

Cycle Superhighway Route 9

Revised Section 7 Proposals

Stage 1 Road Safety Audit

Ref: 3246.07/028/A315/BOR/2018

Prepared for:

TfL Cycle Superhighways – Project and Programme Sponsorship

By:

Road Safety Audit

TfL Engineering Services – Highways Engineering Team

Prepared by: [REDACTED] Audit Team Leader

Checked by: [REDACTED] Audit Team Member

Approved by: [REDACTED]

Version	Status	Date
A	Audit report issued to Client	12/10/2018
B	Audit report updated to clarify points 3.2.1 and 3.4.1	06/11/2018

1.0

1.1 INTRODUCTION

1.2 Commission

- 1.2.1 This report results from a Stage 1 Road Safety Audit carried out on the Cycle Superhighway Route 9, revised Section 7 proposals.
- 1.2.2 The Audit was undertaken by TfL Road Safety Audit in accordance with the Audit Brief issued by the Client Organisation on 28th August 2018. It took place at the Palestra offices of TfL on 24th September 2018 and comprised an examination of the documents provided as listed in Appendix A, plus a visit to the site of the proposed scheme.
- 1.2.3 The visit to the site of the proposed scheme was made on 24^h September 2018. During the site visit the weather was sunny and the existing road surface was dry.

1.3 Terms of Reference

- 1.3.1 The Terms of Reference of this Audit are as described in TfL Procedure SQA-0170 dated May 2014. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and how it impacts on all road users and has not examined or verified the compliance of the designs to any other criteria. However, to clearly explain a safety problem or the recommendation to resolve a problem the Audit Team may, on occasion, have referred to a design standard without touching on technical audit. An absence of comment relating to specific road users / modes in Section 3 of this report does not imply that they have not been considered; instead the Audit Team feels they are not adversely affected by the proposed changes.
- 1.3.2 This Safety Audit is not intended to identify pre-existing hazards which remain unchanged due to the proposals; hence they will not be raised in Section 3 of this report as they fall outside the remit of Road Safety Audit in general as specified in the procedure SQA-0170 dated May 2014. Safety issues identified during the Audit and site visit that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in Section 4 of this report.
- 1.3.3 Nothing in this Audit should be regarded as a direct instruction to include or remove a measure from within the scheme. Responsibility for designing the scheme lies with the Designer and as such the Audit Team accepts no design responsibility for any changes made to the scheme as a result of this Audit.
- 1.3.4 In accordance with TfL Procedure SQA-0170 dated May 2014, this Audit has a maximum shelf life of 2 years. If the scheme does not progress to the next stage in its development within this period, then the scheme should be re-audited.
- 1.3.5 Unless general to the scheme, all comments and recommendations are referenced to the detailed design drawings and the locations have been indicated on the plan located in Appendix B.
- 1.3.6 It is the responsibility of the Design Organisation to complete the Designer's response section of this Audit report. Where applicable and necessary it is the responsibility of the Client Organisation to complete the Client comment section of this Audit report. Signatures from both the Design Organisation and Client Organisation must be added within Section 5 of this Audit report. A copy of which must be returned to the Audit Team.

1.4 Main Parties to the Audit

1.4.1 Client Organisation

Client contact details: [REDACTED] – Project and Programme Sponsorship

1.4.2 Design Organisation

Design contact details: TfL Traffic Design Engineering

1.4.3 Audit Team

Audit Team Leader: [REDACTED] – TfL Road Safety Audit

Audit Team Member: [REDACTED] – TfL Road Safety Audit

Audit Team Observer: None present

1.4.4 Other Specialist Advisors

Specialist Advisor Details: None present

1.5 Purpose of the Scheme

- 1.5.1 The purpose of the scheme is to provide a largely-segregated cycle facility between Kensington Olympia and Hounslow Town Centre. Other improvements include new cycle specific traffic signals, footway build outs and new pedestrian crossings, 5.5km of two-way segregated cycle route with public realm improvements at town centres*.

*Taken directly from the Audit Brief.

1.6 Special Considerations

- 1.6.1 Due to the length of the proposed route, the Road Safety Audit process is being undertaken in sections as defined by the project team. This Audit covers only the Section 7 proposals and their associated tie-ins with the adjacent sections.
- 1.6.2 CS9 (Section 7) covers the proposals along Brentford High Street between approximately Alexandra Road and Pottery Road.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

A previous iteration of the proposals was subject to a Stage 1 Road Safety Audit carried out in April 2017 by TfL Road Safety Audit (ref: 2778.08/003/A315/TLRN/2017). The design has been substantially updated since this Audit was undertaken, the contents of which are not deemed relevant.

3.0 ITEMS RAISED AT THIS STAGE 1 ROAD SAFETY AUDIT

This section should be read in conjunction with Paragraphs 1.2.1, 1.2.2 and 1.2.3 of this report.

3.1 CYCLE FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Provision of a stepped track facility may exacerbate a potential for loss of control type collisions by cyclists

It is proposed to provide a stepped track as part of the route. The Audit Team are aware of a number of instances at similar installations whereby cyclists may have failed to appreciate the change in surface levels when transitioning into / from the track, leading to cyclists losing control and falling from their cycle.

It is appreciated that the causation of loss of control collisions at similar installations is not wholly clear, and it is understood that TfL is in the process of undertaking a monitoring study of stepped tracks to identify how riders use this type of facility.

RECOMMENDATION

It is recommended that the design of the stepped track is reconsidered following the outcome of the study. If however the design is progressed before the study results are available, it is recommended that an alternative type of cycle facility is provided, or, the change in surface levels are designed in a manner to ensure they are unambiguous and obvious to cyclists.

Design Organisation Response	Part Accepted
The stepped track layout has been designed in line with the current London Cycling Design Standards. As per the Audit Team's comments, it is understood that a study has commenced looking at the layout of the stepped tracks. The design team will review the layout of the cycle track following the outcome of that study. However, the number of incidents involving cyclists losing control and falling from their cycle in locations already implemented is very low compared to the number of cycle trips that have been generated by these highly successful schemes.	
Client Organisation Comments	
Agree with the designer's response. Stepped cycle tracks have been proposed according to the London Cycling Design Standards.	
In locations where stepped tracks are proposed, the change in surface levels is indicated with ramps and road markings at the start of each section. Road markings also delineate the edge of the carriageway including double yellow lines. The width of the kerbs forming the edge of the stepped cycle track have been specified to be 300mm to reduce the likelihood that these are confused with a mandatory lane white road marking.	
If there are recommendations from the study during the design process that can further improve the design then these will be reviewed.	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Cycle tracks with priority over turning vehicles may be ambiguous and lead to an exacerbated potential for conflict with cyclists

It is proposed to provide cycle tracks through the mouth of a junction (both at the front and inset) where cyclists have priority over turning traffic. The Audit Team have the following concerns:

- a) Drivers may not anticipate the necessity to stop when turning from a major road into a minor road / access. This may result in failure to give way type collisions with cyclists.
- b) Where the cycle track is adjacent to a footway in front of the junction by means of a stepped track, cyclists in the track are likely to approach the crossing at a faster speed than pedestrians. This may mean they are less easily identified than pedestrians with a potential for failure to give way type collisions.
- c) The road markings used to define the give way when recessed into the side road are unlikely to be understood by the majority of drivers as it is not a conventional give way road marking. This may lead to failure to give way type collisions.

Drivers may therefore turn to / from the side road injudiciously with an exacerbated potential for conflict with cyclists as a result.

RECOMMENDATION

It is recommended that the junction layout is modified to make it clearer who has priority. This may require:

- The use of an alternative road marking to make the necessity to give way clearer.
- Relocating the cycle facility further into the side road to increase the distance to the edge of the carriageway.

Design Organisation Response	Part Accepted
<p>Owing to the geometrical constraints, the set-back distance of the cycle track varies from 4m to less than 1m through the mouth of the junction. As such, space for a vehicle to wait has been provided wherever possible unless space constraints due to trees, narrow footways or other specific constraints to the side roads exist.</p> <p>The designs have also reduced the turning radius at many side roads to reduce turning speeds. In addition, the cycle track will be raised and associated with an entry treatment on the side road, therefore, reducing the entry speeds further. Colour contrasting surface and road markings are also proposed to highlight the cycle track.</p>	
Client Organisation Comments	
<p>The Highway Code (Rule 182) states that any vehicle turning left must watch out for traffic coming up on the left before making the turn including cyclists and motorcyclists which may be hidden from view.</p> <p>Nonetheless, where possible, we have sought to eliminate the chance of conflict at side roads or accesses through closing roads or banning certain movements. Where this not possible due access constraints, or where vehicle flows are very low, we have sought to reduce the likelihood of conflict arising through a combination of some or all of the design approaches set out in guidance such as the London Cycling</p>	

Design Standards (LCDS) including:

- Setting the cycle track further into the side road to provide space for turning motorists to wait after leaving the main carriageway before crossing the cycle track. This also provides an area for drivers to wait before turning out of the side road without blocking the cycle track
- Restricting access or egress from the side road to reduce the number of vehicle movements
- Reducing the kerb radii to reduce the speed at which motorists can enter and exit the side road
- Introducing raised tables to reduce motorist speeds entering or exiting the side road
- Providing contrasting coloured surfacing and cycle logos across the junction to raise awareness of the presence of the cycle track and the fact that cyclists are crossing

The design treatment proposed at each side road is dependent on local conditions such as traffic and pedestrian flows, one-way or two-way nature of the street and visibility. Clear road markings such as give way lines and cycle logos are proposed at all side roads to highlight the requirement for motor vehicles to give way to cyclists upon entry and exit. We will continue to review the best way to provide priority for cycling at un-signalised side roads as the design progresses.

3.1.3 PROBLEM

Location: A – Ealing Road junction with Brentford High Street

Summary: Cyclists turning off the cycle track onto a red traffic signal may exacerbate a potential for conflict with pedestrians

It is proposed to provide internal stop lines for the pedestrian crossing facilities at the junction to 'catch' cyclists turning left from Brentford High Street. This may mean they could be shown a red traffic signal immediately as they turn, having just been given a green signal to proceed. Turning cyclists may fail to appreciate the requirement to stop at this location due to the close proximity of the stop line and signals within the junction. Cyclists may cycle through the pedestrian crossing injudiciously as a result, with a potential for conflict with pedestrians.

RECOMMENDATION

It is recommended that the method of control is modified to ensure cyclists are not stopped immediately after turning when leaving the cycle facility.

Design Organisation Response	Rejected
Design has provided a shared use footway to facilitate this movement. The proposed stop line is a precautionary measure to stop any conflicting movement with the pedestrians. In addition, the traffic signals at this stop line provide good visibility to approaching traffic. Finally, this interaction has a low risk since the classified turning counts show two cycles doing this left turn in the AM peak hour and 4 in the PM peak hour.	
Client Organisation Comments	
At this junction, the signalisation of the pedestrian crossing and internal stop line was designed to accommodate cyclists turning left onto Ealing Road while providing a pedestrian crossing and not increasing the signal cycle time at the junction. With very low numbers of cyclists making this left turn movement, the risk of cycle to pedestrian conflict is also low.	
Red light compliance is an enforcement matter. If constructed, information about the changes to the layout of this junction would be provided to TfL's enforcement team who undertake regular cycle patrols on all Cycle Superhighways as part of business as usual enforcement activity. Furthermore, TfL has Operation Safeway which is a high visibility roadside enforcement operation who enforce the rules of the road and engage with users on how to use the road safely.	

3.2 PEDESTRIANS

3.2.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Proposed 'reverse stagger' crossings may increase risk of conflicts between pedestrians and approaching traffic.

A number of reverse staggered crossings are proposed along Brentford High Street between Ealing Road and Pottery Road. The proposed 'reverse stagger' pedestrian crossings guide pedestrians to walk away from approaching traffic and as such pedestrians may have a reduced awareness of approaching vehicles. The arrangement may increase the potential for pedestrians to ignore the stagger and cross in a straight ahead movement. Any pedestrian performing this manoeuvre may do so behind the stop-line, and therefore potentially between stationary, accelerating or decelerating vehicles thereby increasing the potential for conflict.

RECOMMENDATION

It is recommended to revise the alignment of the crossings or provide measures to ensure compliance of the stagger by pedestrians. This may require the provision of pedestrian deterrent measures.

Design Organisation Response	Rejected
<p>The scenario of 'walk away' from approaching traffic is no different to pedestrians walking along the nearside footway and then using the crossing.</p> <p>The lack of pedestrian guard rail is intended to open up the staggered crossings, promote caution, increase visibility and make it more attractive for pedestrians to use the facility. Furthermore, sight lines are sufficiently clear for pedestrians to decide when it would be safe to cross.</p> <p>While these are 'non-preferred' staggered crossing layouts, the location of the stop lines on the carriageway makes it difficult for pedestrians to cross in a straight ahead movement behind stationary vehicles.</p> <p>It is proposed to provide kerb upstands around the pedestrian island to help guide visually-impaired pedestrians through the area without pedestrian guard rail and encourage compliance with the formal crossing point. This design approach is set out in TfL's Streetscape Design Guidance.</p>	
Client Organisation Comments	
<p>Reverse staggered crossings are proposed along Brentford High Street between Ealing Road and Pottery Road to maximise the capacity for vehicles and have been implemented in other locations across London. The layout at the junction means that pedestrians crossing straight rather than using the formal stagger would be doing so across the stop line. It is likely that motor traffic would be positioned here and as such would form a deterrent.</p> <p>Due to the number of movements that need to be catered for at this location, including separating traffic, pedestrians and cyclists, it is not possible to provide conventional staggered crossing layouts as this would push back the position of the stop lines, increasing intergreen and signal cycle times. This would introduce delay to all road users which would likely to lead to congestion and longer wait times and in turn could lead to vehicles blocking crossings as they queue through the junction or increase the likelihood for pedestrians to cross on a red light as they become</p>	

impatient waiting for a green man.

The design provides a new crossing movement over the west arm of the Bretford High Street and Pottery road junction.

3.2.2 PROBLEM

Location: B – Floating footway opposite Watermans Art Centre

Summary: Footway layout may lead to conflict between pedestrians and cyclists

It is proposed to provide a floating footway / bus stop opposite Watermans Art Centre, requiring all pedestrians to cross onto the island and walk past the bus shelter. The Audit Team are concerned that pedestrians are unlikely to use the facility as intended, instead opting to walk the most direct route within the cycle track. Pedestrians, especially those walking eastbound may step into the cycle track injudiciously without looking out for cyclists. This may lead to an increase potential for conflict between pedestrians and cyclists.

RECOMMENDATION

It is recommended that the cycle track and floating footway layout is reviewed to facilitate how pedestrians are most likely to use the facility.

Design Organisation Response	Rejected
<p>Owing to the geometrical constraints there is no alternative layout for the floating footway / bus stop. The proposed layout of the tactile paving, zebra crossing and the belisha beacon has taken consideration of the pedestrian desire line.</p> <p>This is not the first location in London with similar arrangement, for example the bi-directional cycle track at A2209 Deptford Church Street adjacent to Lewisham Southwark College has this floating arrangement with no issues been identified.</p>	
Client Organisation Comments	

Agree with the Designer.

Due to space constraints it has not been possible to propose a conventional bus stop bypass layout at this location. A shared use facility was considered as an alternative to this layout but was discounted as priorities between pedestrians and cyclists would be ambiguous making the cycle facility and bus stop less attractive to both users. Providing no bus stop bypass was also considered but would require cyclists to re join the carriageway and as such would provide no protection from traffic. As pedestrian flows are low in volume at this location, the proposed layout was deemed to provide an appropriate balance of space and level of service between all users.

Following TfL's recent review of bus stop bypasses, zebra crossings are proposed at the pedestrian crossing points at either end of the island. This means that pedestrians stepping out onto the crossing will have priority over cyclists who would need to stop. Belisha beacons are proposed on the inside (cycle track side) of the footway at each crossing point to provide a physical deterrent to discourage pedestrians from walking into the cycle track and instead crossing onto the island. A ramp at the western end of the cycle track is designed to reduce cyclist speeds on approach to the bus stop bypass, reducing the potential for conflict between pedestrians and cyclists.

3.3 BUS FACILITIES

3.3.1 PROBLEM

Location: C – Brentford High Street in proximity to Alexandra Road

Summary: Buses at the bus stop may obstruct visibility for pedestrians using the controlled crossing

It is proposed to provide a bus stop in close proximity to the controlled pedestrian crossing. The Audit Team are concerned that the location of the bus stop may restrict visibility to the right for pedestrians using the crossing. Pedestrians may therefore step into the junction injudiciously with an exacerbated potential for conflict with vehicles as a result. This is of particular concern for pedestrians crossing out of phase, and when westbound vehicles are overtaking a stationary bus.

RECOMMENDATION

It is recommended that the bus stop is relocated away from the crossing.

Design Organisation Response	Rejected
<p>Owing to geometrical constraints, it is not possible to relocate the bus stop as the road width at either side of the proposed bus stop means that minimum widths for the bus stop island / traffic lanes would not be feasible.</p> <p>Following discussion with the Signal Engineer, the design will show two primary and two secondary signals to ensure overtaking vehicles have good visibility of the signals so as to ensure compliance with the lights when pedestrians are crossing on a green man.</p> <p>The traffic signal infrastructure design will be reviewed again at the detailed design stage and will be subject to site safety checks by the Signal Engineer.</p> <p>Visibility for pedestrians crossing from the northern footway is over 50m at either side and visibility for pedestrians crossing out of phase from the southern side is over 50m to the west and east with the exception of when the bus stop is in use where visibility to the east would be reduced to 20m.</p>	
Client Organisation Comments	

Agree with designer's response. It is not possible to relocate the bus stop away from the crossing and removing the bus stop would increase spacing between bus stops to over the recommended distance of 400m.

As the pedestrian crossing is proposed to be signalised, pedestrians will receive a clear indication as to when it is safe to cross. To ensure that traffic stops when the crossing is on a green man, two primary and two secondary signals are proposed to ensure good forward visibility, even if vehicles are overtaking a stopped bus.

This is a stand alone crossing with two signal stages and as such waiting times for pedestrians are not likely to be excessive and the likelihood of pedestrians crossing out of phase is therefore low.

There is no minimum visibility distance that must be provided for pedestrians at signalised crossings and the design therefore provides the most appropriate layout given the geometric constraints.

The design will be reviewed at the detailed design stage in coordination with the

traffic infrastructure designs and will be subject to separate signal safety audits.

3.3.2 PROBLEM

Location: D – Brentford High Street adjacent to Watermans Art Centre

Summary: Buses at the bus stop may obstruct visibility for pedestrians using the controlled crossing

It is proposed to provide a bus stop in close proximity to the controlled pedestrian crossing. The Audit Team are concerned that the location of the bus stop may restrict visibility to the right for pedestrians using the crossing. Pedestrians may therefore step into the junction injudiciously with an exacerbated potential for conflict with vehicles as a result. This is of particular concern for pedestrians crossing out of phase, and when westbound vehicles are overtaking a stationary bus.

RECOMMENDATION

It is recommended that the bus stop is relocated away from the crossing.

Design Organisation Response	Rejected
<p>Owing to geometrical constraints, it is not possible to relocate the bus stop to the west as road space means that minimum widths for the bus stop island and traffic lanes would not be feasible or to the east as this would remove the overtaking space around the bus stop.</p> <p>The design includes two primary and a secondary offside signal to ensure overtaking vehicles have good visibility of the signals so as to ensure compliance with the lights when pedestrians are crossing on a green man.</p> <p>The traffic signal infrastructure design will be reviewed again at the detailed design stage and will be subject to site safety checks by the Signal Engineer.</p> <p>Visibility for pedestrians crossing out of phase from the southern footway is 25m when the bus stop is in use and increased when it is not in use.</p> <p>In addition, the presence of the 0.5m segregated track island on the east side of the crossing would provide some space for pedestrians that start to cross and needed to stop to wait.</p>	

Client Organisation Comments

Agree with designer's response. It is not possible to relocate the bus stop away from the crossing and removing the bus stop would increase spacing between bus stops to over the recommended distance of 400m.

As the pedestrian crossing is proposed to be signalised, pedestrians will receive a clear indication as to when it is safe to cross. To ensure that traffic stops when the crossing is on a green man, two primary and an offside secondary signal are proposed to ensure good forward visibility, even if vehicles are overtaking a stopped bus.

This is a staggered, stand alone crossing and as such waiting times for pedestrians are not likely to be excessive and the likelihood of pedestrians crossing out of phase is therefore low.

There is no minimum visibility distance that must be provided for pedestrians at signalised crossings and the design therefore provides the most appropriate layout given the geometric constraints.

The design will be reviewed at the detailed design stage in coordination with the traffic infrastructure designs and will be subject to separate signal safety audits.

3.3.3 PROBLEM

Location: E – Brentford High Street junction with Goat Wharf

Summary: Bus stop may obstruct visibility for drivers exiting the junction

It is proposed to provide a bus stop in close proximity to the junction with Goat Wharf. The Audit Team are concerned that the location of the bus stop may restrict visibility to the right for vehicles exiting the junction. Drivers may therefore exit the junction injudiciously with an exacerbated potential for side-swipe type conflicts as a result.

RECOMMENDATION

It is recommended that the bus stop is relocated away from the junction.

Design Organisation Response	Rejected
<p>The location of the bus stop in this section is constrained owing to maximum spacing between bus stops and lack of feasible alternative locations. The side road has been provided with an entry treatment to slow vehicles down.</p> <p>Visibility out of Goat Wharf is satisfactory for oncoming westbound and eastbound traffic. In the case that a westbound vehicle was passing the bus and was 'masked by it', the visibility is 20m from the give way line. The vehicle exiting will have to proceed at a low speed to the eastbound carriageway where the visibility will be satisfactory.</p>	
Client Organisation Comments	
<p>Agree with the designer's response. It is not possible to relocate the bus stop in question away from the junctions and removing this bus stop would increase spacing between bus stops to over the recommended distance of 400m.</p> <p>As this is a residential area, provision of adequate bus stop spacing is important to maintain to provide access to public transport. Visibility from the side roads is considered to be sufficient given the constraints.</p>	

3.4 PARKING AND LOADING FACILITIES

3.4.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Close proximity of loading / parked vehicles to the track may exacerbate a potential for conflict with cyclists.

The proposed cycle track runs alongside a number of loading / parking bays located within a floating island. The Audit Team have the following concerns:

- Insufficient lateral clearance appears to have been provided between the loading / parking bays and the track. Drivers or passengers may open their door into the path of cyclists within the track with a potential to unseat a cyclist and sustain personal injury.
- Pedestrians, users unloading and disabled users entering / exiting vehicles, may do so within the cycle track into the path of cyclists. Cyclists may therefore collide with users of the adjacent bays with a potential for personal injury as a result.

This was noted at the following locations:

- Brentford High Street in proximity to Ferry Lane, and;
- Brentford High Street opposite Goat Wharf.

RECOMMENDATION

It is recommended that sufficient space is provided to permit parking / loading activities whilst providing sufficient clearance to the cycle track.

Design Organisation Response	Accepted
<p>All loading bays have been reviewed to provide at least a 0.5m gap which is sufficient space to avoid the 'dooring' issue and is in accordance with LCDS 2015. The extents of the bays have been further clarified by providing a full box road marking where the cycle track runs 'behind' the bay so that the 0.5m gap is maintained. The loading bay west of Ealing Road has been redesigned to provide the 0.5m buffer to avoid the 'dooring' issue.</p> <p>Finally the presence of the cycle track is highlighted by the cycle logos besides the loading bay.</p>	
Client Organisation Comments	
<p>Agree with designer. The design provides the minimum clearance between parking and the cycle track as per LCDS. This addresses the risk of users of parked cars colliding with cyclists in the cycle track as they get in or out of their vehicles. Due to the physical constraints of the highway and the need to balance space for all road users, it has not been possible to widen this buffer to provide additional space for loading / unloading of passengers.</p>	

3.4.2 PROBLEM

Location: F – Brentford High Street junction with Ferry lane

Summary: Loading vehicles may obstruct visibility for drivers exiting the junction

It is proposed to provide a loading bay in close proximity to the junction with Ferry Lane. The Audit Team are concerned that the location of the loading bay may restrict

visibility to the left for vehicles exiting the junction. Drivers may therefore exit the junction injudiciously with an exacerbated potential for side-swipe type conflicts as a result.

RECOMMENDATION

It is recommended that the loading bay is relocated away from the junction.

Design Organisation Response	Rejected
The location of this loading bay is constrained as it is located to provide loading for a Public House, there is no space west of this location to move it to as there are existing trees that would need removal. The visibility from the give way lines at this location hasn't significantly varied from the existing, it has only been adjusted to match the proposed road layout.	
Client Organisation Comments	
Agree with designer's response.	

3.5 TRAFFIC SIGNALS

3.5.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Split phasing of traffic signal stages may lead to pedestrians inadvertently stepping into the path of vehicles

It is proposed to provide a number of the arms on Brentford High Street and Ealing Road with adjacent traffic streams that run in different stages. The Audit Team are concerned that pedestrians may observe stationary traffic in one lane and incorrectly assume traffic in the adjacent lanes is also held. Pedestrians may therefore inadvertently step into the path of moving vehicles with an exacerbated potential for conflict as a result.

RECOMMENDATION

It is recommended that the adjacent traffic streams on a single arm run concurrently. If this is not possible it may be beneficial to provide measures to discourage crossing in a single movement inadvertently, such as staggering or offsetting the different halves of the same crossing.

Design Organisation Response	Rejected
The proposed 'split phasing of traffic signal stages' is to optimise the junction capacity. Due to geometrical constraints, it is not possible to provide alternatives such as a staggered crossing, offsetting the different halves of the same crossing to remove the need to cross in a single movement. The proposed signal layout and method of control has been reviewed by the Traffic Signal team to ensure it is sufficient and safe for operation. In addition, the presence of traffic islands in some locations provides space for pedestrians to wait should they start to cross and need to stop.	
Client Organisation Comments	
Due to the number of movements that need to be catered for at this junction, including separating traffic, pedestrians and cyclists, it is not possible to run adjacent traffic streams concurrently as this would increase signal cycle times. This would introduce delay to all road users which would likely to lead to congestion and longer	

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wait times and in turn could lead to vehicles blocking crossings as they queue through the junction or increase the likelihood for pedestrians to cross on a red light as they become impatient waiting for a green man.

Split phased traffic signals have been provided across junctions in London to optimise the operation of junctions for all road users.

