can restrict emerging back out into traffic when traffic flows are high. Removal of the bus lay-bys might be easier on a dual carriageway as there would still be a lane available to pass round the bus, but it's not a fundamental problem on a single carriageway – after all most of the other bus stops along the A4019 to the west of the M5 are in the running lane.

3.13 Design Discussion – Junction Crossings – 14th May 2021

3.13.1 A discussion took place between the GG 142 review team and the design team regarding the options for layouts of the pedestrian and cycle crossings at each of the junctions throughout the scheme. The following are key notes from the meeting:

- A key issue was identified as getting visually impaired users from the footway across the cycleway to the road crossing. This might need a tactile tail to capture/guide these users and to guide them to the crossing.
- Give way markings on the cycleway to get cyclists to allow pedestrians to cross but there is a risk that cyclists will not see these at speed and on the approach to a junction and thus it could increase the potential for a pedestrian/cyclist collision.
- The layout could separate out uncontrolled and controlled crossings – see Figure 6.12 in LTN 1/20.
- An unofficial Zebra crossing of the cycleway would be expected to encourage cyclists to stop and allow a pedestrian to cross; it would also allow a tactile tail to stretch to the back of the footway.
- Switching around pedestrian and cyclist facilities to place pedestrians closest to the carriageway at the crossings may simplify movements at the junction and

improve pedestrian/cyclist interactions.

- Narrowing the cycleway locally may allow more space for pedestrians, especially in waiting areas. Retain the width of the cycle crossing but locally reduce the width of the cycleway alongside the carriageway.
- The layouts as shown may look attractive as they allow cyclists a straight-across movement, but it is likely that the traffic signal design will focus upon high capacity will leave cyclists with very long wait times in the cycle. At the Elms Park three-arm junction a straight across crossing is being used so it is on green when the mainline is on green and the left and right turns into the development would be on hold to facilitate this.
- Limited space at the Gallagher Retail Park so a larger junction does not appear to be an option. The only alternative is to ban movements and divert them to other junctions to reduce lanes and widths of carriageway.
- These considerations are likely to need a directive from a high level in GCC to put cyclists and pedestrians at a higher priority than vehicles.
- Detection for cyclists is better using above-ground methods: thermal imaging works on straight approaches but not when cyclists approach at an angle. Induction loops are poor for detecting cyclists as there is very little metal to be detected. The third detection option is push button units, which are simple but inefficient. GCC are generally content with their current technology so agreement is required about what is acceptable across a number of junctions.
- At Arle Court the WCTIS works include segregated facilities but with push buttons; however, these crossing are mostly straight-across movements. Guidance from GCC would be very helpful and this could also include comments from any disability/accessibility forum that may exist.
- In terms of the options, it was concluded that the preferred option was option 4.
- Option 1 - prioritizes cycling over pedestrians and the uncontrolled crossing areas mean that there is a mix of controlled and uncontrolled facilities, which should be avoided. For visually impaired pedestrians it adds complexity. The idea behind the in-line crossings was to remove the number of staggers and simplify movements across the junction.
- Option 2 - addresses the hierarchy slightly by adding the give-way markings for cyclists, but still relies on users crossing in a mix of controlled and uncontrolled crossing points through a series of staggered facilities. Again, for visually impaired peds it's not very clear.
- Option 3 – adding the zebra crossing highlights the hierarchy further, but again is a mix of crossing types. The staggered crossings require pedestrians to move in a certain way between crossings. How would a partially sighted person know that they need to go left rather than right once they crossed the signalised crossing?
- Option 4 – provides a clear route for pedestrians from back of footway to back of footway on the other side of the road. The type of surface and tactile paving will also help cyclists to know they are crossing a pedestrian area, so potentially will reduce speeds. There is also a bigger waiting area for pedestrians but could mean that pedestrians hang back a bit and affect cyclists. This could happen on all options, especially if pedestrian numbers are high, but on the others there likely to wait in the cycle area. Either way if there is not enough space there may be some conflict between pedestrians and cyclists. On the drawing there is an increase between the pedestrian and cycle parallel crossings, which may not be needed. If there is a concern on the number of pedestrians then the width of the crossing should be wider, rather than the gap.
- Option 5 – this is a great facility for cyclists, but at the expense of pedestrians. Anybody without a sight issue would be okay, but diagonal crossing points across cycle lanes and the transition from the inner pedestrian ring beyond the junction is not defined.
- It was agreed that Option 4 does seem to be the best way forward given that it is a consistent method of control throughout the whole junction. It was concluded that further thought is needed to ensure the pedestrian crossing of the cycle track

is really clear to cyclists: they need to cede priority to pedestrians. On balance, it was agreed that this is the best approach and could be most easily rolled out across the variety of junctions in the scheme – and the wider Gloucestershire area.

3.14 Value Engineering discussion 14 July 2021

3.14.1 In a Value Engineering discussion, the idea of reducing the width of the segregated footway/cycleway along the link road was raised. Two possible scenarios were discussed.

3.14.2 The first scenario explored providing a 2m footway along the link road and divert cyclist along Withybridge Lane – It was felt that the issue with this option would be the potential conflict of cyclists with the volume and speed of traffic along Withybridge Lane (the model shows approx. 4000 vehicles/hour two-way flow). There could be various works done to Withybridge Lane, such as closing it to traffic at the northern end (which would add traffic to the scheme junctions and potentially add more work/cost), narrowing it down and providing a kerbed, segregated cycleway (again, additional costs).

3.14.3 The second scenario explored providing a 3m shared use path on the link road (or, preferably, a segregated walking/cycling facility) and keeping Withybridge Lane open. It was thought that this would provide the most savings (potentially reducing the embankment width by 4 to 5m) without additional work on Withybrdge Lane. This facility could be justified in terms of the likely usage of this path and would give cyclists the options of using the path, Withybridge Lane or the link road carriageway. It would also avoid any potential increase in the size of the link road junctions to cater for the displaced traffic from Withybridge Lane.

3.14.4 On balance, it seems Option 2 would provide greater cost savings while still providing options for cyclists.

3.14.5 It was agreed that there was also logic in providing shared facilities (rather than segregated) along the A4019 west of the link road junction, over the motorway and on to the Stoke Road junction, as the usage of this section is likely to be significantly lower than to the east of the link road. This approach was supported by John Franklin. However, a segregated facility is the preferred layout to provide better future-proofing in case of further development.

3.15 Stakeholder discussion – Cheltenham & Tewkesbury Cycling Campaign, 16 July 2021

3.15.1 A virtual meeting was held between the GG 142 Lead Assessor, David Lucas of Atkins and John Franklin representing the Cheltenham and Tewkesbury Cycling Campaign. The call discussed the A38/A4019 junction at Coombe Hill but primarily focused upon the M5 Junction 10 Improvement scheme.

3.15.2 The key messages from John Franklin were:

- Signal-controlled junctions at either end of the WCLR were welcomed;
- Off-carriageway facilities alongside the A4019 and WCLR will be very lightly used;
- Shared use facilities in the western end of the scheme is acceptable due to the anticipated light flows;
- As much segregation as possible is welcome alongside a busy road to encourage higher use;
- Closing Withybridge Lane would be appealing to cyclists but onward connections are a concern;
- Off-carriageway cycling facilities alongside WCLR would be better connected on the east side and located at the bottom of the embankment would make them more appealing;

- Signal control at Junction 10 is an improvement over priority layouts but the design should avoid 'dead' carriageway space where debris can gather;
- The success of off-carriageway facilities will largely depend upon the level of delays at junctions; detection and 'with traffic' phasing can help greatly;
- A share of the signal cycle should be proportionate to the level of cycle usage. Check the A4714 Hubble Road crossing in Bristol for a good example that does not increase traffic delays; and
- Avoid left turn lanes where possible as these are high risk for cyclists. They are best created by a definitive bifurcation movement for traffic to give cyclists greater protection/prominence.

3.16 Design Team/GG 142 team discussion 3rd November 2021

3.16.1 The following are the notes recorded during the design discussion held between the GG 142 WCHAR Lead Assessor, the highway design team leaders and the Project Managers/Project Director.

3.16.2 Local Transport Note (LTN) 1/20 assessments – opportunities for improved provision for cyclists

3.16.3 The side roads to the north of the A4019 have multiple lanes for cyclists (and pedestrians) to cross and this has a significant negative impact upon the LTN 1/20 assessment scores. The need for four accesses with multiple lanes was questioned.

3.16.4 The fundamental reason for the poor LTN 1/20 scores is to do with delay and lack of priority. An on-carriageway cyclist would only have to stop at one signal and as the signals are mostly designed to favour traffic there's a low chance of them receiving a red signal. If they used the off-carriageway facility as included in the design they would be required to stop at every junction at least once (probably more often) as well as not following a straight line at some of the junctions. On this basis the on-carriageway option is likely to be favourable to many cyclists despite the high traffic flows and speeds. So there is a significant negative impact upon cyclists when we fully analyse the operation of the junctions. The LTN 1/20 assessment is based upon some very robust evidence that supports this argument.

3.16.5 It was clarified that the scheme was being funded by Homes England to unlock access to the housing developments to the north of the A4019. Elms Park is intended to include 4,000 homes and the possible development accessed from the West Cheltenham Link Road (WCLR) junction is currently only safeguarded with no masterplan. Some of the crossing points may be 'straight-across' movements to reduce the delay to cyclists but there was general agreement that the design facilitates traffic movements with cyclists and pedestrians fitting around these movements. There is a move from 'predict and provide' towards 'design and provide' thinking in scheme development.

