

Cycle Superhighway Route 9 Revised Section 12 Proposals

Stage 1 Road Safety Audit

Ref: 3246.12/028/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	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 12 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 12 proposals and their associated tie-ins with the adjacent sections.

1.5.2 CS9 (Section 12) covers the proposals at the junction of Chiswick High Road and Goldhawk 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: 2778.12/003/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 JUNCTIONS

3.1.1 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 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.
- Alterations to the alignment of the facility to ensure cyclists from both directions are immediately visible, such as ensuring drivers and cyclists 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

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.

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. Following a review of the designs for this section, additional give-way lines have been included at some side roads where the design approach was not consistent. We will continue to review the best way to provide priority for cycling at un-signalised side roads as the design progresses.

3.1.2 PROBLEM

Location: A – Chiswick High Road junction with St Peters Square

Summary: Vehicles queueing westbound may reduce inter-visibility between cyclists on the track and motorists entering the side road.

The Audit Team are concerned that the proposed 'keep-clear' road markings may result in waiting vehicles either side of the junction reducing the inter-visibility between motorists turning into the side road and cyclists on the segregated cycle track. Reduced inter-visibility may result an increased potential for side impact type collisions between right turning motorists and cyclists attempting to assert priority on the cycle track.

RECOMMENDATION

It is recommended to ensure that sufficient inter-visibility is provided between cyclists crossing the track and vehicles entering the side road. This may require the 'keep-clear' road marking to be increased in size.

Design Organisation Response	Rejected
<p>Owing to the geometrical, capacity constraints as well as the proximity of this side road to the junction, it is not advisable to further increase the size of the 'Keep Clear' marking as it could lead to non-compliance. The size of the 'Keep Clear' marking has already been increased following previous RSA comments and this improved the visibility splay of the junction, in that traffic will be facing the cycle track perpendicularly with good sight lines of cycle movements. Finally, the movements have been tracked to ensure the 'Keep Clear' marking can accommodate the intended movements.</p> <p>Give way markings have been reviewed to clarify priorities for traffic turning into St Peters Square.</p>	
Client Organisation Comments	
<p>Agree with the designer's response.</p>	

3.2 PEDESTRIANS

3.2.1 PROBLEM

Location: B – Chiswick High Road junction with Goldhawk Road

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

A reverse staggered crossing is proposed at the junction of Chiswick High Road and Goldhawk Road. The proposed 'reverse stagger' pedestrian crossing guides 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>A reversed staggered crossing is proposed on the west arm of the Goldhawk Road junction to maximise 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 impatient waiting for a green man.</p> <p>The proposed design for the Goldhawk Road junction provides straight across crossings over the carriageway on the other three arms of the junction and the staggered crossings on the west arm are wider than the existing crossing providing more space for pedestrians to cross.</p>

3.3 TRAFFIC SIGNALS

3.3.1 PROBLEM

Location: C – Chiswick High Road junction with Goldhawk Road

Summary: Cycle turning left / right onto a red traffic signal on the junction exit may exacerbate a potential for conflict with pedestrians

It is proposed that cyclists wishing to turn left / right from Chiswick High Road onto Goldhawk Road will be shown a red traffic signal immediately on the junction exit, having just been given a green signal to proceed. Left / right turning cyclists may fail

to appreciate the requirement to stop at this location due to the close proximity of the stop line and signals to the junction itself. 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 / right.

Design Organisation Response	Rejected
Owing to geometrical and capacity constraints, it is not possible to provide an alternative method of control at this location to ensure cyclists are not stopped after turning left/right from Chiswick High Road onto Goldhawk Road. However, the cycle flows for these movements are low and the travelling distance for the cycle stream to the said stop line is approximately 25m. Therefore, the cycle stream will have clear forward visibility and time to respond to the traffic signal.	

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 Goldhawk Road while providing a pedestrian crossing and not increasing the signal cycle time at the junction. As cyclists will be approaching this stop line from the cycle track on the south side of Chiswick High Road, they will be doing so at a perpendicular angle to the stop line from a distance of around 25 metres meaning that forward visibility of the signals will be good. 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.

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
	<p>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.</p> <p>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.</p> <p>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.</p>
Client Organisation Comments	
	<p>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.</p> <p>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 200-250 cyclists in the peak hour meaning that the cycle track widths proposed would cater for these flows plus future uplift.</p> <p>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.</p>

4.2 ISSUE

Location: 1 – Chiswick High Road junction with Goldhawk Road

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 westbound traffic lane flare to two lanes after the bus lane terminates in advance of the junction, then immediately merges back to a single lane on the junction exit. This layout is unlikely to increase capacity through the junction significantly and may encourage drivers to undertake from the stop line to make progress. It may be beneficial to consider making the nearside lane left turn only (except buses).

Design Organisation Response	Rejected
<p>Owing to the geometrical and capacity constraints, the proposed method of control is running the east and west bound under the same stage opposite to each other. The right turn volume for the westbound direction is significant. Following modelling outputs it was deemed necessary to have two ahead lanes for the westbound traffic movements to make this junction viable. It is not uncommon for traffic to merge downstream after a signal controlled junction and drivers often stagger their movements through the junction so that merging is an orderly movement.</p> <p>Finally, the design of the yellow box junction takes the capacity into consideration by splitting it into two boxes to create a gap that effectively works as a right turn pocket.</p>	
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: 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.

Name: [REDACTED]
Position: Design Engineer
Organisation: RS&P, Highways and Traffic, TfL Engineering

Signed: [REDACTED] **Dated:** 13/11/18

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:** 13/11/18

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name: [REDACTED]
Position: Principal Sponsor
Organisation: TfL

Signed: [REDACTED] **Dated:** 15/11/18

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:** 15/11/18

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER

PJ549C-RSM-PRD-11-DR-TE-25-57-0057 (P07)

PJ549C-RSM-PRD-11-DR-TE-25-57-0057.1 (P07)

DRAWING TITLE

A315 Brentford High Street
Concept Design
Section 12 – Sheet 57
A315 Brentford High Street
Concept Design
Section 12 – Sheet 57.1

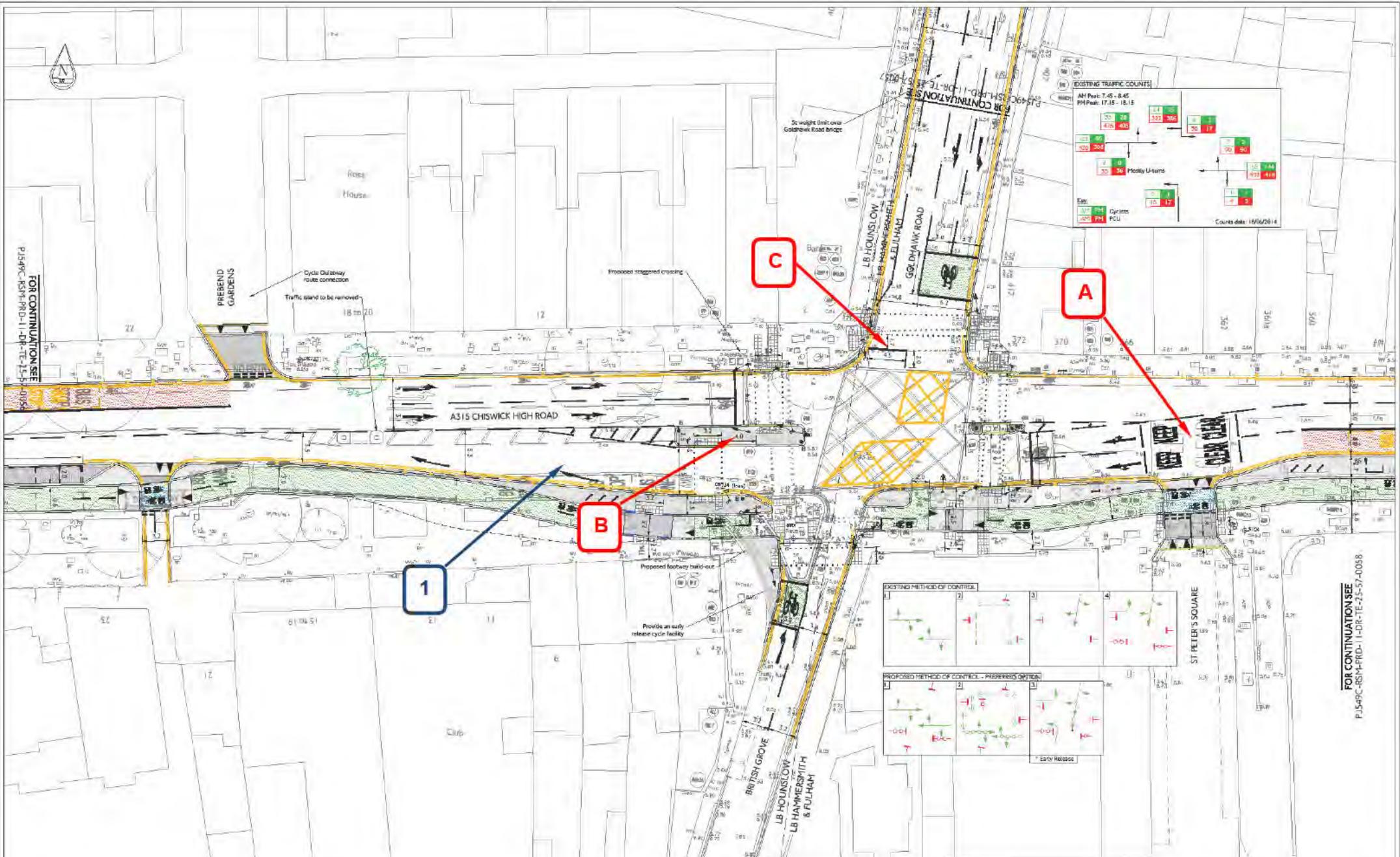
DOCUMENTS

- 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

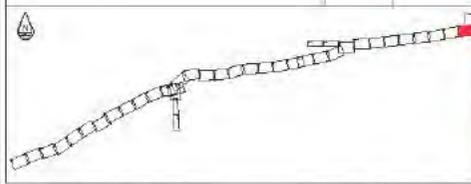
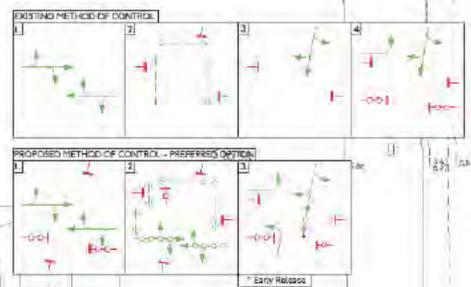


EXISTING TRAFFIC COUNTS

AH Peak: 7:05 - 8:45
PM Peak: 17:15 - 18:15

323	204	423	416	481	24	20	323	366	20	17
4	10	32	36	34	Priority U-turns	20	30	144	144	413
194	194	194	194	194	Cycles	194	194	194	194	194
194	194	194	194	194	PCU	194	194	194	194	194

Counts date: 10/06/2014



LEGEND

Existing road marking	Proposed sign and post	Proposed tactile paving - buff	Proposed cycle sign (TSRD 102)
Existing kerb	Proposed lamp column	Proposed tactile paving - grey	Potential next line
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 bollard (out / stand)	
Proposed road marking - red	Proposed bollard	Proposed cover-cum island	
Proposed double lip	Proposed bollard beam	Proposed bus lane	
Proposed single lip	Proposed ticket machine	Proposed cycle lane - blue	
Proposed dropped kerb	Proposed taxi shelter	Proposed cycle lane - green	
Proposed kerb lip	Proposed traffic sign		

NOTES

1. All proposed cycle lanes are to be constructed in accordance with the current edition of the Design Manual for Urban Street Layouts (DMUSL).
2. All proposed cycle lanes are to be constructed in accordance with the current edition of the Design Manual for Urban Street Layouts (DMUSL).
3. All proposed cycle lanes are to be constructed in accordance with the current edition of the Design Manual for Urban Street Layouts (DMUSL).
4. All proposed cycle lanes are to be constructed in accordance with the current edition of the Design Manual for Urban Street Layouts (DMUSL).

REV	DATE	DESCRIPTION	BY	CHK
001	21.06.16	Issue for V&P (Final)	SP	AG
002	09.08.17	Issue for V&P (Final)	SP	AG
003	08.07.17	Issue for V&P (Final)	SP	AG
004	07.07.17	Issue for V&P (Final)	SP	AG

REVISIONS

REV	DATE	DESCRIPTION	BY	CHK
001	11.06.17	Issue for P&C review	SP	AG
002	16.05.17	Issue for P&C review	SP	AG
003	12.03.17	Issue for V&P (Final)	SP	AG
004	11.02.17	Issue for V&P (Final)	SP	AG

Surface Transport

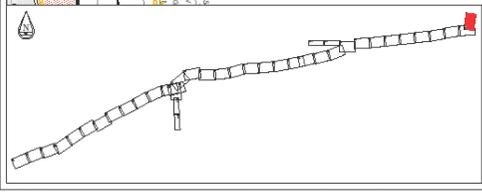
Road Space Management
Outcomes Design Engineering

File No: 197
197 Blackbus Road
SE1 8JZ

FOR COMMENT

P07

PJ549C-BSM-PRD-11-DR-TE-25-57-0057



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

no.	date	details	by	chk	app
P07	22.06.18	Issued for VSSM Modelling	JF	JA	KCL
P06	10.08.17	Issued following updated waiting restrictions	JF	AD	KCL
P05	18.07.17	Issued following comments from borough	JF	AD	KCL
P04	07.07.17	Issued for VSSM Modelling	JF	AD	KCL
P03	13.06.17	Issued for DRG review	JF	AO	KCL
P02.1	16.05.17	Ahead only arrow amended	JF	AO	KCL
P02	17.03.17	Issued for VSSM Modelling	JF	AO	KCL
P01	14.02.17	Issued for ITAG review	JF	AO	KCL

LB of HOUNSLOW
 CYCLE SUPERHIGHWAY 9
 A315 CHISWICK HIGH ROAD
 CONCEPT DESIGN
 SECTION 12

Transport for London
Surface Transport
 Road Space Management
 Outcomes Design Engineering
 Fulera
 197 Blackfriars Road
 London
 SE1 8JQ

date: FEB 17
 scale: 1:200 @ A1
 title: FOR COMMENT
 sheet no: 0057 CP 0075
 drawing no: **P07**
 drawing title: **P1549C-RSM-PRD-11-DR-TE-25-57-0057.1**

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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	14/09/2018
B	Audit report updated to clarify Road Safety Audit problem 3.1.2	29/10/2018



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1.1 Commission

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- 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 13 proposals and their associated tie-ins with the adjacent sections.

1.5.2 CS9 (Section 13) 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 JUNCTIONS

3.1.1 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 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.
- Alterations to the alignment of the facility to ensure cyclists from both directions are immediately visible, such as ensuring drivers and cyclists approach perpendicular to each other.

Design Organisation Response	Part Accepted
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.	
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.	

Client Organisation Comments

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.

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.

3.1.2 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	Rejected
Following clarification with the auditor, the proposed locations in question are the two ramped access points to the Tesco car park on sheet 59 (one entry only and one exit only). These accesses are defined as 'footway crossovers' and are not proposed to be 'continuous footways'.	
TfL's Streetscape Guidance (2017), states that for footway crossovers 'a continuous footway surface is preferable which should be suitably robust.' It is proposed for these accesses to remain as ramped providing a flush surface for pedestrians and for them to be surfaced in asphalt as per existing arrangements (rather than a continuous footway paving which is at risk of cracking).	
Client Organisation Comments	
Agree with the designer's response. Though the locations in question are not continuous footways they will be one way in / out and will be raised to footway level as per the existing arrangements to provide a flush surface for pedestrians to cross as well as slowing vehicles down and highlighting the presence of pedestrians.	