End of list of problems identified and recommendations offered in this Stage 1 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 1 ROAD SAFETY AUDIT THAT ARE OUTSIDE THE TERMS OF REFERENCE

Safety issues identified during the audit and site inspection that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in this section. It is to be understood that, in raising these issues, the Audit Team in no way warrants that a full review of the highway environment has been undertaken beyond that necessary to undertake the Audit as commissioned.

The Audit Team has no issues to raise within this section.

5.0 SIGNATURES AND SIGN-OFF

5.1 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and documents listed in Appendix A. to this Safety Audit report. The Road Safety Audit has been carried out in accordance with TfL Procedure SQA-0170 dated May 2014, with the sole purpose of identifying any feature that could be removed or modified in order to improve the safety of the measures. The problems identified have been noted in this report together with associated suggestions for safety improvements that we recommend should be studied for implementation.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 06/11/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact:

[REDACTED] [@tfl.gov.uk](mailto:[REDACTED]@tfl.gov.uk) [REDACTED]

AUDIT TEAM MEMBER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 06/11/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact:

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5.2 DESIGN TEAM STATEMENT

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Design Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 16/11/18

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Senior Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 16/11/18

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Principal Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 16/11/18

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Lead Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 16/11/18

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER

DRAWING TITLE

PJ549C-RSM-PRD-11-DR-TE-25-57-0028 (P06)	A315 Brentford High Street Concept Design Section 7 – Sheet 28
PJ549C-RSM-PRD-11-DR-TE-25-57-0029 (P06)	A315 Brentford High Street Concept Design Section 7 – Sheet 29
PJ549C-RSM-PRD-11-DR-TE-25-57-0030 (P05)	A315 Brentford High Street Concept Design Section 7 – Sheet 30
PJ549C-RSM-PRD-11-DR-TE-25-57-0030.1 (P06)	A315 Brentford High Street Concept Design Section 7 – Sheet 30.1
PJ549C-RSM-PRD-11-DR-TE-25-57-0031 (P06)	A315 Brentford High Street Concept Design Section 7 – Sheet 31

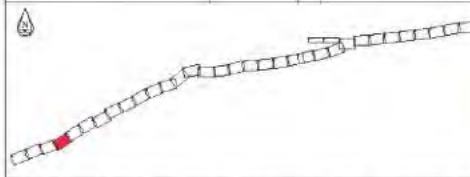
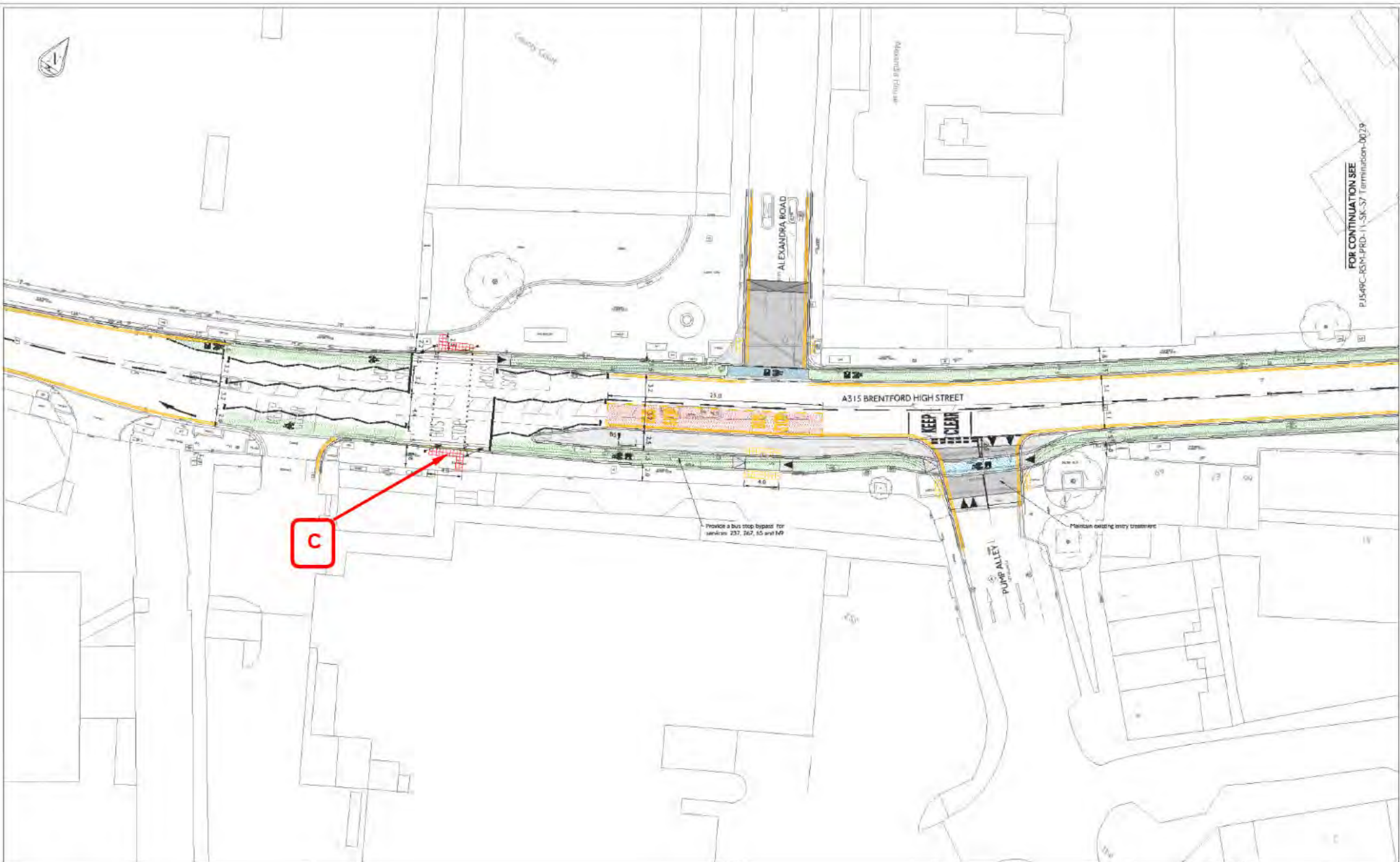
DOCUMENTS

DETAILS (where appropriate)

- ☒ Safety Audit Brief
- ☐ Site Location Plan
- ☐ Traffic signal details
- ☐ TfL signal safety checklist
- ☐ Departures from standard
- ☐ Previous Road Safety Audits
- ☐ Previous Designer Responses
- ☐ Collision data
- ☐ Collision plot
- ☐ Traffic flow / modelling data
- ☐ Pedestrian flow / modelling data
- ☐ Speed survey data
- ☐ Other documents

APPENDIX B

Problem Locations



LEGEND

<ul style="list-style-type: none"> Existing road marking Existing kerb Existing sign and post Proposed road marking - white Proposed road marking - yellow Proposed road marking - red Proposed double slip Proposed single slip Proposed dropped kerb Proposed transition kerb 	<ul style="list-style-type: none"> SP - Proposed sign and post LC - Proposed lamp column G - Proposed gully BS - Proposed bus stop flag BT - Proposed bollard BTM - Proposed bus stop beacon BTM - Proposed ticket machine BTM - Proposed bus shelter BTM - Proposed traffic signal 	<ul style="list-style-type: none"> Proposed tactile paving - buff Proposed tactile paving - grey Proposed tactile paving - red Proposed kerb Proposed raised kerb / island Proposed sleep-run island Proposed bus lane Proposed cycle lane - blue Proposed cycle lane - green 	<ul style="list-style-type: none"> Proposed cycle logo (T340 1357) Potential new trees
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NOTE

REV	DATE	DESCRIPTION	BY	CHK	APP
001	15.06.18	Issued for MCHP/Planning	JP	SA	WCL
002	18.07.17	Issued following comments from Planning	JP	SA	WCL
003	07.02.17	Issued for V&S/Planning	JP	SA	WCL

LB of HOUNSLOW
CYCLE SUPERHIGHWAY 9
A315 BRENTFORD HIGH STREET
CONCEPT DESIGN
SECTION 7

West Space Management
Outcome Design Engineering

197 Buckle Road
London
SE1 8JL

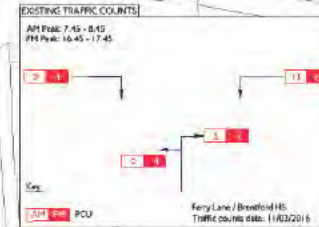
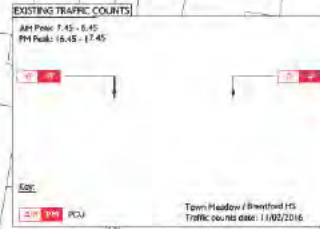
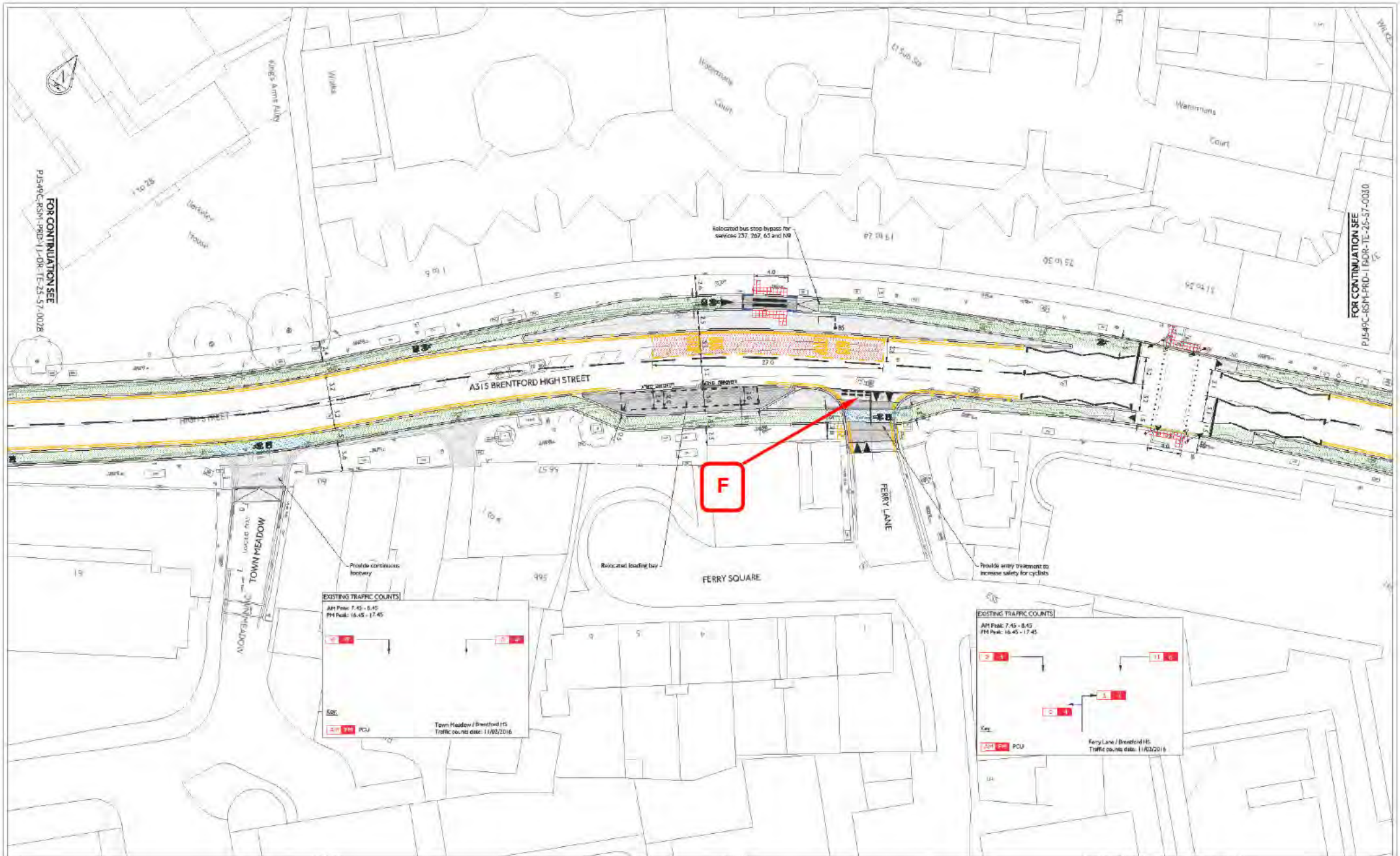
FOR COMMENT

P06

DATE OF SHEET: 09.07.2018

FOR CONTINUATION SEE
PJS49C-RSM-PRD-11-DR-TE-25-57-0028

FOR CONTINUATION SEE
PJS49C-RSM-PRD-11-DR-TE-25-57-0030



NOTES

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Cycle Superhighway Route 9

Revised Section 8 Proposals

Stage 1 Road Safety Audit

Ref: 3246.08/028/A315/BOR/2018

Prepared for:

TfL Cycle Superhighways – Project and Programme Sponsorship

By:

Road Safety Audit

TfL Engineering Services – Highways Engineering Team

Prepared by: [REDACTED] Audit Team Leader

Checked by: [REDACTED] Audit Team Member

Approved by: [REDACTED]

Version	Status	Date
A	Audit report issued to Client	04/09/2018
B	Audit report updated following an error in the text of Problem 3.1.2	02/10/2018
C	Audit report updated to clarify Road Safety Audit problem 3.3.1. Problem modified and additional problem added	12/10/2018

1.0 INTRODUCTION

1.1 Commission

- 1.1.1 This report results from a Stage 1 Road Safety Audit carried out on the Cycle Superhighway Route 9, revised section 8 proposals.
- 1.1.2 The Audit was undertaken by TfL Road Safety Audit in accordance with the Audit Brief issued by the Client Organisation on 28th August 2018. It took place at the Palestra offices of TfL on 3rd September 2018 and comprised an examination of the documents provided as listed in Appendix A, plus a visit to the site of the proposed scheme.
- 1.1.3 The visit to the site of the proposed scheme was made on 3rd September 2018. During the site visit the weather was sunny and the existing road surface was dry.

1.2 Terms of Reference

- 1.2.1 The Terms of Reference of this Audit are as described in TfL Procedure SQA-0170 dated May 2014. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and how it impacts on all road users and has not examined or verified the compliance of the designs to any other criteria. However, to clearly explain a safety problem or the recommendation to resolve a problem the Audit Team may, on occasion, have referred to a design standard without touching on technical audit. An absence of comment relating to specific road users / modes in Section 3 of this report does not imply that they have not been considered; instead the Audit Team feels they are not adversely affected by the proposed changes.
- 1.2.2 This Safety Audit is not intended to identify pre-existing hazards which remain unchanged due to the proposals; hence they will not be raised in Section 3 of this report as they fall outside the remit of Road Safety Audit in general as specified in the procedure SQA-0170 dated May 2014. Safety issues identified during the Audit and site visit that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in Section 4 of this report.
- 1.2.3 Nothing in this Audit should be regarded as a direct instruction to include or remove a measure from within the scheme. Responsibility for designing the scheme lies with the Designer and as such the Audit Team accepts no design responsibility for any changes made to the scheme as a result of this Audit.
- 1.2.4 In accordance with TfL Procedure SQA-0170 dated May 2014, this Audit has a maximum shelf life of 2 years. If the scheme does not progress to the next stage in its development within this period, then the scheme should be re-audited.
- 1.2.5 Unless general to the scheme, all comments and recommendations are referenced to the detailed design drawings and the locations have been indicated on the plan located in Appendix B.
- 1.2.6 It is the responsibility of the Design Organisation to complete the Designer's response section of this Audit report. Where applicable and necessary it is the responsibility of the Client Organisation to complete the Client comment section of this Audit report. Signatures from both the Design Organisation and Client Organisation must be added within Section 5 of this Audit report. A copy of which must be returned to the Audit Team.

1.3 Main Parties to the Audit

1.3.1 Client Organisation

Client contact details: [REDACTED] – Project and Programme Sponsorship

1.3.2 Design Organisation

Design contact details: TfL Traffic Design Engineering

1.3.3 Audit Team

Audit Team Leader: [REDACTED] – TfL Road Safety Audit

Audit Team Member: [REDACTED] – TfL Road Safety Audit

Audit Team Observer: None present

1.3.4 Other Specialist Advisors

Specialist Advisor Details: None present

1.4 Purpose of the Scheme

- 1.4.1 The purpose of the scheme is to provide a largely-segregated cycle facility between Kensington Olympia and Hounslow Town Centre. Other improvements include new cycle specific traffic signals, footway build outs and new pedestrian crossings, 5.5km of two-way segregated cycle route with public realm improvements at town centres*.

*Taken directly from the Audit Brief.

1.5 Special Considerations

- 1.5.1 Due to the length of the proposed route, the Road Safety Audit process is being undertaken in sections as defined by the project team. This Audit covers only the Section 8 proposals and their associated tie-ins with the adjacent sections.
- 1.5.2 CS9 (Section 8) covers the proposals along Brentford High Street and Kew Bridge Road between the junctions of Pottery Road (to the west) and Kew Road (to the east).

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

A previous iteration of the proposals was subject to a Stage 1 Road Safety Audit carried out in April 2017 by TfL Road Safety Audit (ref: 2778.08/003/A315/TLRN/2017). The design has been substantially updated since this Audit was undertaken, the contents of which are not deemed relevant.

3.0 ITEMS RAISED AT THIS STAGE 1 ROAD SAFETY AUDIT

This section should be read in conjunction with Paragraphs 1.2.1, 1.2.2 and 1.2.3 of this report.

3.1 CYCLE FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Provision of a stepped track facility may exacerbate a potential for loss of control type collisions by cyclists

It is proposed to provide a stepped track as part of the route. The Audit Team are aware of a number of instances at similar installations whereby cyclists may have failed to appreciate the change in surface levels when transitioning into / from the track, leading to cyclists losing control and falling from their cycle.

It is appreciated that the causation of loss of control collisions at similar installations is not wholly clear, and it is understood that TfL is in the process of undertaking a monitoring study of stepped tracks to identify how riders use this type of facility.

RECOMMENDATION

It is recommended that the design of the stepped track is reconsidered following the outcome of the study. If however the design is progressed before the study results are available, it is recommended that an alternative type of cycle facility is provided, or, the change in surface levels are designed in a manner to ensure they are unambiguous and obvious to cyclists.

Design Organisation Response	Part Accepted
The stepped track layout has been designed in line with the current London Cycling Design Standards. As per the Audit Team's comments, it is understood that a study has commenced looking at the layout of the stepped tracks. The design team will review the layout of the cycle track following the outcome of that study. However, the number of incidents involving cyclists losing control and falling from their cycle in locations already implemented is very low compared to the number of cycle trips that have been generated by these highly successful schemes.	
Client Organisation Comments	
Agree with the designer's response. Stepped cycle tracks have been proposed according to the London Cycling Design Standards.	
In locations where stepped tracks are proposed, the change in surface levels is indicated with ramps and road markings at the start of each section. Road markings also delineate the edge of the carriageway including double yellow lines. The width of the kerbs forming the edge of the stepped cycle track have been specified to be 300mm to reduce the likelihood that these are confused with a mandatory lane white road marking.	
If there are recommendations from the study during the design process that can further improve the design then these will be reviewed.	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Provision of a cycle track through Watermans Park may exacerbate a potential for conflict during the hours of darkness

It is proposed to provide a cycle track through Watermans Park adjacent to the retaining wall for the main carriageway. The Audit Team are concerned that the location of the proposed track is unlikely to be lit from the existing street lighting, resulting in the facility being dark at night. It is noted that no additional lighting is shown as proposed as part of the scheme.

In addition to the above, there is a possibility that the track will be used by pedestrians. The potential use by pedestrians, combined with a potential for the facility to be dark, could exacerbate a potential for conflict between these two modes.

RECOMMENDATION

It is recommended that the street lighting is reviewed to ensure it is adequate to illuminate the facility during the hours of darkness.

Design Organisation Response	Accepted
Street lighting will be reviewed as part of the Detail Designs process.	
Client Organisation Comments	
Agree with designer. The London Borough of Hounslow, who is the owner of Waterman's Park, will be undertaking the detailed design for this section of the route and will review lighting requirements for the cycle track as part of this stage of the design. A parallel pedestrian path is proposed alongside the cycle track to discourage pedestrians from walking in the cycle track.	

3.1.3 PROBLEM

Location: A – Watermans Park Access Ramp, opposite Holland Gardens

Summary: Cycle track layout may lead to conflict between pedestrians and cyclists

It is proposed to provide a cycle track through Watermans Park immediately adjacent to the ramped access up to the main carriageway. The Audit Team are concerned that the location of the proposed track may lead to conflict between pedestrians using the ramped access and cyclists. The location of the track is in very close proximity to the ramp, and any pedestrian using the ramp will turn immediately onto the track, which is unlikely to be anticipated by cyclists. The potential for conflict is exacerbated due to the wall of the ramp reducing inter-visibility between pedestrians and cyclists.

RECOMMENDATION

It is recommended that the cycle track is relocated away from the ramp.

Design Organisation Response	Accepted
The cycle track will be offset away from the ramp to improve inter-visibility. The design team will liaise with LB Hounslow for the proposed changes and ensure these changes will be adopted by the Waterman's Park proposals.	
Client Organisation Comments	
Agree with the designer's response. The exact layout of the cycle track through	

Waterman's Park is to be carried out as part of the design proposals for the Waterman's Park development. This will take into account the wider proposals for the park, including the position of the proposed new pedestrian ramp and new pedestrian paths. TfL will work closely with LB Hounslow who are the client for the park development to ensure that requirements for the design include appropriate inter-visibility between pedestrians and cyclists.

3.1.4 PROBLEM

Location: B – Brentford High Street junction with Pump House Crescent

Summary: Cycle track layout may lead to exacerbated potential for 'left hook' type conflicts

The Audit Team is concerned that a floating footway / bus stop is proposed immediately prior to the junction with Pump House Crescent. Drivers wishing to turn left into the side road may not fully appreciate the potential presence of cyclists as they emerge from the floating facility, potentially immediately into the path of a left turning vehicle. A potential for 'left hook' type conflicts may therefore exist as a result.

The potential for conflict is exacerbated at this location due to a number of factors:

- Cyclists may be approaching at a speed greater than general traffic,
- Cyclists may be masked by the bus shelter and/or pedestrians waiting at the bus stop, and;
- Cyclists may be located outside the visibility envelope for a nearside wing mirror, meaning they may not be visible to left turning vehicles even if they check their nearside mirror.

RECOMMENDATION

It is recommended that the layout of the floating footway is modified to make it clearer to left turning drivers of the potential presence of cyclists, ensuring that cyclists are appropriately visible to drivers when turning left. This may require the floating facility to be relocated away from the junction.

Design Organisation Response	Rejected
Owing to the geometrical constraints, it is not possible to relocate the bus stop east as it would block access to the petrol station or west as the road width means that minimum widths for the bus stop island / traffic lanes would not be feasible. The designs have reduced the turning radius into side road to reduce turning speeds and position turning vehicles at right angles to the path of cyclists as they enter the side road to improve inter-visibility. In addition, the cycle track will be raised and associated with an entry treatment on the side road, therefore, further reducing the entry / exit speed of motor vehicles.	
Client Organisation Comments	
Agree with the designer's response. It is not possible to relocate the bus stop away from the junction and removing the bus stop would increase distances between eastbound bus stops to over 600m which exceeds the recommended distance of 400m between bus stops. As this is a residential area, provision of adequate bus stop spacing is important to maintain to provide access to public transport.	
Providing no bus stop bypass would require cyclists to re join the carriageway and as such would provide no protection from traffic. Given the geometric constraints of the highway, the proposed layout is deemed to provide an appropriate balance of protection and visibility.	
The Highway Code (Rule 182) states that any vehicle turning left must watch out for traffic coming up on the left before making the turn including cyclists and motorcyclists which may be hidden from view.	
Notwithstanding this, a number of measures have been proposed to highlight the	

presence of cyclists to left turning vehicles including a raised cycle track with a colour contrasting surface and cycle logos. A raised entry treatment and tighter turning radii is also proposed to slow vehicles down and reduce the likelihood or severity of conflict. In addition, the shelter at the existing bus stop has part width side panels without advertising which provides more visibility compared to shelters with wider, masked panels. The design will recommend that this type of shelter is used on the bus stop bypass to ensure visibility is optimised.

3.1.5 PROBLEM

Location: C – Brentford High Street petrol station access

Summary: Cycle lane layout may lead to exacerbated potential for 'left/right hook' type conflicts

The Audit Team is concerned that the layout of the stepped cycle track may lead cyclists into a false sense of security as the facility returns to carriageway level immediately at the petrol station access. Cyclists may fail to appreciate the potential presence of vehicles turning across their path, given they have just left a segregated and protected facility. An exacerbated potential for 'left/right hook' type conflicts may exist as a result.

RECOMMENDATION

It is recommended that the layout of the cycle facility and petrol station access is modified to reduce the potential for conflict. This may require cyclists to be returned to carriageway level earlier, the use of conspicuous colour across the access, and tightening up of the junction geometry to reduce vehicular approach speeds.

Design Organisation Response	Part Accepted
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The proposed set-back distance of the stepped track is 5m which is consistent with the recommendation from Transport Research Laboratory 'Segregated cycle lanes and tracks at priority junctions'. The conclusions of this study stated:

- Bring segregation very close to the turning (<5m), sufficient to reduce the turning radius and so reduce turning speeds and position turning vehicles at right angles to the path of cyclists. This is best suited to lower speed roads with little space.

As Brentford High Street is a low speed road, a 5 metre set back is appropriate. In addition, colour contrast surfacing will be provided across the access to improve awareness of the cycle facilities.

Client Organisation Comments

Agree with the designer's response.

The Highway Code (Rule 182) states that any vehicle turning left must watch out for traffic coming up on the left before making the turn including cyclists and motorcyclists which may be hidden from view.

Notwithstanding this, a number of measures have been proposed to highlight the presence of cyclists to left turning vehicles including a colour contrasting surface and cycle logos. A raised entry treatment is not proposed as the entrance already includes a ramp to the petrol station forecourt. A tighter turning radii cannot be proposed due to the need to maintain swept paths for vehicles accessing the petrol station.

3.2 PEDESTRIANS

3.2.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Proposed 'reverse stagger' crossings may increase risk of conflicts between pedestrians and approaching traffic.