3.16.6 There is a planned park & ride site at one Elms Park access; the Gallagher Retail Park access is also intended to provide access to Elms Park. The GG 142 team are keen to explore options to change the road layout and improve the width to accommodate better segregated walking & cycling facilities along the A4019.

3.16.7 Consideration to be given to moving the walking & cycling facility alongside the WCLR from the west side to the east side.

3.16.8 The ideas for design improvement are being put forward to try to find a better design that better serves the needs of pedestrians and cyclists (and therefore deliver a design that overall is as inclusive as possible). The GG 142 team think this is a design team decision and not reliant on complaints from the public.

- **Action**: **GG 142 team** to use Propensity to Cycle Tool to provide an indication of the possible cycle demand from the developments to help inform traffic forecasts.
- **Action**: **GG 142 team** to arrange a brief meeting with Craig and Chris to discuss options for walking & cycling facilities at the Uckington junction.
- **Action**: **GG 142 team** to approach signal design lead to discuss signal staging

and number of crossing movements for cyclists.

- **Action**: **PM/design team** to confirm the contact for the signals design team.
- **Action**: **GG 142 team** to provide a summary of the key design factors that could improve the LTN 1/20 scores so the design team can assess whether they would be achievable.
- **Action: PM/design team** to provide details of the Elms Park development shared in the meeting and Park & Ride referenced in the meeting.

Equestrian facilities

3.16.9 Information gathered by the GG 142 WCHAR team indicates there is clear evidence of existing equestrian activity in the area despite the very poor network of facilities; this includes riding along the A4019 (both on the carriageway and footway). This is actual existing demand that has potential to increase. A good point has been made that it is probably not a good thing for us to be encouraging equestrians to use the A4019 as a busy highway corridor which crosses a motorway junction. The bottom line is we can continue with the design omitting equestrian facilities alongside the A4019 but the horse-riding public may justifiably feel GCC should have an alternative strategy for the wider area, given the impacts/severance caused by increased traffic.

3.16.10 The meeting discussed provision of a Pegasus crossing of the A4019 near Withybridge Lane or at the A4019/WCLR to facilitate the north-south movement from Hayden Lane to Elmstone Hardwicke. Discussed an underpass east of Junction 10, a stand-alone Pegasus crossing just west of Withybridge Lane and a Pegasus crossing integrated into the WCLR junction. A stand-alone Pegasus crossing near Withybridge Lane would also benefit the option of moving the WCLR walking & cycling facility to the east side of the WCLR. A connection could then be provided at the back of the walking & cycling facility to connect with the bridleway to Elmstone Hardwicke as well as a direct connection to Withybridge Lane. This could also be used by cyclists on Withybridge Lane. Equestrian use would not be expected to affect traffic flows due to occasional demand on the crossing. The level of potential cyclist use is not known but might be expected to be mostly out of peak periods.

- **Action**: **design team** to work up a feasibility design sketch of a stand-alone Pegasus. Further thought to be given to an underpass that could also serve bat movements although at present it would seem this is likely to be too expensive given budget pressures.
- **Action**: **project team** to discuss with GCC an overall equestrian strategy for the wider area that could be presented as part of the public consultation to address concerns about a lack of equestrian provision in the scheme.

Cycling facilities on the surrounding network

3.16.11 A key route for cycling (and possibly walking) for GCC appears to be the B4634 although it is outside the scope of the M5 Junction 10 scheme. It has been included in the Local Cycling & Walking Infrastructure Plan (LCWIP). It is possible that it will be included in GCC thinking for Site C to the south-east of the B4634.

3.16.12 A route favoured by on-carriageway cyclists is the north-south rural roads from Boddington to Hardwicke west of the M5. Public concerns have been raised about increased traffic levels on the A4019 to Coombe Hill making crossing the A4019 by cycle more difficult.

3.16.13 The walking & cycling facility in the scheme extends to Stoke Road at the Gloucester Old Spot but that is the extent of the scheme. The high-quality proposed facilities would continue as far as this point but would go no further.

Value engineering

3.16.14 The government expects 50% of trips in towns & cities to be made by walking & cycling by 2030, therefore Active Travel should be considered essential to any local transport scheme. Therefore we believe it is important that we focus our design/budget on the facilities that are going to best support this expectation. Facilities on the WCLR and B4634 are much more likely to deliver this expectation than a segregated facility to the west of the WCLR.

3.16.15 The walking & cycling facility alongside the WCLR could be lowered towards the toe of the embankment for much of the length (i.e. not at the River Chelt structure) to save to earthworks materials and move the users away from passing traffic for a more pleasant experience. We had envisaged this to be above ground level to reduce earthworks quantities without it being below flood levels. We also envisaged it rising up to highway level on the approaches to the structure. If it is too complicated or doesn't provide enough VE benefit then let's forget the idea.

3.16.16 The meeting discussed the standard of the A4019 walking & cycling facility to the west of the WCLR junction. The segregated facility is a high standard although user numbers are expected to be very low. The project management team indicated GCC are keen to provide a high standard to cater for possible future demand.

Public Rights of Way (PRoW)

3.16.17 Brief discussion about connections to PRoW and possible upgrades.

3.16.18 **Action:** Meeting decided scheme development should focus upon the design of the diversions.

3.17 LTN 1/20 Assessments – Design Fix 2.2 (July 2021)

3.17.1 The scheme has been assessed using Appendix A (Cycling Level of Service – CLoS) and Appendix B (Junction Assessment Tool – JAT) of LTN 1/20 to judge the level of service the proposed design would provide for cyclists. These tools were introduced by the Department for Transport (DfT) to set minimum quality criteria for cycling infrastructure design. This process gives a clear indication of the level of service for cyclists but must be considered in conjunction with the needs of other users in the pedestrian and equestrian user groups.

3.17.2 The technical note set out the key results of the two assessment tools and what recommendations could be implemented to further improve the scheme. Two subsequent iterations of the preliminary design have been subject to the same assessment processes; however, it was decided that for the subsequent assessments the scheme would be treated as a single entity for the CLoS assessment and nine junctions were subject to the JAT process, compared with seven junctions for this first assessment. A comparison of the scores is provided later in this report to demonstrate design development.

3.17.3 Firstly, the two main route corridors, the A4019 corridor between its junctions with M5 Junction 10 and the Gallagher Retail Park, and the other for the new West Cheltenham Link Road, were assessed using the Cycling Level of Service tool, Appendix A of LTN 1/20. Both corridors failed to achieve the 70% pass mark and did not score well with regards to criteria in the five core design criteria. However, neither registered a 'critical' response to a particular criterion, which also fails a scheme.

3.17.4 The junctions along both corridors were then assessed using the Junction Assessment Tool, Appendix B of LTN 1/20. Out of the seven junctions assessed, two passed the assessment, where they did not register any manoeuvres which may be unsafe for cyclists whilst the remaining five junctions did.

3.17.5 Therefore, this chapter will set out some considerations for the design team that may help to improve scores with respect to the five design principles set out in LTN 1/20. These are set out in Table 3-1.

Table 3-1 - Design Recommendation

Design Criteria	Recommendations
Cohesion	There are occasions in the overall design where a route is not continuous, such as connecting up to existing provisions at the eastern end of the A4019 corridor. Make it clear where routes are connecting into and avoid any ambiguity.
Directness	Consider having single stage cycle crossings so delays for cyclists are shorter than those in motor vehicles.

Design Criteria	Recommendations
	Consider cycle detection equipment at signal-controlled crossing points so cyclist delay at junctions is minimal.
Safety	Consider the use of segregated provision instead of shared use. Designs should include appropriate surface markings (found in the TSRGD) that allow the scheme to function properly and avoid ambiguity.
Comfort	Provide destination/wayfinding signage for cyclists which is located at all decision points. This should be based on Transport for London's 'Cycleways Signing Guidance'.
Attractiveness	Provide street lighting along routes so the routes feel more secure and cyclists/links are more visible. Provide cycle parking at key destinations so this gives people the option to cycle to their destination rather than drive.

3.18 PCT and forecasting levels of cycling

3.18.1 In order to provide greater evidence for cycle numbers around the new M5 J10 scheme, the 'Propensity to Cycle Tool' (PCT) was used to highlight the cyclist potential in the area. The PCT, being an open-source tool, was able to be modified to account for the key new developments in the area which will have a direct impact on the road network usage around the M5 J10.

Destinations for Commuters

3.18.2 In order to input the new trips into the PCT, the origins/destinations to/from the new developments had to be considered to understand which trips the new commuters would be making. The current route data for the LSOAs that the developments sit in was obtained from the PCT site. It was assumed that the split for trip origins/destinations made by existing commuters in the LSOAs would remain the same for the new trips to/from the new developments.

3.18.3 For example, if they are ten total commuters in LSOA 1 and two of them both travel to the same destination LSOA 2, then we can say than 20% of the commuters in LSOA 1 travel from LSOA 1 to LSOA 2. Using this analysis, we would then say that 20% of the new commuters in LSOA 1 (e.g., Elms Park) will also travel from LSOA 1 to LSOA 2.

3.18.4 Therefore, this allowed the new commuters in the LSOAs that a new development sits within to be distributed to destination LSOAs with the same proportion as the existing commuters.

Destinations for Cyclist Commuters

3.18.5 Two scenarios were considered for the destinations that the new development cycling commuters would travel to:

3.18.6 1. A similar process to Section 0 was carried out for the cyclists, whereby the new cyclist trips were distributed according to the proportions for the current cycling destinations from the LSOAs. This carries a bias of the routes and road existing cyclists use and so destinations which currently have no cyclist commuters remained at zero.