3.2 PARKING AND LOADING FACILITIES

3.2.1 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. At the loading Bay west of Cromwell Avenue a 1.5m island is proposed to facilitate loading activities adjacent to parked vehicles and at the loading Bay west of Dimes Place there is a long landing area proposed at the back of the bay to facilitate rear loading activities.	
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. At the loading bays, additional space is provided alongside the bays or at the rear of the bays to assist drivers loading or unloading goods to not encroach the cycle track.	

3.2.2 PROBLEM

Location: A – King Street junction with Cromwell Avenue

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 Cromwell Avenue. 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
<p>Owing to the geometrical constraints and demand for loading facilities. It is not possible to relocate or shorten the inset loading bay. The design layout provides a visibility splay of 25m for Cromwell Avenue which is sufficient as King Street has been proposed to be 20mph road by the Borough.</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>	

3.2.3 PROBLEM

Location: B – King Street junction with Hamlet Gardens

Summary: Parked vehicles may obstruct visibility for pedestrians using the uncontrolled crossing

It is proposed to provide a parking bay on Hamlet Gardens in close proximity to the uncontrolled pedestrian crossing. The Audit Team are concerned that the location of the parking bay 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.

RECOMMENDATION

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

Design Organisation Response	Rejected
<p>Owing to geometrical constraints and demand for parking facilities, it is not possible to relocate or shortened the proposed parking bay. There is an existing single yellow line waiting restriction (Monday to Saturday, 8am to 7pm) along the length of the proposed parking bay. The proposal simply formalises / regulates parking activities in this section. In addition, the uncontrolled crossing will be accommodated by an 'Entry Treatment' which will reduce traffic speeds turning in and out of Hamlet Gardens. Therefore, on balance, proposed measures will improve condition for vulnerable road users.</p>	
Client Organisation Comments	
<p>Agree with the designer's response. Due to the removal of parking in other locations such as on Chiswick High Road, it is desirable to provide parking bays on the side roads. As parking is already permitted along this section of the side road, the visibility is no worse than the existing layout and the crossing facility is improved with a raised entry treatment.</p>	

3.3 TRAFFIC SIGNALS

3.3.1 PROBLEM

Location: C – King Street in proximity to Weltje Road

Summary: Pedestrian crossing facility may be obscured by the close proximity of mature trees

The Audit Team are concerned that the northern side of the proposed pedestrian crossing facility may be obscured by two mature trees situated in close proximity. This may pose a number of problems, namely:

- Visibility to/for pedestrians using the crossing point may be reduced by the presence of the tree trunk. Pedestrians may therefore fail to see or be seen by approaching vehicles entering the carriageway injudiciously. Pedestrians that enter the carriageway injudiciously are at an exacerbated potential for conflict. This is of particular concern for pedestrians crossing out of phase.
- The traffic signals on the northern kerb-line may be obscured by the tree canopy. Drivers may fail to appreciate the message portrayed by the traffic signal, potentially over-shooting the crossing, or braking late upon the traffic signals coming into view. Drivers that overshoot the crossing are at a potential for conflict with pedestrians. Drivers that brake late are susceptible to shunt type conflicts with following vehicles.

RECOMMENDATION

It is recommended that sufficient forward visibility is provided to/for pedestrians and the traffic signals. This may require the relocation of the crossing, the removal or pruning of trees, or the building out of the northern kerb-line.

Design Organisation Response	Rejected
Owing to geometrical constraints, it is not possible to relocate the proposed crossing. The tree trunks in question are however setback over 1.5m from the kerb, giving pedestrians waiting at the crossing sufficient visibility of oncoming traffic. The tree canopies are also higher than the height of standard traffic signals and therefore it is unlikely that they will obscure the traffic signals. The traffic signal infrastructure design will be reviewed at the detailed design stage and will be subject to site safety checks by the Signal Engineer.	
Client Organisation Comments	
Agree with the designer's response. This is a controlled crossing and as such, pedestrians will have priority of traffic during the green man phase. If choosing to cross on a red man, visibility of traffic, or visibility of the signals by traffic is not expected to be compromised by the nearby trees due to their positioning back from the kerbs and canopy height. Nonetheless, 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.	

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 – King Street junction with Nigel Playfair Avenue

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

The Audit Team note that the alignment of the right turning pocket from King Street into Nigel Playfair Avenue may encourage drivers to approach in a straight movement from the eastbound carriageway, potentially straddling the central zig-zag markings. Drivers who perform this manoeuvre may hinder progress for westbound vehicles. It may be beneficial to consider modifying the alignment of the junction to better cater for right turning traffic.

Design Organisation Response	Accepted
Following this comment, the central hatching has been reintroduced and the alignment of the westbound movement shifted south to replicate the existing arrangement. The westbound movement should now progress without being hindered by the right turners waiting in the pocket. Furthermore there is no collision data to suggest any issues with the existing right turn pocket.	
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: 29/10/2018

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: 29/10/2018

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: 13/11/18

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: 13/11/18

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Principal Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 15/11/18

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: 15/11/18

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER

PJ549C-RSM-PRD-11-DR-TE-58-76-0058 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0059 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0060 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0061 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0062 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0063 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0064 (P07)

DRAWING TITLE

A315 Brentford High Street
Concept Design

Section 13 – Sheet 58

A315 Brentford High Street
Concept Design

Section 13 – Sheet 59

A315 Brentford High Street
Concept Design

Section 13 – Sheet 60

A315 Brentford High Street
Concept Design

Section 13 – Sheet 61

A315 Brentford High Street
Concept Design

Section 13 – Sheet 62

A315 Brentford High Street
Concept Design

Section 13 – Sheet 63

A315 Brentford High Street
Concept Design

Section 13 – Sheet 64

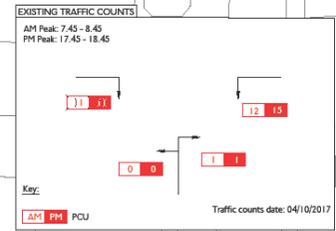
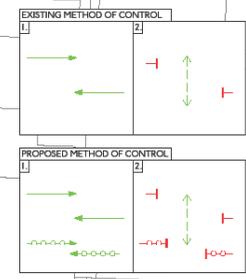
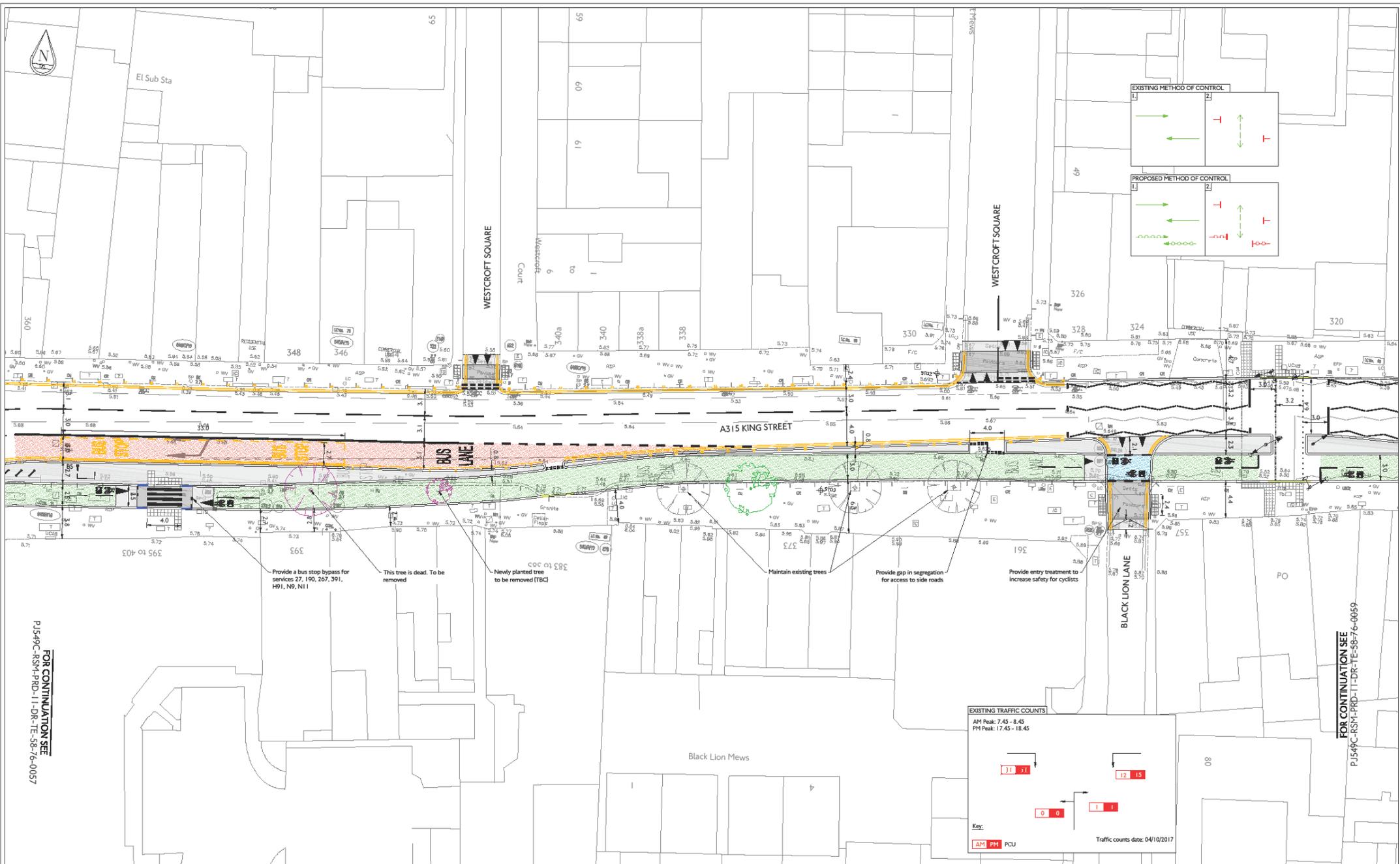
DOCUMENTS

- 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
P1549C-RSM-PRD-11-DR-TE-58-76-0057

FOR CONTINUATION SEE
P1549C-RSM-PRD-11-DR-TE-58-76-0059

LEGEND	
	Existing road marking
	Existing kerb
	Proposed sign and post
	Proposed lamp column
	Proposed gully
	Proposed cycle stand
	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	
PO4	07.07.17 Issued for VESPM Modelling
PO3	13.06.17 Issued for DRG review
PO2	17.03.17 Issued for VESPM Modelling
PO1	13.02.17 Issued for TRAG review
PO7	22.06.18 Issued for VESPM Modelling
PO6	10.08.17 Issued following updated waiting restrictions
PO5	17.07.17 Issued following comments from borough

REV	DATE	DETAILS	BY	CHK	APP
PO7	22.06.18	Issued for VESPM Modelling	JF	AK	KCL
PO6	10.08.17	Issued following updated waiting restrictions	JF	AO	KCL
PO5	17.07.17	Issued following comments from borough	JF	AO	KCL

LB OF HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
A315 KING STREET
CONCEPT DESIGN
SECTION 13

Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

Palstra
197 Blackfriars Road
London
SE1 8NJ

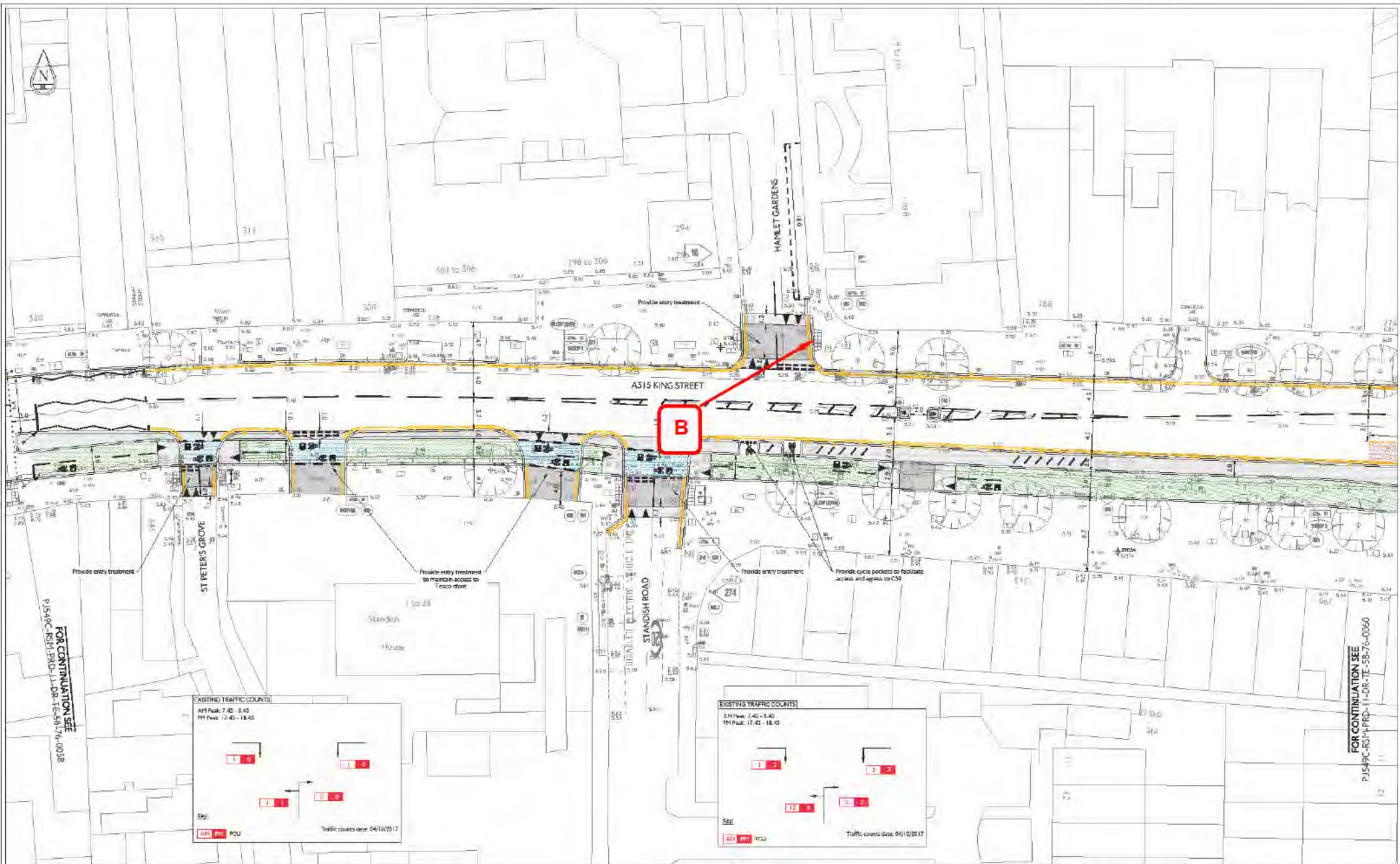
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FOR COMMENT

PROJECT: P1549C-RSM-PRD-11-DR-TE-58-76-0058

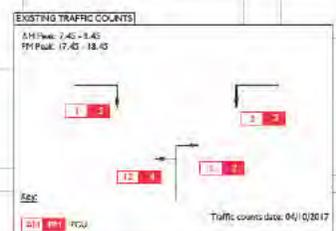
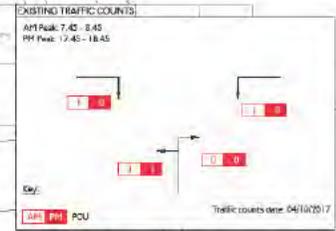
WORK: 0058 OF 0076

SECTION: P07



FOR CONTINUATION SEE
P1549C-RSM-PRD-11-DR-TE-S8-76-0058

FOR CONTINUATION SEE
P1549C-RSM-PRD-11-DR-TE-S8-76-0060



- LEGEND**
- Existing road marking
 - Existing kerb
 - Existing sign and post
 - Proposed road marking - white
 - Proposed road marking - yellow
 - Proposed road marking - red
 - Proposed double lip
 - Proposed single lip
 - 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 tactile beacon
 - Proposed ticket machine
 - Proposed bus shelter
 - Proposed traffic signal
 - Proposed tactile paving - kerb
 - Proposed tactile paving - grey
 - Proposed tactile paving - red
 - Proposed kerb
 - Proposed build-out / Heels
 - Proposed crossover island
 - Proposed tree lane
 - Proposed cycle lane - filter
 - Proposed cycle lane - green
 - Proposed cycle logo (TSRGD 1001)
 - Potential new trees

- NOTES**
1. Proposed cycle lanes are to be constructed in accordance with the current standards of the Department for Transport (DfT) and the Highways Act 1980.
 2. Proposed cycle lanes are to be constructed in accordance with the current standards of the Department for Transport (DfT) and the Highways Act 1980.
 3. Proposed cycle lanes are to be constructed in accordance with the current standards of the Department for Transport (DfT) and the Highways Act 1980.