A number of reverse staggered crossings are proposed at the junction of Kew Bridge Road and Kew Road. The proposed 'reverse stagger' pedestrian crossings guide pedestrians to walk away from approaching traffic and as such pedestrians may have a reduced awareness of approaching vehicles. The arrangement may increase the potential for pedestrians to ignore the stagger and cross in a straight ahead movement. Any pedestrian performing this manoeuvre may do so behind the stop-line, and therefore potentially between stationary, accelerating or decelerating vehicles thereby increasing the potential for conflict.

RECOMMENDATION

It is recommended to revise the alignment of the crossings or provide measures to ensure compliance of the stagger by pedestrians. This may require the provision of pedestrian deterrent measures.

Design Organisation Response	Rejected
<p>The scenario of 'walk away' from approaching traffic is no different to pedestrians walking along the nearside footway and then using the crossing.</p> <p>The lack of pedestrian guard rail is intended to open up the staggered crossings, promote caution, increase visibility and make it more attractive for pedestrians to use the facility. Furthermore, sight lines are sufficiently clear for pedestrians to decide when it would be safe to cross.</p> <p>While these are 'non-preferred' staggered crossing layouts, the location of the stop lines on the carriageway makes it difficult for pedestrians to cross in a straight ahead movement behind stationary vehicles.</p> <p>It is proposed to provide kerb upstands around the pedestrian island to help guide visually-impaired pedestrians through the area without pedestrian guard rail and encourage compliance with the formal crossing point. This design approach is set out in TfL's Streetscape Design Guidance.</p>	
Client Organisation Comments	
<p>Reverse staggered crossings are proposed at Kew Bridge junction to maximise the capacity for vehicles and have been implemented in other locations across London. The layout at the junction means that pedestrians crossing straight rather than using the formal stagger would be doing so across the stop line. It is likely that motor traffic would be positioned here and as such would form a deterrent.</p> <p>Due to the number of movements that need to be catered for at this junction, including separating traffic, pedestrians and cyclists, it is not possible to provide conventional staggered crossing layouts as this would push back the position of the stop lines, increasing intergreen and signal cycle times. This would introduce delay to all road users which would likely to lead to congestion and longer wait times and in turn could lead to vehicles blocking crossings as they queue through the junction or increase the likelihood for pedestrians to cross on a red light as they become</p>	

impatient waiting for a green man.

The proposed design for Kew Bridge Road / Kew Road junction provides improvements for pedestrians by reducing the number of crossings required to cross each arm of the junction from four to three. The design also provides a new crossing movement over the east arm of the junction to get to / from the station.

The reduction in crossing movements compared to the existing layout should help to improve the ease with which pedestrians can cross at this junction, thereby reducing the temptation to cross away from the green man.

3.2.2 PROBLEM

Location: D – Floating footway between Holland Gardens and Pump House Crescent

Summary: Footway layout may lead to conflict between pedestrians and cyclists

It is proposed to provide a floating footway / bus stop between the junctions of Holland Gardens and Pump House Crescent, requiring all pedestrians to cross onto the island and walk past the bus shelter. The Audit Team are concerned that pedestrians are unlikely to use the facility as intended, instead opting to walk the most direct route within the cycle track. Pedestrians, especially those walking eastbound may step into the cycle track injudiciously without looking out for cyclists. This may lead to an increased potential for conflict between pedestrians and cyclists.

RECOMMENDATION

It is recommended that the cycle track and floating footway layout is reviewed to facilitate how pedestrians are most likely to use the facility.

Design Organisation Response	Rejected
<p>Owing to the geometrical constraints there is no alternative layout for the floating footway / bus stop. The proposed layout of the tactile paving, zebra crossing and the belisha beacon has taken consideration of the pedestrian desire line.</p> <p>This is not the first location in London with similar arrangement, for example the bi-directional cycle track at A2209 Deptford Church Street adjacent to Lewisham Southwark College has this floating arrangement with no issues been identified. In addition, the design principle is based on similar arrangement in Manchester where it is implemented in rural areas with low pedestrian volume.</p>	
Client Organisation Comments	
<p>Agree with the Designer.</p>	

Due to space constraints it has not been possible to propose a conventional bus stop bypass layout at this location. A shared use facility was considered as an alternative to this layout but was discounted as priorities between pedestrians and cyclists would be ambiguous making the cycle facility and bus stop less attractive to both users. Providing no bus stop bypass was also considered but would require cyclists to re join the carriageway and as such would provide no protection from traffic. As pedestrian flows are low in volume at this location, the proposed layout was deemed to provide an appropriate balance of space and level of service between all users.

Following TfL's recent review of bus stop bypasses, zebra crossings are proposed at the pedestrian crossing points at either end of the island. This means that

pedestrians stepping out onto the crossing will have priority over cyclists who would need to stop. Belisha beacons are proposed on the inside (cycle track side) of the footway at each crossing point to provide a physical deterrent to discourage pedestrians from walking into the cycle track and instead crossing onto the island. A ramp at the western end of the cycle track is designed to reduce cyclist speeds on approach to the bus stop bypass, reducing the potential for conflict between pedestrians and cyclists.

3.2.3 PROBLEM

Location: E – Floating footway to the west of Kew Bridge

Summary: Footway layout may lead to conflict between pedestrians and cyclists

It is proposed to provide a floating footway / bus stop to the west of Kew Bridge, requiring all pedestrians to cross onto the island and walk past the bus shelter. The Audit Team are concerned that pedestrians are less likely to use the facility as intended, instead opting to walk the most direct route within the cycle track. Pedestrians, especially those walking eastbound may step into the cycle track injudiciously without looking out for cyclists. This may lead to an increase potential for conflict between pedestrians and cyclists.

RECOMMENDATION

It is recommended that the cycle track and floating footway layout is reviewed to facilitate how pedestrians are most likely to use the facility.

Design Organisation Response	Rejected
<p>Owing to the geometrical constraints there is no alternative layout for the floating footway / bus stop. The proposed layout of the tactile paving, zebra crossing and the belisha beacon has taken consideration of the pedestrian desire line.</p> <p>This is not the first location in London with similar arrangement, for example the bi-directional cycle track at A2209 Deptford Church Street adjacent to Lewisham Southwark College has this floating arrangement with no issues been identified. In addition, the design principle is based on similar arrangement in Manchester where it is implemented in rural areas with low pedestrian volume.</p>	
Client Organisation Comments	

Agree with the Designer.

Due to space constraints it has not been possible to propose a conventional bus stop bypass layout at this location. A shared use facility was considered as an alternative to this layout but was discounted as priorities between pedestrians and cyclists would be ambiguous making the cycle facility and bus stop less attractive to both users. Providing no bus stop bypass was also considered but would require cyclists to re join the carriageway and as such would provide no protection from traffic. As pedestrian flows are low in volume at this location, the proposed layout was deemed to provide an appropriate balance of space and level of service between all users.

Following TfL's recent review of bus stop bypasses, zebra crossings are proposed at the pedestrian crossing points at either end of the island. This means that pedestrians stepping out onto the crossing will have priority over cyclists who would need to stop. Belisha beacons are proposed on the inside (cycle track side) of the footway at each crossing point to provide a physical deterrent to discourage pedestrians from walking into the cycle track and instead crossing onto the island. Ramps on the approach to the bus stop bypass crossings are designed to reduce cyclist speeds on approach to the bus stop bypass, reducing the potential for conflict between pedestrians and cyclists.

3.2.4 PROBLEM

Location: F – Kew Bridge Road, west of the junction with Green Dragon Lane

Summary: Proposed uncontrolled crossing facility may lead to conflict with cyclists

It is proposed to provide an uncontrolled pedestrian crossing facility to the west of Green Dragon Lane. The Audit Team are concerned that users of the crossing facility may not appreciate the presence of the cycle track, and that the facility is bi-directional. Pedestrians may focus on identifying an appropriate time to cross the main carriageway and step into the cycle track injudiciously, without realising the potential presence of cyclists. This may exacerbate a potential for conflict between pedestrians and cyclists.

RECOMMENDATION

It is recommended that the layout of the crossing and cycle facility is modified to discourage pedestrians from crossing into the path of cyclists. This may require the provision of a controlled facility.

Design Organisation Response	Accepted
It is agreed that the proposed pedestrian refuge may encourage pedestrians to wait on the cycle track, potentially causing conflict between pedestrians and cyclists. A controlled crossing facility is not feasible at this location due to the close proximity of a bus stop and a number of accesses which mean that there isn't space for a formal crossing with appropriate visibility on approach. Therefore, the proposed pedestrian refuge has been withdrawn from the proposal.	
Client Organisation Comments	
Agree with designer. As a controlled or staggered crossing cannot be provided to assist pedestrians crossing the cycle track and carriageway at this location, the proposed pedestrian refuge has been removed from the proposal. A new signalised pedestrian crossing is however proposed to the west which would provide pedestrians with a safe crossing point as an alternative.	

3.3 JUNCTIONS

3.3.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The layout of minor arm / access may reduce the likelihood of drivers giving way to pedestrians. This could result in an increased risk of collisions between pedestrians and turning vehicles.

It is proposed to provide a continuous footway side road entry treatment at a number of side roads and accesses along the route. It is appreciated that the side roads and accesses are lightly trafficked; however, the Audit Team have the following concerns:

- a) A recent study has found that drivers are most likely to give way to pedestrians/cyclists when they are turning out of a side road, rather than turning in. This may result in a potential interaction between road users. At a number of locations where continuous footways have been installed across two-way roads, compliance of drivers giving way from the main road was low. This may result in a potential for failure to give way collisions with pedestrians.
- b) The main road was observed to be relatively busy. Drivers following vehicles turning into the side road or access may not expect them to stop to give way to pedestrians. This may result in an increased potential for shunt type collisions.
- c) Given the busy nature of the main road, vehicles waiting to turning right could be impeding the progress of following vehicles. Drivers may therefore feel pressured to turn quicker into the side road / access with a potentially reduced awareness of approaching pedestrians. This may result in drivers failing to appropriately take heed of pedestrians with a potential for conflict as a result.

RECOMMENDATION

It is recommended that where possible the junctions are made exit only.

Where it is not possible to make the side road / access exit only, it is recommended to provide measures to clarify the route is priority for pedestrians. This may require the use of a change in vertical alignment and the use of contrasting colours and materials to the surrounding carriageway.

Design Organisation Response	Part Accepted
Proposed locations for continuous footways are at lightly trafficked access roads to either gated properties or 'no through roads'. Therefore it is impossible to make these roads exit only.	
The design consideration for continuous footway is based on experience gained from Magee Street at Oval. Criteria such as traffic volume of no more than 45 vehicles per hour during the peak hour and few, if any heavy vehicles have been used to develop the designs. Contrasting colours and materials in association with a vertical alignment of the cycle track will be part of the design features.	
Client Organisation Comments	
Continuous footways are pavement spaces that continue over a side road or access without a step or change in visual design, similar to a driveway cross over. The purpose is to aid pedestrians crossing by highlighting pedestrian priority over turning motor traffic with a continuous flush surface. The raised entry is intended to reduce vehicle speeds when turning across them. The Highway Code states that drivers should watch out for pedestrians crossing a road into which they are turning and if a	

pedestrian has started to cross they have priority, so drivers should give way

Along the route, continuous footways are proposed at some accesses, or 'no through roads' where the number of vehicles per hour is low and the relative risk of pedestrian / vehicle conflict is therefore low. Vertical deflection is intended to reduce the speed of traffic turning and road markings are proposed to highlight the presence of this feature.

Measures such as contrasting coloured surfacing and cycle logos are also proposed to highlight the presence of cyclists in these locations.

TfL is currently monitoring the use of continuous footways and any results of this that emerge during the design process will be used to inform our design proposals. In addition, continuous footway proposals are highlighted within this schemes Equality Impact Assessment.

3.3.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Cycle track with priority over turning vehicles may be ambiguous and lead to an exacerbated potential for conflict with cyclists.

It is proposed to provide a cycle track through the mouth of junctions and accesses where cyclists have priority over turning traffic. The Audit Team have the following concerns:

- a) Drivers may not anticipate the necessity to stop when turning from a major road into a minor road / access. This may result in failure to give way type collisions with cyclists.
- b) Where the cycle track is adjacent to a continuous footway, cyclists in the track are likely to approach the crossing at a faster speed than pedestrians. This may mean they are less easily identified than pedestrians with a potential for failure to give way type collisions.
- c) Cyclists may approach the junction from both directions concurrently. This will mean that cyclists approach from behind the driver. Drivers may therefore fail to appreciate the presence of a cyclist approaching the crossing and turn across their path. This may result in left/right hook type collisions.
- d) Drivers who do identify the necessity to cede priority to cyclists may only look to the right and fail to appreciate cyclists approaching from both directions where a bi-directional facility is proposed. This may result in failure to give way type collisions with cyclists.

RECOMMENDATION

It is recommended that the junction layout is modified to make it clearer who has priority. This could include making the junction exit only (where feasible) and/or the use of an alternative road marking to make the necessity to give way clearer. It may also be beneficial to consider the use of a conspicuous colour to highlight the conflict point.

Design Organisation Response	Part Accepted
<p>Owing to the geometrical constraints, the set-back distance of the cycle track varies from 4m to less than 1m through the mouth of the junction. As such, space for a vehicle to wait has been provided wherever possible unless space constraints due to trees, narrow footways or other specific constraints to the side roads exist.</p> <p>The designs have also reduced the turning radius at many side roads to reduce turning speeds. In addition, the cycle track will be raised and associated with an entry treatment on the side road, therefore, reducing the entry speeds further. Colour contrasting surface and road markings are also proposed to highlight the cycle track.</p>	
Client Organisation Comments	
<p>The Highway Code (Rule 182) states that any vehicle turning left must watch out for traffic coming up on the left before making the turn including cyclists and motorcyclists which may be hidden from view.</p> <p>Nonetheless, where possible, we have sought to eliminate the chance of conflict at side roads or accesses through closing roads or banning certain movements. Where this not possible due access constraints, or where vehicle flows are very low, we</p>	

have sought to reduce the likelihood of conflict arising through a combination of some or all of the design approaches set out in guidance such as the London Cycling Design Standards (LCDS) including:

- Setting the cycle track further into the side road to provide space for turning motorists to wait after leaving the main carriageway before crossing the cycle track. This also provides an area for drivers to wait before turning out of the side road without blocking the cycle track
- Restricting access or egress from the side road to reduce the number of vehicle movements
- Reducing the kerb radii to reduce the speed at which motorists can enter and exit the side road
- Introducing raised tables to reduce motorist speeds entering or exiting the side road
- Providing contrasting coloured surfacing and cycle logos across the junction to raise awareness of the presence of the cycle track and the fact that cyclists are crossing

The design treatment proposed at each side road is dependent on local conditions such as traffic and pedestrian flows, one-way or two-way nature of the street and visibility. Clear road markings such as give way lines and cycle logos are proposed at all side roads to highlight the requirement for motor vehicles to give way to cyclists upon entry and exit. We will continue to review the best way to provide priority for cycling at un-signalised side roads as the design progresses.

3.3.3 PROBLEM

Location: G – Brentford High Street junction with Holland Gardens

Summary: Right turning vehicles through a queue may exacerbate a potential for side-swipe type conflicts.

It is proposed to provide a bus stop within the eastbound carriageway immediately after the junction with Holland Gardens. The Audit Team are concerned that eastbound drivers will be held up by a bus stopping at the stop, and any vehicle wishing to turn right into Holland Gardens may need to do so through a static queue. Drivers turning right through a static queue may have reduced visibility to the cycle facility and to cyclists filtering on the nearside due to the close proximity of vehicles. Drivers may therefore turn injudiciously with an exacerbated potential for side-swipe type conflicts with cyclists.

RECOMMENDATION

It is recommended that an appropriate visibility splay is maintained at the junction. This may require the provision of a 'keep clear' road marking. It may also be beneficial to consider the provision of a conspicuous colour in the cycle facility to further highlight the potential presence of cyclists.

Design Organisation Response	Accepted
Contrasting coloured surfacing and cycle logos to highlight the presence of cyclists are already proposed. However, the provision of 'Keep Clear' road marking may be beneficial for the visibility splay, therefore, the design has been changed to include a 'Keep Clear' road marking.	
Client Organisation Comments	
Agree with designer. 'Keep Clear' road markings have been added to the design at this junction to increase visibility for right turning traffic into Holland Gardens.	

3.3.4 PROBLEM

Location: H – Kew Bridge Road, opposite Green Dragon Lane

Summary: Right turning vehicles through a queue may exacerbate a potential for side-swipe type conflicts.

It is proposed to provide a port-to-port marking with 'keep clear' road markings on both sides of the road at the junction with Green Dragon Lane. The Audit Team are concerned that westbound drivers may stop at the extents of the 'keep clear' marking to allow right turning vehicles to turn, who may have restricted visibility of cyclists within the cycle track due to the close proximity of vehicles. Drivers may therefore turn injudiciously with an exacerbated potential for side-swipe type conflicts with cyclists.

RECOMMENDATION

It is recommended that an appropriate visibility splay is maintained at the junction. This may require the provision of an elongated 'keep clear' road marking. It may also be beneficial to consider the provision of a conspicuous colour in the cycle facility to further highlight the potential presence of cyclists.

Design Organisation Response	Accepted
Contrasting coloured surfacing and cycle logos to highlight the presence of cyclists	

are already proposed. However, the provision of an elongated 'Keep Clear' road marking may be beneficial for the visibility splay, therefore, the design has changed to include an elongated 'Keep Clear' road marking.

Client Organisation Comments

Agree with the designer's response. The 'keep clear' marking will be extended to increase the visibility splay for traffic. The cycle track is already proposed to have a contrasting coloured surface.

3.4 BUS FACILITIES

3.4.1 PROBLEM

Location: I – Brentford High Street between junctions with Holland Gardens and Pump House Crescent

Summary: Proximity of the bus stop to nearby junctions may lead to vehicles pulling out into the path of other road users

It is proposed to provide a bus stop between the junctions of Holland Gardens and Pump House Crescent within the eastbound carriageway. The Audit Team are concerned that a bus stopped within the bus stop may significantly reduce visibility for exiting vehicles from both of the two side roads. Drivers wishing to exit Holland Gardens or Pump House Crescent may do so injudiciously into the path of a vehicle passing the bus, this may lead to an increased potential for side-swipe type conflicts.

RECOMMENDATION

It is recommended that the bus stop is relocated.

Design Organisation Response	Rejected
<p>Owing to the geometrical constraints, it is not possible to relocate the bus stop east as it would block access to the petrol station or west as the road width means that minimum widths for the bus stop island / traffic lanes would not be feasible. The decision to provide this bus stop at this location is based on the fact that traffic volume accessing Holland Gardens and Pump House Crescent is extremely low.</p> <p>The give way markings at Holland Gardens are there to show pedestrian priority, vehicles will then move ahead to the edge of the road where they would give way to traffic and cyclists coming eastbound at which point the visibility is satisfactory. Vehicles wishing to come out of Holland Gardens and wanting to proceed westbound will be assisted by the 'Keep Clear' at which point the visibility of oncoming westbound traffic is satisfactory given the constraints.</p> <p>Visibility out of Pump House Crescent is satisfactory for oncoming westbound and eastbound traffic. In the case that an eastbound vehicle was passing the bus and was 'masked by it', the visibility is 30m from the give way line. The vehicle exiting will have to proceed at a low speed to the westbound carriageway where the visibility will be satisfactory.</p>	
Client Organisation Comments	
<p>Agree with the designer's response. It is not possible to relocate the bus stop away from the junction and removing the bus stop would increase distances between eastbound bus stops to over 600m which exceeds the recommended distance of 400m between bus stops. As this is a residential area, provision of adequate bus stop spacing is important to maintain to provide access to public transport. Visibility from the side roads is considered to be sufficient and sight lines will be optimised by the removal of redundant street furniture such as pedestrian guard railing.</p>	

3.5 PARKING AND LOADING FACILITIES

3.5.1 PROBLEM

Location: J – Brentford High Street opposite Victoria Steps Quay

Summary: Loading activity within the cycle track may force cyclists into the carriageway. This may result in side swipe type collisions with eastbound traffic.

The proposed stepped cycle track runs alongside two loading bays located within the bus lane. Whilst it is appreciated that a dooring buffer has been provided, the Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the cycle track, obstructing cyclists. Cyclists may therefore decide to enter the general traffic lane to avoid such activities, potentially into the path of vehicles, who may not expect such manoeuvres. This may result in side swipe type collisions.

RECOMMENDATION

It is recommended that sufficient space is provided to permit parking / loading activities whilst providing sufficient clearance to the cycle track.

Design Organisation Response	Accepted
The design has been updated to increase the size of the segregation island to 1 metre to avoid loading / unloading activities on the cycle track.	
Client Organisation Comments	
Following discussion with the London Borough of Hounslow who are the highway owner for this road, it has been confirmed that these loading bays would not be for use by blue badge users (loading only) and as such, we do not expect disabled users to be entering / exiting vehicles here. Following concerns regarding loading activities in the cycle track, the design has been updated to increase the segregation island to 1 metre wide which allows more space for vehicles to unload or load without blocking the cycle track.	

3.6 TRAFFIC SIGNALS

3.6.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Split phasing of traffic signal stages may lead to pedestrians inadvertently stepping into the path of vehicles

It is proposed to provide a number of the arms on Kew Bridge Road at the junction with Kew Bridge with adjacent traffic streams that run in different stages. The Audit Team are concerned that pedestrians may observe stationary traffic in one lane and incorrectly assume traffic in the adjacent lanes is also held. Pedestrians may therefore inadvertently step into the path of moving vehicles with an exacerbated potential for conflict as a result.

RECOMMENDATION

It is recommended that the adjacent traffic streams on a single arm run concurrently. If this is not possible it may be beneficial to provide measures to discourage crossing in a single movement inadvertently, such as staggering or offsetting the different halves of the same crossing.

Design Organisation Response	Rejected
The proposed 'Split phasing of traffic signal stages' is to optimise the junction	

capacity. Due to geometrical constraints, it is not possible to provide alternatives such as a staggered crossing, offsetting the different halves of the same crossing to remove the need to cross in a single movement. The proposed signal layout and method of control has been reviewed by the Traffic Signal team to ensure it is sufficient and safe for operation. In addition, the presence of traffic islands in some locations provides space for pedestrians to wait should they start to cross and need to stop.

Client Organisation Comments

Split phased traffic signals have been across junctions in London to optimise the operation of junctions.

Due to the number of movements that need to be catered for at this junction, including separating traffic, pedestrians and cyclists, it is not possible to run adjacent traffic stream concurrently as this would increase signal cycle times. This would introduce delay to all road users which would likely lead to congestion and longer wait times and in turn could lead to vehicles blocking crossings as they queue through the junction or increase the likelihood for pedestrians to cross on a red light as they become impatient waiting for a green man.

The proposed design for Kew Bridge Road / Kew Road junction provides improvements for pedestrians by reducing the number of crossings required to cross each arm of the junction from four to three. The design also provides a new crossing movement over the east arm of the junction to get to / from the station.

The reduction in crossing movements compared to the existing layout should help to improve the ease with which pedestrians can cross at this junction, thereby reducing the temptation to cross away from the green man. Traffic islands also offer some protection for any pedestrians who start to cross on a red man.

3.6.2 PROBLEM

Location: K – Brentford High Street in proximity to Victoria Steps Quay

Summary: Stationary traffic may obstruct visibility to the nearside primary traffic signal. Drivers may fail to see the traffic signals. This may result in red light violations or nose to tail type collisions

Brentford High Street comprises a general traffic lane and a nearside bus lane on the approach to the cycle crossover point for CS9. The design indicates only the provision of nearside traffic signals. No method of control has been provided, but it is assumed that it will run in two stages, general traffic and cyclists/pedestrians.

The Audit Team is concerned that visibility to the nearside primary signal may be obstructed by stationary eastbound buses in the adjacent bus lane. Inadequate visibility may result in red light violations (with potential for collisions with cyclists and/or pedestrians) or nose to tail type collisions as drivers fail to appreciate the traffic signal in time and brake late.

RECOMMENDATION

It is recommended that appropriate visibility is provided to the traffic signals from all lanes. This could be achieved by providing an offside island / traffic signal.

Design Organisation Response

Accepted

Design has been changed to include a secondary signal head positioned at the far side footway for both east and west bound traffic. The position of these secondary

signal heads will provide sufficient visibilities to approaching traffic.

Client Organisation Comments

Agree with the designer's response. The design will also be subject to a traffic signal safety audit.

3.6.3 PROBLEM

Location: L – Brentford High Street in proximity to Victoria Steps Quay

Summary: Cycle track and pedestrian island layout may exacerbate a potential for conflict between these two users

No method of control has been provided for the crossover point, but it is assumed that it will run in two stages, general traffic and cyclists/pedestrians. If eastbound cyclists and pedestrians run concurrently, there is a risk that they will converge on the southern side of the road at the same time. Pedestrians may therefore continue ahead into the path of cyclists, unaware that they may be approaching from behind them. An exacerbated potential for conflict between pedestrians and cyclists may exist as a result.

RECOMMENDATION

It is recommended that the layout of the cycle and pedestrian facility is modified to make cyclists more visible to pedestrians. This may require reorientation of the cycle facility. It may also be beneficial to provide the traffic signals with an offset to ensure cyclists are established (or through the crossing) before pedestrians reach the opposite side of the carriageway and want to cross the cycle track.

Design Organisation Response

Rejected

Owing to the geometrical constraints it is not possible to modify the proposed layout. The crossing facility has two stages, general traffic and cycle / pedestrian operation. Cyclists leaving the stop line are likely to reach the crossing before pedestrians who will be travelling slower and so would have cleared the crossing before coming into conflict. Pedestrians will have an island to wait on and would need to give way to cyclists. A zebra crossing was investigated but not viable due to proximity to the cycle crossing and likelihood that cyclists could block back across the carriageway when traffic is on green

Client Organisation Comments

Agree with the designer's response. While it is anticipated that cyclists will have cleared the informal crossing point by the time pedestrians come to cross it, cyclists will have priority and as such pedestrians would need to give way to cyclists. The crossing point has been designed with a raised table and road markings to encourage cyclists to slow down as they pass through, reducing the likelihood of conflict or injury.

3.6.4 PROBLEM

Location: M – Kew Bridge Road junction with Kew Bridge

Summary: Cycle turning left immediately onto a red traffic signal may exacerbate a potential for conflict with pedestrians

Cyclists turning left from Kew Bridge Road onto Kew Bridge will be shown a red traffic signal immediately as they turn left, having just been given a green signal to

proceed. Left turning cyclists may fail to appreciate the requirement to stop at this location due to the close proximity of the stop line and signals for the left turn manoeuvre. Cyclists may cycle through the pedestrian crossing injudiciously as a result, with a potential for conflict with pedestrians.