3.18.7 2. The alternative scenario was to not consider existing cycle numbers and assume that if the facilities are provided cyclists are equally likely to cycle to all destinations from a LSOA. Therefore, cyclist numbers were calculated using a percentage of the total commuters travelling between two LSOAs. This would create a more even distribution of cyclists across the whole road network.

Creating route networks

3.18.8 To understand the total number of cyclists using a road during a daily commute, a route network had to be created. This takes all the individual routes between LSOAs and where they overlap the data is combined to provide one singular route along a stretch of road.

To create a route network, the geographical information stored within the current PCT data had to be used. The PCT data only includes trips with greater than 5 commuters and less than 20km and so this too had to be constrained of the new data that was to be included so not all trips and cycle numbers will be represented in the results.

Creating Different Scenarios

3.18.9 To consider cyclist potential in the area, different scenarios were created using the PCT source code within RStudio to provide comparison to show how cycling numbers could increase if better cycle facilities are provided and there is a positive attitude shift to cycling in the area. Three scenarios were run:

3.18.10 **Scenario 1 – 'Do Minimum' Cyclists**

- No change to the UK 2011 Census number of cyclists and 'do minimum' cycling levels of new developments

3.18.11 **Scenario 2 – Government Target Number of Cyclists**

- PCT 'Gov Target 2020' scenario carried out on UK 2011 Census cyclists and 'do minimum' cycling levels of new developments
- Government target is based on a doubling of cycling levels, from the 2014 Cycling Delivery Plan, which is assumed to be the same as Elms Park TA 'do something' percentages. The '2020' refers to a PCT refinement of the original scenario to improve the scenario predictions.

3.18.12 **Scenario 3 – Dutch Cycling Rates**

- PCT 'Go Dutch 2020' scenario applied to UK 2011 Census and new development commuters

3.18.13 The 'Go Dutch' scenario shows cycling potential if, for each trip, UK residents were as likely to cycle as Dutch people currently do

3.18.14 The assumption for these three scenarios was to show that cycle numbers would increase moving down the scenarios as for each one it was assumed a greater number of cyclists would be present if the appropriate attitudes and facilities were provided.

Presenting the Results

3.18.15 Each of the scenarios was run on RStudio which allowed a figure to be produced. Two different types of data were shown:

- Total number of cyclists on the road network
- Percentage of total commuters on road network that are cyclists

Limitations

3.18.16 The following points set out some of the limitations with using the PCT which should be considered when viewing the results:

- Information can only be shown for routes which from the 2011 Census Data had more than 5 total commuters and a route distance of less than 20km.
- All trips start/end at the same geographical point (node) within a LSOA rather than at the specific location within the LSOA. For larger zones there is greater error in where the trips start/end from and so may cause routes to travel on roads or not travel on roads which would not occur if the specific trip location was able to be used.

Example Output and Conclusion

3.18.17 The following figure shows the output from the PCT for the scheme; in this instance a 'Go Dutch' scenario is adopted the test the level of cycling in very favourable conditions and this indicates notable levels of cyclin along the A4019. Note the WCLR is not included in the PCT model as it does not currently exist.

3.18.18 The work on the PCT has a number of limitations and yet it gives an indication that the numbers of cyclists on the A4019, once developments at Elms Park and to the south of

the B4634 have been implemented, could be quite high. Without the WCLR in the PCT model it is difficult to gauge the importance of that connection but it would be expected to increase cycling levels further.

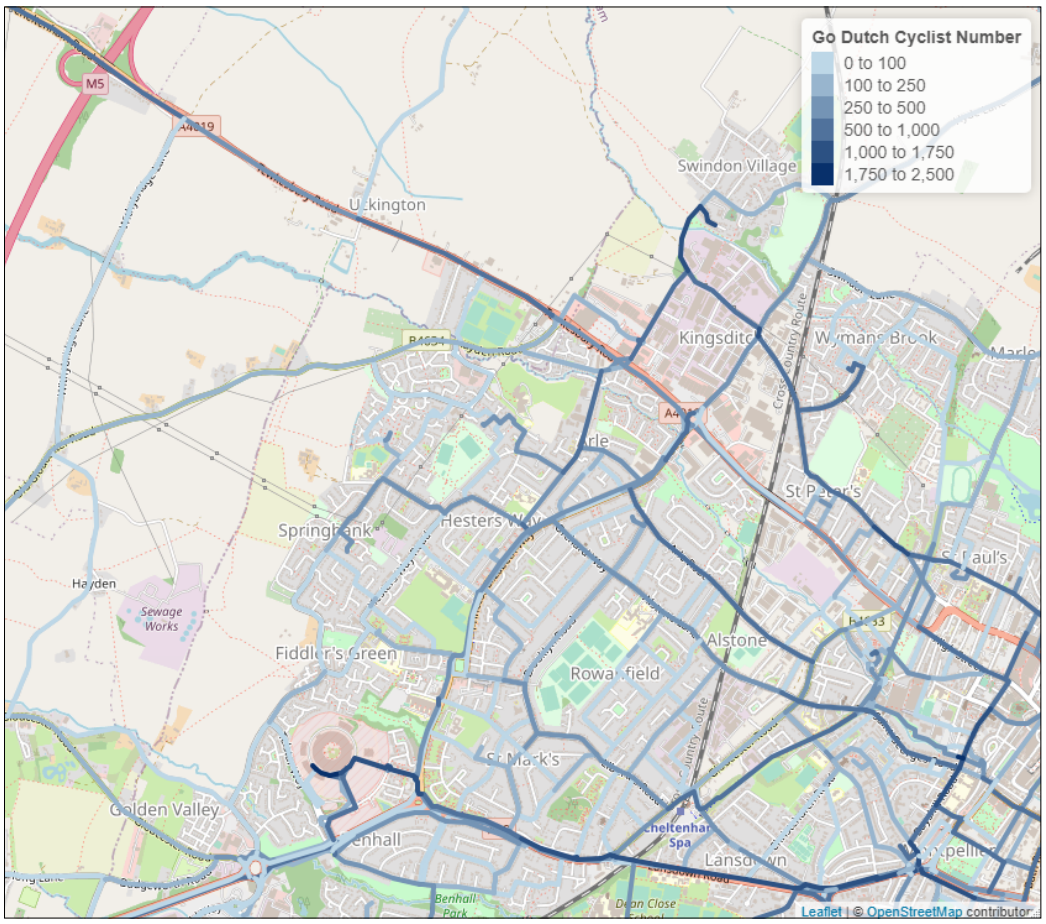

Figure 3-4 - Example output for the adapted Propensity to Cycle Tool model[1]

3.19 Cycling Improvement Opportunities Technical Note (April 2022)

3.19.1 The purpose of this technical note was to assess the cycling network and infrastructure included in the proposed M5 Junction 10 Improvement scheme and identify opportunities for further improvement. The assessment was based on the designs made available for public consultation between December 2021 and February 2022 and has been updated to take account of the final design fix (DF3.4) for the end of preliminary design. The recommendations were informed by assessments undertaken using the two scoring tools contained within LTN 1/20 Cycle Infrastructure Design guidance – Cycling Level of Service (CLoS) & Junction Assessment Tool (JAT). These tools were introduced by the Department for Transport (DfT) to set minimum quality criteria for cycling infrastructure design. The technical note set out the key results of the two assessment tools and what recommendations could be implemented to further improve the scheme.

3.19.2 The latest designs for the M5 Junction 10 Improvement scheme include a wide range of pedestrian and cycle facilities both on links and at junctions. Many of these facilities are of high quality and in accordance with LTN 1/20.

[1] Lovelace, R., Goodman, A., Aldred, R., Berkoff, N., Abbas, A., Woodcock, J., 2017.The Propensity to Cycle Tool: An open source online system for sustainable transport planning. Journal of Transport and Land Use. 10:1, 505–528, DOI: 10.5198/jtlu.2016.862.

3.19.3 Overall, the M5 Junction 10 Improvement scheme meets the minimum 70% standard for the LTN 1/20 CLoS assessment, scoring strongly for safety and comfort. Safety is also a consistent strength of the junction designs within the scheme.

3.19.4 However, the scheme still contains numerous weak elements. The CLoS assessment scores for three of the five key requirements – cohesion, directness, attractiveness – are only 50%, whilst the JAT assessments of several junctions identified several critical fails which should be addressed.

3.19.5 Comparison of CLoS assessment scoresTable 3-2 sets out a summary of the CLoS assessment scores for the following scenarios:

- the existing layout;
- the Design Fix 2.2 layout (DF 2.2 – July 2021);
- the Design Fix 2 layout (DF 2 – Public Consultation layout); and
- the Design Fix 3 layout (DF 3 – end of preliminary design).

3.19.6 As the first LTN 1/20 assessment considered the A4019 and the WCLR separately the scores for both routes are shown. However, the scores are generally similar for the two routes. As the WCLR does not currently exist, the existing scores for the WCLR are based upon Withybridge Lane which is the nearest existing parallel route.

3.19.7 The increase in the scores between Design Fixes 2.2 and 3.4 can be attributed to:

- more direct alignments for cycle routes at signal-controlled junctions;
- improved connections for cyclists at the scheme extents;
- greater separation from passing traffic along the A4019;
- clearer information about traffic signal operation; and
- more information about street lighting.