NO	DATE	ISSUED FOR	BY	APP	CHK
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002	09.05.17	Issued for VED11/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100	JR	AC	AC
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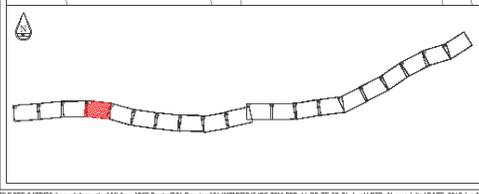
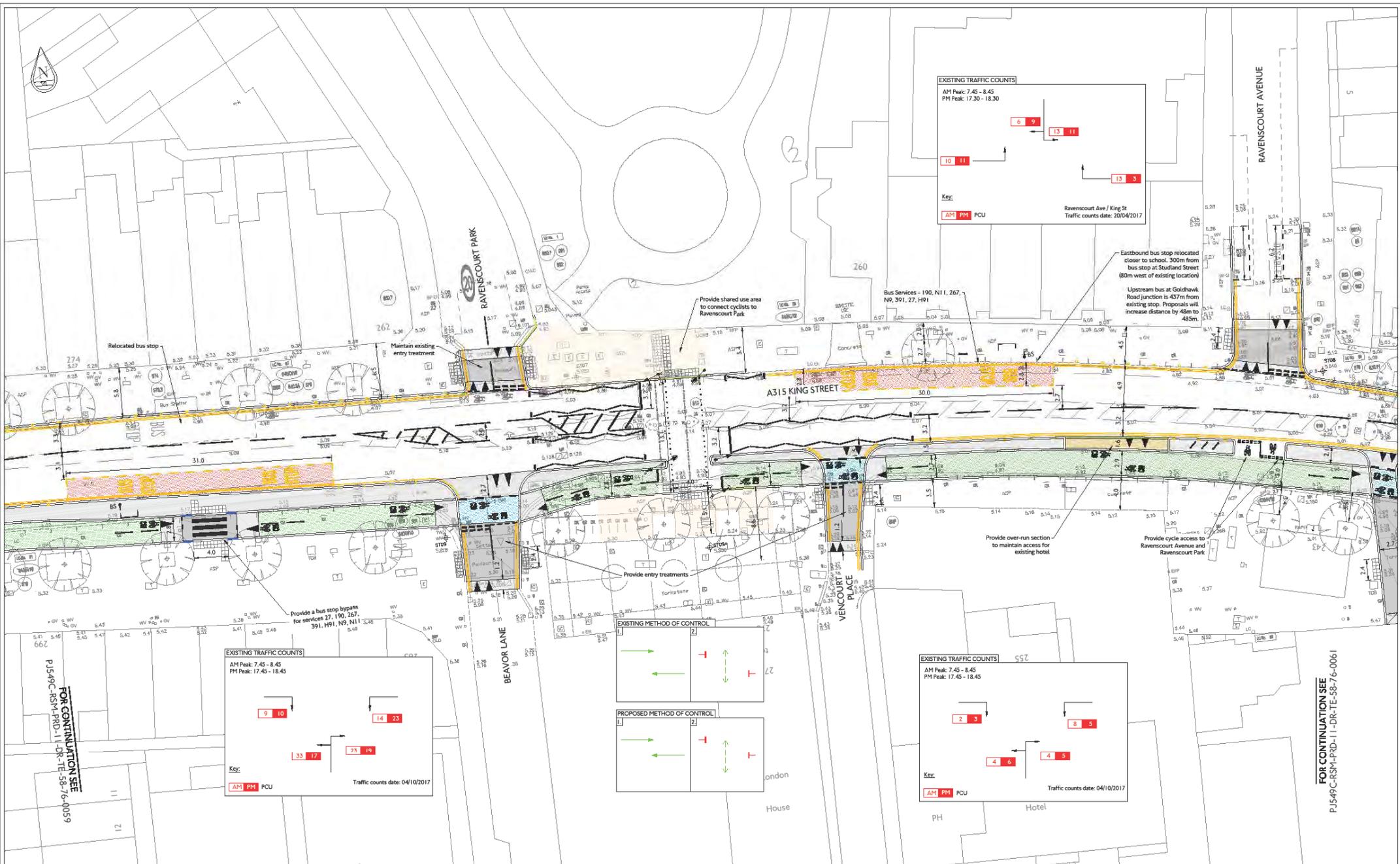
LB of HAMMERSMITH & FULHAM
 CYCLE SUPERHIGHWAY 9
 A315 KING STREET
 CONCEPT DESIGN
 SECTION 13

Surfcon Transport
 Road Space Management
 Outcomes Design Engineering

Palmer
 1191 Dudding Road
 London
 SE18 6PL

FOR COMMENT
 P07

P1549C-RSM-PRD-11-DR-TE-S8-76-0059



LEGEND

Existing road marking	SP	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	G	Proposed gully	Proposed tactile paving - red	
Proposed road marking - white	SP	Proposed cycle stand	Proposed kerb	
Proposed road marking - yellow	BS	Proposed bus stop flag	Proposed built-out / island	
Proposed road marking - red	BS	Proposed bollard	Proposed over-run island	
Proposed double blip	BS	Proposed belisha beacon	Proposed bus lane	
Proposed single blip	BS	Proposed ticket machine	Proposed cycle lane - blue	
Proposed dropped kerb	TM	Proposed bus shelter	Proposed cycle lane - green	
Proposed transition kerb	TM	Proposed traffic signal		

NOTES

- 1
- 2

P04	07.07.17	Issued for VESPM Modelling	JF	AO	KCL
P05	13.06.17	Issued for DRG review	JF	AO	KCL
P02	17.03.17	Issued for VESPM Modelling	JF	AO	KCL
P01	13.02.17	Issued for ITAG review	JF	AO	KCL
rev	date	details	dm	chk	app

LB OF HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
A315 KING STREET
CONCEPT DESIGN
SECTION 13

rev	date	details	dm	chk	app
P07	22.06.18	Issued for VESPM Modelling	JF	JA	KCL
P06	10.06.17	Issued following updated waiting restrictions	JF	AO	KCL
P05	17.07.17	Issued following comments from borough	JF	AO	KCL

Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

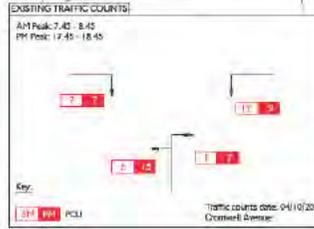
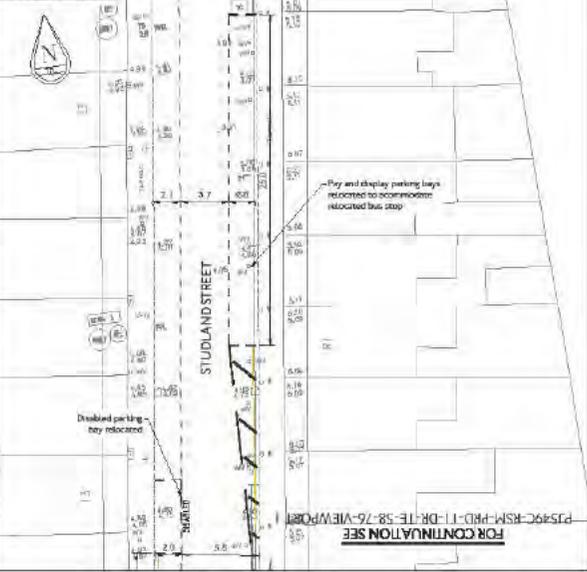
Palstra
197 Blackfriars Road
London
SE1 8JY

date: FEB 17 11:00 AM
drawing: S3
revision: FOR COMMENT
sheet: P07

Project: P1549C-RSM-PRD-11-DR-TE-58-76-0060

VIEWPORT 2
Scale 1:500

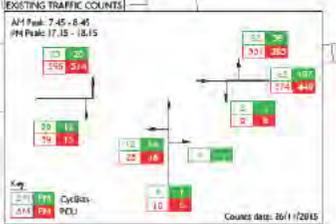
VIEWPORT 1



Bus stop relocated from King Street requires pay and display / permit holders bays to be reduced by 24m (requires relocation of one disabled bay)

FOR CONTINUATION SEE P1549C-RSM-PRD-11-DR-TE-58-76-VIEWPORT 1

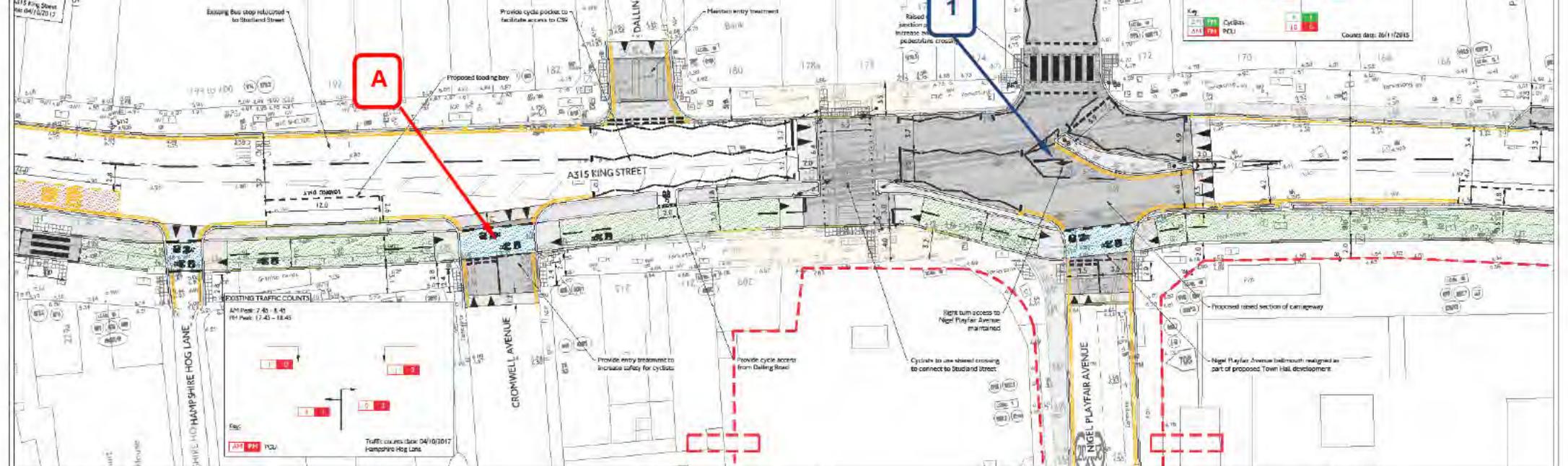
FELGATE MEWS



FOR CONTINUATION SEE P1549C-RSM-PRD-11-DR-TE-58-76-0663

A

1



LEGEND

- Existing road marking
- Existing kerb
- Existing sign and post
- Proposed road marking - white
- Proposed road marking - yellow
- Proposed road marking - red
- Proposed double lines
- 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 tactile beacon
- Proposed tactile machine
- Proposed bus shelter
- Proposed traffic signal
- Proposed tactile paving - full
- Proposed tactile paving - grey
- Proposed tactile paving - red
- Proposed kerb
- Proposed build-out / Hebel
- Proposed crossover island
- Proposed tree lane
- Proposed cycle lane - blue
- Proposed cycle lane - green
- Proposed cycle lane (TSRGD 1001)
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- Proposed cycle lane (TSRGD 1100)

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002	09.08.17	Issued for DRD make	JP	AC	MSL
003	17.05.17	Issued for VED11 tendering	JP	AC	MSL
004	19.02.17	Issued for TSO make	JP	AC	MSL
005	08.06.16	Issue	JP	AC	MSL

LB OF HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
A315 KING STREET
CONCEPT DESIGN
SECTION 13

Surstra transport Road Space Management Outcomes Design Engineering

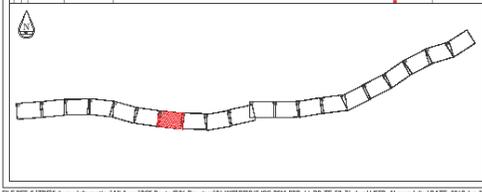
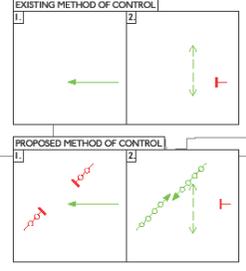
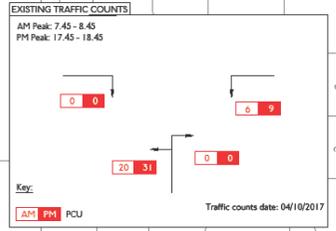
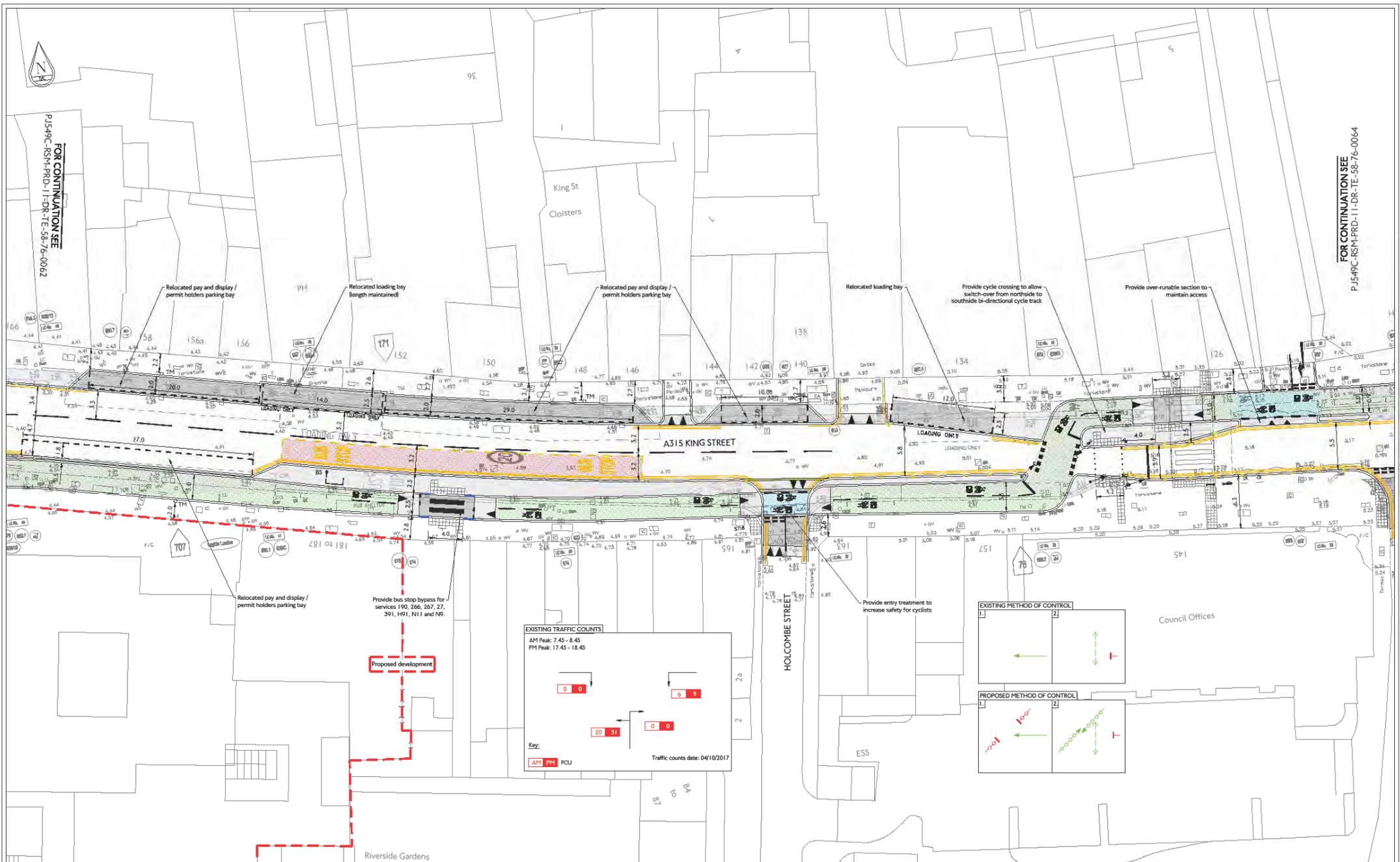
Palmer 1191 Southway Road London SE18 6JH