RECOMMENDATION

It is recommended that the method of control is modified to ensure cyclists are not stopped immediately after turning left. If this cannot be achieved it may be beneficial to modify the alignment of the cycle facility to make the traffic signals more visible to turning cyclists.

Design Organisation Response	Part Accepted
Owing to geometrical and capacity constraints, it is not possible to provide an alternative method of control at this location. The design includes a dropped kerb before the cycle signal so that cyclists can access the shared use area to bypass the said stop line.	

Client Organisation Comments
At this junction, the signalisation of the pedestrian crossing and internal stop line was designed to accommodate cyclists turning left/right onto Kew Bridge while providing a pedestrian crossing and not increasing the signal cycle time at the junction. As there is an alternative facility for cyclists making this movement (via a shared use path and dropped kerb), it is anticipated that the number of cyclists making this movement will be low and as such the risk of cycle to pedestrian conflict is low.
Red light compliance is an enforcement matter. If constructed, information about the changes to the layout of this junction would be provided to TfL's enforcement team who undertake regular cycle patrols on all Cycle Superhighways as part of business as usual enforcement activity. Furthermore, TfL has Operation Safeway which is a high visibility roadside enforcement operation who enforce the rules of the road and engage with users on how to use the road safely.

3.6.5 PROBLEM

Location: N – Kew Bridge north of junction with Kew Green

Summary: Stationary traffic may obstruct visibility to the nearside primary traffic signal. Drivers may fail to see the traffic signals. This may result in red light violations or nose to tail type collisions

Kew Bridge comprises two general traffic lanes in both directions. The proposed design includes only nearside traffic signals. The Audit Team is concerned that visibility to the nearside primary signal may be obstructed by stationary vehicles in the adjacent lane. Inadequate visibility may result in red light violations (with potential for collisions with cyclists and/or pedestrians) or nose to tail type collisions as drivers fail to appreciate the traffic signal in time and brake late.

This is of particular concern at this location southbound as a bus situated on the opposite side of the carriageway may obstruct visibility to any offside traffic signal.

RECOMMENDATION

It is recommended that appropriate visibility is provided to the traffic signals from all lanes. This could be achieved by providing an offside island to house an offside traffic signal.

Design Organisation Response	Part Accepted
Owing to the geometrical constraints, it is impossible to provide an island to house the secondary signal head. However, a secondary signal head will be provided on the far side footway.	
Client Organisation Comments	
Agree with the designer's response. A secondary signal head will be provided to improve visibility. The design will also be subject to a traffic signal safety audit.	

End of list of problems identified and recommendations offered in this Stage 1 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 1 ROAD SAFETY AUDIT THAT ARE OUTSIDE THE TERMS OF REFERENCE

Safety issues identified during the audit and site inspection that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in this section. It is to be understood that, in raising these issues, the Audit Team in no way warrants that a full review of the highway environment has been undertaken beyond that necessary to undertake the Audit as commissioned.

4.1 ISSUE

Location: General to scheme, multiple locations

Reason considered to be outside the Terms of Reference: Item for consideration rather than a defined road safety concern

It is proposed to provide a 2.5m bi-directional cycle track along the route. With moderate flows, a track at 2.5m width may be narrow to facilitate bi-directional cycle flow and may reduce the effectiveness of the facility, due to the limited opportunities to overtake combined with cyclists likely to adopt a more central riding position. There is a risk that more confident cyclist will choose not to use the facility, and instead ride within the carriageway where it may be easier to make progress. If possible it may be beneficial to consider whether the facility can be increased in width.

Design Organisation Response	Rejected
There are various design constraints along the route preventing the bi-directional cycle tracks from being widened such as trees, bus stops, traffic infrastructure and high footfall areas.	
To highlight the two-way nature of the bi-directional track at sections which are 2.5m wide, cycle logos 1057, and 1004 central lane line markings will be provided.	
Cycle flows during the peak periods are tidal based on existing traffic counts which helps maximise use of space within the cycle track and splayed kerbs will be used at these locations to increase the effective width of the track.	
Client Organisation Comments	
When designing the scheme, we have taken cycle flows into account to inform the width of the cycle track. The two-way cycle track is proposed to be 2.5 metres wide, increasing to 3 metres in some locations which would allow cyclists of different speeds to overtake one another.	
According to LCDS, a 2 metre wide cycle track would cater for up to 300 cyclists in the peak hour and a 3 metre wide cycle track would cater for between 300 and 1000 cyclists in the peak hour. Along this section of the route, current cycle flows are circa 100 – 150 cyclists in the peak hour meaning that the cycle track widths proposed would cater for these flows plus future uplift.	
In addition, where flows are tidal, for example during peak times, two-way tracks offer a more flexible use of space, allowing cyclists to use the opposite side of the track for overtaking if free from oncoming cyclists.	

4.2 ISSUE

Location: 1 – Brentford High Street junction with North Road

Reason considered to be outside the Terms of Reference: Detailed design issue

It is unclear from the proposals whether the pedestrian guardrail (PGR) at the junction is to be removed. The Audit Team are concerned that removal of the PGR may expose a desire line away from formal crossing facilities. As part of the detailed design of the measures it may be worthwhile considering whether retention of the PGR would be of benefit.

Design Organisation Response	Rejected
The pedestrian guardrail (PGR) at this junction is proposed to be removed under the proposals. It is TfL policy to remove PGR. Removing PGR will make informal crossing more attractive for pedestrians to use. It also helps to promote caution and increase the visibility for all road users. Furthermore, the sightlines are sufficiently clear for pedestrians to decide if it is safe to cross.	
Client Organisation Comments	
Agree with the designer's response.	

4.3 ISSUE

Location: 2 – Marina Development Area

Reason considered to be outside the Terms of Reference: Item for clarification rather than a defined road safety concern

The Audit Team noted that the area of the proposed Marina Development Area does not include the adjacent vehicular access, which is not shown as included across the cycle facility. It may be beneficial to review the layout to include an access to the adjacent property.

Design Organisation Response	Accepted
The design team believed the new development will close this access. However, following conversations with the borough this access is to be retained. The design has been amended to maintain the access.	
Client Organisation Comments	
Agree with the designer's response. Following discussion with the London Borough of Hounslow it has been confirmed that this access will remain and has now been included in the designs.	

4.4 ISSUE

Location: 3 – Kew Bridge Road junction with Kew Bridge

Reason considered to be outside the Terms of Reference: Item for consideration rather than a defined road safety concern

The Audit Team noted that the landing area for pedestrians crossing southbound onto the triangular island to the west of the junction is narrow. As part of the detailed design of the measures it may be beneficial to consider whether the island can be widened or realigned to better accommodate pedestrians.

Design Organisation Response	Accepted
The design has been updated to realign the crossing area to better accommodate pedestrians.	
Client Organisation Comments	
Agree with the designer's response.	

4.5 ISSUE

Location: 4 – Access Road junction with Kew Bridge

Reason considered to be outside the Terms of Reference: Item for consideration rather than a defined road safety concern

The Audit Team noted that the junction alignment for vehicles turning left and wishing to proceed ahead onto Kew Bridge Road appears tight. There is a risk that larger vehicles may over-run the triangular island leading to damage and a potential maintenance liability. It may be beneficial to check the swept path of this manoeuvre for all likely vehicles and ensure it can be completed without encroaching onto the triangular island.

Design Organisation Response	Accepted
Swept path exercise has been carried out with no encroaching issue.	
Client Organisation Comments	
Agree with the designer's response.	

5.0 SIGNATURES AND SIGN-OFF

5.1 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and documents listed in Appendix A. to this Safety Audit report. The Road Safety Audit has been carried out in accordance with TfL Procedure SQA-0170 dated May 2014, with the sole purpose of identifying any feature that could be removed or modified in order to improve the safety of the measures. The problems identified have been noted in this report together with associated suggestions for safety improvements that we recommend should be studied for implementation.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 12/10/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: [REDACTED] [@tfl.gov.uk](mailto:[REDACTED]@tfl.gov.uk) ([REDACTED])

AUDIT TEAM MEMBER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 12/10/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: [REDACTED] [@tfl.gov.uk](mailto:[REDACTED]@tfl.gov.uk) ([REDACTED])

5.2 DESIGN TEAM STATEMENT

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Design Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 26/10/18

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Senior Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 26/10/18

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Principal Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 31/10/18

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Lead Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 31/10/18

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER

DRAWING TITLE

PJ549C-RSM-PRD-11-DR-TE-25-57-0032 (P06)	A315 Brentford High Street Concept Design Section 8 – Sheet 32
PJ549C-RSM-PRD-11-DR-TE-25-57-0033 (P06)	A315 Brentford High Street Concept Design Section 8 – Sheet 33
PJ549C-RSM-PRD-11-DR-TE-25-57-0034 (P06)	A315 Brentford High Street Concept Design Section 8 – Sheet 34
PJ549C-RSM-PRD-11-DR-TE-25-57-0035 (P06)	A315 Brentford High Street Concept Design Section 8 – Sheet 35
PJ549C-RSM-PRD-11-DR-TE-25-57-0036 (P06)	A315 Brentford High Street Concept Design Section 8 – Sheet 36
PJ549C-RSM-PRD-11-DR-TE-25-57-0036.1 (P06)	A315 Brentford High Street Concept Design Section 8 – Sheet 36.1
PJ549C-RSM-PRD-11-DR-TE-25-57-0036.2 (P06)	A315 Brentford High Street Concept Design Section 8 – Sheet 36.2
PJ549C-RSM-PRD-11-DR-TE-25-57-0036.3 (P06)	A315 Brentford High Street Concept Design Section 8 – Sheet 36.3

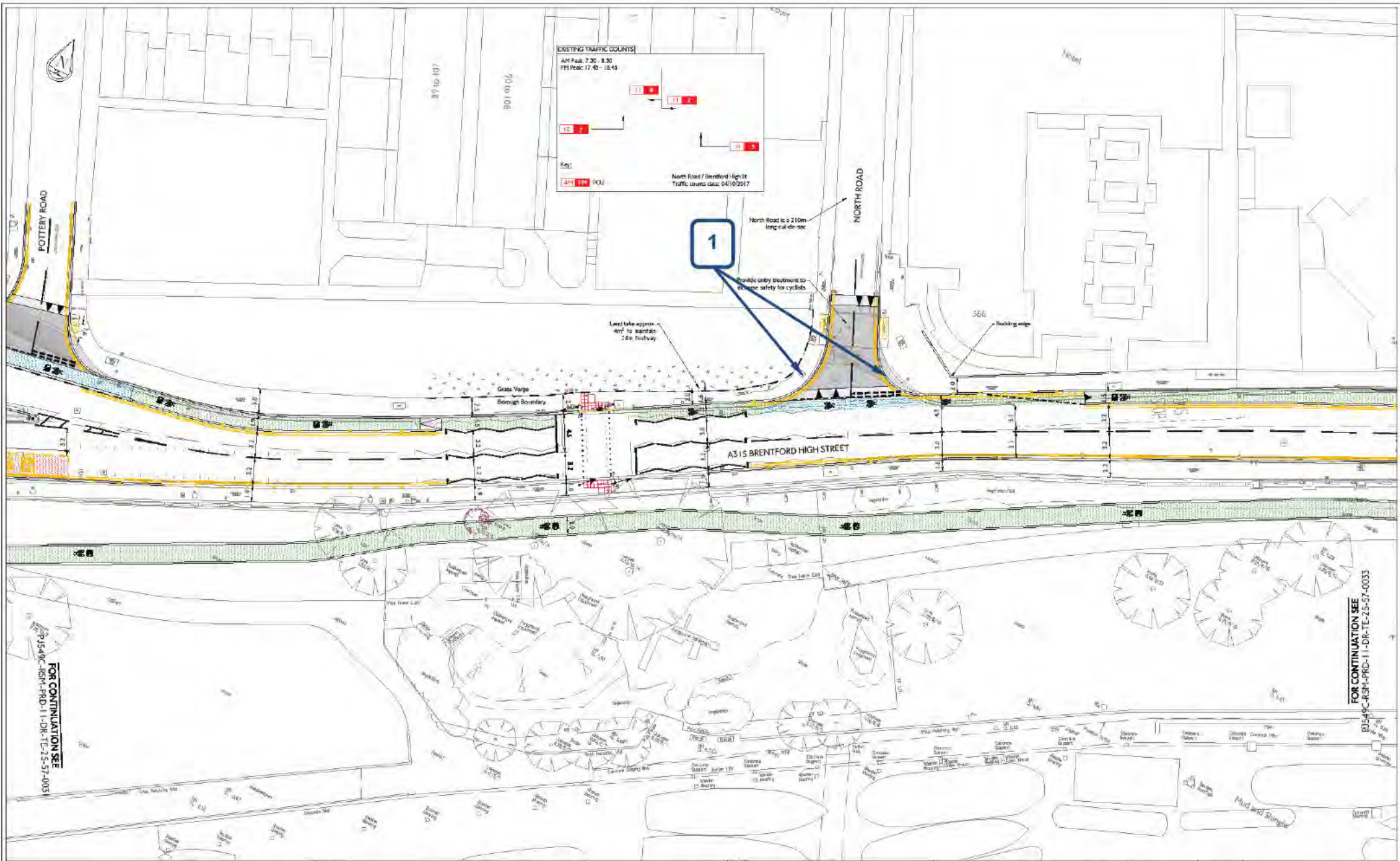
DOCUMENTS

DETAILS (where appropriate)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Safety Audit Brief
<input type="checkbox"/> Site Location Plan
<input type="checkbox"/> Traffic signal details
<input type="checkbox"/> TfL signal safety checklist
<input type="checkbox"/> Departures from standard
<input type="checkbox"/> Previous Road Safety Audits
<input type="checkbox"/> Previous Designer Responses
<input type="checkbox"/> Collision data
<input type="checkbox"/> Collision plot
<input type="checkbox"/> Traffic flow / modelling data
<input type="checkbox"/> Pedestrian flow / modelling data
<input type="checkbox"/> Speed survey data
<input type="checkbox"/> Other documents | |
|--|--|

APPENDIX B

Problem Locations



LEGEND

- Existing road marking
- Existing kerb
- Existing sign and post
- Proposed road marking - white
- Proposed road marking - yellow
- Proposed road marking - red
- Proposed double line
- Proposed single line
- Proposed dropped kerb
- Proposed transition kerb
- Proposed sign and post
- Proposed lamp column
- Proposed gully
- Proposed cycle stand
- Proposed bus stop flag
- Proposed bollard
- Proposed bollard beacon
- Proposed bollard machine
- Proposed bus shelter
- Proposed traffic signal
- Proposed tactile paving - buff
- Proposed tactile paving - grey
- Proposed tactile paving - red
- Proposed kerb
- Proposed bollard-out / stand
- Proposed over-run island
- Proposed cycle lane - blue
- Proposed cycle lane - white
- Proposed cycle lane - green
- Proposed cycle logo (TSRGD 1001)
- Potential new tree

NOTES

1. The proposed cycle lane is to be constructed in accordance with the requirements of the TSRGD 1001.

2. The proposed cycle lane is to be constructed in accordance with the requirements of the TSRGD 1001.

REVISIONS

NO	DATE	REVISION	BY	CHK	APP
1	15.06.19	Issue for CDR review	JF	JA	ECL
2	19.05.19	Issue following TAD comment	JF	JA	ECL
3	13.04.19	Amendments completed to 3.2m in accordance with TAD comment	JF	JA	ECL
4	20.04.17	Issue for TAD review	JF	JA	ECL

FILE REF: 157024chess Information/A315/Brentford High Street/021 WPD/021549C-RSM-PRD-11-DR-TE-25-57-0033/021549C-RSM-PRD-11-DR-TE-25-57-0033

LB of HOUNSLOW
 CYCLE SUPERHIGHWAY 9
 A315 BRENTFORD HIGH STREET
 CONCEPT DESIGN
 SECTION 8

FOR CONTINUATION SEE
 PJ549C-RSM-PRD-11-DR-TE-25-57-0033

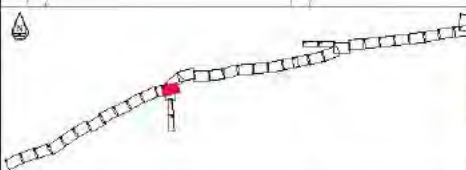
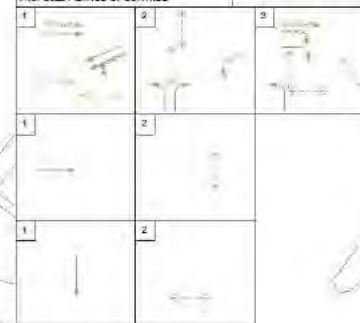


A315 KEW BRIDGE ROAD

M

FOR CONTINUATION SEE
PJ549C-RSM-PRD-11-DR-TE-25-57-0037

PROPOSED METHOD OF CONTROL
1. <i>Control of the environment</i>
2. <i>Control of the host</i>
3. <i>Control of the vector</i>
4. <i>Control of the parasite</i>
5. <i>Control of the disease</i>
6. <i>Control of the community</i>
7. <i>Control of the economy</i>
8. <i>Control of the culture</i>
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100. <i>Control of the industry</i>



LEGEND

- | | | | | | | | |
|--|--------------------------------|-----|--------------------------|--|---------------------------------|--|---------------------------------|
| | Existing road marking | SR | Proposed sign and post | | Proposed tactile paving - buff | | Proposed tactile paving - blue |
| | Existing kerb | LC | Proposed tap column | | Proposed tactile paving - red | | Proposed tactile paving - green |
| | Proposed sign and post | □ | Proposed cycle lane | | Proposed tactile paving - blue | | Proposed tactile paving - green |
| | Proposed road marking - white | → | Proposed cycle stand | | Proposed tactile paving - blue | | Proposed tactile paving - green |
| | Proposed road marking - yellow | SR | Proposed bike shed | | Proposed tactile paving - buff | | Proposed tactile paving - blue |
| | Proposed road marking - red | LC | Proposed tactile | | Proposed tactile paving - red | | Proposed tactile paving - green |
| | Proposed tactile sign | | Proposed tactile beacon | | Proposed tactile paving - blue | | Proposed tactile paving - green |
| | Proposed single slip | LTN | Proposed tactile machine | | Proposed tactile paving - green | | Proposed tactile paving - blue |
| | Proposed dropped kerb | | Proposed bike shelter | | Proposed tactile paving - buff | | Proposed tactile paving - blue |
| | Proposed straight kerb | | Proposed tactile aid | | Proposed tactile paving - red | | Proposed tactile paving - green |

NOTES

[illegible]

Surface Treatment

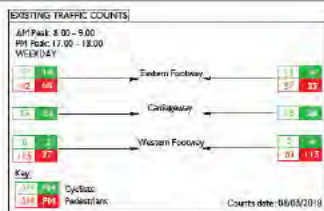


Politeia
167 Blackfriars Road
London
SE1 1NU

date	grade	type	plan	app	photo
APR 17	1.50 @ A1		JA	EC2	8636 / OF 0076
submitted	FOR COMMENT				review
3/5/17					P06

PJ549C-RSM-PRD-11-DR-TE-25-57-0036.

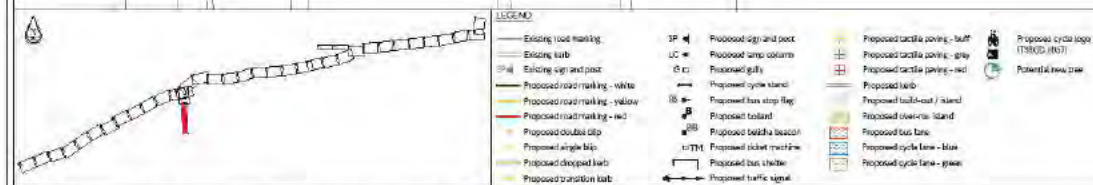




FOR CONTINUATION SEE
PJS49C-RSM-PRD-1-DR-TE-25-57-0036.2

FOR CONTINUATION SEE
PJ549C-RSM-P RD-11-DR-TE-25-57-0063, 7 ABOVE

FOR CONTINUATION SEE
PJ549C-RSM-PRD-11-DR-TE25-57-0066.3 BELOW



501

P0	22.06.18	Project to VSBH Housing	B	A	
Fw	CW	Dwh	dr	CR	

LB OF HOUNSLOW
CYCLE SUPERHIGHWAY 9
A315 BRENTFORD HIGH STREET
CONCEPT DESIGN
SECTION 8

UNIVERSITY COLLEGE London Transport		Road Space Management Customised Design Engineering	
		Fulham 190 Blackhorse Road London SE1 8NU	
DATE	TIME	DATE	TIME
04/11/84	10:00 AM	04/11/84	10:00 AM
LOCATION	FOR COMMENT		STATUS
83			P01
APPROVED BY:			
PJ549C-RSM-PRD-11-DR-TE-25-57-0036.3			

Cycle Superhighway Route 9

Revised Section 9 Proposals

Stage 1 Road Safety Audit

Ref: 3246.09/028/A315/BOR/2018

Prepared for:

TfL Cycle Superhighways – Project and Programme Sponsorship

By:

Road Safety Audit

TfL Engineering Services – Highways Engineering Team

Prepared by: [REDACTED] Audit Team Leader

Checked by: [REDACTED] Audit Team Member

Approved by: [REDACTED]

Version	Status	Date
A	Audit report issued to Client	10/09/2018

1.0 INTRODUCTION

1.1 Commission

- 1.1.1 This report results from a Stage 1 Road Safety Audit carried out on the Cycle Superhighway Route 9, revised Section 9 proposals.
- 1.1.2 The Audit was undertaken by TfL Road Safety Audit in accordance with the Audit Brief issued by the Client Organisation on 28th August 2018. It took place at the Palestra offices of TfL on 3rd September 2018 and comprised an examination of the documents provided as listed in Appendix A, plus a visit to the site of the proposed scheme.
- 1.1.3 The visit to the site of the proposed scheme was made on 3rd September 2018. During the site visit the weather was sunny and the existing road surface was dry.

1.2 Terms of Reference

- 1.2.1 The Terms of Reference of this Audit are as described in TfL Procedure SQA-0170 dated May 2014. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and how it impacts on all road users and has not examined or verified the compliance of the designs to any other criteria. However, to clearly explain a safety problem or the recommendation to resolve a problem the Audit Team may, on occasion, have referred to a design standard without touching on technical audit. An absence of comment relating to specific road users / modes in Section 3 of this report does not imply that they have not been considered; instead the Audit Team feels they are not adversely affected by the proposed changes.
- 1.2.2 This Safety Audit is not intended to identify pre-existing hazards which remain unchanged due to the proposals; hence they will not be raised in Section 3 of this report as they fall outside the remit of Road Safety Audit in general as specified in the procedure SQA-0170 dated May 2014. Safety issues identified during the Audit and site visit that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in Section 4 of this report.
- 1.2.3 Nothing in this Audit should be regarded as a direct instruction to include or remove a measure from within the scheme. Responsibility for designing the scheme lies with the Designer and as such the Audit Team accepts no design responsibility for any changes made to the scheme as a result of this Audit.
- 1.2.4 In accordance with TfL Procedure SQA-0170 dated May 2014, this Audit has a maximum shelf life of 2 years. If the scheme does not progress to the next stage in its development within this period, then the scheme should be re-audited.
- 1.2.5 Unless general to the scheme, all comments and recommendations are referenced to the detailed design drawings and the locations have been indicated on the plan located in Appendix B.
- 1.2.6 It is the responsibility of the Design Organisation to complete the Designer's response section of this Audit report. Where applicable and necessary it is the responsibility of the Client Organisation to complete the Client comment section of this Audit report. Signatures from both the Design Organisation and Client Organisation must be added within Section 5 of this Audit report. A copy of which must be returned to the Audit Team.

1.3 Main Parties to the Audit

1.3.1 Client Organisation

Client contact details: [REDACTED] – Project and Programme Sponsorship

1.3.2 Design Organisation

Design contact details: TfL Traffic Design Engineering

1.3.3 Audit Team

Audit Team Leader: [REDACTED] – TfL Road Safety Audit

Audit Team Member: [REDACTED] – TfL Road Safety Audit

Audit Team Observer: None present

1.3.4 Other Specialist Advisors

Specialist Advisor Details: None present

1.4 Purpose of the Scheme

- 1.4.1 The purpose of the scheme is to provide a largely-segregated cycle facility between Kensington Olympia and Hounslow Town Centre. Other improvements include new cycle specific traffic signals, footway build outs and new pedestrian crossings, 5.5km of two-way segregated cycle route with public realm improvements at town centres*.

*Taken directly from the Audit Brief.

1.5 Special Considerations

- 1.5.1 Due to the length of the proposed route, the Road Safety Audit process is being undertaken in sections as defined by the project team. This Audit covers only the Section 9 proposals and their associated tie-ins with the adjacent sections.
- 1.5.2 CS9 (Section 9) covers the proposals along Chiswick High Road between the junctions of Kew Bridge (to the west) and just past Capital Interchange Way (to the east).

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

A previous iteration of the proposals was subject to a Stage 1 Road Safety Audit carried out in April 2017 by TfL Road Safety Audit (ref: 2778.08/003/A315/TLRN/2017). The design has been substantially updated since this Audit was undertaken, the contents of which are not deemed relevant.

3.0 ITEMS RAISED AT THIS STAGE 1 ROAD SAFETY AUDIT

This section should be read in conjunction with Paragraphs 1.2.1, 1.2.2 and 1.2.3 of this report.

3.1 CYCLE FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Provision of a stepped track facility may exacerbate a potential for loss of control type collisions by cyclists

It is proposed to provide a stepped track as part of the route. The Audit Team are aware of a number of instances at similar installations whereby cyclists may have failed to appreciate the change in surface levels when transitioning into / from the track, leading to cyclists losing control and falling from their cycle.

It is appreciated that the causation of loss of control collisions at similar installations is not wholly clear, and it is understood that TfL is in the process of undertaking a monitoring study of stepped tracks to identify how riders use this type of facility.

RECOMMENDATION

It is recommended that the design of the stepped track is reconsidered following the outcome of the study. If however the design is progressed before the study results are available, it is recommended that an alternative type of cycle facility is provided, or, the change in surface levels are designed in a manner to ensure they are unambiguous and obvious to cyclists.