3.19.8 The similarity in scores between the Public Consultation (DF 2) and end of preliminary design (DF 3) is a result of a number of factors, including:

- replacement of a section of shared use facility on the A4019 at Uckington with segregated walking and cycling facilities;
- other sections of shared use being included in the scheme design, particularly in the vicinity of the Gallagher Retail Park junction. The east end of the scheme is where the highest pedestrian and cyclist flows are expected and shared facilities are significantly less suitable in these conditions. Whilst the need to provide carriageway space for the expedient movement of traffic is acknowledged, it is likely to have a significant detrimental impact upon the cohesion, directness and attractiveness of the route for cyclists (and pedestrians); and
- various previous assumptions have subsequently been confirmed. Some have been confirmed as accurate – such as street lighting and traffic signs – whereas others – such as traffic signal phasing – have been confirmed as less advantageous to cyclists than previously hoped.

Table 3-2 - CLoS summary comparison

Key Requirement	Maximum Score	Existing (Combined Scores)	DF 2.2 (Combined Scores)	DF 2 (Public Consultation)	DF 3 (end of prelim design)
Cohesion	6	0/1	2/1	3	3
Directness	10	6/7	5/7	4	4
Safety	16	CRITICAL (0)	11	16	16
Comfort	8	2/3	6	7	7
Attractiveness	10	1	1	5	5

Total (X/50)	50	9/12	25/26	35	35
Percentage (Pass = 70%)	100%	18%/24%	50%/52%	70%	70%

3.19.9 The key focus of improvements based on the outcome of the CLoS assessment should be reducing delays for cyclists at junctions (i.e., the number of times they have to stop), separating pedestrians and cyclists throughout the scheme, and ensuring the good provision of lighting and cycle parking.

3.19.10 Although this Technical Note focuses on cycling provision in the M5 Junction 10 Improvement scheme it is important to note that the recommendations would provide other benefits.

3.19.11 The first is pedestrians' benefits which are significant because pedestrians are at the top of the Road User Hierarchy so measures which benefit them are very important, especially in an area where circa 8,000 new homes are planned.

3.19.12 Recommendations relating to the separation of pedestrians and cyclists and lighting would also improve the accessibility of the scheme by benefitting visually impaired users.

3.19.13 Lastly, the recommendations relating to the A4019 & B4634 junction, and the B4634 and the WCLR junction would future proof those junctions. If the current junction designs were implemented both would need to be upgraded to be in accordance with LTN 1/20 when GCC delivers its LCWIP network. Given the size of these junctions, this would have significant cost implications for GCC and mean future unnecessary disruption to the road network. A summary of the recommendations is shown in Table 3-3.

Table 3-3 - Recommended cycling opportunities

Ref	Location	Design issue	Recommendation(s)
1	A4019/ Uckington junction and approaches	Pedestrians and cycles are not separated in certain locations within the scheme extent	Extend segregated pedestrian and cycle facilities on the west side of the junction (note: this recommendation has already been implemented by the Design Team) Create segregated pedestrian and cycle crossing of The Green Provide transitions for cycles to use access road so that shared use path can be converted to footway
2	A4019/ B4634 junction	Pedestrians and cycles are not separated in certain locations within the scheme extent	Provide segregated pedestrian and cycle facilities at the junction on the north-east side, which may require small land take Provide segregated facilities on the south-east side through the removal of one of the exit lanes on the south side of the junction Provide segregated facilities on the south-west side through the removal of left turn slip lane Delivering these improvements not only improves cycle facilities but pedestrian facilities too and future proofs the junction, reducing future capital costs and disruption
3	Throughout scheme	Lack of cycle parking provision	Identify suitable locations for cycle parking within the scheme extents, consider: Key trip attractors Locations where parked cycles won't create potential hazards for pedestrians Locations where parked cycles will be overlooked and well-lit so that natural surveillance will help reduce the risk of theft

Ref	Location	Design issue	Recommendation(s)
4	WCLR & west of Uckington	Cycle facilities provided in isolated locations	Ensure that lighting is adequate throughout the scheme extents, including providing good lighting in less built-up areas with less natural surveillance
5	A4019/ Stanboro Lane	Cycle safety at junctions	Set backcrossing for pedestrians and cycles away from the mouth of the junction and fast turning vehicles Reduce the speed of vehicles through design on approach to crossing Consider potential visibility issues and solutions
6	B4634/ WCLR	Cycle safety at junctions	Upgrade the existing junction design to a protected junction which would provide much improved pedestrian and cycle facilities using existing signal phasing Protected junction design also future proofs the junction reducing future costs and disruption
7	A4019/ The Green/Moat Lane	Not all cycle movements are considered in junction design	Upgrade the existing signalised pedestrian crossing to a toucan crossing to permit all cycle movements at the junction Provide straight ahead toucan crossing to ensure the crossing is accessible for all cycles
8	A4019/ Elms Park Development	Not all cycle movements are considered in junction design	Provide crossing facilities to allow cycle (and pedestrian) access to and from the sports club/ground on the south side of the junction
9	B4634/ WCLR	Not all cycle movements are considered in junction design	Upgrade the existing junction design to a protected junction which would provide much improved pedestrian and cycle facilities using existing signal phasing Protected junction design also future proofs the junction reducing future costs and disruption
10	A4019/ WCLR	Excessive delays for cycles at junction	Shift pedestrian and cycle crossing facilities to the east side of the junction to reduce delays to active modes Also shift pedestrian and cycle facilities to the east side of New Link Road Reduce the road on the north side of the junction to a single carriageway to reduce crossing distances (note: this recommendation has already been implemented by the Design Team)
11	A4019/ Homecroft Drive	Excessive delays for cycles at junction	Replace the existing left filter lane on A4019 eastbound with a ‘hold the left’ layout to reduce delays for pedestrians and cycles who could then cross in one-stage Reduce the number of lanes on the minor road at the junction to reduce the crossing distance for pedestrians and cycles
12	A4019/ Elms Park development	Excessive delays for cycles at junction	Ban left turn from A4019 into Site Road B to reduce delays for pedestrians and cycles at the junction. If not possible apply ‘hold the left’ layout, as per recommendation 11 Reduce the number of lanes on the minor road at the junction to reduce the crossing distance for pedestrians and cycles

Ref	Location	Design issue	Recommendation(s)
13	A4019/ B4634	Excessive delays for cycles at junction	Replace the existing left filter lane on A4019 eastbound with a 'hold the left' layout to reduce delays for pedestrians and cycles who could then cross in one-stage Ban right turn from A4019 into Gallagher Retail Park and left turn from Gallagher Retail Park onto A4019 to allow alternate signal stages which reduce delays for pedestrians and cycles Implement alternate 4 stage signal phasing which reduces delays for pedestrians and cycles

3.20 WCHAR/Design Team discussion 16th February 2022

3.20.1 The following is a record of a discussion between the GG 142 Lead Assessor and the highway design team.

Transitions to/from the carriageway at the western extent of the scheme

3.20.2 National Highways has provided a comment regarding the western end of the scheme near Stanboro Lane; the comment relates to how cyclists would move between the carriageway/off-carriageway facility.

3.20.3 Previously there had been a proposal for traffic signals at the Gloucester Old Spot junction although it would appear this is not being progressed any longer. On this basis, a transition is needed for cyclists in both directions given there are no off-carriageway cycling facilities to the west of the scheme extents.

3.20.4 A discussion considered the options and facilities immediately to the east of the Stanboro Lane junction was chosen. This would allow eastbound cyclists to avoid the complication of negotiating a shared use path across the Stanboro Lane junction as well as providing a simple slip from carriageway to cycle track.

3.20.5 For westbound cyclists on the cycle track, there would be a turn through nearly 90 degrees to reach a refuge in an extension of the central reserve where they would wait for a gap in traffic exiting the Junction 10 roundabout. This would be the only direction of travel across the cycle route; visibility to approaching vehicles would be expected to be sufficient to allow an informed judgement about when to cross. On the nearside of the westbound A4019 lane there would be a 'jug handle' arrangement to allow cyclists to move alongside westbound traffic which would lead into a transition from cycle track to cycle lane; this would subsequently terminate. This transition would provide protection from following vehicles until the cyclists are fully merged with other traffic. Cyclists would also be able to join the carriageway directly from the crossing if they felt this was more appealing or a safe transition in the absence of vehicles.

A4019 to the east of the Gallagher Retail Park junction

3.20.6 The discussion moved on to about transitions to/from the A4019 carriageway for cyclists travelling to/from the east where there are no facilities for cyclists.

3.20.7 After discussing the very limited space available within the highway boundary it was concluded that westbound carriageway cyclists wanting to join the segregated facility on the norther side of the A4019 could exit at a slip at the junction and then use the signal-controlled crossings. The southern footway could remain a footway until this point.

3.20.8 For eastbound cyclists there is need to provide a safe transition from the shared use path to the carriageway by providing some protection from following vehicles. However, this should not be located close to the start of the downstream junction as this could put cyclist at brisk of being struck by left-turning vehicles as the left turn lane forms. The design team are to look at moving the carriageway to the south as much as possible (now only a footway is required, see preceding paragraph) to create space for an eastbound transition lane closer to the Gallagher Retail Park junction, upstream of the scheme extent.