FOR COMMENT: P07

P1549C-RSM-PRD-11-DR-TE-58-76-0062

FOR CONTINUATION SEE
P1549C-RSM-PRD-11-DR-TE-58-76-0062

FOR CONTINUATION SEE
P1549C-RSM-PRD-11-DR-TE-58-76-0064



LEGEND

Existing road marking	SP	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	G	Proposed gully	Proposed tactile paving - red	
Proposed road marking - white	BS	Proposed cycle stand	Proposed kerb	
Proposed road marking - yellow	BS	Proposed bus stop flag	Proposed built-out / island	
Proposed road marking - red	BS	Proposed bollard	Proposed over-run island	
Proposed double blip	BS	Proposed belisha beacon	Proposed bus lane	
Proposed single blip	BS	Proposed ticket machine	Proposed cycle lane - blue	
Proposed dropped kerb	TM	Proposed bus shelter	Proposed cycle lane - green	
Proposed transition kerb	TM	Proposed traffic signal		

NOTES

1. Provide entry treatment to increase safety for cyclists
2. Provide bus stop bypass for services 190, 266, 267, 27, 391, H91, N11 and N9.

P07	22.06.18	Issued for VESM Modelling	JF	AO	KCL
P06.1	24.10.17	Speed markings updated (Signage removed)	JF	AO	KCL
P09	10.06.17	Issued following updated	JF	AO	KCL
P05	17.07.17	Issued following comments from borough	JF	AO	KCL
P04	07.07.17	Issued for VESM Modelling	JF	AO	KCL

P05.1	20.06.17	Issued for DRG review	JF	AO	KCL
P05	13.06.17	Issued for DRG review	JF	AO	KCL
P02	17.03.17	Issued for VESM Modelling	JF	AO	KCL
P01	13.02.17	Issued for ITAG review	JF	AO	KCL

LB OF HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
A315 KING STREET
CONCEPT DESIGN
SECTION 13

Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

Falster
197 Backfins Road
London
SE1 8NJ

date: 13.06.17
scale: 1:200 @ A1
drawing: S3
revision: 0003 OF 0076
drawing no: P1549C-RSM-PRD-11-DR-TE-58-76-0063

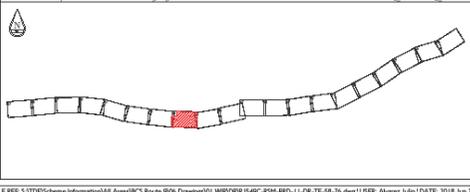
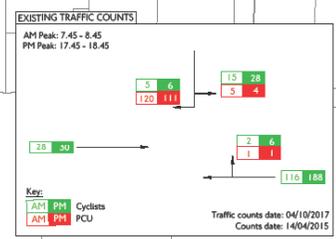
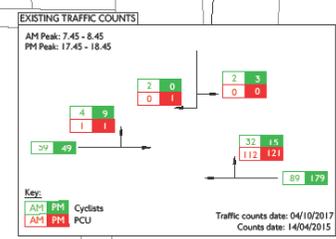
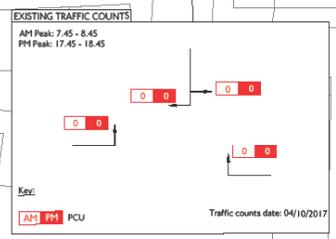
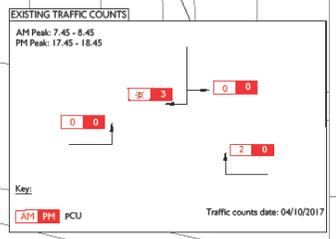
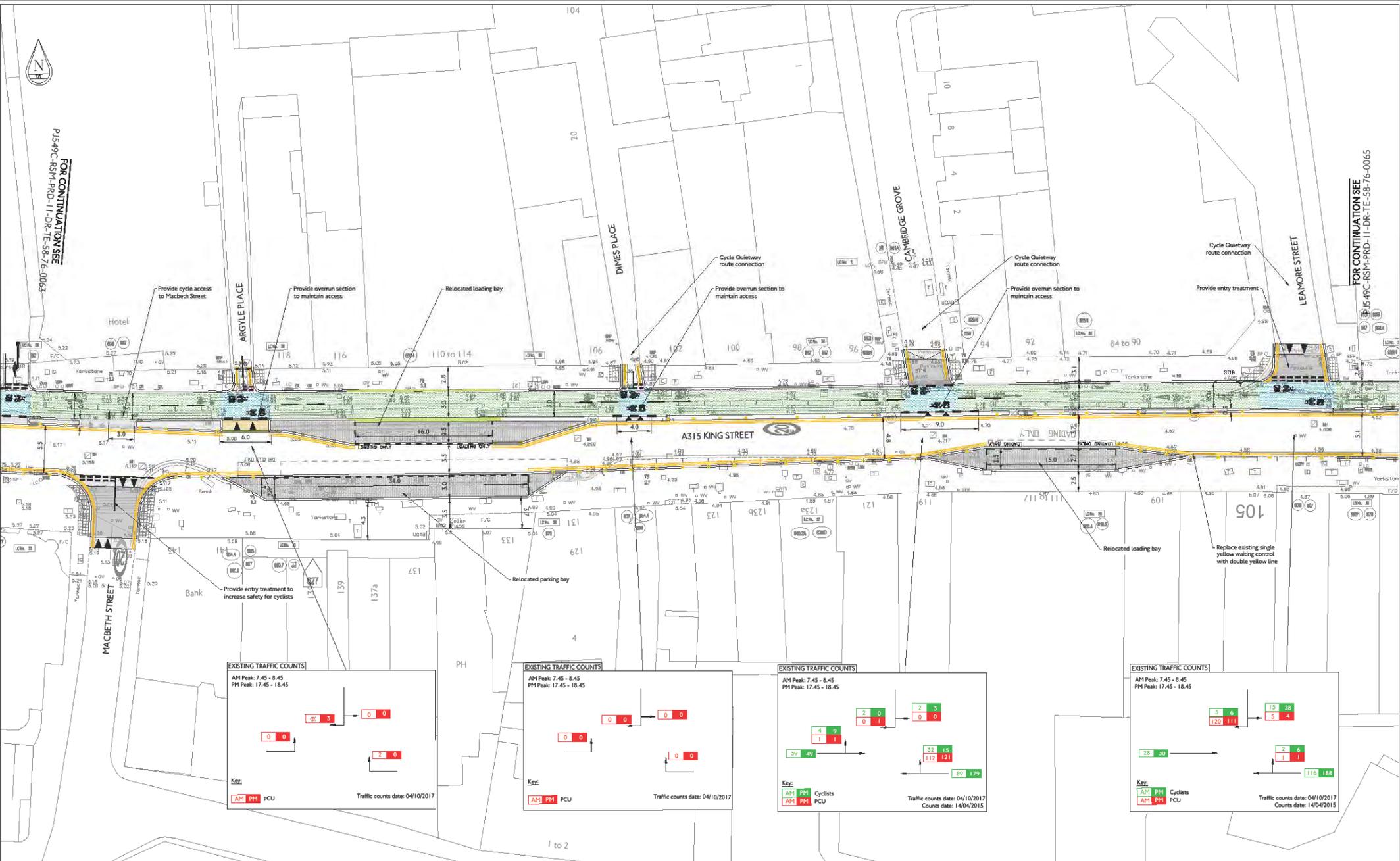
FOR COMMENT

0076

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PJ549C-RSM-PRD-11-DR-TE-58-76-0063
FOR CONTINUATION SEE

PJ549C-RSM-PRD-11-DR-TE-58-76-0065
FOR CONTINUATION SEE



LEGEND

Existing road marking	SP 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
Proposed road marking - white	G Proposed gully	Proposed tactile paving - red	
Proposed road marking - yellow	Proposed cycle stand	Proposed kerb	
Proposed road marking - red	Proposed bus stop flag	Proposed build-out / island	
Proposed double blip	Proposed bollard	Proposed over-run island	
Proposed single blip	Proposed belisha beacon	Proposed bus lane	
Proposed dropped kerb	Proposed ticket machine	Proposed cycle lane - blue	
Proposed transition kerb	Proposed bus shelter	Proposed cycle lane - green	
	Proposed traffic signal		

NOTES

- 1 to 2

rev	date	details	drn	ckn	app
P07	22.06.18	Issued for VSSM1 Modelling	JF	JA	KCL
P06	10.08.17	Issued following updated waiting restrictions	JF	AO	KCL
P05	17.07.17	Issued following comments from borough	JF	AO	KCL

rev	date	details	drn	ckn	app
P04	07.07.17	Issued for VSSM1 Modelling	JF	AO	KCL
P03	13.06.17	Issued for DRG review	JF	AO	KCL
P02	17.03.17	Issued for VSSM1 Modelling	JF	AO	KCL
P01	13.02.17	Issued for RTAG review	JF	AO	KCL

Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

Palstra
197 Blackthorn Road
SE1 8NU

FOR COMMENT

P07

PJ549C-RSM-PRD-11-DR-TE-58-76-0064

Cycle Superhighway Route 9

Revised Section 14 Proposals

Stage 1 Road Safety Audit

Ref: 3246.14/011/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	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 14 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 14 proposals and their associated tie-ins with the adjacent sections.

1.5.2 CS9 (Section 14) covers the proposals along King Street between the junctions with Hammersmith Broadway and the Lyric Theatre.

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: 2778.14/025/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.	

Cycle Superhighway Route 9, Revised Section 14 Proposals
Stage 1 Road Safety Audit Report

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 – King Street junction with Bridge Avenue

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

Cyclists attempting to enter Bridge Avenue from the bi-directional cycle track during busy periods may quickly exceed the capacity of the small give-way facility. This may lead to cyclists blocking the cycle track which may pose an accessibility and level of service issue for cyclists. It is recommended that the size of the give-way facility is increased where possible to maximise the space for queuing.

Design Organisation Response	Rejected
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Owing to the geometrical constraints it is not possible to increase the size of this give way facility. The area provided would cater for around 2 cyclists at any one time. It is anticipated that the number of cyclists making this movement will reduce due to the proposals to make King Street, east of this side road, two way for cycling rather than one way as it is currently.

Client Organisation Comments

Agree with the designer's response. The number of cyclists making this movement is expected to reduce as King Street becomes two way. In addition, as there is only a single, one way traffic lane to cross from the give way, opportunities to cross should be regular. This location is also in the shadow of a pedestrian crossing which would stop traffic further easing the opportunities for cyclists to use the give way, reducing the chance of numbers building up.

4.2 ISSUE

Location: 2 – King Street junction with Hammersmith Broadway

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 on the northern footway. At this location there is a level difference and the provision of a containment kerb with railing on top. It is unclear of the purpose of the kerb, presumably as an attempt to contain an errant vehicle unable to make the tight left hand bend. It is recommended to review the layout to determine whether a similar measure is required in the revised arrangement.

Furthermore, the railings provided on the kerbs appear to restrict a substantial desire-line away from formal crossing facilities. As part of the detailed design of the

scheme, it may be beneficial to consider whether the railings should be retained or replaced.

Design Organisation Response	Part Accepted
<p>The design proposes to remove the pedestrian guardrail at this location (in line with TfL's policy of guardrail removal). This will make space for the proposed segregated cycle facility while maintaining the effective widths of the northern footway.</p> <p>The requirement for containment will be considered as part of the detailed design. The segregation island for cyclists could work as containment if required as this feature could reintroduce the containment kerbs at the outside edge of the cycle track.</p>	
Client Organisation Comments	
<p>Agree with the designer's response. The PGR is proposed to be removed in line with TfL policies. Details of kerb types would be specified at the detailed design stage. If the existing containment kerbs are deemed required in the proposals then these could be accommodated within the cycle track design. A similar approach has been undertaken with containment kerbs at Holborn Viaduct in Farringdon.</p>	

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.

Name: [REDACTED]

Position: Design Engineer

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

Signed: [REDACTED]

Dated: 13/11/18

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: 13/11/18

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name: [REDACTED]

Position: Principal Sponsor

Organisation: TfL

Signed: [REDACTED]

Dated: 15/11/18

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: 15/11/18

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER

PJ549C-RSM-PRD-11-DR-TE-58-76-0065 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0066 (P07)

DRAWING TITLE

A315 King Street
Concept Design
Section 14 – Sheet 65

A315 King Street
Concept Design
Section 14 – Sheet 66

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

Cycle Superhighway Route 9 Revised Section 15 Proposals

Stage 1 Road Safety Audit

Ref: 3246.15/011/VAR/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	15/10/2018



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 15 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 15 proposals and their associated tie-ins with the adjacent sections.

1.5.2 CS9 (Section 15) 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/VAR/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
<p>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.</p>	
Client Organisation Comments	
<p>Agree with the designer's response. Stepped cycle tracks have been proposed according to the London Cycling Design Standards.</p> <p>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.</p> <p>If there are recommendations from the study during the design process that can further improve the design then these will be reviewed.</p>	

3.1.2 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) 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.
- c) 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	Rejected
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Owing to the geometrical constraints, the set-back distance of the bi-directional cycle track varies from 4m to less than 1m through the mouth of the junction. Space for a vehicle to wait has been provided everywhere except where space constraints exist owing to trees, narrow footway and specific constraints to the side road.

Proposals have clearly defined priorities by Give Way markings. The designs have sufficiently reduced the turning radius into side roads and so reduce turning speeds. In addition, the cycle track will be raised and associated with an entry treatment on the side road, therefore, reducing entry speeds further.

Client Organisation Comments

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.

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.

3.1.3 PROBLEM

Location: A – Queen Caroline Street junction with Blacks Road

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

The Audit Team is concerned that a segregated cycle track is proposed immediately prior to the junction with Queen Caroline Street. Drivers wishing to turn left into the side road may not fully appreciate the potential presence of cyclists as they emerge from the segregated 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 other vehicles in front / behind the turning vehicle, 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 segregated cycle facility 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.