Design Organisation Response	Part accepted
The stepped track layout has been designed in line with the current London Cycling Design Standards. As per the Audit Team's comments, it is understood that a study has commenced looking at the layout of the stepped tracks. The design team will review the layout of the cycle track following the outcome of that study. However, the number of incidents involving cyclists losing control and falling from their cycle in locations already implemented is very low compared to the number of cycle trips that have been generated by these highly successful schemes.	
Client Organisation Comments	
Agree with the designer's response. Stepped cycle tracks have been proposed according to the London Cycling Design Standards.	
In locations where stepped tracks are proposed, the change in surface levels is indicated with ramps and road markings at the start of each section. Road markings also delineate the edge of the carriageway including double yellow lines. The width of the kerbs forming the edge of the stepped cycle track have been specified to be 300mm to reduce the likelihood that these are confused with a mandatory lane white road marking.	
If there are recommendations from the study during the design process that can further improve the design then these will be reviewed.	

3.2 JUNCTIONS

3.2.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The layout of minor arm / access may reduce the likelihood of drivers giving way to pedestrians / cyclists. This could result in an increased risk of collisions between pedestrians / cyclists and turning vehicles.

It is proposed to provide a continuous footway side road entry treatment at a number of side roads and accesses along the route. It is appreciated that the side roads and accesses are lightly trafficked; however, the Audit Team have the following concerns:

- a) A recent study has found that drivers are most likely to give way to pedestrians/cyclists when they are turning out of a side road, rather than turning in resulting in a potential interaction between road users if they fail to give way. At a number of locations where continuous footways have been installed across two-way roads, compliance of drivers giving way from the main road was low. This may result in vehicle and pedestrian / cycle conflicts.
- b) Where the continuous footway incorporates a cycle track, cyclists in the track are likely to approach the crossing at a faster speed than pedestrians. Drivers may therefore fail to appreciate a cyclist approaching and a greater speed exacerbating a potential for conflict.
- c) Cyclists may approach the junction from both directions concurrently. This will mean that cyclists approach from behind the driver. Drivers may therefore fail to appreciate the presence of a cyclist approaching the crossing and turn across their path. This may result in left/right hook type collisions.
- d) The main road was observed to be relatively busy. Drivers following vehicles turning into the side road or access may not expect them to stop to give way to pedestrians / cyclists. This may result in an increased potential for shunt type collisions.
- e) Given the busy nature of the main road, vehicles waiting to turning right could be impeding the progress of following vehicles. Drivers may therefore feel pressured to turn quicker into the side road / access with a potentially reduced awareness of approaching pedestrians / cyclists. This may result in drivers failing to appropriately take heed of pedestrians / cyclists with a potential for conflict as a result.

RECOMMENDATION

It is recommended that where possible the junctions are made exit only.

Where it is not possible to make the side road / access exit only, it is recommended to provide measures to clarify the route is priority for pedestrians and cyclists. This may require the use of a change in vertical alignment and the use of contrasting colours and materials.

Design Organisation Response	Part Accepted
Proposed locations for continuous footways are at lightly trafficked access roads to either gated properties or 'no through roads'. Therefore it is impossible to make these roads exit only.	
The design consideration for continuous footway is based on experience gained from Magee Street at Oval. Criteria such as traffic volume of no more than 45 vehicles per	

hour during the peak hour and few, if any heavy vehicles have been used to develop the designs. Contrasting colours and materials in association with a vertical alignment of the cycle track will be part of the design features.

Client Organisation Comments

Continuous footways are pavement spaces that continue over a side road or access without a step or change in visual design, similar to a driveway cross over. The purpose is to aid pedestrians crossing by highlighting pedestrian priority over turning motor traffic with a continuous flush surface. The raised entry is intended to reduce vehicle speeds when turning across them. The Highway Code states that drivers should watch out for pedestrians crossing a road into which they are turning and if a pedestrian has started to cross they have priority, so drivers should give way

Along the route, continuous footways are proposed at some accesses, or 'no through roads' where the number of vehicles per hour is low and the relative risk of pedestrian / vehicle conflict is therefore low. Vertical deflection is intended to reduce the speed of traffic turning and road markings are proposed to highlight the presence of this feature.

Measures such as contrasting coloured surfacing and cycle logos are also proposed to highlight the presence of cyclists in these locations.

TfL is currently monitoring the use of continuous footways and any results of this that emerge during the design process will be used to inform our design proposals. In addition, continuous footway proposals are highlighted within this schemes Equality Impact Assessment.

End of list of problems identified and recommendations offered in this Stage 1 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 1 ROAD SAFETY AUDIT THAT ARE OUTSIDE THE TERMS OF REFERENCE

Safety issues identified during the audit and site inspection that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in this section. It is to be understood that, in raising these issues, the Audit Team in no way warrants that a full review of the highway environment has been undertaken beyond that necessary to undertake the Audit as commissioned.

4.1 ISSUE

Location: 1 – Wellesley Road junction with Chiswick High Road

Reason considered to be outside the Terms of Reference: Item for consideration rather than a defined road safety concern

It is proposed to close the junction of Chiswick High Road and Wellesley Road, and provide a large shared surface area. The Audit Team noted that the straight alignment of Wellesley Road and the controlled crossing facility may lead to increased cycle speeds through this area, which may make the area quite imposing for pedestrians. As part of the ongoing design process it may be beneficial to investigate whether cycle speeds can be reduced.

Design Organisation Response	Accepted
The design has been reviewed and the proposed shared use area has been replaced with a segregated cycle track which separates cyclists from pedestrians through this junction and introduces a curved alignment which should slow down cyclists.	
Client Organisation Comments	
Agree with designer. The shared used area has been replaced by a segregated cycle track which provides clear definition of space for cyclists and pedestrians. Pedestrian footways are proposed to be widened and a raised informal crossing point has been proposed to provide an opportunity for pedestrians to cross the cycle track while slowing down cyclists.	

5.0 SIGNATURES AND SIGN-OFF

5.1 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and documents listed in Appendix A. to this Safety Audit report. The Road Safety Audit has been carried out in accordance with TfL Procedure SQA-0170 dated May 2014, with the sole purpose of identifying any feature that could be removed or modified in order to improve the safety of the measures. The problems identified have been noted in this report together with associated suggestions for safety improvements that we recommend should be studied for implementation.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 10/09/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact:

[REDACTED] [@tfl.gov.uk](mailto:[REDACTED]@tfl.gov.uk) [REDACTED]

AUDIT TEAM MEMBER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 10/09/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact:

[REDACTED] [@tfl.gov.uk](mailto:[REDACTED]@tfl.gov.uk) [REDACTED]

5.2 DESIGN TEAM STATEMENT

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Design Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 07/11/18

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Senior Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 07/11/18

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Principal Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 07/11/18

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Lead Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 07/11/18

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER

PJ549C-RSM-PRD-11-DR-TE-25-
57-0037 (P06)

PJ549C-RSM-PRD-11-DR-TE-25-
57-0038 (P06)

DRAWING TITLE

A315 Brentford High Street
Concept Design
Section 9 – Sheet 37
A315 Brentford High Street
Concept Design
Section 9 – Sheet 38

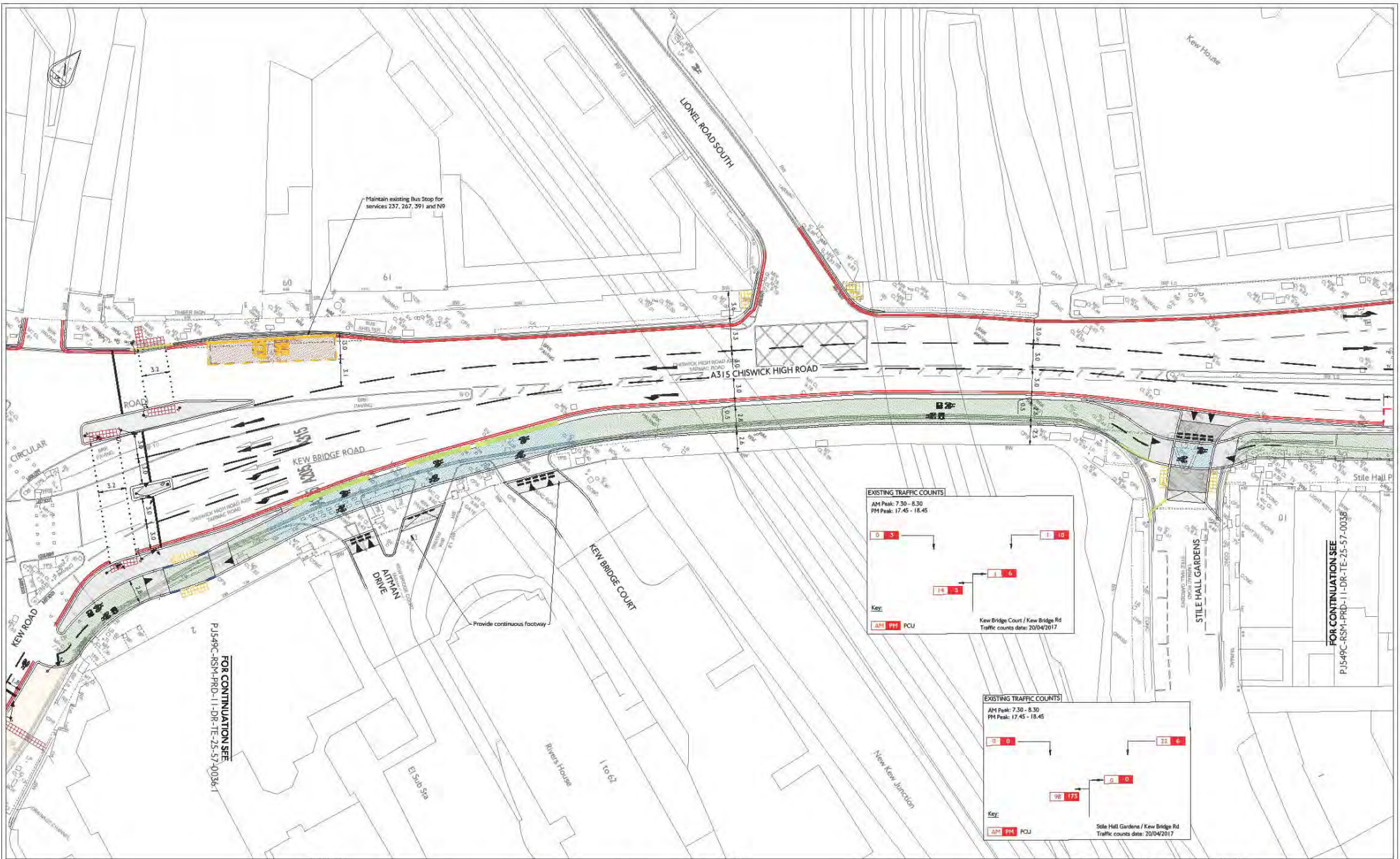
DOCUMENTS

- ☐ Safety Audit Brief
- ☐ Site Location Plan
- ☐ Traffic signal details
- ☐ TfL signal safety checklist
- ☐ Departures from standard
- ☐ Previous Road Safety Audits
- ☐ Previous Designer Responses
- ☐ Collision data
- ☐ Collision plot
- ☐ Traffic flow / modelling data
- ☐ Pedestrian flow / modelling data
- ☐ Speed survey data
- ☐ Other documents

DETAILS (where appropriate)

APPENDIX B

Problem Locations



LEGEND

Existing road marking	SR Proposed sign and post	Proposed tactile paving - buff	Proposed cycle logo (TSRGD 1057)
Existing kerb	LC Proposed lamp column	Proposed tactile paving - grey	Potential new tree
Existing sign and post	Proposed gully	Proposed tactile paving - red	
Proposed road marking - white	Proposed cycle stand	Proposed kerb	
Proposed road marking - yellow	Proposed bus stop flag	Proposed build-out / island	
Proposed road marking - red	Proposed bollard	Proposed over-run island	
Proposed double blip	Proposed belisha beacon	Proposed bus lane	
Proposed single blip	CTM Proposed ticket machine	Proposed cycle lane - blue	
Proposed dropped kerb	Proposed bus shelter	Proposed cycle lane - green	
Proposed transition kerb	Proposed traffic signal		

NOTES

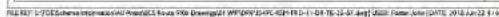
POD	13.06.17	Issued for DRG review	JP	JA	KCL
PCL	25.05.17	Issued following TI comments	JP	JA	KCL
PCL	19.05.17	Issued following ITAG comments	JP	JA	KCL
PCL	13.04.17	Issued for VSDH Modeling	JP	JA	KCL

LB OF HOUNSLOW
CYCLE SUPERHIGHWAY 9
A315 CHISWICK HIGH ROAD
CONCEPT DESIGN
SECTION 9

POD	22.06.18	Issued for VSDH Modeling	JP	JA	KCL
POD	18.07.17	Issued following comments from Highways	JP	JA	KCL
POD	07.07.17	Issued for VSDH Modeling	JP	JA	KCL

FOR COMMENT
P06

PJ549C-RSM-PRD-11-DR-TE-25-57-0037



Cycle Superhighway Route 9

Revised Section 10 Proposals

Stage 1 Road Safety Audit

Ref: 3246.10/025/A3000/BOR/2018

Prepared for:

TfL Cycle Superhighways – Project and Programme Sponsorship

By:

Road Safety Audit

TfL Engineering Services – Highways Engineering Team

Prepared by: [REDACTED] Audit Team Leader

Checked by: [REDACTED] Audit Team Member

Approved by: [REDACTED]

Version	Status	Date
A	Audit report issued to Client	25/09/2018

1.0 INTRODUCTION

1.1 Commission

- 1.1.1 This report results from a Stage 1 Road Safety Audit carried out on the Cycle Superhighway Route 9, revised Section 10 proposals.
- 1.1.2 The Audit was undertaken by TfL Road Safety Audit in accordance with the Audit Brief issued by the Client Organisation on 28th August 2018. It took place at the Palestra offices of TfL on 24th September 2018 and comprised an examination of the documents provided as listed in Appendix A, plus a visit to the site of the proposed scheme.
- 1.1.3 The visit to the site of the proposed scheme was made on 24th September 2018. During the site visit the weather was sunny and the existing road surface was dry.

1.2 Terms of Reference

- 1.2.1 The Terms of Reference of this Audit are as described in TfL Procedure SQA-0170 dated May 2014. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and how it impacts on all road users and has not examined or verified the compliance of the designs to any other criteria. However, to clearly explain a safety problem or the recommendation to resolve a problem the Audit Team may, on occasion, have referred to a design standard without touching on technical audit. An absence of comment relating to specific road users / modes in Section 3 of this report does not imply that they have not been considered; instead the Audit Team feels they are not adversely affected by the proposed changes.
- 1.2.2 This Safety Audit is not intended to identify pre-existing hazards which remain unchanged due to the proposals; hence they will not be raised in Section 3 of this report as they fall outside the remit of Road Safety Audit in general as specified in the procedure SQA-0170 dated May 2014. Safety issues identified during the Audit and site visit that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in Section 4 of this report.
- 1.2.3 Nothing in this Audit should be regarded as a direct instruction to include or remove a measure from within the scheme. Responsibility for designing the scheme lies with the Designer and as such the Audit Team accepts no design responsibility for any changes made to the scheme as a result of this Audit.
- 1.2.4 In accordance with TfL Procedure SQA-0170 dated May 2014, this Audit has a maximum shelf life of 2 years. If the scheme does not progress to the next stage in its development within this period, then the scheme should be re-audited.
- 1.2.5 Unless general to the scheme, all comments and recommendations are referenced to the detailed design drawings and the locations have been indicated on the plan located in Appendix B.
- 1.2.6 It is the responsibility of the Design Organisation to complete the Designer's response section of this Audit report. Where applicable and necessary it is the responsibility of the Client Organisation to complete the Client comment section of this Audit report. Signatures from both the Design Organisation and Client Organisation must be added within Section 5 of this Audit report. A copy of which must be returned to the Audit Team.

1.3 Main Parties to the Audit

1.3.1 Client Organisation

Client contact details: [REDACTED] – Project and Programme Sponsorship

1.3.2 Design Organisation

Design contact details: TfL Traffic Design Engineering

1.3.3 Audit Team

Audit Team Leader: [REDACTED] – TfL Road Safety Audit

Audit Team Member: [REDACTED] – TfL Road Safety Audit

Audit Team Observer: None present

1.3.4 Other Specialist Advisors

Specialist Advisor Details: None present

1.4 Purpose of the Scheme

- 1.4.1 The purpose of the scheme is to provide a largely-segregated cycle facility between Kensington Olympia and Hounslow Town Centre. Other improvements include new cycle specific traffic signals, footway build outs and new pedestrian crossings, 5.5km of two-way segregated cycle route with public realm improvements at town centres*.

*Taken directly from the Audit Brief.

1.5 Special Considerations

- 1.5.1 Due to the length of the proposed route, the Road Safety Audit process is being undertaken in sections as defined by the project team. This Audit covers only the Section 10 proposals and their associated tie-ins with the adjacent sections.
- 1.5.2 CS9 (Section 10) covers the proposals along Heathfield Terrace and Wellesley Road approximately between the junctions of Horticultural Place and Clarence Road.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

A previous iteration of the proposals was subject to a Stage 1 Road Safety Audit carried out in April 2017 by TfL Road Safety Audit (ref: 2778.10/025/A3000/TLRN/2017). The design has been substantially updated since this Audit was undertaken, the contents of which are not deemed relevant.

3.0 ITEMS RAISED AT THIS STAGE 1 ROAD SAFETY AUDIT

This section should be read in conjunction with Paragraphs 1.2.1, 1.2.2 and 1.2.3 of this report.

3.1 JUNCTIONS

3.1.1 PROBLEM

Location: A – Heathfield Terrace junction with Sutton Lane North

Summary: Removal of roundabout deflection may increase vehicle speeds through the junction

It is proposed to modify the layout of the roundabout to reduce the extents of the junction. In doing so, the revised design reduces the approach lane deflection around the roundabout. Due to a reduced amount of deflection, drivers may attempt to negotiate the junction at a higher speed. Drivers who negotiate the junction at a higher speed are at an exacerbated potential for conflict with other road users.

Furthermore, drivers travelling at an increased speed are at an increased potential for failure to give-way type collisions and potentially with an associated increase in personal injury severity in the event of a collision.

RECOMMENDATION

It is recommended that adequate approach lane deflection is provided on all arms of the roundabout.

Design Organisation Response	Rejected
The proposed design has substantially tightened the geometrical layout of the existing roundabout and as such traffic approach speeds should be significantly lower compared to the existing layout. In addition, the proposed dome of the roundabout will be raised (height and construction detail to be determined during detailed design stage in agreement with the borough) so that small vehicles will have to manoeuvre around this feature, reducing speeds further. Any further deflection would negatively impact on the ability of large vehicles to negotiate the roundabout since they will be overrunning footway and that would pose a higher safety risk to pedestrians.	
Client Organisation Comments	
Agree with the designer's response. It is also understood that the London Borough of Hounslow who are the highway authority for this road are planning to implement 20mph speed limits on this road which should reduce overall approach speeds. In addition, the closure of Wellesley Road at the western end should reduce the number of vehicles using these roads, reducing the overall risk of interaction between motor traffic and cyclists.	

End of list of problems identified and recommendations offered in this Stage 1 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 1 ROAD SAFETY AUDIT THAT ARE OUTSIDE THE TERMS OF REFERENCE

Safety issues identified during the audit and site inspection that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in this section. It is to be understood that, in raising these issues, the Audit Team in no way warrants that a full review of the highway environment has been undertaken beyond that necessary to undertake the Audit as commissioned.

The Audit Team has no issues to raise within this section.

5.0 SIGNATURES AND SIGN-OFF

5.1 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and documents listed in Appendix A. to this Safety Audit report. The Road Safety Audit has been carried out in accordance with TfL Procedure SQA-0170 dated May 2014, with the sole purpose of identifying any feature that could be removed or modified in order to improve the safety of the measures. The problems identified have been noted in this report together with associated suggestions for safety improvements that we recommend should be studied for implementation.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 25/09/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: [REDACTED] [@tfl.gov.uk](mailto:[REDACTED]@tfl.gov.uk) ([REDACTED])

AUDIT TEAM MEMBER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 25/09/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: [REDACTED] [@tfl.gov.uk](mailto:[REDACTED]@tfl.gov.uk) ([REDACTED])

5.2 DESIGN TEAM STATEMENT

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Design Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 05/11/18

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Senior Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 05/11/18

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Principal Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 05/11/18

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Lead Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 05/11/18

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
PJ549C-RSM-PRD-11-DR-TE-25-57-0039 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 39
PJ549C-RSM-PRD-11-DR-TE-25-57-0040 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 40
PJ549C-RSM-PRD-11-DR-TE-25-57-0041 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 41
PJ549C-RSM-PRD-11-DR-TE-25-57-0042 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 42
PJ549C-RSM-PRD-11-DR-TE-25-57-0043 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 43
PJ549C-RSM-PRD-11-DR-TE-25-57-0044 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 44
PJ549C-RSM-PRD-11-DR-TE-25-57-0045 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 45
PJ549C-RSM-PRD-11-DR-TE-25-57-0046 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 46
PJ549C-RSM-PRD-11-DR-TE-25-57-0047 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 47
PJ549C-RSM-PRD-11-DR-TE-25-57-0048 (P06)	A3000 Wellesley Road Concept Design Section 10 – Sheet 48

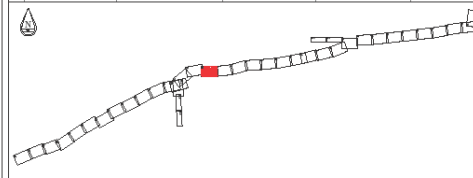
DOCUMENTS

- ☒ Safety Audit Brief
- ☐ Site Location Plan
- ☐ Traffic signal details
- ☐ TfL signal safety checklist
- ☐ Departures from standard
- ☐ Previous Road Safety Audits
- ☐ Previous Designer Responses
- ☐ Collision data
- ☐ Collision plot
- ☐ Traffic flow / modelling data
- ☐ Pedestrian flow / modelling data
- ☐ Speed survey data
- ☐ Other documents

DETAILS (where appropriate)

APPENDIX B

Problem Locations



LEGEND	
	Existing road marking
	Existing kerb
	Existing sign and post
	Proposed road marking - white
	Proposed road marking - yellow
	Proposed road marking - red
	Proposed double blip
	Proposed single blip
	Proposed dropped kerb
	Proposed transition kerb
	Proposed sign and post
	Proposed lamp column
	Proposed gully
	Proposed cycle stand
	Proposed bus stop flag
	Proposed bollard
	Proposed belisha beacon
	Proposed ticket machine
	Proposed bus shelter
	Proposed traffic signal
	Proposed tactile paving - buff
	Proposed tactile paving - grey
	Proposed tactile paving - red
	Proposed kerb
	Proposed built-out / island
	Proposed over-run island
	Proposed bus lane
	Proposed cycle lane - blue
	Proposed cycle lane - green
	Proposed cycle logo (TSRGD 1057)
	Potential new tree

NOTES

rev	date	details	dm	chs	app
P06	22.06.18	Issued for VESDH Modelling	JF	JA	KCL
P05	18.07.17	Issued following comments from boroughs	JF	JA	KCL
P04	07.07.17	Issued for VESDH Modelling	JF	JA	KCL

P03	13.06.17	Issued for DRG review	JF	JA	KCL
P02.1	25.05.17	Issued following TI comments	JF	JA	KCL
P02	19.05.17	Issued following ITAG comments	JF	JA	KCL
P01	13.04.17	Issued for VESDH Modelling	JF	AO	KCL

LB OF HOUNSLOW
CYCLE SUPERHIGHWAY 9
A3000 WELLESLEY ROAD
CONCEPT DESIGN
SECTION 10

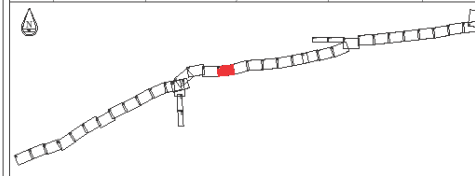
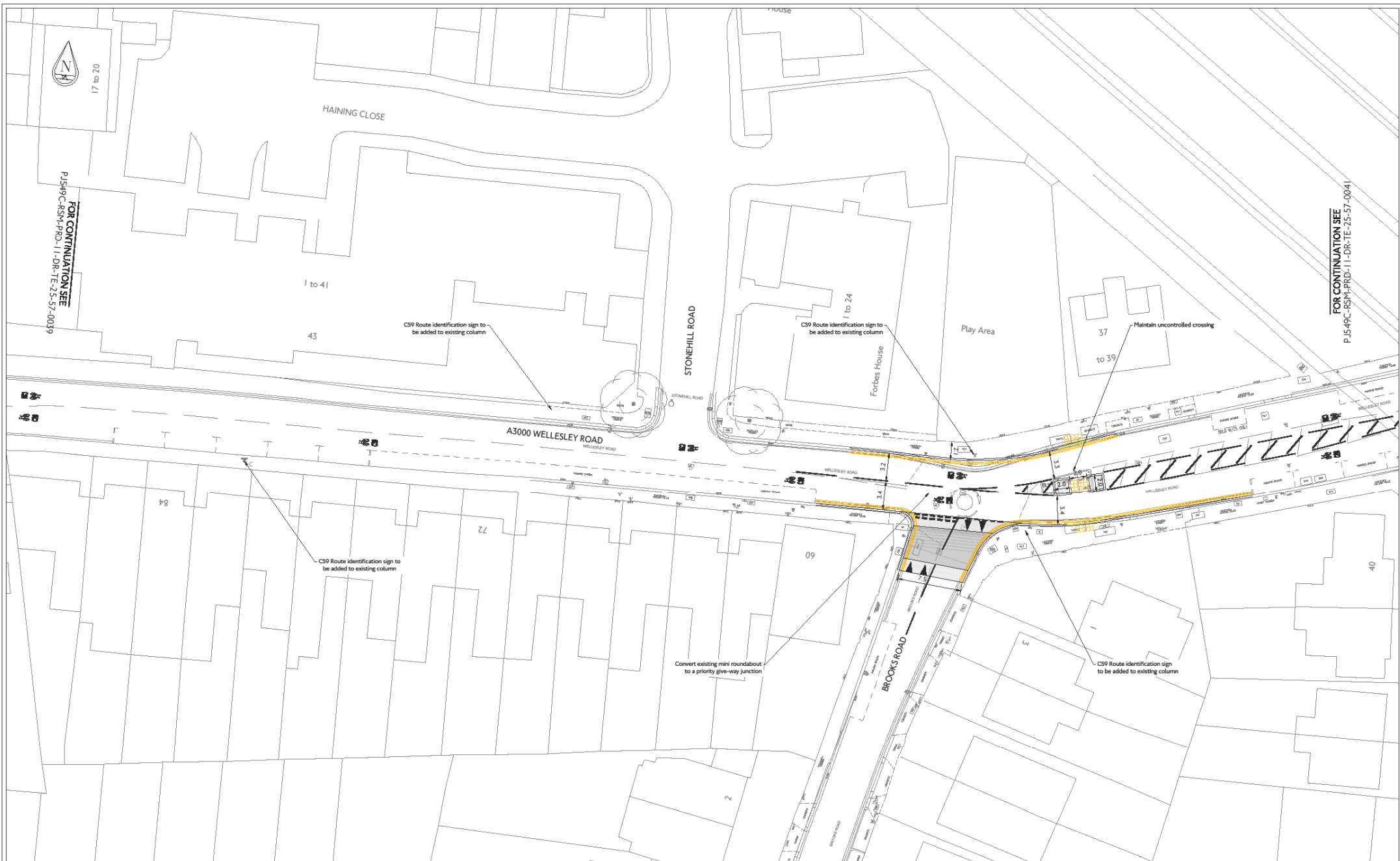
Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