B4634 arm to the south of the Gallagher Retail Park junction

3.20.9 Continuing the shared use paths further along the B4634 was discussed but it was concluded that if these extensions were not included it would not preclude them from being developed in the future. On this basis, a short cycle slip is proposed at the junction to allow cyclists using the crossings at the junction (or leaving the A4019 westbound carriageway) to immediately join the B4634 carriageway instead of negotiating a length of shared path and a junction before merging with the carriageway. For B4634 cyclists approaching the junction from the south it was concluded that the most appealing location for a transition from carriageway to shared use path (there is insufficient space close to the junction for segregated facilities) would be downstream of the access to Aldi/Bristol Street Motors so these cyclists would not need to negotiate a shared use path through that junction bellmouth. The shared use path would connect with the Aldi access to provide a link to this trip generator for pedestrians and cyclists.

3.20.10 Post meeting note: the proposal to the east of the Gallagher Retail Park junction were subsequently not taken forward as part of this scheme and are instead understood to form part of the Elms Park development proposals.

3.21 March 2023 – Inclusion of an Eastbound A4019 Bus Lane

Bus Lane Proposal

3.21.1 The design of Scheme Element 3 (A4019 to the east of Junction 10) was changed in March 2023 to include an eastbound (inbound) bus lane on the A4019 from the Site A Junction (West Cheltenham Fire Station) to the Gallagher Junction. The bus lane will affect the operation of the Site A and B Junctions as well as the Gallagher Junction including left-turn lanes.

3.21.2 The design of the bus lane has been confirmed as being 4m wide. This width is in accordance with the guidance in LTN 1/20 Cycle Infrastructure Design and it has been confirmed that cyclists will be permitted to use the bus lane. LTN 1/20 identifies this width as a suitable width to allow space for buses to pass cyclists that choose to use the bus lane. The widths of the off-road cycle facility and footway alongside the A4019 eastbound carriageway have been confirmed as being unchanged following the introduction of the bus lane into the design.

Observations

3.21.3 It would seem that the bus lanes will operate largely in sync with the normal traffic lanes and thus use of the bus lanes will be more attractive to cyclists than the general traffic lanes.

3.21.4 While there are cycle tracks included in the design it is highlighted that cyclists are a widely-varying user group and a notable proportion will be expected to use the carriageway. This would be the case even if delays were minimised/non-existent on the cycle track; some cyclists simply are more content to travel with traffic due to the perception that this is the most efficient method to proceed. The expected delays at junctions created by the number of crossings and phases for vehicular turning movements are likely to encourage some cyclists to use the carriageway. In addition, the delays may discourage less willing cyclists from cycling at all. This latter issue is the primary reason for the concern about junction operation; government policy is looking to encourage a greater proportion of journeys by cycling and walking. Delays at signal-controlled junctions are likely to have a negative impact in this regard.

3.21.5 It has been confirmed that buses, taxis and cyclists will be permitted to use the bus lane to maintain consistency with the A40 Gloucester Road in Cheltenham. The more vehicles that are allowed to use the bus lanes, the greater the risk for cyclists as they are at risk of being struck by another user of the bus lane. However, the 4m width of the proposed bus lane is designed to provide sufficient space for passing on the links between junctions. Therefore the greatest risk would be expected to occur at junctions where there could be conflicting movements of bus lane users as well as those not using the bus lane.

Potential Challenges for Pedestrians, Cyclists and Equestrians

3.21.6 Cyclists making the ahead movement in the bus lane could be at risk of being struck by buses turning left into the park and ride site if this movement is permitted. It is not yet known if other vehicles will be permitted to turn left and hence potentially cut across cyclists.

3.21.7 The left slip into the park and ride site is now intended to give priority to pedestrians and cyclists using the off-road facilities over turning vehicles. This would be expected to assist in reducing the risk for pedestrians and cyclists crossing this slip, especially eastbound, with visibility to approaching vehicles almost 180 degrees behind as they approach the crossing. It may also not be clear which vehicles on the main carriageway will be entering the park and ride access. However, it should be investigated further as a raised table crossing would be expected to be good for cyclists and pedestrians but could present other hazards. These could include queuing back onto the main carriageway when vehicles slow to let pedestrians and cyclists cross.

3.21.8 Inbound on-road cyclists could be at risk of being struck by left-turning vehicles, either at the park and ride site entrance or where vehicles would be turning left at Site A, Site B and Gallagher Junctions. On the approach to Site A, Site B and Gallagher Junctions the conflict points would be expected to be where vehicles move to the nearside from the ahead lane. This could bring them into conflict with a cyclist already in the nearside/bus lane or at the point where the left turn lane peels away from the ahead lanes but the bus lane commences/recommences. In the latter locations cyclists wishing to proceed ahead could be struck by left-turning vehicles as they move to the nearside. These potential conflict points are highlighted by red stars in Figure 3-1.

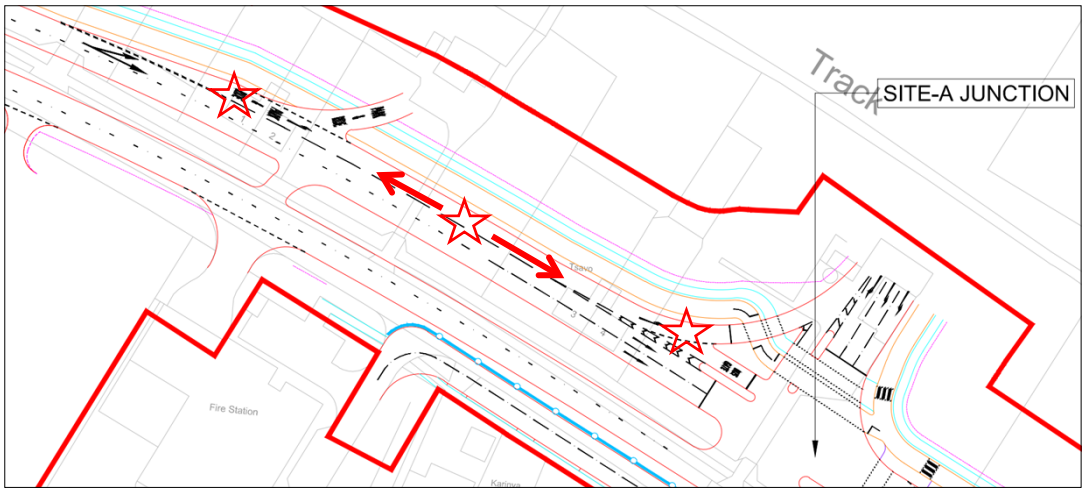

Figure 3-1: Possible conflict points for cyclists

3.21.9 At Site A and Site B Junctions, the bus lane downstream of each junction is offset to the right relative to the upstream entry to the junction. This could lead to cyclists in the bus lane being squeezed by buses (or other vehicles in the bus lane) against the kerb as there may seem to be too little room caused by this change of alignment mid-junction. The movement to the offside required by cyclists as they proceed across the junction is shown by the red arrow in Figure 3-2.

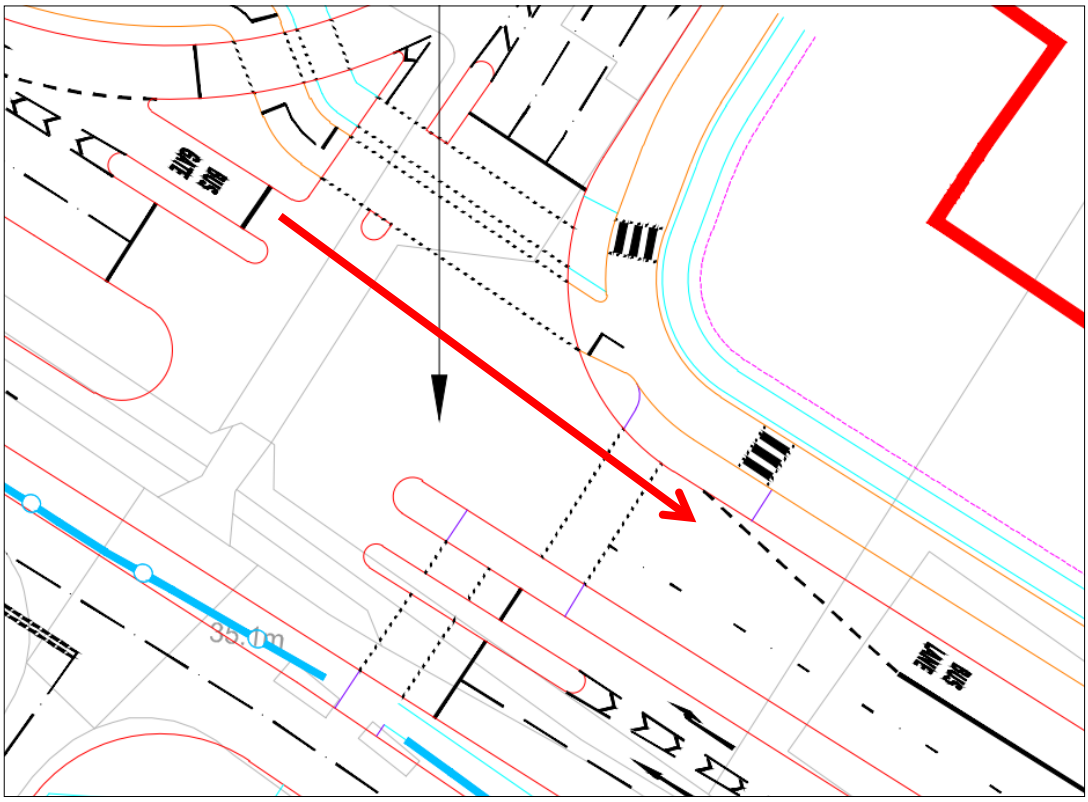

Figure 3-2: Movement towards the offside required by cyclists following the bus lane

3.21.10 At the Site B and Gallagher Junctions, the bus lane terminates and becomes a left-turn lane. This is likely to lead to conflicts between cyclists in the bus lane and left-turning vehicles.