Design Organisation Response	Accepted
<p>The proposed set-back distance of the cycle track has been increased to 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:</p> <ul style="list-style-type: none">• 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. <p>In addition, a colour contrast surfacing will be provided across the access to improve awareness of the cycle facilities.</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>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 and tighter turning radii is also proposed to slow vehicles down and reduce the likelihood or severity of conflict.</p>	

3.2 TRAFFIC SIGNALS

3.2.1 PROBLEM

Location: B – Shepherds Bush Road junction with Hammersmith Broadway

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

Cyclists turning left / right from Hammersmith Broadway onto Shepherds Bush Road will be shown a red traffic signal immediately as they turn left / right, having just been given a green signal to proceed. Left / right 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 / right 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. If this cannot be achieved it may be beneficial to modify the location and alignment of the cycle facility / pedestrian crossing to make the traffic signals more visible to turning cyclists.

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 pedestrian crossing location is constrained by an existing planter and cannot be shifted any farther north. Shifting the crossing to the south would bring the crossing too close to the cycle track. Modifying the alignment of the cycle facility would mean that cyclists would be approaching the stop line at a softer angle instead of perpendicularly which would likely increase speeds of turning cyclists exasperating the chances of non-compliance. Primary and secondary signals are proposed at the pedestrian crossing to provide visibility of the signals from multiple angles. In addition, the signals team will carry out their own signal safety audits prior to designs being taken forward.</p>	
Client Organisation Comments	
<p>At this junction, the signalisation of the pedestrian crossing and internal stop line was designed to accommodate cyclists turning left/right onto Shepherd's Bush Road from the cycle track while providing a pedestrian crossing and not increasing the signal cycle time at the junction.</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 separate the pedestrian crossing and cyclists ahead into separate signal stages 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 the crossing as they queue through the junction or increase the likelihood for pedestrians or cyclists to proceed on a red light as they become impatient waiting for a green light.</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 LOADING / TAXI BAYS

3.3.1 PROBLEM

Location: C – Hammersmith Broadway junction with Shepherd’s Bush Road

Summary: Proposed inset loading / taxi bays may result in difficulties for users emerging to suitably observe approaching vehicles

Both the proposed inset loading / taxi bays are situated on the inside of a curve. Drivers wishing to exit the facilities may experience difficulties observing approaching vehicles due to the curvature of the carriageway. This may lead to an increased potential for side swipe or shunt type collisions as motorists pull out of the bays and encounter a vehicle in close proximity. The potential for such conflicts may be exacerbated by the close proximity to traffic signals / controlled crossing facilities, which may be the main focus of approaching drivers’ attention.

RECOMMENDATION

It is recommended to alter the inset loading / taxi bays so that vehicles exiting the bays can position themselves to gain better visibility, such as the layout of the existing taxi bay.

Design Organisation Response	Rejected
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Taxi bays:

There is an existing inset taxi bay at this location and there is no collision data to suggest there have been any side swipe or shunt type collisions at this location. We have realigned these features to fit the new proposal. Traffic signal provision is such that a primary and a secondary signal pole have been provided to ensure that vehicles approaching the stop line are aware of the controls.

Loading bays:

There is an existing inset loading bay near to this location and there is no collision data to suggest there have been any swipe or shunt type collisions at this location. The loading bay has been moved away from the middle of the junction to a point past the pedestrian crossing on Shepherd’s Bush Road. This pedestrian crossing will provide regular gaps in the stream of traffic where loading vehicles could re-join the carriageway. Furthermore the loading bay has been proposed at a location where visibility is better than the existing location and with only one stream of traffic running besides it.

Client Organisation Comments

Agree with the designer’s response. The taxi bays are positioned in the same location as the existing layout and collision data shows that there is no pattern of collisions caused by this layout. The taxi bays are located here to serve the station and due to the complexity of the junction, no other suitable location exists to move this facility to.

The position of the loading bays have been moved further into Shepherd’s Bush Road, which is proposed to be reduced to one lane exit compared to the existing two lane exit. Gaps in the flow of traffic caused by the pedestrian crossing phase will provide opportunities for vehicles to pull out into the carriageway.

Cycle Superhighway Route 9, Revised Section 15 Proposals
Stage 1 Road Safety Audit Report

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: 15/10/2018

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: 15/10/2018

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: 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

PJ549C-RSM-PRD-11-DR-TE-58-76-0066.1 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0067 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0067.1 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0068 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0069 (P07)

DRAWING TITLE

VAR Brentford High Street
Concept Design

Section 15 – Sheet 66.1

VAR Brentford High Street
Concept Design

Section 15 – Sheet 67

VAR Brentford High Street
Concept Design

Section 15 – Sheet 67.1

VAR Brentford High Street
Concept Design

Section 15 – Sheet 68

VAR Brentford High Street
Concept Design

Section 15 – Sheet 69

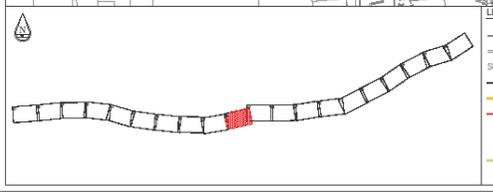
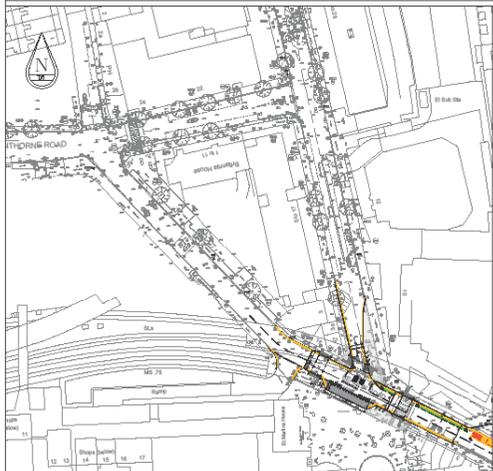
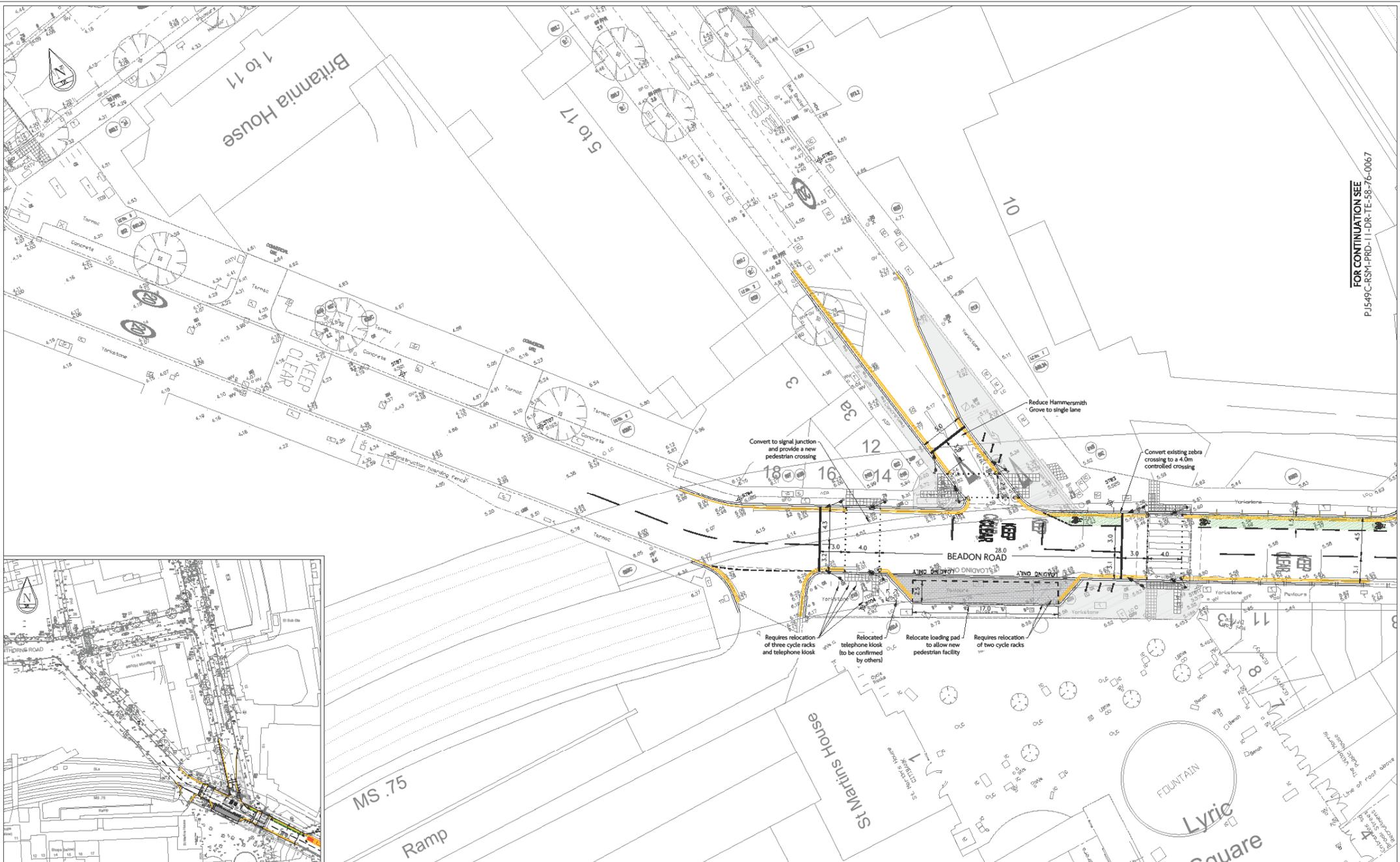
DOCUMENTS

- 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		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 - red		
	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

P07	22.06.18	Issued for VSMH Modelling	JF	JA	KCL
P06	10.08.17	Issued following updated wetting instructions	JF	AO	KCL
P05	17.07.17	Issued following comments from Henshall	JF	AO	KCL
P04	07.07.17	Issued for VSMH Modelling	JF	AO	KCL
rev	date	Details	dm	cm	app

P03	09.05.17	Issued for DRG review	JF	AO	KCL
P02.1	07.03.17	Hammersmith statutory detail design change	JF	AO	KCL
P02	03.03.17	Issued for VSMH Modelling	JF	AO	KCL
P01	01.02.17	Issued for ITAG review	JF	AO	KCL
rev	date	Details	dm	cm	app

LB of HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
HAMMERSMITH BROADWAY
CONCEPT DESIGN
SECTION 15

Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

197 Backfins Road
London
SE1 8NU

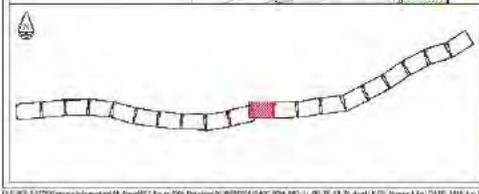
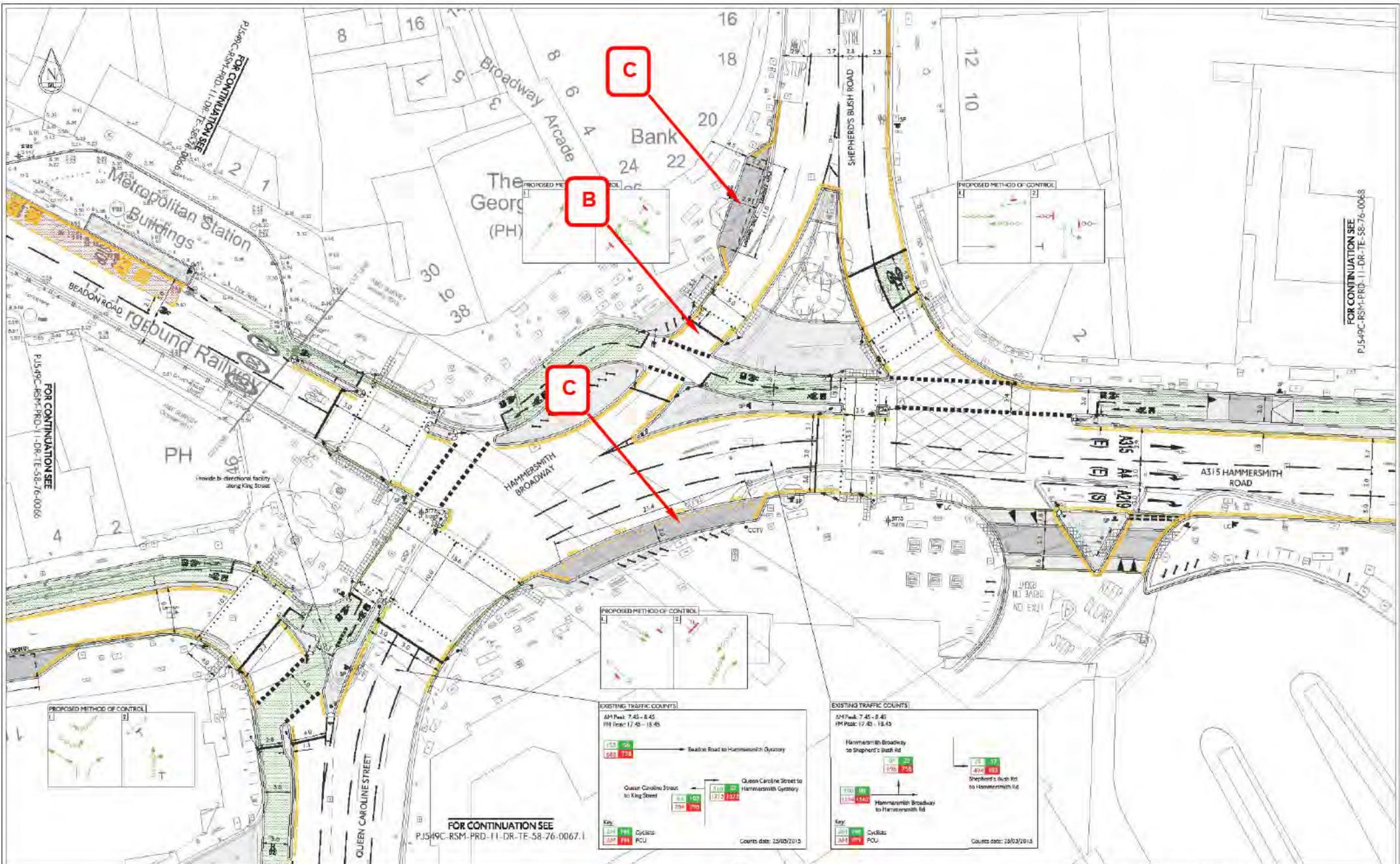
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DATE: FEB 17

FOR COMMENT

P07

PJ549C-RSM-PRD-11-DR-TE-58-76-0066



LEGEND

	Existing road marking		Proposed sign and post		Proposed tactile paving - buff		Proposed cycle logo (TSAGD - 033)
	Existing kerb		Proposed lamp column		Proposed tactile paving - grey		Potential new tree
	Existing sign and post		Proposed cycle stand		Proposed kerb		
	Proposed road marking - white		Proposed bus stop flag		Proposed kerb - raised		
	Proposed road marking - yellow		Proposed bollard		Proposed over-run island		
	Proposed road marking - red		Proposed bollard		Proposed bus lane		
	Proposed double slip		Proposed ticket machine		Proposed cycle lane - blue		
	Proposed single slip		Proposed bus shelter		Proposed cycle lane - green		
	Proposed dropped kerb		Proposed traffic signal				
	Proposed tactile kerb						

NOTES

1. All proposed cycle routes are subject to the approval of the London Underground.
2. All proposed cycle routes are subject to the approval of the London Underground.
3. All proposed cycle routes are subject to the approval of the London Underground.