Paletta
197 Blackfriars Road
London
SE1 8NU

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scale: 33
drawing no: P06
drawing title: FOR COMMENT
drawing no: P06
drawing title: FOR COMMENT

Project: P06
Drawing: P06
Drawing title: FOR COMMENT
Drawing no: P06
Drawing title: FOR COMMENT



LEGEND

- | | | | |
|--------------------------------|----------------------------|--------------------------------|----------------------------------|
| Existing road marking | SP Proposed sign and post | Proposed tactile paving - buff | Proposed cycle logo (TSRGD 1037) |
| Existing kerb | LC Proposed lamp column | Proposed tactile paving - grey | Potential new tree |
| Existing sign and post | G Proposed gully | Proposed tactile paving - red | |
| Proposed road marking - white | BS Proposed bus stop flag | Proposed kerb | |
| Proposed road marking - yellow | Proposed bollard | Proposed built-out / island | |
| Proposed road marking - red | Proposed belisha beacon | Proposed over-run island | |
| Proposed double blip | TM Proposed ticket machine | Proposed bus lane | |
| Proposed single blip | Proposed bus shelter | Proposed cycle lane - blue | |
| Proposed dropped kerb | Proposed traffic signal | Proposed cycle lane - green | |
| Proposed transition kerb | | | |

NOTES

P06	22.06.18	Issued for VESPM Modelling	JF	JA	KCL
P05	18.07.17	Issued following comments from borough	JF	JA	KCL
P04	07.07.17	Issued for VESPM Modelling	JF	JA	KCL
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P02.1	15.05.17	Issued following TI comments	JF	JA	KCL
P02	19.05.17	Issued following TAG comments	JF	JA	KCL
P01	13.04.17	Issued for VESPM Modelling	JF	AO	KCL
rev	date	details	dm	ch	app

LB of HOUNSLOW
CYCLE SUPERHIGHWAY 9
A3000 WELLESLEY ROAD
CONCEPT DESIGN
SECTION 10

Transport for London
Surface Transport

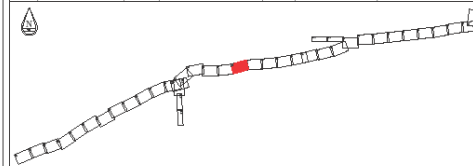
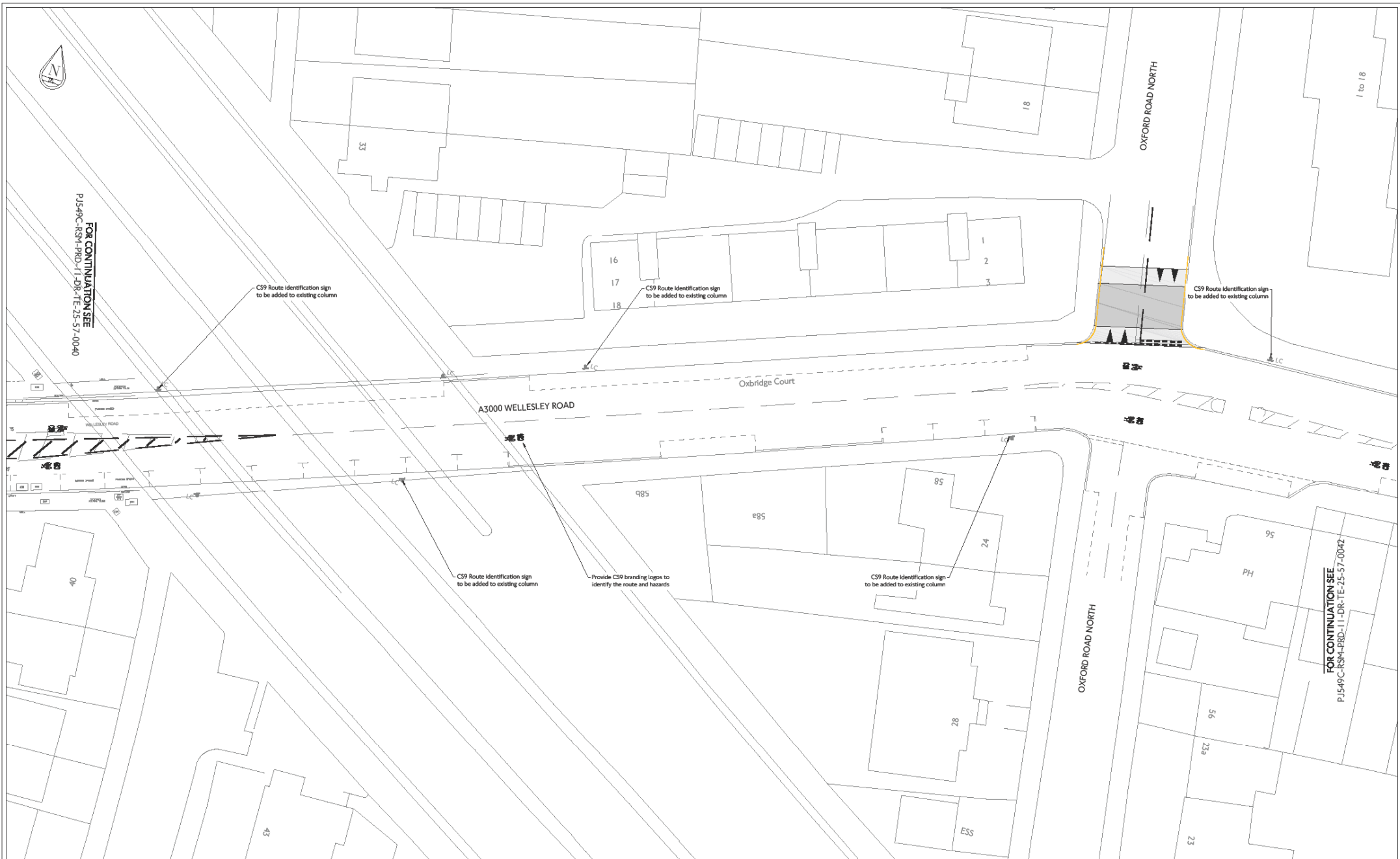
FOR COMMENT

0040 CP 0076

P06

Road Space Management
Outcomes Design Engineering

Paletta
197 Blackfriers Road
London
SE1 8NU



LEGEND	
	Existing road marking
	Existing kerb
	Existing sign and post
	Proposed road marking - white
	Proposed road marking - yellow
	Proposed road marking - red
	Proposed double blip
	Proposed single blip
	Proposed dropped kerb
	Proposed transition kerb
	Proposed sign and post
	Proposed lamp column
	Proposed gully
	Proposed cycle stand
	Proposed bus stop flag
	Proposed bollard
	Proposed belisha beacon
	Proposed ticket machine
	Proposed bus shelter
	Proposed traffic signal
	Proposed tactile paving - buff
	Proposed tactile paving - grey
	Proposed tactile paving - red
	Proposed kerb
	Proposed build-out / island
	Proposed over-run island
	Proposed bus lane
	Proposed cycle lane - blue
	Proposed cycle lane - green
	Proposed cycle logo (TSRGD 1057)
	Potential new tree

NOTES

rev	date	details	dm	chk	app
P06	22.06.18	Issued for VESPH Modelling	JF	JA	KCL
P05	18.07.17	Issued following comments from borough	JF	JA	KCL
P04	07.07.17	Issued for VESPH Modelling	JF	JA	KCL

rev	date	details	dm	chk	app
P03	13.06.17	Issued for DRG review	JF	JA	KCL
P02.1	25.05.17	Issued following TI comments	JF	JA	KCL
P02	19.05.17	Issued following ITAQ comments	JF	JA	KCL
P01	13.04.17	Issued for VESPH Modelling	JF	AO	KCL

Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

Palstra
197 Blackfriars Road
London
SE1 8NL

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FOR COMMENT

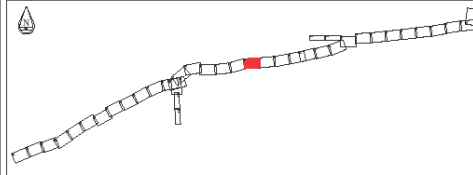
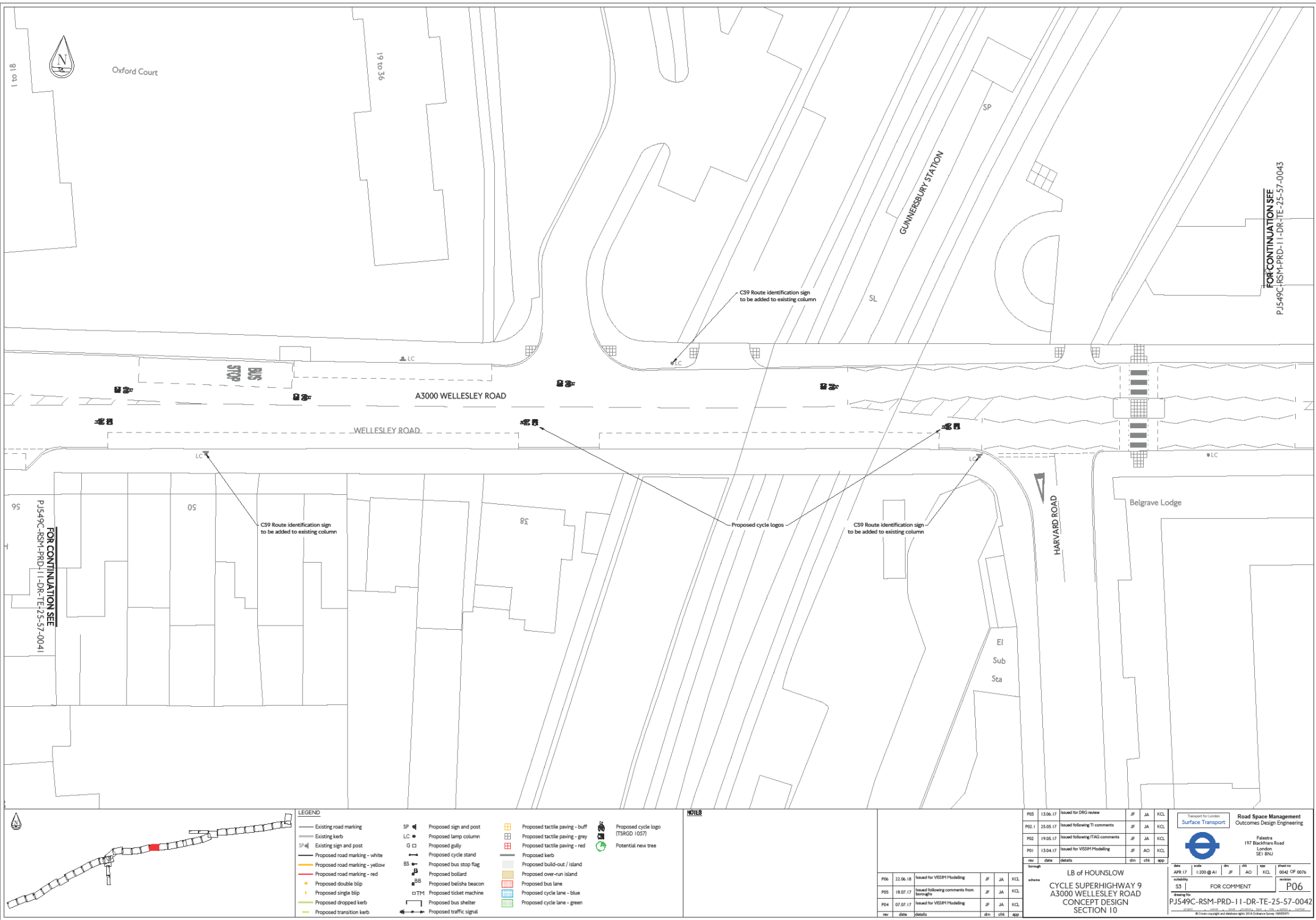
P06

LB of HOUNSLOW
CYCLE SUPERHIGHWAY 9
A3000 WELLESLEY ROAD
CONCEPT DESIGN
SECTION 10

FOR COMMENT

P06

PJ549C-RSM-PRD-11-DR-TE-25-57-0041



LEGEND	
	Existing road marking
	Existing kerb
	Existing sign and post
	Proposed road marking - white
	Proposed road marking - yellow
	Proposed road marking - red
	Proposed double blip
	Proposed single blip
	Proposed dropped kerb
	Proposed transition kerb
	Proposed sign and post
	Proposed lamp column
	Proposed gully
	Proposed bus stop
	Proposed bus stop flag
	Proposed bollard
	Proposed belisha beacon
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	Proposed bus lane
	Proposed cycle lane - blue
	Proposed cycle lane - green
	Proposed cycle logo (TSRGD 1057)
	Potential new tree

NOTES

rev	date	details	dm	ch	app
P06	22.06.18	Issued for VSSM Modelling	JF	JA	KCL
P05	18.07.17	Issued following comments from boroughs	JF	JA	KCL
P04	07.07.17	Issued for VSSM Modelling	JF	JA	KCL

rev	date	details	dm	ch	app
P03	13.06.17	Issued for DRG review	JF	JA	KCL
P02.1	15.05.17	Issued following TI comments	JF	JA	KCL
P02	19.05.17	Issued following TAG comments	JF	JA	KCL
P01	13.04.17	Issued for VSSM Modelling	JF	AD	KCL

Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

Palstra
197 Blackfriars Road
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SE1 8JN

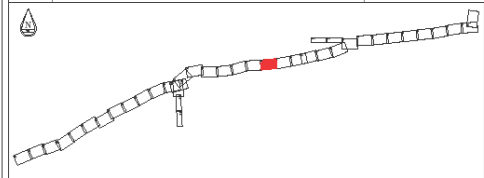
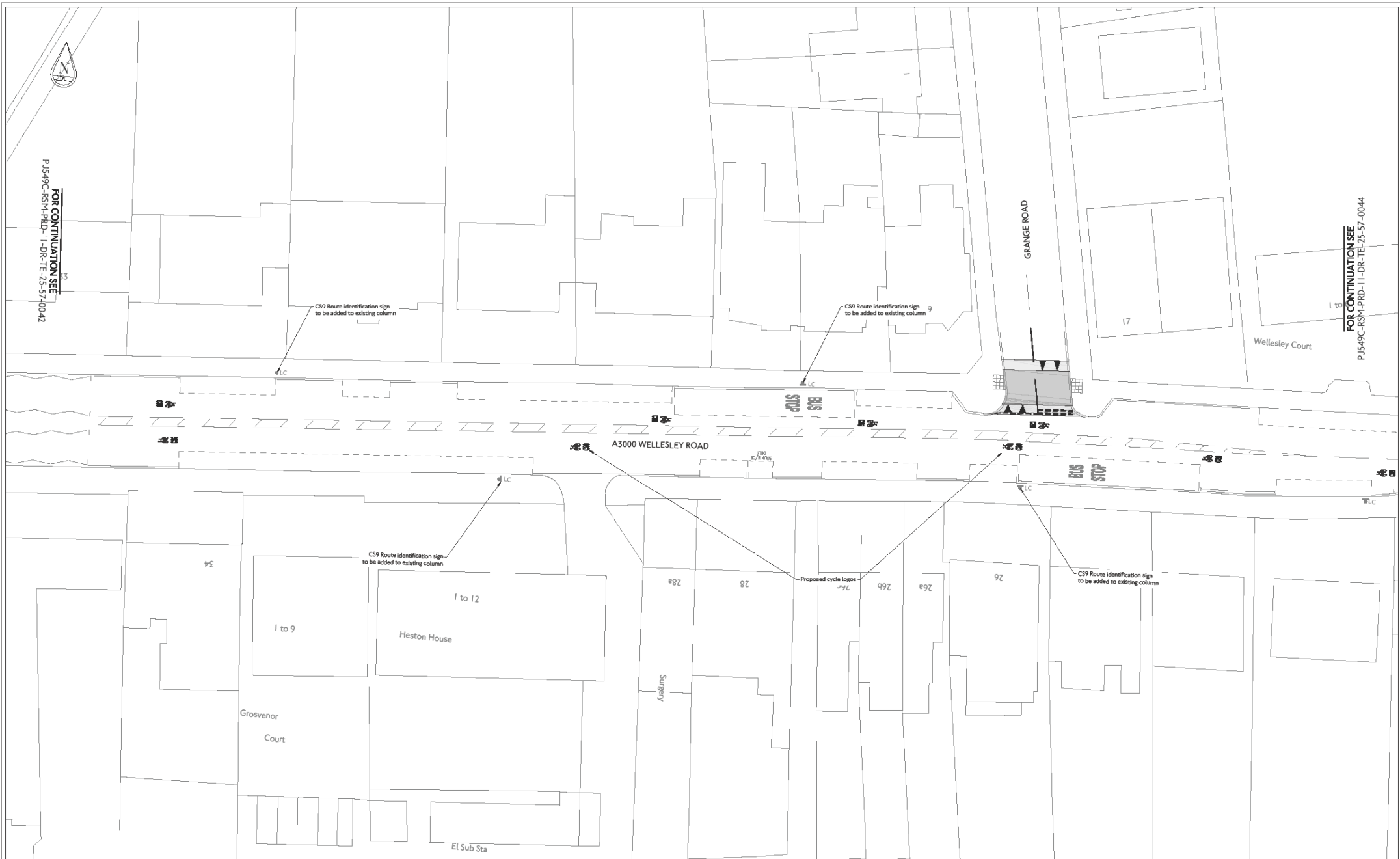
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rev: 1

sheet no: 0042 OF 0076
rev: 1

FOR COMMENT

P06

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LEGEND	
	Existing road marking
	Existing kerb
	Existing sign and post
	Proposed road marking - white
	Proposed road marking - yellow
	Proposed road marking - red
	Proposed double blip
	Proposed single blip
	Proposed dropped kerb
	Proposed transition kerb
	Proposed sign and post
	Proposed lamp column
	Proposed gully
	Proposed cycle stand
	Proposed bus stop flag
	Proposed bollard
	Proposed belisha beacon
	Proposed ticket machine
	Proposed bus shelter
	Proposed traffic signal
	Proposed tactile paving - buff
	Proposed tactile paving - grey
	Proposed tactile paving - red
	Proposed kerb
	Proposed built-out / island
	Proposed over-run island
	Proposed bus lane
	Proposed cycle lane - blue
	Proposed cycle lane - green
	Proposed cycle logo
	Potential new tree

NOTES

rev	date	details	dm	cm	app
P06	23.06.18	Issued for VESPM Modelling	JF	JA	KCL
P05	18.07.17	Issued following comments from boroughs	JF	JA	KCL
P04	07.07.17	Issued for VESPM Modelling	JF	JA	KCL

rev	date	details	dm	cm	app
P03	13.06.17	Issued for DRG review	JF	JA	KCL
P02.1	25.05.17	Issued following TI comments	JF	JA	KCL
P02	19.05.17	Issued following ITAG comments	JF	JA	KCL
P01	13.04.17	Issued for VESPM Modelling	JF	AO	KCL

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date scale 1:200 @ A1

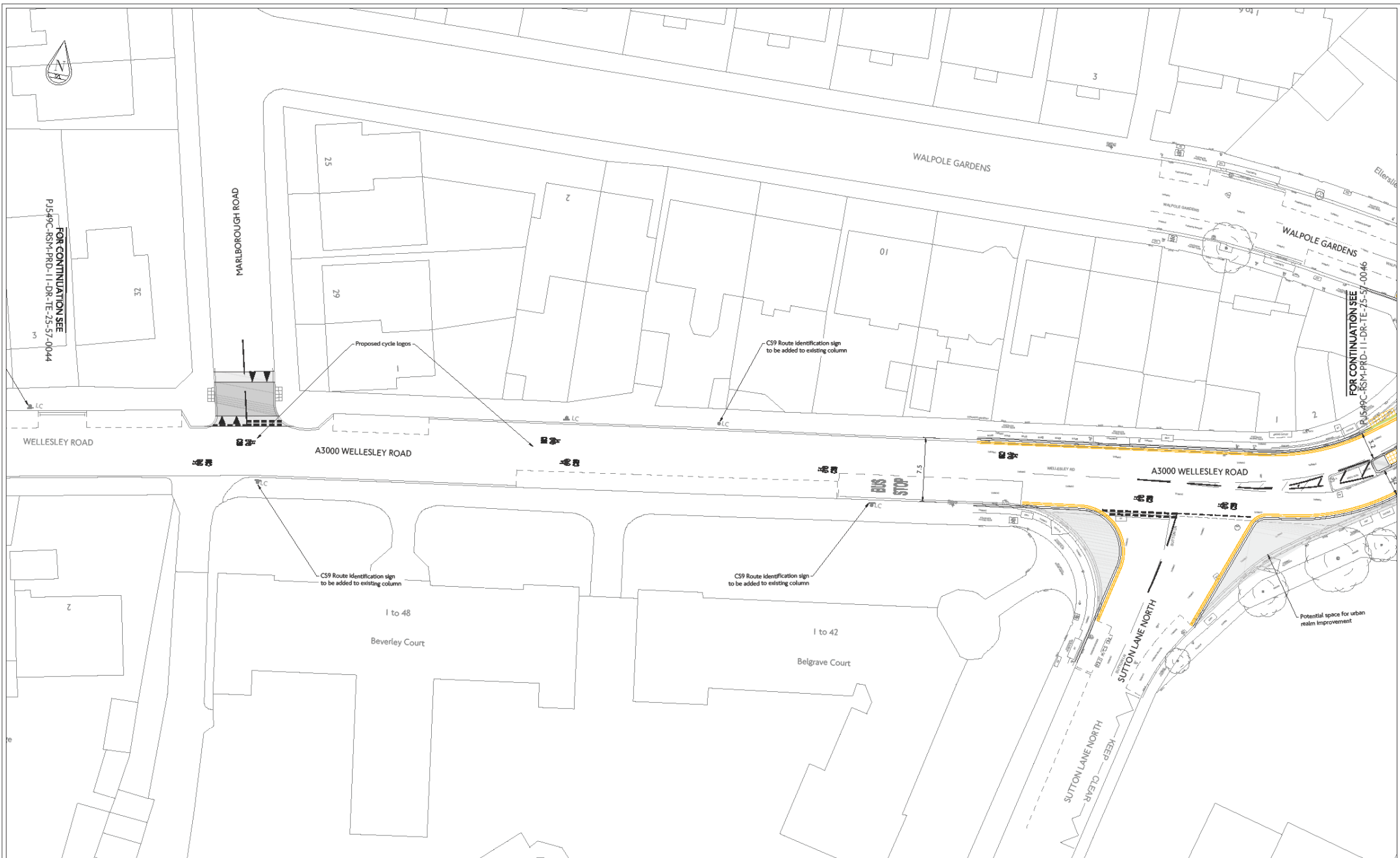
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FOR COMMENT

drawing title P06

PJ549C-RSM-PRD-11-DR-TE-25-57-0043





FOR CONTINUATION SEE
PJ549C-RSM-PRD-11-DR-TE-25-57-0044

LEGEND

SP	Proposed sign and post	Proposed tactile paving - buff	Proposed cycle logo
LC	Proposed lamp column	Proposed tactile paving - grey	Potential new tree
G	Proposed gully	Proposed tactile paving - red	
SP	Proposed sign and post	Proposed kerb	
BS	Proposed bus stop	Proposed build-out / island	
BS	Proposed bus stop flag	Proposed over-run island	
BS	Proposed bollard	Proposed bus lane	
BS	Proposed belisha beacon	Proposed cycle lane - blue	
DTM	Proposed ticket machine	Proposed cycle lane - green	
BS	Proposed bus shelter		
BS	Proposed traffic signal		