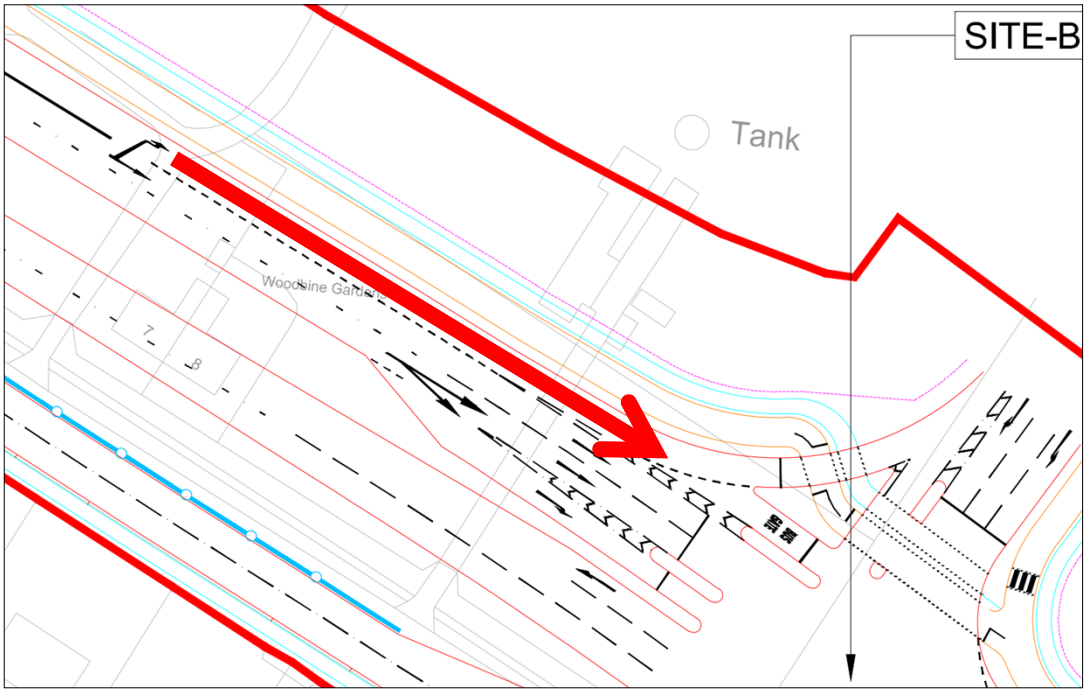

Figure 3-3: Example of where the end of the bus lane and left turn are likely to create conflicts for cyclists (highlighted by the red arrow)

Potential Opportunities for Pedestrians, Cyclists and Equestrians

3.21.11 A reduction in the number of stops/delays on the traffic islands at each junction would make a significant difference to the user experience for pedestrians and cyclists. For cyclists, each time they are required to stop at a crossing, the extra effort of restarting requires significant extra effort compared with being able to continue cycling. This, combined with the general sense of discontinuity, would be expected to significantly reduce the attractiveness of the route. Redesigning the traffic signal cycle at each junction to accommodate the bus lane., would be of great benefit to these users and would be expected to make the route more appealing. It would also provide more time in the cycle for pedestrians and cyclists using the off-road facilities.

3.21.12 It is recommended that the bus lane is not held at a junction signal when other A4019 eastbound traffic is permitted to proceed. This could result in cyclists changing lane and be at risk of being struck whilst doing so.

3.21.13 There remains an opportunity to change the method of signal control to reduce the number of stops pedestrians and cyclists on the off-road facility need to make to complete the crossing at the Gallagher Junction. Along with staging improvements and balancing the share of the signal cycle between all users, there is an opportunity to make the off-road cycle facilities (and the bus lane) much more appealing to cyclists. This would also directly improve the pedestrian experience.

3.21.14 The start/restart of the bus lane at Site A and Site B Junctions immediately after the location of the left turn manoeuvres raises concerns for ahead cyclists wishing to join the bus lane being struck by turning vehicles. There is an opportunity to review this layout with the safety of cyclists in mind.

3.21.15 There is an opportunity to amend the alignment of the nearside eastbound exit kerb at Site A and Site B Junctions. This could be designed such that the change in alignment to the offside is not as sudden and thus reduce the likelihood of a cyclist exiting the junction into the bus lane being squeezed against the kerb by a bus (or other vehicle in the bus lane).

3.21.16 At Site B and Gallagher Junctions the bus lane terminates and becomes a left-turn lane. This is likely to lead to conflicts between cyclists in the bus lane and left-turning vehicles (as the latter move to the nearside). There is an opportunity to review the design with the safety of on-road cyclists in mind.

3.21.17 If additional bus stops are included in the design then there is an opportunity to create layouts for these to minimise conflicts between cyclists and bus passengers boarding and alighting buses.

3.21.18 The BHS has indicated that this section of the A4019 is used by horse-riders but there is insufficient space within the highway boundary to be able to provide a separate equestrian facility alongside the A4019. It is not known whether horse-riders would choose to use the bus lane and it is also not known whether the bus lane restrictions would mean this is leagally allowed. However, overall the bus lane would provide a greater buffer from general traffic if a horse-rider was using the the off-road footway/cycleway facilities.

3.22 Crossing of A4019 at Site A Junction – May 2023

Type of Provision

3.22.1 The original intention for crossing facilities at Site A Junction was to include a Toucan crossing over the A4019. Due to changes in the design from the planning layout associated with Elms Park, a crossing at Site A Junction would be the only crossing for pedestrians and cyclists between Uckington and the Gallagher Junction. There would be no formal cycling facilities to the south of the A4019 in the vicinity of Site A Junction. However, a service road would provide some connectivity for these users and destinations such as the Civil Service Sports Association could be expected to draw users from the north side of the A4019.

3.22.2 Due to the limited central refuge island widths, the provision of a Toucan crossing was in some doubt. A design review of the signal layout and operation was carried out between the highway design team, the signals team and the Lead Assessor.

3.22.3 On the south side of the A4019, any cyclists using the crossing would need to access the service road. The design of the traffic island/verge between the A4019 westbound carriageway and the service road could be difficult if cyclists are cycling across a Toucan and then immediately joining the service road. This would be in the same location that pedestrians will need to cross the service road (or carry on eastwards on a footway to Sandpiper Drive).

Layout Without Cycling Provision

3.22.4 The design without a Toucan crossing included a pedestrian facility that (from north to south):

- crossed the cycleway on an informal crossing;moved a short distance to the west;
- crossed all three sections of A4019 (including the right turn lane);
- before rejoining a footway; and
- then an uncontrolled crossing would take them across the service road to the footway. This type of facility may have been accompanied by the undesirable 'Cyclists Dismount' signs.

3.22.5 The design discussion then considered whether the waiting areas and general passage through the crossing were of a sufficient size to accommodate a cycle design vehicle specified in CD 195 or LTN 1/20 (which can be somewhat bigger than a standard bicycle); a dismounted cyclist would be able to wheel their cycle if a Toucan crossing was not provided. However, this would not assist a cyclist that is unable to dismount, possibly due to a disability. In this instance it would be expected they would proceed on the pedestrian route anyway, although this would be unsatisfactory and would be a prohibited movement.

Toucan Crossing Proposal

3.22.6 Despite the waiting area on the northern side of the A4019 being reduced in width from the DF3 design, it was decided that it would be possible to include a Toucan crossing. The limiting factor is the refuge/staggered island. If the design included pedestrian guardrailing in these islands then it would be difficult to accommodate two cycles at the recommended design cycle dimensions of 1.2m wide by 2.8m long. There would be limited space to pass through the poles in the centre of the island and this could create the potential for conflict between cycles and cycles/pedestrians.

3.22.7 The staggered area in the centre of the proposed Toucan crossing would be 12m long x 3m wide. The current assumption is that guardrailing would not be included and instead upstand kerbing would be provided along the edge of the island to guide users and provide a safety margin. The proposed speed limit of the A4019 through this section is 40mph.This crossing provides access between the non-primary pedestrian and cycling routes to the south of the A4019 and the primary facilities north of the A4019 Forecast use is less than that along the northern corridor.

3.22.8 The A4019 through lanes are 3.65m wide at this location so there is scope for narrowing these in order to increase the refuge island width at detailed design. This would also then allow for the provision of pedestrian guardrailing should that be considered necessary at detailed design.

3.23 Other WCH Design Elements Developed Throughout the Preliminary Design

Surfacing Needs for Each User Group

3.23.1 Surfacing options have been discussed for the route through the underpass under the A4019, including cinder/crushed rock, shredded tyre bound surfacing for horses' hooves, different types of sealed surfaces. Sealed surfaces with a negative texture (binder at the

surface) lead to problems for horses as hooves/horseshoes cannot grip this well. Hot rolled asphalt with a positive texture works better for horses, whilst either a bound shredded tyre surface course or an unbound surface provide good grip for horses.

3.23.2 Conversely, cyclists prefer the smoothest surface to reduce rolling resistance and maximise comfort and pedestrians generally prefer a consistent surface to minimise the potential for stumbling or walking through standing water. In addition, high friction surfaces can lead to stumbling which can be an unpleasant experience for pedestrians.