REV	DATE	DESCRIPTION	BY	CHKD	APPD
001	22.06.12	Issue for RMT review	JP	AC	KGL
002	02.02.13	Hammersmith station west stage change	JP	AC	KGL
003	03.03.17	Issue for RMT Review	SH	AC	KGL
004	01.02.13	Issue for RMT review	JP	AC	KGL
005	01.02.13	Issue for RMT Review	JP	AC	KGL

LB OF HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
HAMMERSMITH BROADWAY 9
CONCEPT DESIGN
SECTION 15

Surface Transport

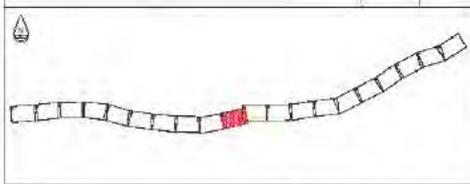
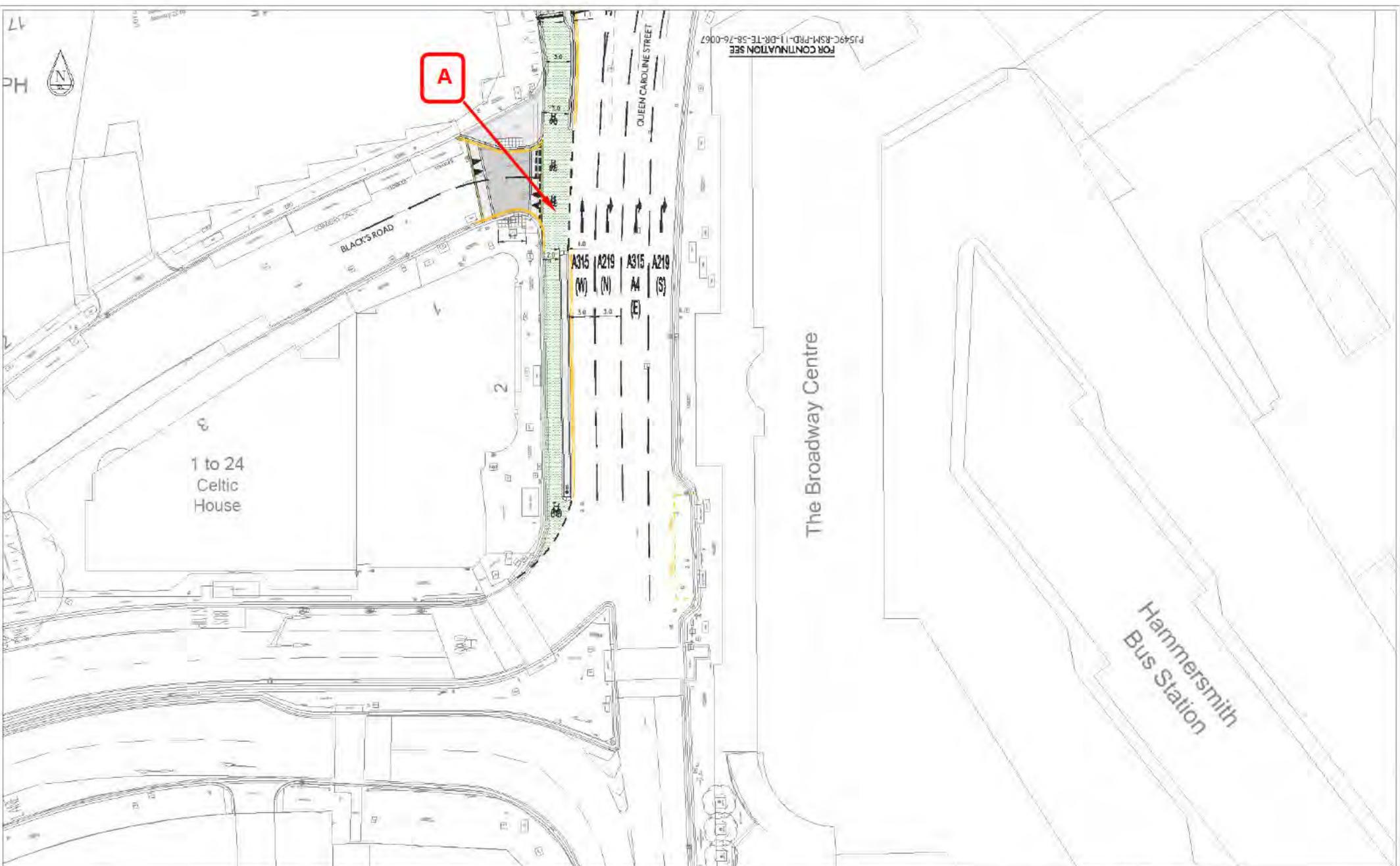
Road Space Management
Customs Design Engineering

Phase 1
1st Revision Issue
London
(15/03)

FOR COMMENT

P07

P1549C-RSM-PRD-11-DR-TE-58-76-0067



LEGEND

	Existing road marking		Proposed sign and post		Proposed tactile paving - buff		Proposed cycle light (TSRGD 1021)
	Existing kerb		Proposed kerb column		Proposed tactile paving - grey		Proposed cycle light
	Existing sign and post		Proposed gully		Proposed tactile paving - red		Proposed cycle light
	Proposed road marking - white		Proposed cycle start		Proposed tactile paving - blue		Proposed cycle light
	Proposed road marking - yellow		Proposed bus stop flag		Proposed tactile paving - island		Proposed cycle light
	Proposed road marking - red		Proposed bollard		Proposed tactile paving - island		Proposed cycle light
	Proposed double stop		Proposed bus shelter		Proposed tactile paving - island		Proposed cycle light
	Proposed single stop		Proposed bus shelter		Proposed tactile paving - island		Proposed cycle light
	Proposed dropped kerb		Proposed bus shelter		Proposed tactile paving - island		Proposed cycle light
	Proposed transition kerb		Proposed bus shelter		Proposed tactile paving - island		Proposed cycle light
			Proposed tactile signal		Proposed tactile paving - island		Proposed cycle light

NOTES

1	12.06.14	Issued for MSH Planning	SP	AS	NCL
2	18.08.17	Issued following general planning approval	SP	AS	NCL
3	13.07.17	Issued following comments from Transport	SP	AD	NCL
4	22.07.17	Issued for MSH Planning	SP	AD	NCL
5	28.08.17	Issued	SP	DR	APP

REV	19.05.17	Issued for ODS review	SP	AD	NCL
REV	07.03.17	Issue monthly priority sheet design change	SP	AD	NCL
REV	05.03.17	Issue for MSH Planning	SP	AD	NCL
REV	01.02.17	Issued for ITAG review	SP	AD	NCL
REV	01.02.17	Issue	SP	DR	APP

LB of HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
 HAMMERSMITH BROADWAY
 CONCEPT DESIGN
 SECTION 15

Surface Transport

London Underground

177 Blackmore Road
 London
 SW12 8NU

FOR COMMENT

P07

EJS49C-RSM-PRD-11-DR-TE-58-76-0067

FOR CONTINUATION SEE
PJ549C-RSM-PRD-1-DR-TE-58-76-0067

FOR CONTINUATION SEE
PJ549C-RSM-PRD-1-DR-TE-58-76-0069

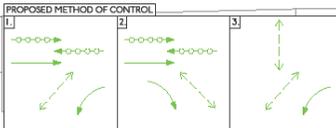
EXISTING TRAFFIC COUNTS

AM Peak: 7.45 - 8.45
PM Peak: 17.45 - 18.45

304	62	11	4
505	466	45	28
58	78	10	21
1423	410	650	686

Key:
AM PM Cyclists
AM PM PCU

Counts date: 25/03/2015



LEGEND

Existing road marking	SP	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	G	Proposed gully	Proposed tactile paving - red	
Proposed road marking - white	BS	Proposed cycle stand	Proposed kerb	
Proposed bus stop flag	BS	Proposed bus stop flag	Proposed built-out / island	
Proposed road marking - red	BB	Proposed bollard	Proposed over-run island	
Proposed double blip	TM	Proposed belisha beacon	Proposed bus lane	
Proposed single blip	TM	Proposed ticket machine	Proposed cycle lane - blue	
Proposed dropped kerb	TM	Proposed bus shelter	Proposed cycle lane - green	
Proposed transition kerb	TM	Proposed traffic signal		

NOTES

rev	date	details	by	chk	app
P07	22.06.18	Issued for VESPA Modelling	JF	JA	KCL
P06	10.08.17	Issued following updated waiting restrictions	JF	AO	KCL
P05	17.07.17	Issued following comments from borough	JF	AO	KCL

LB of HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
A315 HAMMERSMITH ROAD
CONCEPT DESIGN
SECTION 15

Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

Palera
197 Blackfriars Road
London
SE1 8NU

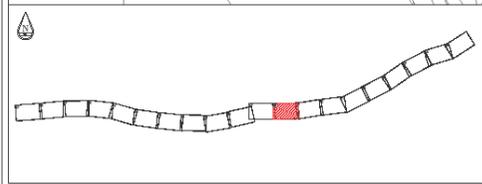
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FOR COMMENT

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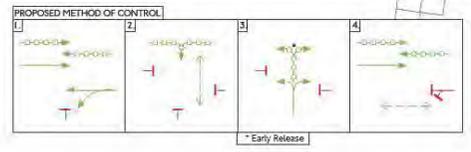
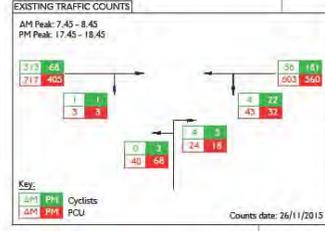
0068 OF 0076

P07



FOR CONTINUATION SEE
P1549C-RSM-PRD-11-DR-TE-58-76-0068

FOR CONTINUATION SEE
P1549C-RSM-PRD-11-DR-TE-58-76-0070



Proposed development

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	By	Chk	App
P01	22.06.18	Issued for VSPM Modelling	JF	JA	KCL
P02	10.08.17	Issued following updated waiting restrictions	JF	AO	KCL
P03	17.07.17	Issued following comments from Borough	JF	AO	KCL

LB OF HAMMERSMITH & FULHAM
 CYCLE SUPERHIGHWAY 9
 A315 HAMMERSMITH ROAD
 CONCEPT DESIGN
 SECTION 15

Surface Transport

Road Space Management
 Outcomes Design Engineering

Falouts
 197 Blackthorn Road
 London
 SE1 8NU

Rev: 03
 Date: 08/01/17
 Status: FOR COMMENT

Sheet No: P07

Project No: P1549C-RSM-PRD-11-DR-TE-58-76-0069

Cycle Superhighway Route 9 Revised Section 16 Proposals

Stage 1 Road Safety Audit

Ref: 3246.16/011/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	16/10/2018



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 16 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 24^h 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 16 proposals and their associated tie-ins with the adjacent sections.

1.5.2 CS9 (Section 16) covers the proposals along Hammersmith Road and Kensington High Street between the junction with Holland Road and Colet Gardens approximately.

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: 2778.16/025/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
<p>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.</p>	
Client Organisation Comments	
<p>Agree with the designer's response. Stepped cycle tracks have been proposed according to the London Cycling Design Standards.</p> <p>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.</p> <p>If there are recommendations from the study during the design process that can further improve the design then these will be reviewed.</p>	

3.1.2 PROBLEM

Location: A – Hammersmith Road junction with Brook Green

Summary: Provision of a dedicated cycle phase of short duration may lead to a lack of compliance or cyclists choosing not to use the cycle track

The cycle track at the junction is shown to operate within its own stage as part of a five stage method of control. Experience from other similar facilities has shown that cycle compliance with the traffic signals diminishes if it is not provided with adequate green-time, more so when if the green time is not comparable to the adjacent traffic lane. As a result cyclists may choose to ignore the traffic signals and cross illegally, or leave the cycle track earlier and use the traffic lane where no facilities are provided. Cyclists that cross the junction illegally are susceptible to conflict with turning vehicles. Cyclists that leave the cycle track are less likely to be anticipated by other road users and are vulnerable to 'left hook' type conflicts at the junction where drivers turn left across the path of a cyclist travelling ahead.

It is appreciated that this is predominantly a detailed design issue, however, a solution may impact on the feasibility of the proposals or be more difficult to resolve at detailed design stage.

RECOMMENDATION

It is recommended that adequate green-time is provided to cyclists. This may require modifying the junction to prohibit turning manoeuvres into Brook Green or modifying the signal timing / staging to maximise green-time for cyclists.

Design Organisation Response	Part Accepted
<p>Owing to the demand for access to Brook Green, it is not possible to modify the junction to prohibit any turning movements. The design of the segregated track makes it difficult for cyclists to leave the track and re-join traffic prior to this junction. Signal timing will be reviewed during final modelling assessments so that as much green time is allocated to cyclists as possible.</p>	
Client Organisation Comments	
<p>Turning counts into and out of Brook Green from Hammersmith Road are too high to be considered for a banned turn. If one of these turns were to be banned then other nearby junctions would experience increased flows of traffic as it is diverted which would impact the amount of green time cyclists would receive elsewhere along the route, thereby moving the problem.</p>	
<p>As the designer notes, this section of the cycle track is segregated with islands and there are no nearby gaps in the segregation for cyclists to attempt to re-join the carriageway ahead of the junction. Hammersmith Road is currently an unpleasant route for cyclists and it is therefore anticipated that the proposed segregated facility will be appealing to cyclists even if wait times are slightly higher than current conditions.</p>	
<p>Notwithstanding this, signal timings will be reviewed as the designs are developed and technologies such as SCOOT will be implemented as part of the scheme to optimise green time for different modes throughout the day.</p>	

3.1.3 PROBLEM

Location: B – Kensington High Street junction with Olympia Way

Summary: Cycle track layout may lead to exacerbated potential for squeezing cyclists against the kerb

The Audit Team is concerned that the layout of the cycle track may lead cyclists into a false sense of security as the facility returns to carriageway level immediately after the junction and at the start of the bus lane. Cyclists may fail to appreciate the potential presence of buses (and general traffic if the proposed facility is not 24 hour) given they have just left a segregated and protected facility. Similarly, eastbound drivers may fail to appreciate the presence of cyclists, or anticipate cyclists emerging from a segregated facility as the orientation of cyclists may mean they are not adequately visible to drivers. An exacerbated potential for side swipe type collisions may exist as a result.

RECOMMENDATION

It is recommended that the layout of the cycle facility and bus lane is modified to reduce the potential for conflict. This may require the commencement of the bus lane later and / or the use of conspicuous colour.

Design Organisation Response	Accepted
The vehicle (bus) alignment into the Bus Lane has been altered by providing a larger buildout as such the merge is pushed farther to the east which increases visibility. Secondly the Bus Lane entry taper has been extended generating a larger merging space to facilitate the movement. Finally colour contrast and cycle logos have been introduced in the merge area to highlight the interaction.	
Client Organisation Comments	
Agree with the designer's response. The bus lane proposed on Kensington High Street will be in operation 24 hours a day, 7 days a week. As such, no general traffic will be permitted to use it.	

3.1.4 PROBLEM

Location: C – Hammersmith Road near Avonmore Road

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 cyclists and pedestrians run concurrently, there is a risk that they will converge on the northern 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. A 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
<p>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 general traffic is given a green light to proceed ahead.</p>	
Client Organisation Comments	
<p>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.</p>	

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
------------------------------	---------------

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.

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.

Client Organisation Comments

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.

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.

3.3 BUS FACILITIES

3.3.1 PROBLEM

Location: D – Hammersmith Road junction with Munden Street

Summary: Proposed bus stop may result in difficulties for cyclists emerging to suitably observe approaching vehicles

A bus stop is proposed immediately adjacent to the cycle give-way opposite Munden Street. The location of the bus stop may restrict visibility to the left for cyclists wishing to exit the facility. Cyclists may exit the facility injudiciously due to the restricted visibility, potentially egressing into the path of westbound drivers. An exacerbated potential for side-swipe type conflicts may therefore exist as a result.

RECOMMENDATION

It is recommended to relocate the bus stop to provide adequate visibility for cyclists.