NOTES

P06 21.06.18 Issued for VESPH Modelling JF JA KCL

P05 18.07.17 Issued following comments from boroughs JF JA KCL

P04 07.07.17 Issued for VESPH Modelling JF JA KCL

LB of HOUNSLOW
CYCLE SUPERHIGHWAY 9
A3000 WELLESLEY ROAD
CONCEPT DESIGN
SECTION 10

P06	13.06.17	Issued for DRG review	JF	JA	KCL
P02.1	25.05.17	Issued following TI comments	JF	JA	KCL
P02	19.05.17	Issued following ITAG comments	JF	JA	KCL
P01	13.04.17	Issued for VESPH Modelling	JF	AO	KCL

rev date details dwn chg app

33

FOR COMMENT

P06

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Date: APR 17

Sheet: 33

FOR COMMENT

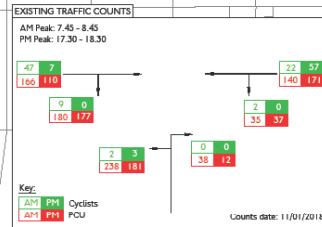
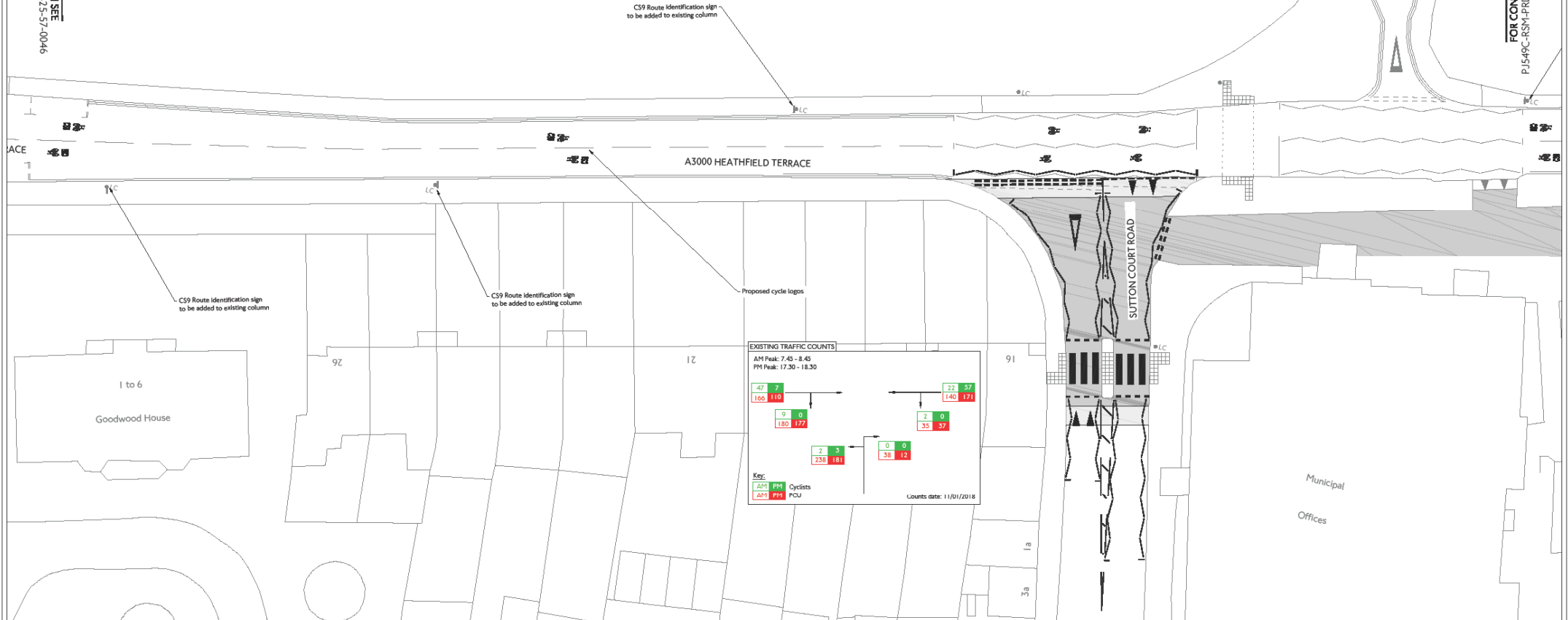
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FOR CONTINUATION SEE
PJ549C-RSM-PRD-11-DR-TE-25-57-0046

FOR CONTINUATION SEE
PJ549C-RSM-PRD-11-DR-TE-25-57-0048



LEGEND

Existing road marking	Proposed sign and post	Proposed tactile paving - buff	Proposed cycle logo (TSRGD 1057)
Existing kerb	Proposed lamp column	Proposed tactile paving - grey	Potential new tree
Existing sign and post	Proposed gully	Proposed tactile paving - red	
Proposed road marking - white	Proposed cycle stand	Proposed kerb	
Proposed road marking - yellow	Proposed bus stop flag	Proposed build-out / island	
Proposed road marking - red	Proposed bollard	Proposed over-run island	
Proposed double blip	Proposed belisha beacon	Proposed bus lane	
Proposed single blip	Proposed ticket machine	Proposed cycle lane - blue	
Proposed dropped kerb	Proposed bus shelter	Proposed cycle lane - green	
Proposed transition kerb	Proposed traffic signal		

NOTES

rev	date	details	dm	ch	app
P06	22.06.18	Issued for VISM Modelling	JF	JA	KCL
P05	18.07.17	Issued following comments from boroughs	JF	JA	KCL
P04	07.07.17	Issued for VISM Modelling	JF	JA	KCL

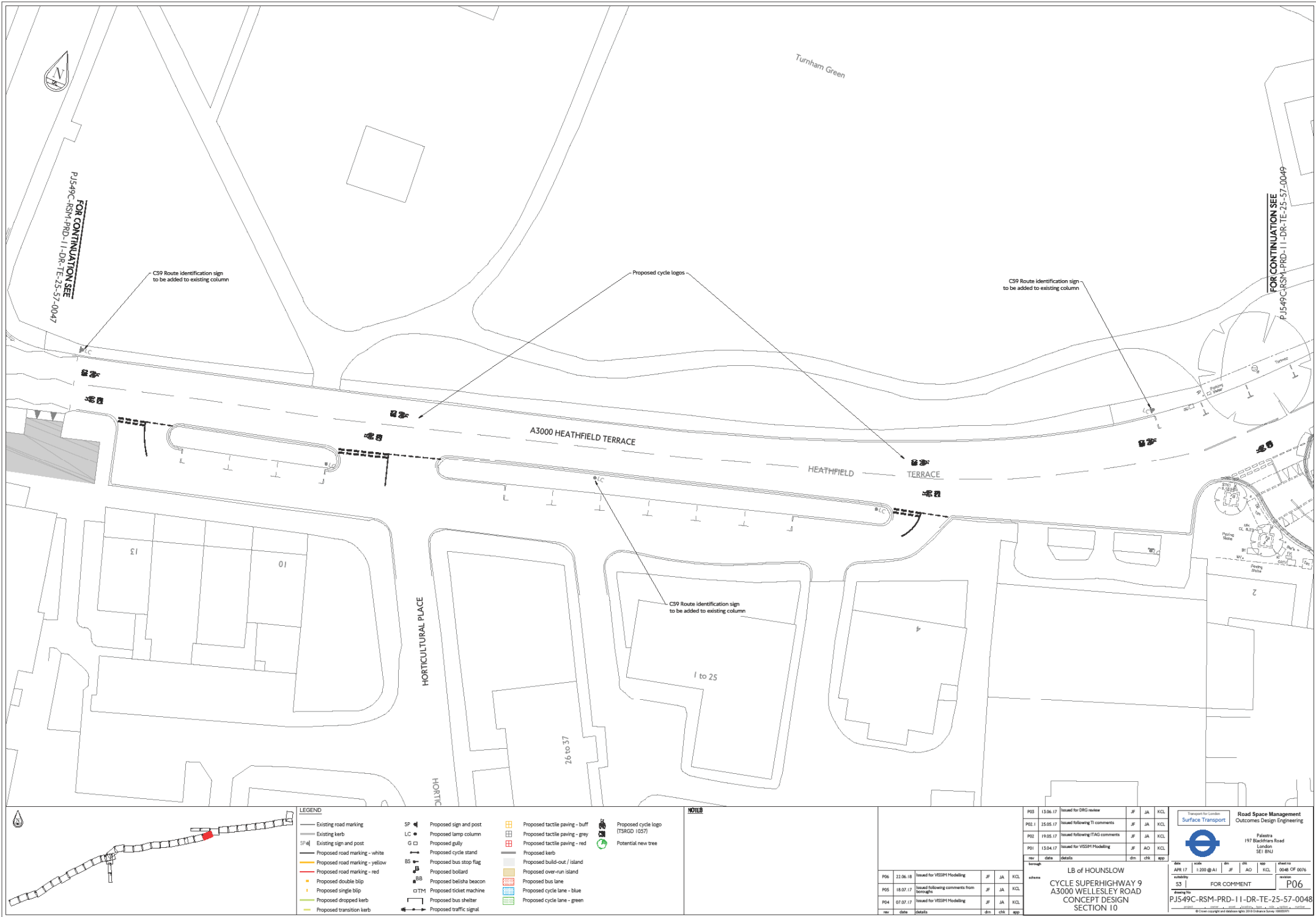
LB OF HOUNSLOW
CYCLE SUPERHIGHWAY 9
A3000 WELLESLEY ROAD
CONCEPT DESIGN
SECTION 10

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P02.1	25.05.17	Issued following TI comments	JF	JA	KCL
P02	19.05.17	Issued following ITAG comments	JF	JA	KCL
P01	13.04.17	Issued for VISM Modelling	JF	AO	KCL

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33
FOR COMMENT
P06

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PJ549C-RSM-PRD-11-DR-TE-25-57-0047



Cycle Superhighway Route 9

Revised Section 11 Proposals

Stage 1 Road Safety Audit

Ref: 3246.11/028/A315/BOR/2018

Prepared for:

TfL Cycle Superhighways – Project and Programme Sponsorship

By:

Road Safety Audit

TfL Engineering Services – Highways Engineering Team

Prepared by: [REDACTED] Audit Team Leader

Checked by: [REDACTED] Audit Team Member

Approved by: [REDACTED]

Version	Status	Date
A	Audit report issued to Client	10/09/2018
B	Audit report updated to remove problem 3.2.1. Numbering has been updated within this section.	12/10/2018

1.0 INTRODUCTION

1.1 Commission

- 1.1.1 This report results from a Stage 1 Road Safety Audit carried out on the Cycle Superhighway Route 9, revised Section 11 proposals.
- 1.1.2 The Audit was undertaken by TfL Road Safety Audit in accordance with the Audit Brief issued by the Client Organisation on 28th August 2018. It took place at the Palestra offices of TfL on 3rd September 2018 and comprised an examination of the documents provided as listed in Appendix A, plus a visit to the site of the proposed scheme.
- 1.1.3 The visit to the site of the proposed scheme was made on 3rd September 2018. During the site visit the weather was sunny and the existing road surface was dry.

1.2 Terms of Reference

- 1.2.1 The Terms of Reference of this Audit are as described in TfL Procedure SQA-0170 dated May 2014. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and how it impacts on all road users and has not examined or verified the compliance of the designs to any other criteria. However, to clearly explain a safety problem or the recommendation to resolve a problem the Audit Team may, on occasion, have referred to a design standard without touching on technical audit. An absence of comment relating to specific road users / modes in Section 3 of this report does not imply that they have not been considered; instead the Audit Team feels they are not adversely affected by the proposed changes.
- 1.2.2 This Safety Audit is not intended to identify pre-existing hazards which remain unchanged due to the proposals; hence they will not be raised in Section 3 of this report as they fall outside the remit of Road Safety Audit in general as specified in the procedure SQA-0170 dated May 2014. Safety issues identified during the Audit and site visit that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in Section 4 of this report.
- 1.2.3 Nothing in this Audit should be regarded as a direct instruction to include or remove a measure from within the scheme. Responsibility for designing the scheme lies with the Designer and as such the Audit Team accepts no design responsibility for any changes made to the scheme as a result of this Audit.
- 1.2.4 In accordance with TfL Procedure SQA-0170 dated May 2014, this Audit has a maximum shelf life of 2 years. If the scheme does not progress to the next stage in its development within this period, then the scheme should be re-audited.
- 1.2.5 Unless general to the scheme, all comments and recommendations are referenced to the detailed design drawings and the locations have been indicated on the plan located in Appendix B.
- 1.2.6 It is the responsibility of the Design Organisation to complete the Designer's response section of this Audit report. Where applicable and necessary it is the responsibility of the Client Organisation to complete the Client comment section of this Audit report. Signatures from both the Design Organisation and Client Organisation must be added within Section 5 of this Audit report. A copy of which must be returned to the Audit Team.

1.3 Main Parties to the Audit

1.3.1 Client Organisation

Client contact details: [REDACTED] – Project and Programme Sponsorship

1.3.2 Design Organisation

Design contact details: TfL Traffic Design Engineering

1.3.3 Audit Team

Audit Team Leader: [REDACTED] – TfL Road Safety Audit

Audit Team Member: [REDACTED] – TfL Road Safety Audit

Audit Team Observer: None present

1.3.4 Other Specialist Advisors

Specialist Advisor Details: None present

1.4 Purpose of the Scheme

- 1.4.1 The purpose of the scheme is to provide a largely-segregated cycle facility between Kensington Olympia and Hounslow Town Centre. Other improvements include new cycle specific traffic signals, footway build outs and new pedestrian crossings, 5.5km of two-way segregated cycle route with public realm improvements at town centres*.

*Taken directly from the Audit Brief.

1.5 Special Considerations

- 1.5.1 Due to the length of the proposed route, the Road Safety Audit process is being undertaken in sections as defined by the project team. This Audit covers only the Section 11 proposals and their associated tie-ins with the adjacent sections.
- 1.5.2 CS9 (Section 11) covers the proposals along Chiswick High Road between the junctions of Sutton Lane North (to the west) and Netheravon Road (to the east).

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

A previous iteration of the proposals was subject to a Stage 1 Road Safety Audit carried out in April 2017 by TfL Road Safety Audit (ref: 2778.08/003/A315/TLRN/2017). The design has been substantially updated since this Audit was undertaken, the contents of which are not deemed relevant.

3.0 ITEMS RAISED AT THIS STAGE 1 ROAD SAFETY AUDIT

This section should be read in conjunction with Paragraphs 1.2.1, 1.2.2 and 1.2.3 of this report.

3.1 CYCLE FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Provision of a stepped track facility may exacerbate a potential for loss of control type collisions by cyclists

It is proposed to provide a stepped track as part of the route. The Audit Team are aware of a number of instances at similar installations whereby cyclists may have failed to appreciate the change in surface levels when transitioning into / from the track, leading to cyclists losing control and falling from their cycle.

It is appreciated that the causation of loss of control collisions at similar installations is not wholly clear, and it is understood that TfL is in the process of undertaking a monitoring study of stepped tracks to identify how riders use this type of facility.

RECOMMENDATION

It is recommended that the design of the stepped track is reconsidered following the outcome of the study. If however the design is progressed before the study results are available, it is recommended that an alternative type of cycle facility is provided, or, the change in surface levels are designed in a manner to ensure they are unambiguous and obvious to cyclists.

Design Organisation Response	Part Accepted
The stepped track layout has been designed in line with the current London Cycling Design Standards. As per the Audit Team's comments, it is understood that a study has commenced looking at the layout of the stepped tracks. The design team will review the layout of the cycle track following the outcome of that study. However, the number of incidents involving cyclists losing control and falling from their cycle in locations already implemented is very low compared to the number of cycle trips that have been generated by these highly successful schemes.	
Client Organisation Comments	
Agree with the designer's response. Stepped cycle tracks have been proposed according to the London Cycling Design Standards.	
In locations where stepped tracks are proposed, the change in surface levels is indicated with ramps and road markings at the start of each section. Road markings also delineate the edge of the carriageway including double yellow lines. The width of the kerbs forming the edge of the stepped cycle track have been specified to be 300mm to reduce the likelihood that these are confused with a mandatory lane white road marking.	
If there are recommendations from the study during the design process that can further improve the design then these will be reviewed.	

3.2 JUNCTIONS

3.2.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Cycle tracks with priority over turning vehicles may be ambiguous and lead to an exacerbated potential for conflict with cyclists

It is proposed to provide bi directional cycle tracks through the mouth of a junction where cyclists have priority over turning traffic. The Audit Team have the following concerns:

- The road markings used to define the give way are unlikely to be understood by the majority of drivers as it is not a conventional give way road marking.
- Drivers are unlikely to anticipate the necessity to stop when turning from a major road into a minor road,
- Generally speaking in the UK drivers give way to the right. Drivers who do identify the necessity to cede priority, may only look to the right and fail to appreciate cyclists approaching from both directions. This is of particular concern for vehicles joining the main road from the side road.
- Turning drivers may have cyclists approaching from behind them and to their right, outside the visibility envelope of a wing mirror, requiring drivers to look over their shoulder to observe when it is safe to proceed.

Drivers may therefore turn into the side road injudiciously with an exacerbated potential for conflict with cyclists as a result.

RECOMMENDATION

It is recommended that the junction layout is modified to make it clearer who has priority. This may require:

- The use of an alternative road marking to make the necessity to give way clearer.
- Relocating the cycle facility further into the side road to increase the distance to the edge of the carriageway.
- Alterations to the alignment of the facility to ensure cyclists from both directions are immediately visible, such as ensuring drivers and cyclists are approach perpendicular to each other.

Design Organisation Response	Part Accepted
<p>Owing to the geometrical constraints, the set-back distance of the cycle track varies from 4m to less than 1m through the mouth of the junction. As such, space for a vehicle to wait has been provided wherever possible unless space constraints due to trees, narrow footways or other specific constraints to the side roads exist.</p> <p>The designs have also reduced the turning radius at many side roads to reduce turning speeds. In addition, the cycle track will be raised and associated with an entry treatment on the side road, therefore, reducing the entry speeds further. Colour contrasting surface and road markings are also proposed to highlight the cycle track.</p>	
Client Organisation Comments	
<p>The Highway Code (Rule 182) states that any vehicle turning left must watch out for traffic coming up on the left before making the turn including cyclists and motorcyclists which may be hidden from view.</p>	

Nonetheless, where possible, we have sought to eliminate the chance of conflict at side roads or accesses through closing roads or banning certain movements. Where this not possible due access constraints, or where vehicle flows are very low, we have sought to reduce the likelihood of conflict arising through a combination of some or all of the design approaches set out in guidance such as the London Cycling Design Standards (LCDS) including:

- Setting the cycle track further into the side road to provide space for turning motorists to wait after leaving the main carriageway before crossing the cycle track. This also provides an area for drivers to wait before turning out of the side road without blocking the cycle track
- Restricting access or egress from the side road to reduce the number of vehicle movements
- Reducing the kerb radii to reduce the speed at which motorists can enter and exit the side road
- Introducing raised tables to reduce motorist speeds entering or exiting the side road
- Providing contrasting coloured surfacing and cycle logos across the junction to raise awareness of the presence of the cycle track and the fact that cyclists are crossing

The design treatment proposed at each side road is dependent on local conditions such as traffic and pedestrian flows, one-way or two-way nature of the street and visibility. Clear road markings such as give way lines and cycle logos are proposed at all side roads to highlight the requirement for motor vehicles to give way to cyclists upon entry and exit. We will continue to review the best way to provide priority for cycling at un-signalised side roads as the design progresses.

3.2.2 PROBLEM

Location: A – Chiswick High Road junction with Chiswick Lane

Summary: Junction alignment may exacerbate a potential for westbound vehicles to collide with the cycle segregation on the opposite side of the junction

The Audit Team are concerned that the alignment of the westbound traffic lane on Chiswick High Road may guide users into the cycle segregation on the exit to the junction. Drivers may fail to appreciate the necessity to deviate to the right to negotiate the junction with a potential for conflict with the island. Drivers who collide with the central island are susceptible to sustaining personal injury as a result.

RECOMMENDATION

It is recommended that junction alignment is modified to better align the entry and exit lane westbound.

Design Organisation Response	Accepted
The design team has reviewed the junction and straightened the alignment. This new alignment reduces the risk of conflict with the island. Furthermore the island is proposed to have retroreflective bollards to further highlight its presence and reduce the risk.	
Client Organisation Comments	
Agree with the designer's response.	

3.3 TRAFFIC SIGNALS

3.3.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Split phasing of traffic signal stages may lead to pedestrians inadvertently stepping into the path of vehicles

It is proposed to split phase a number of junctions along the proposals. The Audit Team are concerned that pedestrians may observe stationary traffic in one lane and incorrectly assume traffic in the adjacent lanes is also held. Pedestrians may therefore inadvertently step into the path of moving vehicles or cyclists with an exacerbated potential for conflict as a result.

RECOMMENDATION

It is recommended that the adjacent traffic streams on a single arm run concurrently. If this is not possible it may be beneficial to provide measures to discourage crossing in a single movement inadvertently, such as staggering or offsetting the different halves of the same crossing.

Design Organisation Response	Rejected
The proposed 'Split phasing of traffic signal stages' is to optimise the junction capacity. Due to geometrical constraints, it is not possible to provide alternatives such as a staggered crossing, offsetting the different halves of the same crossing to remove the need to cross in a single movement. The proposed signal layout and method of control has been reviewed by the Traffic Signal team to ensure it is sufficient and safe for operation. In addition, the presence of traffic islands in some locations provides space for pedestrians to wait should they start to cross and need to stop.	
Client Organisation Comments	
Split phased traffic signals have been across junctions in London to optimise the operation of junctions.	
Due to the number of movements that need to be catered for at these junctions, including separating traffic, pedestrians and cyclists, it is not possible to run adjacent traffic stream concurrently as this would increase signal cycle times. This would introduce delay to all road users which would likely lead to congestion and longer wait times and in turn could lead to vehicles blocking crossings as they queue through the junction or increase the likelihood for pedestrians to cross on a red light as they become impatient waiting for a green man.	
Though crossing on a red man is a matter for enforcement, traffic islands offer some protection for any pedestrians who start to cross on a red man and find they need to stop.	

3.3.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Multiple lane approach to controlled crossing without the provision of an offside traffic signal may exacerbate a potential for conflict

The Audit Team are concerned that a number of controlled crossings are proposed across multiple traffic lanes without the provision of a traffic island to house an offside traffic signal. Given the busy nature of the route, it is plausible that a bus or other

large vehicle could obscure the nearside traffic signal, and a similar vehicle in the opposing lane could obscure any signal on the opposite footway. Drivers within the offside lane may therefore have no immediate visibility of any primary or secondary traffic signal. Drivers may therefore fail to appreciate the necessity to stop, or identify the requirement late; this may lead to over-shoot and/or late braking conflicts.

RECOMMENDATION

It is recommended that all traffic lanes are provided with an appropriately visible traffic signal. This may require the provision of an offside traffic signal within a traffic island or a mast arm.

Design Organisation Response	Accepted
<p>Traffic signal infrastructure shown on the concept design drawings is indicative at this stage. The design team has however reviewed the location of the indicative signal infrastructure with the Traffic Signal Engineer.</p> <p>There are three locations with two lane approaches to controlled crossings with no island:</p> <p>Windmill EB approach</p> <p>Mayfield EB approach</p> <p>Cleveland EB approach</p> <p>Following this review, the EB approaches at these locations will be proposed with two primary signals and an offside secondary signal. The traffic signal infrastructure design will be reviewed again at the detailed design stage and will be subject to site safety checks by the Signal Engineer.</p>	
Client Organisation Comments	
<p>Agree with the designer's response. The indicative signal locations have been updated to include two primary signals (one on each side of the road) and an offside secondary signal. This would provide signals visible for traffic in either of the two approach lanes. This design will be reviewed again at the detailed design stage in coordination with the traffic infrastructure designs and will be subject to separate signal safety audits.</p>	

3.3.3 PROBLEM

Location: B – Chiswick High Road junction with Heathfield Terrace

Summary: Cyclists turning off the cycle lane mid junction onto a red traffic signal may exacerbate a potential for conflict with pedestrians

It is proposed to provide internal stop lines for the pedestrian crossing facility at the junction to 'catch' cyclists turning from the cycle lanes. This may mean they could be shown a red traffic signal immediately as they turn, having just been given a green signal to proceed. Turning cyclists may fail to appreciate the requirement to stop at this location due to the close proximity of the stop line and signals within the junction. Cyclists may cycle through the pedestrian crossing injudiciously as a result, with a potential for conflict with pedestrians.

RECOMMENDATION

It is recommended that the method of control is modified to ensure cyclists are not stopped immediately after turning when leaving the cycle facility.

Design Organisation Response	Rejected
<p>Owing to geometrical and capacity constraints, it is not possible to provide an alternative method of control at this location. Cyclists are guided across the junction to the bi-directional track with the appropriate road marking where they can bypass the internal stop line and pedestrian crossing. The proposed stop line is a precautionary measure to stop any conflicting movement with the pedestrians in case a cyclist chooses to continue on the carriageway. In addition, the traffic signals at this stop line provide good visibility to approaching traffic including cyclists.</p>	
Client Organisation Comments	
<p>As per the designer's response, the internal stop line at this junction is designed as a precautionary measure to stop any cyclists who do not follow the signed route and cycle track to turn onto Heathfield Terrace. As there is an alternative facility, it is anticipated that the number of cyclists making this movement will be low and as such the risk of cycle to pedestrian conflict is low. Altering the method of control to separate these movements would increase the signal cycle time at the junction causing disproportionate impacts on all other road users compared to the relative risk.</p> <p>Red light compliance is an enforcement matter. If constructed, information about the changes to the layout of this junction would be provided to TfL's enforcement team who undertake regular cycle patrols on all Cycle Superhighways as part of business as usual enforcement activity. Furthermore, TfL has Operation Safeway which is a high visibility roadside enforcement operation who enforce the rules of the road and engage with users on how to use the road safely.</p>	

3.3.4 PROBLEM

Location: C – Chiswick High Road junction with Chiswick Lane

Summary: Cyclists turning off the cycle lane mid junction onto a red traffic signal may exacerbate a potential for conflict with pedestrians

It is proposed to provide an internal stop line for the pedestrian crossing facility at the junction to 'catch' cyclists turning from the cycle lane meaning they could be shown a red traffic signal immediately as they turn, having just been given a green signal to proceed. Turning cyclists may fail to appreciate the requirement to stop at this location due to the close proximity of the stop line and signals within the junction. Cyclists may cycle through the pedestrian crossing in judiciously as a result, with a potential for conflict with pedestrians.

RECOMMENDATION

It is recommended that the method of control is modified to ensure cyclists are not stopped immediately after turn when leaving the cycle facility.

Design Organisation Response	Rejected
<p>Owing to geometrical and capacity constraints, it is not possible to provide an alternative method of control at this location. The design includes a dropped kerb before the cycle signal so that cyclists can access the shared use area to bypass the said stop line.</p>	

Client Organisation Comments

At this junction, the signalisation of the pedestrian crossing and internal stop line was designed to accommodate cyclists turning left/right onto Chiswick Lane while providing a pedestrian crossing and not increasing the signal cycle time at the junction. As there is an alternative facility for cyclists making this movement (via a shared use path and dropped kerb), it is anticipated that the number of cyclists making this movement will be low and as such the risk of cycle to pedestrian conflict is low.

Red light compliance is an enforcement matter. If constructed, information about the changes to the layout of this junction would be provided to TfL's enforcement team who undertake regular cycle patrols on all Cycle Superhighways as part of business as usual enforcement activity. Furthermore, TfL has Operation Safeway which is a high visibility roadside enforcement operation who enforce the rules of the road and engage with users on how to use the road safely.

3.4 PARKING AND LOADING FACILITIES

3.4.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Close proximity of loading / parked vehicles to the track may exacerbate a potential for conflict with cyclists.