3.23.3 Based upon the preceding paragraph, it is recommended that the surface of any facilities intended for use by pedestrians and cyclists utilise sealed surfaces that are consistent in level and well laid. However, it would be advantageous to any informal equestrian use that the surfaces have a positive texture (such as hot rolled asphalt).

Traffic Signs and Road Markings

3.23.4 It is intended that wayfinding signs will be provided for routes within the highway as well as traditional fingerpost signs for PRoWs. These should follow any Gloucestershire protocols used in adjacent sections of the highway to maintain consistency.

Lighting

3.23.5 Street lighting systems should provide coverage for the walking/cycling facilities alongside the highway on the A4019 and WCLR to improve the safety of users at night. Any lighting columns should be located at least 0.5m away from the edges of any walking or cycling facility to avoid reducing the effective width of the facility and reduce the likelihood of users (particularly cyclists) colliding with the column.

3.23.6 Lighting for the A4019 underpass will need to take account of the needs of bats during the hours of darkness. During the hours of daylight when the underpass would be most expected to be in use by pedestrians, cyclists and equestrians the lighting levels should be sufficiently high to allow these users to see the route and surface clearly and avoid any dark areas.

Change from shared use to segregated facilities at Uckington

3.23.7 The section of A4019 through Uckington is restricted by a variety of properties to the north and south. The need to include a signal-controlled junction, bus stops and walking/cycling facilities originally led to a layout that changed the general segregated walking/cycling facilities elsewhere along the A4019 to a shared facility in Uckington. This lack of consistency and requirement for pedestrians and cyclists to share the facility raised concerns for safety as well as the overall appeal of the facility. During development of the preliminary design the drainage layout on the south side of the A4019 at Uckington was amended and this allowed the main carriageway to be moved to the south by a small distance. This created a slightly wider space on the north side of the A4019 and a revised layout was created that allowed pedestrians and cyclists to remain segregated.

3.23.8 The revised design routed the pedestrian facility close to the northern highway boundary, behind the service roads and across The Green side road at an uncontrolled crossing away from the immediate junction area. The cycle facility would continue to run alongside the carriageway (with the maximum achievable separation given the land constraints) and would have a single stage crossing of The Green as part of the signal-controlled junction operation. This layout would allow cyclists to proceed in a generally straight alignment without needing to interact with pedestrians except where the pedestrian routes cross the cycle facility to then cross the A4019 carriageway.

Footpath/PRoW connections

3.23.9 There are relatively few PRoWs that connect directly with the scheme, despite its size. All will have access arrangements that reflect current best practice. The key connections are:

- Bridleway AUC1 opposite the northern end of Withybridge Lane. This will connect to the service road north of the A4019 with subsequent connections to the A4019 underpass (for pedestrians, cyclists and equestrians) and the A4019/WCLR junction (for pedestrians and cyclists);

- Footpath ABO14 part 2 to the west of the M5 and south of the A4019. A connection along a service road will be incorporated into the scheme although no formal footway connection is planned; and
- Footpath AUC8 is to the east of Uckington and to the north of the A4019. This footpath lies within the proposed Elms Park development and thus the final layout of the M5 Junction 10 Improvement scheme will not require a connection as this PRoW is expected to be extinguished. No connection has been included in the preliminary design although a simple connection to the segregated pedestrian facility to the west of the bus access could be included in the detailed design.

3.23.10 There are no other direct PRoW connections to the scheme although he following PRoWs do have indirect connections or have other relevance:

3.23.11 Footpath AUC15, Bridleway AUC14 part 1 and Footpath AUC11 all connect with Moat Lane to the south of Uckington. Footpath AUC11 also connects with Cook's Lane which itself connects with the A4019 to the west of Uckington although Cook's Lane is not a PRoW;

3.23.12 Footpath AUC11 also connects with Withbridge Lane and would be rerouted as part of the scheme to pass under the River Chelt bridge on the WCLR; and

3.23.13 Footpath ABO24 would also pass under the WCLR River Chelt bridge with a minor rerouting. This footpath connects Boddington and Withybridge Lane to Bridleway AUC14 part 1 to the south of Uckington.

Cyclops/Protected junction at the southern end of WCLR

3.23.14 The current signal-controlled junction at the southern end of the WCLR currently includes segregated/parallel crossings for walking/cycling and these would operate on and all-red traffic phase. This would mean the provision of a protected junction (with segregated walking and cycling crossings on all four arms) could be accommodated without any loss of capacity for traffic. Whilst this may seem an unnecessarily 'urban' high standard of provision at this junction, once the development to the south is completed and if the B4634 becomes the walking/cycling corridor identified in the LCWIP, this type of junction arrangement may be more appropriate.

Separation from traffic alongside A4019

3.23.15 It has been noted on a number of occasions that the greater the separation of an off-carriageway cycle facility from passing traffic, the more appealing the route becomes. Whilst the separation requirements of CD 143 are to be met throughout the design a greater separation would clearly have been desirable. The standard layout for segregated facilities generally places cyclists alongside traffic with pedestrians towards the highway boundary. Due to the pressure of land constraints on a linear highway scheme, providing separation greater than the standards require can be extremely difficult to justify when the scheme involves land take beyond the existing highway boundary. It is expected that cycling routes will be provided within the proposed developments that will be adjacent to the A4019. These would provide an entirely different environment for cycling albeit without the appeal of the directness of following the primary a-class road.

Sandpiper Drive connection for pedestrians

3.23.16 It is understood that the original planning drawings incorporated a signal-controlled crossing close to Sandpiper Drive away from any junctions. Due to the significant challenge of catering for the forecast traffic and additionally providing high-capacity accesses into the Elms Park development the standalone crossing could not be accommodated as previously intended and the design appears to prioritise traffic movements over directness for pedestrians. For the pedestrian connection to Sandpiper Drive (which connects to Appleyard Close via a pedestrian link (which is not classified as a PRoW) and the civil service sports club from Elms Park, the crossing facilities at the proposed adjacent junctions would be intended for use resulting in a significant diversion. To assist in guiding pedestrians to the appropriate crossing point, wayfinding signs are strongly recommended on the A4019 and within the Elms Park development when it is constructed.

With green movements alongside A4019

3.23.17 A recent concept, highlighted in LTN 1/20, is 'hold the left turn' whereby cyclists and pedestrians can cross a side road at a signal-controlled junction at the same time as ahead traffic continues on the major route. Any turning traffic is held to accommodate this green phase for cyclists and pedestrians. Dependent upon the turning movements this may require long left turn lane to hold the turning vehicles but it would dramatically reduce delays to cyclists in keeping with the intentions of LTN 1/20.

Gallagher Retail Park junction

3.23.18 The northbound B4634 entry to the Gallagher Retail Park junction originally included a left turn lane which could only accommodate a single vehicle. This additional crossing would create further delay for pedestrians and cyclists wishing to move between the B4634 and A4019 towards Cheltenham. The final preliminary design no longer includes this left turn lane and thus the layout of the crossings has been simplified.

3.23.19 Elsewhere in the vicinity of the Gallagher Retail Park junction the existing shared use facilities are to be retained due to the limited available space within the highway boundary. The eastern section of the scheme around this junction is expected to be the most heavily used by pedestrians and cyclists and thus the introduction of segregated facilities was given significant attention. However, it is understood that forecast traffic flows have been used to determine the extents of the carriageway and therefore there was insufficient remaining space to accommodate segregated walking and cycling facilities.

Left turn lane at Junction 10 westbound

3.23.20 There are significant traffic constraints that have resulted in the use of a layout where the westbound A4019 approach includes the nearside lane only marked for the left turn onto the M5. However, this does raise serious concerns for the safety of on-carriageway cyclists. An alternative layout may be achievable but one has yet to be identified. Any additional facility to assist on-carriageway cyclists that removes their priority as a road user (for example, takes them off carriageway to cross the slip road) is likely to be ignored.

3.23.21 As noted above, this layout is likely to be hazardous to on-carriageway westbound cyclists. The alternative off-carriageway facility is unlikely to be used by confident on-road cyclists due to the overall lack of priority over traffic. Therefore they will need to try and negotiate changing lanes amongst fairly high-speed traffic approaching a motorway slip, some of the time this will occur on a green signal and thus traffic will be free-flowing. It is likely that any resulting collision would result in a serious or possibly fatal injury given the vulnerability of a cyclist in high-speed traffic. However, the likelihood of such an incident is less easy to define; the cyclist counts on the A4019 were very low (albeit in December 2020) and so the overall risk level may be quite low.

3.23.22 Government policy may be starting to move away from designs being specified to solely accommodate traffic forecasts but that change is likely to be slow; in addition, the increase in government focus upon cycling is mainly around LTN 1/20 and on a high-speed road such as the A4019 it focuses upon off-carriageway facilities. These factors limit the strength of the argument against utilising a left turn lane on this approach; an alternative/addition may be identified at detailed design although as the number of lanes remains constant between the WCLR junction and Junction 10 there is no opportunity to include the development of a left turn lane where a definite movement to change lane would be required for motorway traffic.

Bus lane and slip road

3.23.23 The final preliminary design includes an eastbound slip road into the Elms Park development that appears to provide easy access for any vehicle to the proposed park & ride site. Whilst this facility is admirable for promoting the use of the park & ride site, it does raise serious concerns about the effect this would have on pedestrians and cyclists using the segregated facility. It is understood that the crossing design is being amended to give priority to pedestrians and cyclists. This would be expected to mitigate the risk of pedestrians and cyclists being struck by vehicles exiting the A4019.