Design Organisation Response	Rejected
The location of the bus stop in this section is constrained owing to maximum spacing between bus stops and lack of feasible alternative locations.	
Cyclists wishing to access Munden Street can re-join the eastbound carriageway in first instance until the visibility is appropriate to undertake the manoeuvre to access Munden Street. Counts show that the numbers of cyclists entering and exiting the main road from Munden Street are low.	
Client Organisation Comments	
Agree with the designer's response.	

3.3.2 PROBLEM

Location: E – Hammersmith Road outside Kensington Olympia

Summary: Proposed bus stop may result in difficulties for cyclists emerging to suitably observe approaching vehicles

A bus stop is proposed immediately adjacent to the cycle give-way outside Kensington Olympia. The location of the bus stop may restrict visibility to the right for cyclists wishing to exit the facility. Cyclists may exit the facility injudiciously due to the restricted visibility, potentially egressing into the path of eastbound drivers. An exacerbated potential for side-swipe type conflicts may therefore exist as a result.

RECOMMENDATION

It is recommended to relocate the bus stop to provide adequate visibility for cyclists.

Design Organisation Response	Rejected
The location of the bus stop in this section is constrained owing to maximum spacing between bus stops and lack of feasible alternative locations.	
Cyclists wishing to access Earsby Street can re-join the eastbound carriageway in first instance until the visibility is appropriate to undertake the manoeuvre to access Earsby Street. Counts show that the numbers of cyclists entering and exiting the main road from Earsby Street are low.	
Client Organisation Comments	

Cycle Superhighway Route 9, Revised Section 16 Proposals
Stage 1 Road Safety Audit Report

Agree with the designer's response.

3.4 TRAFFIC SIGNALS

3.4.1 PROBLEM

Location: F – Hammersmith Road outside Kensington Olympia

Summary: Traffic signal layout may lead to non-compliance of the traffic signals or late braking type conflicts

The Audit Team are concerned that the westbound carriageway comprises multiple lanes without the provision of an offside island housing a traffic signal. As a result the nearside traffic signals may be obscured by a high sided vehicle such as a bus, forcing drivers in the traffic lane to rely of the offside signals located on the opposite side of the carriageway. There is a concern that the offside signals may not always be visible, especially in times of heavy traffic when they also could be obscured by a high sided vehicle. Westbound drivers may not therefore have adequate visibility of the traffic signals at all times leading to a potential for failing to stop of the traffic signals or braking late upon the signals coming into view. This may lead to overshoot type conflicts with pedestrians and/or late braking type conflicts with preceding vehicles.

RECOMMENDATION

It is recommended that the layout of the crossing is modified to ensure the traffic signals are adequately visible. This may require the provision of an offside traffic island housing a traffic signal, or the provision of higher level traffic signals or a mast arm.

Design Organisation Response	Rejected
<p>The design shows two primary signal heads, one of which is located on the far side footway. In addition, the design has also provided a secondary signal head on the far side footway. 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 Signal Engineer who is content with the proposed locations at this stage.</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>	
Client Organisation Comments	
<p>Agree with the designer's response. The indicative signal locations 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>	

3.5 PEDESTRIANS

3.5.1 PROBLEM

Location: G – Kensington High Street junction with Olympia Way

Summary: The removal of controlled pedestrian facilities may result in collisions between pedestrians and opposing traffic, particularly cyclists

It is proposed to remove the existing signal controlled pedestrian crossing facilities and provide an uncontrolled facility in a similar location. This represents a reduction in provision. The Audit Team are concerned that users of the crossing facility may not appreciate the presence of the cycle track. 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	Part Accepted
<p>The layout at the southern side of the uncontrolled crossing facility has a 2m with-flow westbound stepped track and a 3.5m wide westbound traffic lane which does not differ from a wider carriageway with cyclists. Pedestrians should look right and judge if any traffic is coming, whether that be a cycle or any vehicle before they can cross to the central reservation. This is the same layout as any other uncontrolled location across London.</p> <p>The layout on the northern side of the uncontrolled crossing facility has been altered to provide a 1m gap from the ramp to the uncontrolled crossing over the cycle track to increase the awareness of the presence of cyclists before the crossing. The waiting island between the cycle track and the carriageway is wide varying from 2.7 to 5m along the waiting area. Pedestrians should then give way to eastbound traffic before reaching the central reservation.</p> <p>An alternative controlled crossing facility has been provided west of Avonmore Road, 34m to the west of the existing in combination with the cycle cross over. Owing to space constraints and the presence of side roads, it is not possible to provide this in the existing location. At the location of the existing controlled crossing facility, an uncontrolled crossing facility has been provided.</p>	

Client Organisation Comments
<p>Agree with the designer's response. The existing controlled pedestrian crossing cannot be changed or moved nearer to the current location due to constraints of side roads and road widths. The informal crossing is proposed to provide pedestrians with an option to cross the road closer to Olympia Way. The with-flow layout of the cycle track means that pedestrians crossing the westbound lane will have visibility of cyclists in the same direction as oncoming traffic, as per any other crossing. On the eastbound side, the ramp for the cycle track has been relocated to alert cyclists of the informal pedestrian crossing over the cycle track sooner than previously proposed. An alternative controlled pedestrian crossing is provided nearby for pedestrians who do not wish to use the informal crossing.</p>

3.5.2 PROBLEM

Location: H – Kensington High Street junction with Addison Bridge Place

Summary: Proposed parking / loading bay may restrict visibility to the right for pedestrians to suitably observe approaching vehicles

A parking / loading bay is proposed in Addison Bridge Place. The location of the bay may restrict visibility to the right for pedestrians wishing to cross the carriageway. Pedestrians may attempt to cross injudiciously due to the restricted visibility, potentially egressing into the path of drivers. An exacerbated potential for conflict may therefore exist as a result.

RECOMMENDATION

It is recommended to relocate the bay to provide adequate visibility for pedestrians.

Design Organisation Response	Rejected
Proposed parking bays simply replaced the existing single yellow line to formalise parking arrangement which still provide sufficient visibility to approaching traffic. In addition, Addison Bridge Place is a 20mph street incorporated with an entry treatment, therefore speeds of approaching traffic will be low.	
Client Organisation Comments	
Agree with the designer's response. Due to the removal of parking in other locations, it is desirable to provide parking bays on the side roads. As parking is already permitted along this section of the side road, the visibility is no worse than the existing layout and the crossing facility is improved with a raised entry treatment.	

3.5.3 PROBLEM

Location: I – Kensington High Street Outside Kensington Olympia (both sides)

Summary: Proposed taxi rank bay may restrict visibility to the right for pedestrians to suitably observe approaching vehicles

A taxi bay is proposed on both sides of Hammersmith Road outside Kensington Olympia. The location of the bay may restrict visibility to the right for pedestrians wishing to cross the carriageway at the controlled crossing facility. Pedestrians may attempt to cross injudiciously due to the restricted visibility, potentially egressing into the path of drivers. An exacerbated potential for conflict may therefore exist as a result. This is particularly of concern for pedestrians crossing out of phase.

RECOMMENDATION

It is recommended to relocate the bay to provide adequate visibility for pedestrians.

Design Organisation Response	Rejected
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Owing to geometrical constraints and service provision, it is not possible to relocate these ranks. The design has provided a formal crossing facility so that pedestrians can cross the road safely.

In addition, the designs provide sufficient traffic signal heads including nearside and offside primary and offside secondary signals to ensure forward visibility is good for traffic approaching the stop lines so as to ensure compliance with the lights when pedestrians are crossing on a green man.

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.

Visibility for pedestrians crossing out of phase from the southern footway to the east is 20m if a taxi is in the rank and from the northern footway visibility is 25m to the west when the taxi rank is in use. These distances are increased when the ranks are not in use.

Client Organisation Comments

Agree with the designer's response. The taxi ranks are proposed to service visitors to Kensington Olympia exhibition centre. In an earlier version of the design, these were proposed on Avonmore Road however this was a significant distance away from the desired location, reducing visibility of the service for customers. During public consultation, concerns were also received from local residents regarding the proposed side road location as it was in a residential area near to a school. As such, it is not possible to relocate these bays away from the main road.

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, primary and offside secondary signals are proposed to ensure good forward visibility, even if vehicles are overtaking the taxi ranks.

This is a stand alone pedestrian 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 and local service needs of the taxi rank.

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

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

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 – Hammersmith Road junction with North End Road

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

It is unclear from the drawings provided how cyclists utilising the cycle track would turn left / right into North End Road. This manoeuvre appears to be desirable, however the cycle track and adjacent traffic lanes run concurrently and no alternative features to facilitate the turning manoeuvres are provided. It is recommended that the layout of the junction is reviewed to facilitate these turning manoeuvres.

Design Organisation Response	Rejected
A signalised cycle facility to enter North End Road was provided in a previous iteration of the design, however owing to network capacity constraints this was removed from the proposal. Alternatively the design team has provided a signalised cycle access at Edith Road which gives access to North End Road further south. Furthermore uncontrolled accesses for cyclists with a waiting space have been provided to Munden Street and Southcombe Street which are both adjacent and also provide access to North End Road reducing or even eliminating the risk of cyclists trying to access through the signalised junction at North End Road where signals are proposed to have no-left/no-right turn illuminated boxes for cyclists to clarify that movements into North End Road are prohibited.	
Client Organisation Comments	
Agree with the designer's response. According to cycle counts, most of the cyclists approaching the North End Road junction continue ahead and would therefore continue in the two way cycle track. A small proportion of cyclists currently turn off onto North End Road and would need to do so at Edith Road or other nearby alternatives.	

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: 16/10/2018

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: 16/10

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: 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

PJ549C-RSM-PRD-11-DR-TE-58-76-0070 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0071 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0072 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0073 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0074 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0075 (P07)

PJ549C-RSM-PRD-11-DR-TE-58-76-0076 (P07)

DRAWING TITLE

A315 Hammersmith Road
Concept Design

Section 16 – Sheet 70

A315 Hammersmith Road
Concept Design

Section 16 – Sheet 71

A315 Hammersmith Road
Concept Design

Section 16 – Sheet 72

A315 Hammersmith Road
Concept Design

Section 16 – Sheet 73

A315 Hammersmith Road
Concept Design

Section 16 – Sheet 74

A315 Hammersmith Road
Concept Design

Section 16 – Sheet 75

A315 Hammersmith Road
Concept Design

Section 16 – Sheet 76

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

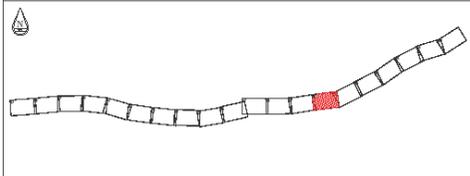
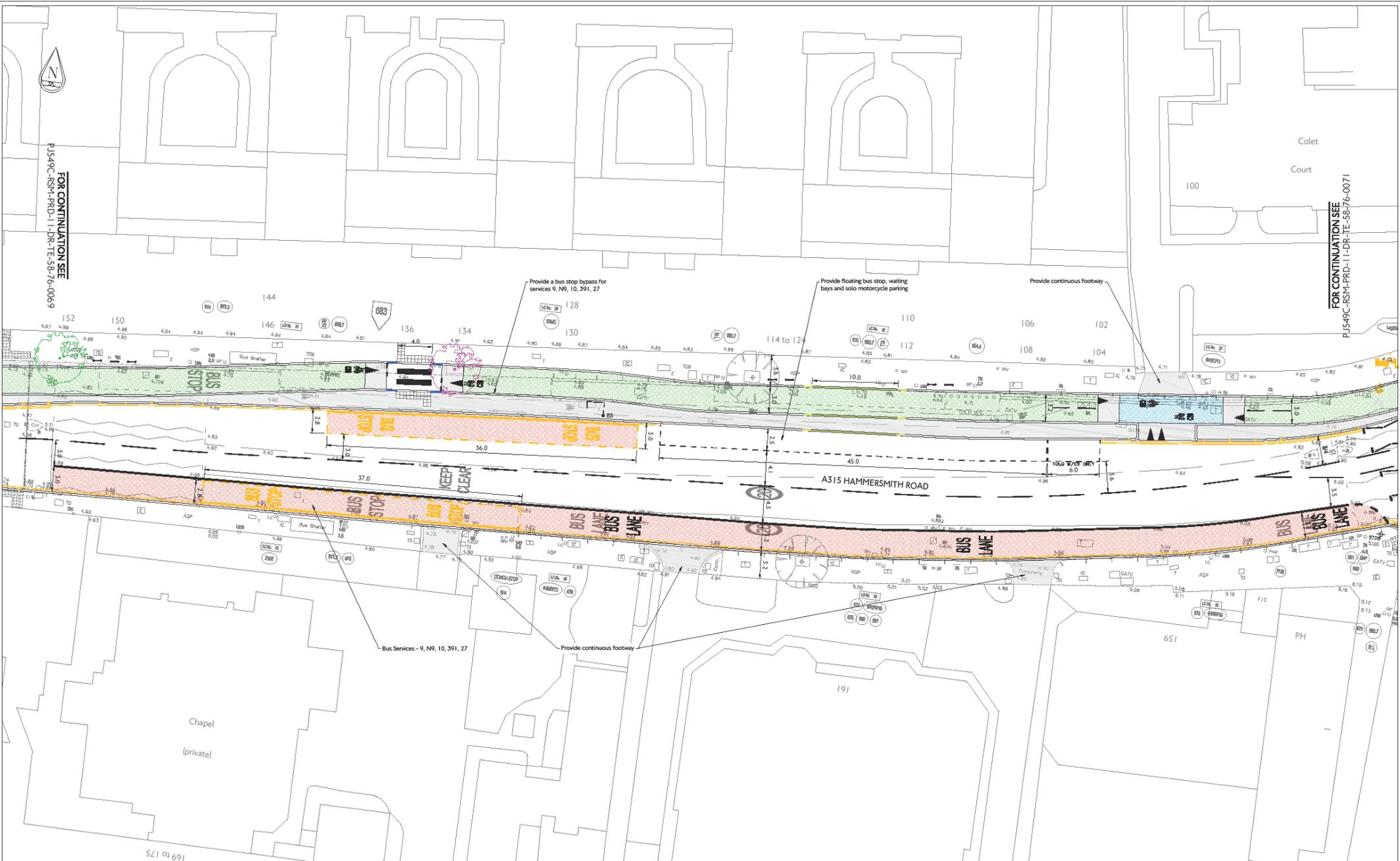
DETAILS (where appropriate)

APPENDIX B

Problem Locations

FOR CONTINUATION SEE
PJS49C-RSM-PRD-11-DR-TE-58-76-0069

FOR CONTINUATION SEE
PJS49C-RSM-PRD-11-DR-TE-58-76-0071



LEGEND

	Existing road marking		Proposed sign and post		Proposed tactile paving - buff		Proposed cycle logo (TSRGD 1037)
	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 beilsha beacon		Proposed bus lane		
	Proposed single blip		Proposed ticket machine		Proposed bus lane - blue		
	Proposed dropped kerb		Proposed bus shelter		Proposed cycle lane - blue		
	Proposed transition kerb		Proposed traffic signal		Proposed cycle lane - green		

NOTES

rev	date	details	by	chk	app
P07	28.03.18	Project design issued for modelling	JF	JA	KCL
P08	10.08.17	Issued following updated waiting restrictions	JF	AO	KCL
P05	17.07.17	Issued following comments from borough	JF	AO	KCL

rev	date	details	by	chk	app
P04	07.07.17	Issued for VSSPH Modelling	JF	AO	KCL
P03	13.06.17	Issued for DRG review	JF	AO	KCL
P02	03.03.17	Issued for VSSPH Modelling	KH	AO	KCL
P01	01.02.17	Issued for ITAG review	JF	AO	KCL