The proposed bi-directional track runs alongside a number of loading / parking bays located within a floating island. The Audit Team have the following concerns:

- Insufficient lateral clearance appears to have been provided between the loading / parking bays and the track. Drivers or passengers may open their door into the path of cyclists within the track with a potential to unseat a cyclist and sustain personal injury.
- Pedestrians, users unloading and disabled users entering / exiting vehicles, may do so within the cycle track into the path of cyclists. Cyclists may therefore collide with users of the adjacent bays with a potential for personal injury as a result.

RECOMMENDATION

It is recommended that sufficient space is provided to permit parking / loading activities whilst providing sufficient clearance to the cycle track.

Design Organisation Response	Rejected
A minimum half meter wide buffer has been provided at all sites. LCDS, 2014 Chapter 4 states that kerbed island separation or light segregation that provides a buffer zone of at least 0.5 metres between cyclists and parked cars is recommended in order to minimise risk of collision between cyclists and car doors. –. The buffer between parked vehicles and the cycle track is therefore sufficient to address the dooring issue.	
Client Organisation Comments	
Agree with the designer's response. The design provides the minimum clearance between parking bays and the cycle track as per LCDS. This addresses the risk of users of parked cars colliding with cyclists in the cycle track as they get in or out of their vehicles. Due to the physical constraints of the highway and the need to balance space for all road users, it has not been possible to widen this buffer to provide additional space for loading / unloading of passengers.	

3.4.2 PROBLEM

Location: D – Chiswick High Road junction with Fishers Lane

Summary: Loading vehicles may obstruct visibility for drivers exiting the junction

It is proposed to provide an inset loading bay in close proximity to the junction with Fishers Lane. The Audit Team are concerned that the location of the loading bay may restrict visibility to the right for vehicles exiting the junction. Drivers may therefore exit the junction injudiciously with an exacerbated potential for side-swipe type conflicts as a result.

RECOMMENDATION

It is recommended that the loading bay is shortened or relocated away from the junction.

Design Organisation Response	Rejected
<p>The loading bay is constrained by the licences for outdoor seating at this location and therefore cannot be moved.</p> <p>The visibility splay measured at 2.4m back is 25m which is the minimum stopping sight distance for 20mph road and given the existing constraints this is deemed sufficient.</p>	
Client Organisation Comments	
<p>Agree with the designer's response. The London Borough of Hounslow have proposed to make Chiswick High Road 20mph which requires a shorter visibility splay than the current 30mph speed limit. It is not possible to relocate or shorten the bays due to constraints on the footway and demand for loading for the local businesses. The loading bay is proposed to be for use only during the off-peak and therefore visibility would be increased during peak times when traffic movements are higher.</p>	

3.4.3 PROBLEM

Location: E – Chiswick High Road in proximity to Mayfield Avenue

Summary: Loading vehicles may obstruct visibility for pedestrians using the controlled crossing

It is proposed to provide a floating loading bay in close proximity to the pedestrian crossing near Mayfield Avenue. The Audit Team are concerned that the location of the loading bay may restrict visibility to the right for pedestrians using the crossing. Pedestrians may therefore step into the carriageway in judiciously with an exacerbated potential for conflict with vehicles as a result. This is of particular concern for pedestrians who may be crossing out of phase.

RECOMMENDATION

It is recommended that the loading bay is shortened or relocated away from the crossing.

Design Organisation Response	Rejected
The design has provided a formal crossing facility so that pedestrians can cross the road safely. In addition, the shadow of the floating island would provide space to pedestrians that started to cross and needed to stop.	
Client Organisation Comments	
The floating loading bay is proposed for use by a nearby funeral directors (127 Chiswick High Road) who, it is understood currently drive and park on footway outside their premises. Providing a loading bay within close proximity to the funeral director's is intended to provide a suitable alternative facility to the illegal footway parking. The length of the loading bay is designed to suit funeral vehicles and therefore cannot be shortened. As the pedestrian crossing is proposed to be signalised, pedestrians will receive a clear indication as to when it is safe to cross and the design therefore reduces the overall risk of pedestrian conflict with motor vehicles by addressing an existing issue. Pedestrians who choose to cross away from the green man signal would benefit from some protection from the traffic islands between the cycle track and traffic lanes.	

3.5 BUS FACILITIES

3.5.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Buses situated at the bus stop may obstruct visibility for drivers exiting the junction

It is proposed to provide a bus stop in close proximity to an adjacent junction. The Audit Team are concerned that the location of the bus stop may restrict visibility to for vehicles exiting the junction. Drivers may therefore exit the junction in judiciously with an exacerbated potential for side-swipe type conflicts as a result.

This was noted at, but not necessarily limited to, the following locations:

- Chiswick High Road junction with Duke Road.
- Chiswick High Road junction with Netheravon Road.

RECOMMENDATION

It is recommended that the bus stop is relocated away from the junction.

Design Organisation Response	Rejected
<p>Owing to the geometrical constraints, it is not possible to relocate the bus stop by Netheravon Road east as it would mean the removal of trees and parking bays or west as the road width means that minimum widths for the bus stop island / traffic lanes would not be feasible also owing to the mature trees present in the vicinity. The decision to provide this bus stop at this location is based on the fact that traffic volumes exiting Netheravon Rd is low.</p> <p>It is also not possible to relocate the bus stop by Duke Road east as it means that minimum widths for the bus stop island / traffic lanes would not be feasible or to the west as it would mean the removal of mature trees. The decision to provide this bus stop at this location is based on the fact that Duke Road has been proposed to be left turn exit only and the provision of 'Keep Clear' markings are proposed to aid this movement.</p>	
Client Organisation Comments	
<p>Agree with the designer's response. It is not possible to relocate the bus stops in question away from the junctions and removing these bus stops would increase spacing between bus stops to over the recommended distance of 400m. As this is a retail area, provision of adequate bus stop spacing is important to maintain to provide access to public transport for those visiting the area.</p> <p>Traffic flows to and from Netheravon Road are very low and so the relative risk is low. At Duke Road, the right turn out is proposed to be banned meaning this would be left turn exit only.</p> <p>Chiswick High Road is also proposed by the borough to be 20mph which will reduce overall speeds of traffic and stopping distances.</p>	

3.5.2 PROBLEM

Location: F – Chiswick High Road in proximity to Airedale Avenue

Summary: Buses at the bus stop may obstruct visibility for pedestrians using the controlled crossing

It is proposed to provide a floating bus stop in close proximity to the pedestrian crossing near Airedale Avenue. The Audit Team are concerned that the location of the bus stop may restrict visibility to the right for pedestrians using the crossing. Pedestrians may therefore step into the carriageway injudiciously with an exacerbated potential for conflict with vehicles as a result. This is of particular concern for pedestrians who may be crossing out of phase.

RECOMMENDATION

It is recommended that the bus stop is relocated away from the crossing.

Design Organisation Response	Rejected
As mentioned on item 3.5.1; Owing to the geometrical constraints, it is not possible to relocate the bus stop.	
The design has provided a formal crossing facility so that pedestrians can cross the road safely. In addition, the shadow of the floating island would provide space to pedestrians that started to cross and needed to stop.	
Client Organisation Comments	
Agree with the designer's response. It is not possible to relocate the bus stop away from the crossing and removing the bus stop would increase spacing between bus stops to over the recommended distance of 400m. As this is a retail area, provision of adequate bus stop spacing is important to maintain to provide access to public transport for those visiting the area.	
As the pedestrian crossing is proposed to be signalised, pedestrians will receive a clear indication as to when it is safe to cross. Pedestrians who choose to cross away from the green man signal would benefit from some protection from the traffic islands between the cycle track and traffic lanes.	
Chiswick High Road is also proposed to be 20mph which will reduce overall speeds of traffic and stopping distances.	

End of list of problems identified and recommendations offered in this Stage 1 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 1 ROAD SAFETY AUDIT THAT ARE OUTSIDE THE TERMS OF REFERENCE

Safety issues identified during the audit and site inspection that are considered to be outside the Terms of Reference, but which the Audit Team wishes to draw to the attention of the Client Organisation, are set out in this section. It is to be understood that, in raising these issues, the Audit Team in no way warrants that a full review of the highway environment has been undertaken beyond that necessary to undertake the Audit as commissioned.

4.1 ISSUE

Location: General to scheme, multiple locations

Reason considered to be outside the Terms of Reference: Item for consideration rather than a defined road safety concern

It is proposed to provide a bi-directional cycle track along the route that varies in width down to 2.5m at some points. With moderate flows, a track at 2.5m width may be considered narrow to facilitate bi-directional cycle flow and may reduce the effectiveness of the facility, due to the limited opportunities to overtake combined with cyclists likely to adopt a more central riding position. There is a risk that more confident cyclist will choose not to use the facility, and instead ride within the carriageway where it may be easier to make progress. If possible it may be beneficial to consider whether the facility can be increased in width.

Design Organisation Response	Rejected
There are various design constraints along the route preventing the bi-directional cycle tracks from being widened such as trees, bus stops, traffic infrastructure and high footfall areas.	
To highlight the two-way nature of the bi-directional track at sections which are 2.5m wide, cycle logos 1057, and 1004 central lane line markings will be provided.	
Cycle flows during the peak periods are tidal based on existing traffic counts which helps maximise use of space within the cycle track and splayed kerbs will be used at these locations to increase the effective width of the track.	

Client Organisation Comments
When designing the scheme, we have taken cycle flows into account to inform the width of the cycle track. The two-way cycle track is proposed to be 2.5 metres wide, increasing to 3 metres in some locations which would allow cyclists of different speeds to overtake one another.
According to LCDS, a 2 metre wide cycle track would cater for up to 300 cyclists in the peak hour and a 3 metre wide cycle track would cater for between 300 and 1000 cyclists in the peak hour. Along this section of the route, current cycle flows are circa 150-200 cyclists in the peak hour meaning that the cycle track widths proposed would cater for these flows plus future uplift.
In addition, where flows are tidal, for example during peak times, two-way tracks offer a more flexible use of space, allowing cyclists to use the opposite side of the track for overtaking if free from oncoming cyclists.

4.2 ISSUE

Location: General to scheme, multiple locations

Reason considered to be outside the Terms of Reference: Detailed design issue

It is proposed to provide a bi-directional cycle track which splits around a number of mature trees along the route. It is proposed to demarcate the presence of the tree with a hatch road marking on both approaches. The Audit Team are concerned that this may not be as effective at keeping cyclists away from this area as intended. It may be preferable to replace the road marking with an alternative pavement type to deter encroachment into this area.

Design Organisation Response	Accepted
Following this RSA comment, the hatching has been removed and a change in materials has been proposed. This will be a similar treatment around the trees as it was proposed at Vauxhall on CS5.	
Client Organisation Comments	
Agree with the designer's response.	

4.3 ISSUE

Location: 1 – Turnham Green Terrace junction with Chiswick High Road

Reason considered to be outside the Terms of Reference: Item for consideration rather than a defined road safety concern

In the existing layout a 'no entry' road marking is provided to discourage drivers on Turnham Green Terrace from proceeding ahead into Annandale Road. In the revised arrangement the marking is not proposed so there is a risk that drivers may be hesitant or attempt to make this manoeuvre. As part of the ongoing design process it may be beneficial to consider the retention of this marking at this location.

Design Organisation Response	Rejected
The 'no entry' road marking has been considered and dropped from the proposal as it would generate more clutter and a confusing arrangement with too many road markings in the same space. The location was reviewed and it was deemed unnecessary as there are sufficient 'no entry' signs at this location (in accordance with TSRGD 2016) to highlight the prohibition to enter Annandale Road.	
Client Organisation Comments	
Agree with the designer's response. The proposals meet minimum standards for 'no entry' demarcation without unnecessary street clutter.	

5.0 SIGNATURES AND SIGN-OFF

5.1 AUDIT TEAM STATEMENT

We certify that we have examined the drawings and documents listed in Appendix A. to this Safety Audit report. The Road Safety Audit has been carried out in accordance with TfL Procedure SQA-0170 dated May 2014, with the sole purpose of identifying any feature that could be removed or modified in order to improve the safety of the measures. The problems identified have been noted in this report together with associated suggestions for safety improvements that we recommend should be studied for implementation.

No one on the Audit Team has been involved with the design of the measures.

AUDIT TEAM LEADER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 12/10/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact:

[REDACTED] [@tfl.gov.uk](mailto:[REDACTED]@tfl.gov.uk) [REDACTED]

AUDIT TEAM MEMBER:

Name:

[REDACTED]

Signed:

[REDACTED]

Date: 12/10/2018

Organisation: Transport for London, Road Safety Audit
Engineering Services, Highways Engineering Team

Address: 3rd Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact:

[REDACTED] [@tfl.gov.uk](mailto:[REDACTED]@tfl.gov.uk) [REDACTED]

5.2 DESIGN TEAM STATEMENT

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Design Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 09/11/18

In accordance with SQA-0170 dated May 2014, I certify that I have reviewed the items raised in this Stage 1 Safety Audit report. I have given due consideration to each issue raised and have stated my proposed course of action for each in this report. I seek the Client Organisation's endorsement of my proposals.

Name: [REDACTED]

Position: Senior Engineer

Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED]

Dated: 09/11/18

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Principal Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 09/11/18

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Lead Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 09/11/18

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
PJ549C-RSM-PRD-11-DR-TE-25-57-0049.1 (P03)	A315 Brentford High Street Concept Design Section 11 – Sheet 49.1
PJ549C-RSM-PRD-11-DR-TE-25-57-0049 (P07)	A315 Brentford High Street Concept Design Section 11 – Sheet 49
PJ549C-RSM-PRD-11-DR-TE-25-57-0050 (P07)	A315 Brentford High Street Concept Design Section 11 – Sheet 50
PJ549C-RSM-PRD-11-DR-TE-25-57-0051 (P07)	A315 Brentford High Street Concept Design Section 11 – Sheet 51
PJ549C-RSM-PRD-11-DR-TE-25-57-0052 (P07)	A315 Brentford High Street Concept Design Section 11 – Sheet 52
PJ549C-RSM-PRD-11-DR-TE-25-57-0052.1 (P07)	A315 Brentford High Street Concept Design Section 11 – Sheet 52.1
PJ549C-RSM-PRD-11-DR-TE-25-57-0053 (P07)	A315 Brentford High Street Concept Design Section 11 – Sheet 53
PJ549C-RSM-PRD-11-DR-TE-25-57-0054 (P07)	A315 Brentford High Street Concept Design Section 11 – Sheet 54
PJ549C-RSM-PRD-11-DR-TE-25-57-0055 (P07)	A315 Brentford High Street Concept Design Section 11 – Sheet 55
PJ549C-RSM-PRD-11-DR-TE-25-57-0056 (P07)	A315 Brentford High Street Concept Design Section 11 – Sheet 56

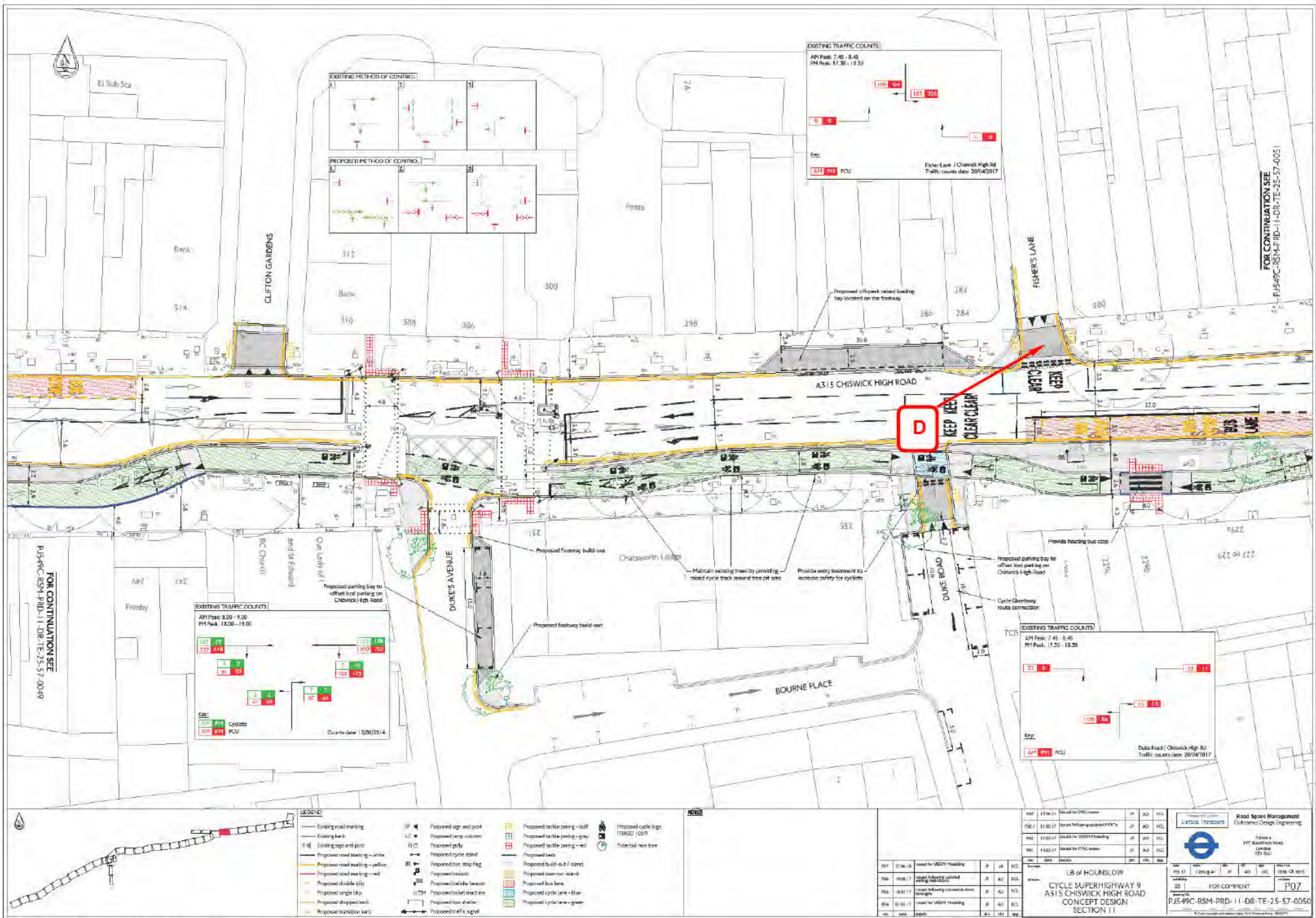
DOCUMENTS

- ☒ Safety Audit Brief
- ☐ Site Location Plan
- ☐ Traffic signal details
- ☐ TfL signal safety checklist
- ☐ Departures from standard
- ☐ Previous Road Safety Audits
- ☐ Previous Designer Responses
- ☐ Collision data
- ☐ Collision plot
- ☐ Traffic flow / modelling data
- ☐ Pedestrian flow / modelling data
- ☐ Speed survey data
- ☐ Other documents

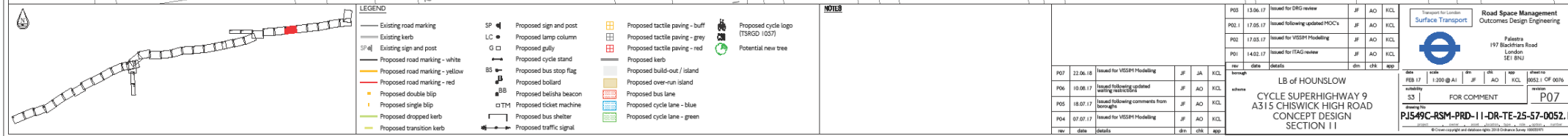
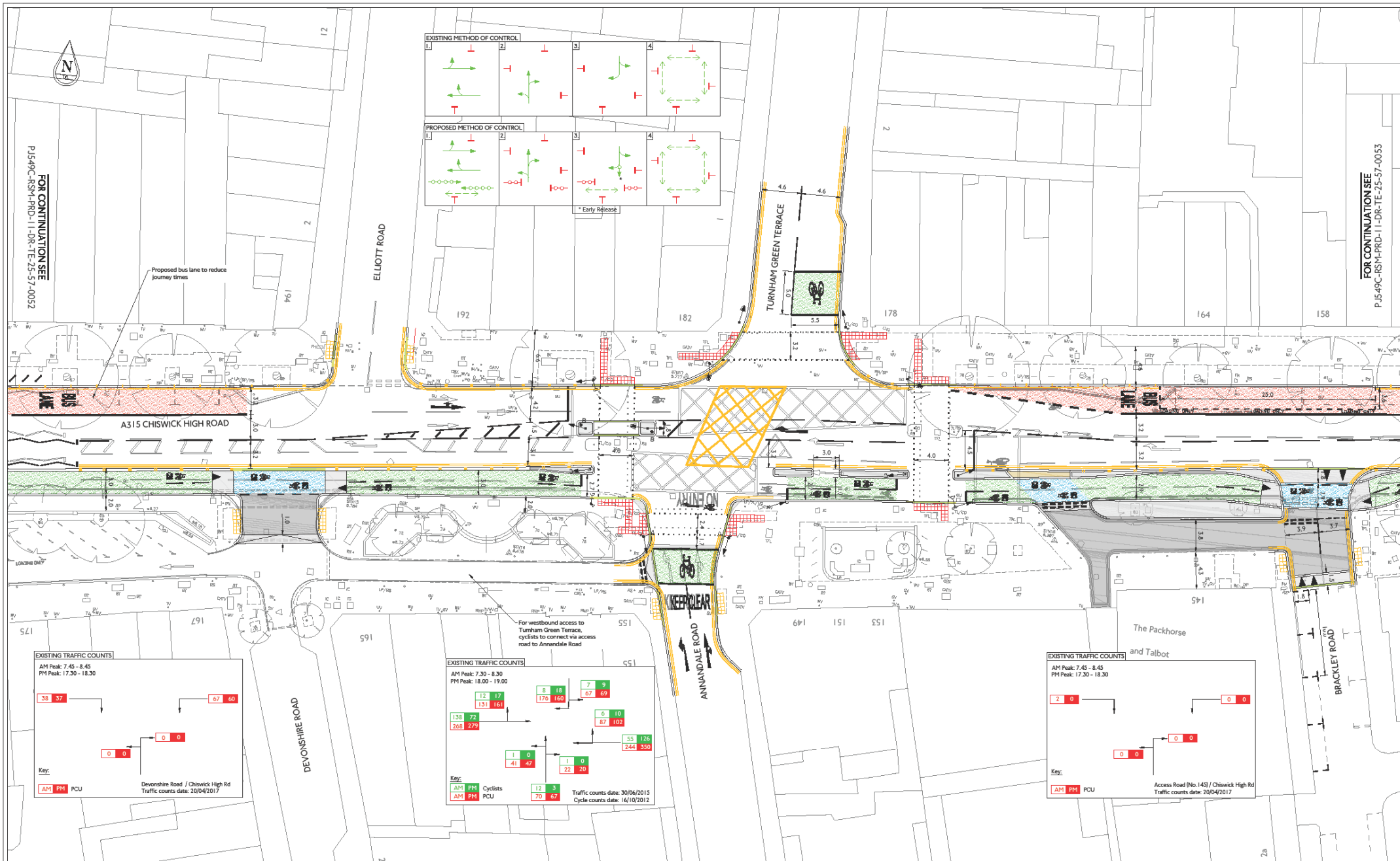
DETAILS (where appropriate)

APPENDIX B

Problem Locations



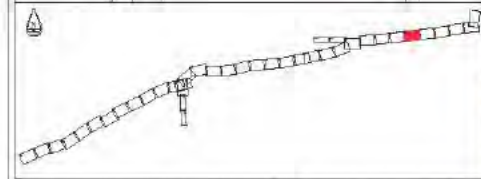
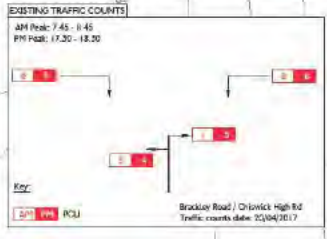
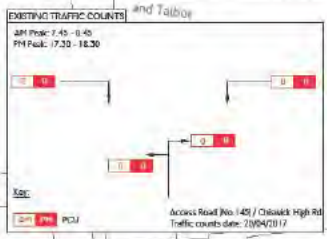






FOR CONTINUATION SEE
PJS49C-RSM-PRD-11-DR-TE-25-57-0052.1

FOR CONTINUATION SEE
PJS49C-RSM-PRD-11-DR-TE-25-57-0053.4



LEGEND

Existing road marking	Proposed sign end post	Proposed tactile paving - buff	Proposed cycle sign (TSRD 1007)
Existing kerb	Proposed lamp column	Proposed tactile paving - grey	Potential new tree
Existing sign and post	Proposed gully	Proposed tactile paving - red	
Proposed road marking - white	Proposed cyclestand	Proposed kerb	
Proposed road marking - red	Proposed one way flag	Proposed tactile paving (island)	
Proposed double stop	Proposed bollard	Proposed bus lane	
Proposed single stop	Proposed tactile section	Proposed cycle lane - blue	
Proposed dropped kerb	Proposed tactile marking	Proposed cycle lane - green	
Proposed transition kerb	Proposed bus shelter		
	Proposed traffic signal		

NOTES

<p>13.06.14</p> <p>10.08.17</p> <p>18.01.17</p> <p>07.01.17</p>	<p>Revised for V&P/H/Building</p> <p>Revised for V&P/H/Building</p> <p>Revised for V&P/H/Building</p> <p>Revised for V&P/H/Building</p>	<p>AP</p> <p>AO</p> <p>AO</p> <p>AO</p>	<p>AO</p> <p>AO</p> <p>AO</p> <p>AO</p>	<p>13.06.14</p> <p>10.08.17</p> <p>18.01.17</p> <p>07.01.17</p>	<p>Revised for V&P/H/Building</p> <p>Revised for V&P/H/Building</p> <p>Revised for V&P/H/Building</p> <p>Revised for V&P/H/Building</p>	<p>AP</p> <p>AO</p> <p>AO</p> <p>AO</p>	<p>AO</p> <p>AO</p> <p>AO</p> <p>AO</p>
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LB of HOUSES OW
CYCLE SUPERHIGHWAY 9
A315 CHISWICK HIGH ROAD
CONCEPT DESIGN
SECTION 11

FOR COMMENT
PJS49C-RSM-PRD-11-DR-TE-25-57-0053

FOR COMMENT
P07

FOR COMMENT
PJS49C-RSM-PRD-11-DR-TE-25-57-0053