Safeguarded land north of A4019 with reduced footprint junction

3.23.24 The final preliminary design includes a significantly reduced footprint for the northern arm of the A4019/WCLR junction, which would eventually provide access to any development that might occur on the parcel of safeguarded land. The WCHAR team has raised the concern about the apparently excessive number of lanes on this arm and the impact this would have on pedestrians and cyclists passing along the northern side of the A4019. The reduced scale of this layout has alleviated these concerns and any increase would be considered a later date when any planning process for the land gets under way.

3.24 Summary of WCH Opportunities Incorporated into the Preliminary Design

3.24.1 The following list is intended to summarise the key walking, cycling and horse-riding opportunities incorporated into the final preliminary design of the scheme:

- Connections to facilitate cyclists moving between the A4019 carriageway and the off-carriageway cycle facility;
- A segregated walking and cycling facility throughout the length of the A4019 from Stanboro Lane to the Gallagher Retail Park junction;
- Signal-controlled segregated walking/cycling facility through Junction 10;
- An underpass below the A4019 for use by pedestrians, cyclists and equestrians connecting directly with Withybridge Lane and Bridleway AUC1 to Elmstone Hardwicke;
- Connections to PRoWs throughout the scheme, in particular Bridleway AUC1 to Elmstone Hardwicke;
- Simplification of walking and cycling movements at the Gallagher Retail Park junction southern arm by removal of left turn lane;
- Segregated walking/cycling facilities alongside the A4019 running through each signal-controlled junction, including at Uckington across The Green;
- Incorporation of bus stops throughout the scheme along the A4019;
- Signal-controlled crossings of the A4019 at a number of locations linking in with facilities on the south side of the A4019 and onward connections including a simplified crossing of the northern arm of the WCLR junction;
- Segregated connections into each development site;
- Segregated waling/cycling facilities alongside the WCLR connecting the different development areas;
- Improvements to the footpaths close to the River Chelt in the vicinity of the WCLR;
- Walking/cycling facilities at the WCLR/B4634 junction including connections into the proposed southern development; and
- Walking/cycling facilities alongside the B4634 between Withybridge Lane and the WCLR allowing for a potential improvement throughout the B4634 as identified in the LCWIP.

4 Summary of Further WCH Opportunities for Consideration at Detailed Design

4.1.1 The following section contains a summary of the opportunities that are proposed for further consideration when the scheme progresses through the detailed design phase.

Opportunity PD1

4.1.2 There is an opportunity to provide a parapet that is sufficiently high to accommodate equestrians passing over the northern M5 Junction 10 bridge. Whilst the facility alongside the roundabout at Junction 10 is designed for pedestrians and cyclists, it is likely that horse-riders will also utilise this facility to cross the M5 as they are currently known to use the A4019.

Opportunity PD2

4.1.3 Inclusion of wayfinding signs within the highway extents of the scheme would be of great benefit in raising the profile of the facilities and guiding unfamiliar users on the most appropriate routes. These should be consistent in style and content with wayfinding signs elsewhere on the network as well as any signs that are provided in the Elms Park development. One of the key trip attractors for this signing would be the civil service sports club on the south side of the A4019 as there would be a lack of pedestrian or cyclist facilities between the sports club and the Elms Park development at that specific junction.

Opportunity PD3

4.1.4 Provide cycle parking at key destinations throughout the scheme, although it is acknowledged that there are few key destinations within the scheme extents and so this opportunity is likely to need to be part of a wider Gloucestershire strategy.

Opportunity PD4

4.1.5 ‘With-traffic’ cycle and pedestrian movements alongside the A4019 would allow a significantly longer green time in each cycle. This opportunity would see turning traffic held to allow cyclists and pedestrians to continue along the segregated facility whilst A4019 ahead traffic has a green signal; this would reduce delay for cyclists and make the facility significantly more appealing.

Opportunity PD5

4.1.6 ‘Hold the left turn’ could be factored into signal timings to allow greater green time for pedestrians and cyclists through the junctions on the A4019. This could be combined with single stage crossings and cycle detection equipment to minimise the level of delay to cyclists.

Opportunity PD6

4.1.7 ‘Cyclops’ or ’protected junction’ layouts at the WCLR/B4634 Old Gloucester Road would allow pedestrians/cyclists to travel around any part of the junction without affecting traffic operation due to an all-red traffic phase. It might also be possible to accommodate this type of layout at the northern end of the WCLR at its junction with the A4019.

Opportunity PD7

4.1.8 To achieve a higher score in the LTN 1/20 assessments a Toucan crossing of the A4019 at the Uckington junction would be beneficial. The onward connection for cyclists would need further consideration but that is not a factor considered in the LTN 1/20 scoring system.

Opportunity PD8

4.1.9 There is an opportunity to relocate the walking/cycling facility to the eastern side of the WCLR (it is currently proposed on the west side) to provide a more direct connection between development sites at Elms Park and the Cheltenham Cyberpark to the south of the B4634.

Opportunity PD9

4.1.10 Relocation of the walking/cycling facility lower down the WCLR embankment would increase the separation from traffic and make the route more appealing.

Opportunity PD10

4.1.11 There is an opportunity to provide a lane layout that is more aligned with the needs of cyclists and not just motor traffic on the westbound A4019 approach to Junction 10 (ahead and left turn allowed in the nearside lane). The current layout accommodates forecast traffic flows and yet is likely to place cyclists at risk of being struck by turning vehicles. This could result in serious or fatal injury for a cyclist.

Opportunity PD11

4.1.12 The transition from segregated to shared walking/cycling facilities at the east end of the scheme could be achieved to the east of the crossing of the northern arm of the Gallagher Retail Park junction to avoid possible conflicts close to the junction. Ideally, a greater share of the highway space at the eastern end of the scheme would be dedicated to pedestrians and cyclists to accommodate more appealing facilities and encourage greater use of active travel modes.

Opportunity PD12

4.1.13 There is an opportunity to provide high quality lighting for pedestrians and cyclists alongside the A4019 and WCLR that is likely to encourage higher use. Whilst this is understood to have been included in the preliminary design, there is an opportunity to make sure the lighting design caters for the needs of these users and that columns do not pose a hazard, particularly for cyclists.

Opportunity PD13

4.1.14 The incorporation of provision for equestrians to cross the A4019 at the signal-controlled junction in Uckington has been initially investigated and there is an opportunity to include this provision in the final design.

Opportunity PD14

4.1.15 There are a number of walking and cycling opportunities associated with the addition of the eastbound A4019 bus lane including:

- Minimising the types of vehicles permitted to use the bus lane to buses and cyclists;
- specifying a minimum bus lane width of 4m;
- Avoiding delays to users of the bus lane by increasing its proportion of the signal cycle to encourage cycling and avoid unnecessary lane changes;
- Maximise the amount of the signal time available to off-road cyclists (and pedestrians) and the bus lane;
- Providing a layout at the left-slip lane into the park and ride site that does not marginalise pedestrians and cyclists and allows them to cross the slip lane with low risk of being struck by vehicles;
- Minimising the conflicts between cyclists in the bus lane and left-turning vehicles;
- Creating a bus lane alignment through each junction that allows sufficient space alongside kerbs for cyclists and buses to proceed without conflict; and
- Provide bus stop layouts alongside the cycle and pedestrian facilities that minimise conflicts between cyclists and bus passengers boarding and alighting buses.

5 Next Steps

5.1 Collaborative Design

5.1.1 This report is intended to record the preliminary design deliberations relating to walking, cycling and horse-riding users and facilities relating to the M5 Junction 10 Improvement scheme. The regular open dialogue between the core design team and the GG 142 WCHAR review team forms the basis of this report.

5.2 Further Outputs

5.2.1 In order to comply with the requirements of GG 142 a further review report for the detailed design stage shall be provided at the end of the detailed design phase, with issue occurring prior to the commencement of construction. It is recommended that the regular liaison between the highway design team and the GG 142 review team is maintained and recorded throughout the detailed design stage.

5.3 Design Transparency and Knowledge Sharing

5.3.1 Where identified opportunities have resulted in changes to the highway scheme design, the steps taken to implement the opportunities will be presented within the detailed design review report.

5.3.2 Where opportunities have been identified but not implemented, the reasoning for this shall be recorded in that review report. This will encourage sharing of knowledge for future schemes in the area.

6 Walking, Cycling and Horse-riding Review Team Statement

6.1.1 As Lead Assessor, I confirm that this walking, cycling and horse-riding review report has been compiled in accordance with best practice.

6.1.2 The walking, cycling and horse-riding review was undertaken by the following review team:

Walking, Cycling and Horse-Riding Lead Assessor

Rob Hunt

BEng, MSc (Eng), CEng, FICE, FCIHT, FSoRSA

Chief Engineer

Atkins Transportation

Walking, Cycling and Horse-Riding Assessor

John Lynn

Principal Consultant

Atkins Transportation

Walking, Cycling and Horse-Riding Assessor

Callan Burchell

Senior Consultant

Atkins Transportation

6.1.3 As design team leader for this initial stage of the M5 Junction 10 Improvements Scheme, I confirm that the assessment has been undertaken at the appropriate stage of scheme development and that the wider design team has been involved in the process.

6.1.4 I confirm that in my professional opinion the appointed Lead Assessor has the appropriate experience for the role.

Design Team Leader

Chris Roberts

BEng (Hons) CEng CEnv MICE

Senior Group Engineer

Atkins Transportation

ATKINS
Member of the SNC-Lavalin Group

5th Floor, Block 5
Shire Hall
Bearland
Gloucester
GL1 2TH

Tel: +44 (0) 8000 514 514