Transport for London
Surface Transport

Road Space Management
Outcomes Design Engineering

Palmer
197 Blackfriars Road
London SE1 1BU

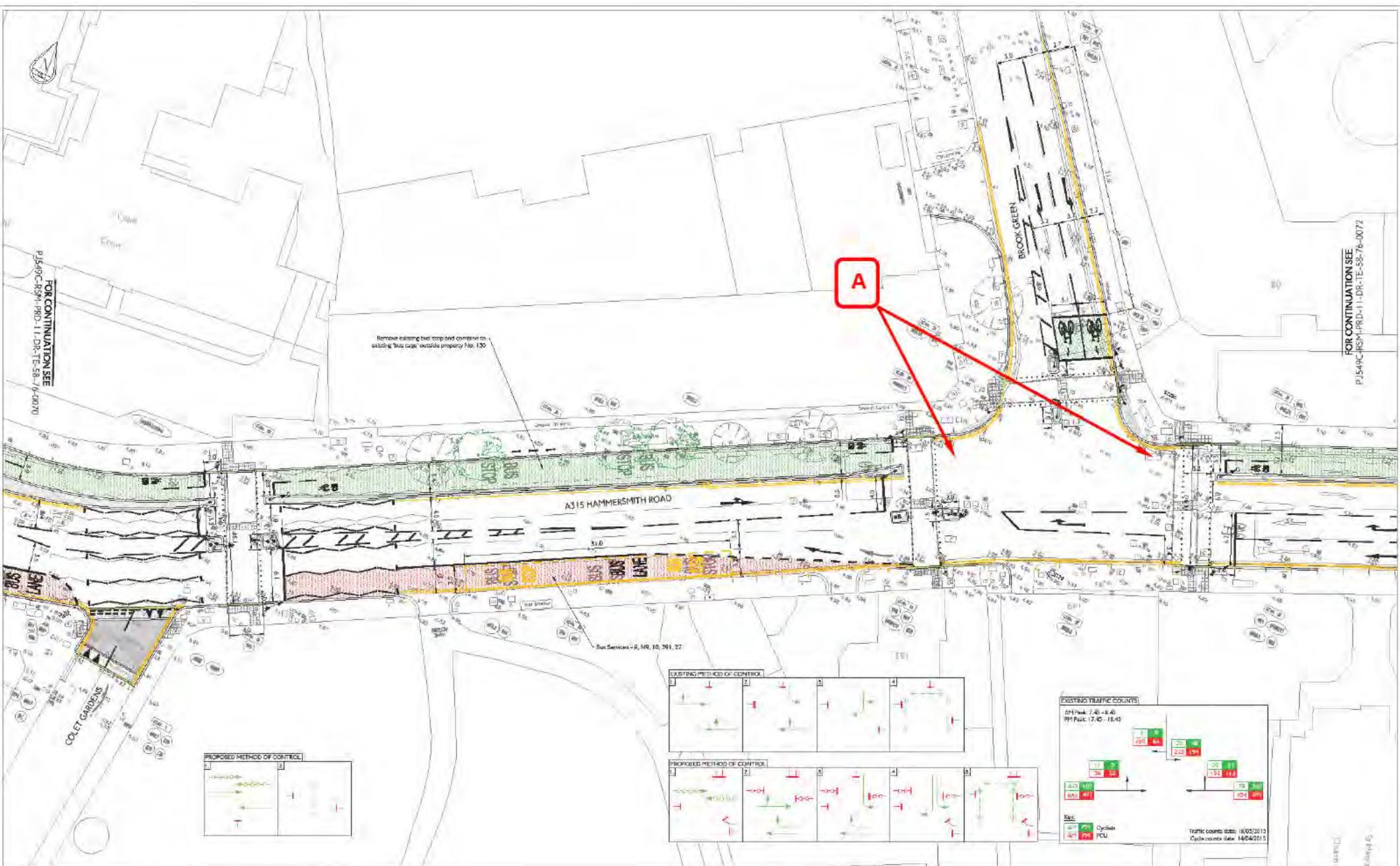
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sheet: 33 OF 0676

FOR COMMENT

P07

Project: LB of HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
A315 HAMMERSMITH ROAD
CONCEPT DESIGN
SECTION 16

Project Reference: PJS49C-RSM-PRD-11-DR-TE-58-76-0070



FOR CONTINUATION SEE
P1549C-RSM-PRD-11-DR-TE-SB-76-0070

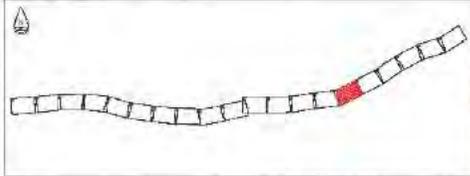
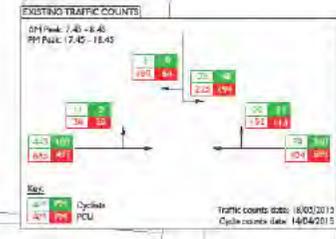
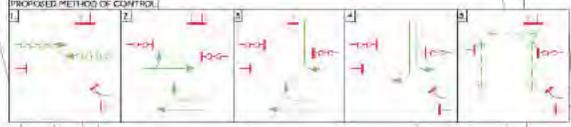
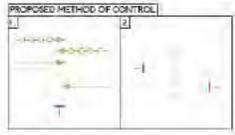
FOR CONTINUATION SEE
P1549C-RSM-PRD-11-DR-TE-SB-76-0072

Remove existing bus stop and combine to existing 'bus cage' outside property No. 130

A

A215 HAMMERSMITH ROAD

Bus Services - 8, 40, 10, 391, 27



LEGEND

	Existing road marking		Proposed sign and post		Proposed tactile paving - buff		Proposed cycle sign (TRGD 1627)
	Existing kerb		Proposed lamp column		Proposed tactile paving - grey		Federal new tree
	Existing sign and post		Proposed gully		Proposed kerb		
	Proposed road marking - white		Proposed tree stem		Proposed tactile paving - red		
	Proposed road marking - yellow		Proposed tree stem		Proposed tactile paving - blue		
	Proposed road marking - red		Proposed bollard		Proposed tactile paving - green		
	Proposed double stop		Proposed tactile paving - black				
	Proposed single stop		Proposed tactile paving - white				
	Proposed dropped kerb		Proposed bus shelter				
	Proposed transition kerb		Proposed traffic signal				

NOTES

1. All proposed works shall be in accordance with the latest edition of the relevant standards.
2. All proposed works shall be in accordance with the latest edition of the relevant standards.
3. All proposed works shall be in accordance with the latest edition of the relevant standards.

REV	DATE	DESCRIPTION	BY	CHK	APP
R01	11/06/13	Issue for V&A/PRD	JK	JK	JK
R02	18/03/14	Proposed design based on V&A/PRD	JK	JK	JK
R03	19/08/17	Issue for V&A/PRD	JK	JK	JK
R04	01/02/17	Issue for V&A/PRD	JK	JK	JK

LE of HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
A215 HAMMERSMITH ROAD
CONCEPT DESIGN
SECTION 16

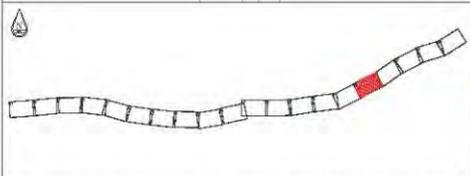
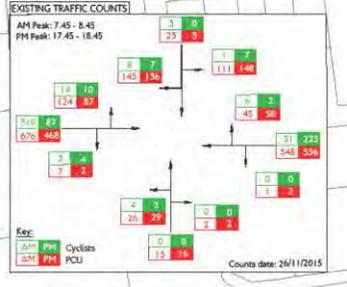
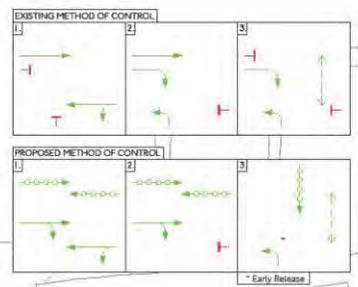
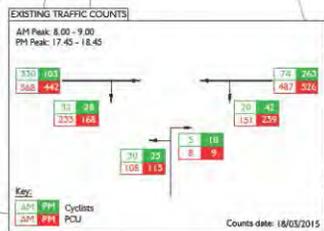
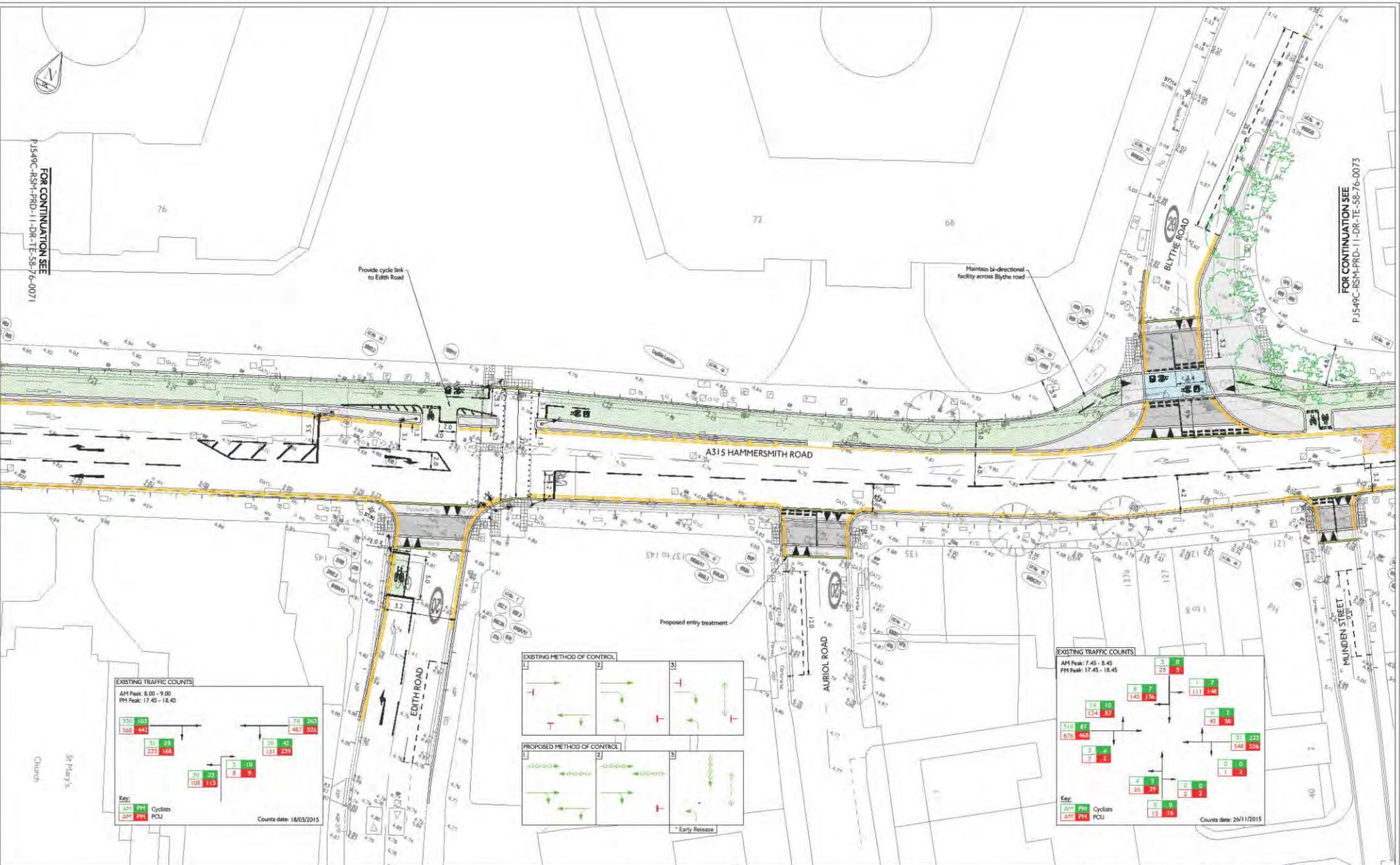
FOR COMMENT

P1549C-RSM-PRD-11-DR-TE-SB-76-0071

Page 07 of 07

PJ549C-RSM-PRD-11-DR-TE-58-76-0071
FOR CONTINUATION SEE

FOR CONTINUATION SEE
PJ549C-RSM-PRD-11-DR-TE-58-76-0073



LEGEND

	Existing road marking	SP	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	G	Proposed gully		Proposed tactile paving - red		
	Proposed road marking - white	BS	Proposed bus stop flag		Proposed kerb		
	Proposed road marking - yellow	BS	Proposed bus stop flag		Proposed build-out / island		
	Proposed road marking - red	BS	Proposed bollard		Proposed over-run lane		
	Proposed double blip	BS	Proposed belisha beacon		Proposed bus lane		
	Proposed single blip	BS	Proposed ticket machine		Proposed cycle lane - blue		
	Proposed dropped kerb	BS	Proposed bus shelter		Proposed cycle lane - green		
	Proposed transition kerb	BS	Proposed traffic signal				

NOTES

- Issue for VSMH Modeling
- Issue for DMR review
- Issue for VSMH Modeling
- Issue for TAG review

PN1	22.06.18	Issue for VSMH Modeling	JF	JA	KCL
PN2	28.03.18	Issue for VSMH Modeling	JF	JA	KCL
PN3	10.08.17	Issue following updated waiting restrictions	JF	AO	KCL
PN4	17.07.17	Issue following comments from Borough	JF	AO	KCL

LB OF HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
A315 HAMMERSMITH ROAD
 CONCEPT DESIGN
 SECTION 16

Road Space Management
 Outcomes Design Engineering

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 197 Blackthorn Road
 SE1 8NA

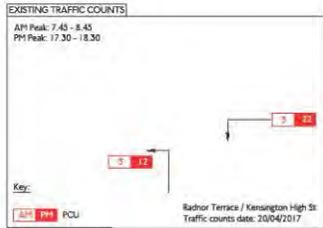
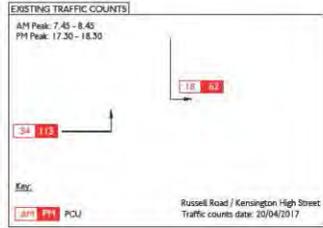
FOR COMMENT

P07

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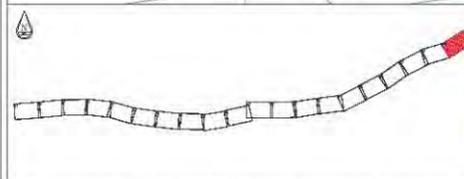
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FOR CONTINUATION SEE

Buff surfacing to be provided to match LB Kensington & Chelsea streetscape guidance



Provide gap in traffic island to facilitate cycle connection to Russell Road

Proposed markings to tie-in to A3220 Warwick Road / Kensington High Street scheme



LEGEND

- | | | | |
|--------------------------------|---------------------------|--------------------------------|----------------------------------|
| Existing road marking | SP 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 | G 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 beilisha beacon | Proposed bus lane | |
| Proposed single blip | Proposed ticket machine | Proposed cycle lane - blue | |
| Proposed dropped kerbs | Proposed bus shelter | Proposed cycle lane - green | |
| Proposed transition kerb | Proposed traffic signal | | |

NOTES

REV	DATE	DESCRIPTION	BY	CHK	APP	
P04	27.07.17	Issued for V&SHP Modelling	JF	AG	KCL	
P05	18.06.17	Issued for DRG review	JF	AG	KCL	
P02	09.05.17	Issued for V&SHP Modelling	JF	AG	KCL	
P01	01.02.17	Issued for TAG review	JF	AG	KCL	
		Rev	Date	Drawn	Checked	Approved

LB of HAMMERSMITH & FULHAM
CYCLE SUPERHIGHWAY 9
A315 HAMMERSMITH ROAD
CONCEPT DESIGN
SECTION 16

Road Space Management
Outcomes Design Engineering

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FOR COMMENT
P07

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