Transport for London

Cycle Enfield - Section 1

A105 South of Ecclesbourne Gardens to Oakthorpe Road

Stage 2 Road Safety Audit

Ref: 2759.03.01/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	21/12/2016

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 1, A105 South of Ecclesbourne Gardens to Oakthorpe Road 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 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 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 16 h December 2016. 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: Paul Rogers – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 1 (Sheets 1 & 2) of this route only, along the A105 South of the junction with Ecclesbourne Gardens to the junction with Oakthorpe Road / Broomfield Lane.

1.5.2 Full details of the traffic signal staging / timings have not yet been provided and therefore the Audit Team could not fully comment on this element of the proposals.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016. This report covered the whole route and therefore many of the issues raised are not specific to this (Section 1) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.1	General to the scheme - Proposed Zebra and cycle crossing layouts may result in drivers failing to give-way to cyclists This problem remains in the detailed design proposals and is therefore raised again within this report as Problem 3.2.1.
Problem 3.1.3	Cycle lanes past junction locations - Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists A very similar problem remains but in relation to busy vehicular accesses and is therefore raised as 3.1.7 within this Audit Report.
Problem 3.1.4	Side road cycle crossovers at raised junction tables - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict. A very similar problem remains but in relation to busy vehicular accesses in the detailed design proposals and therefore this is raised again as 3.1.7 in this Audit Report.
Problem 3.1.4	Palmerston Crescent - Northbound cycle facility returns cyclists from footway to carriageway at the junction and this may lead to failure to give-way type collisions. This problem is no longer present in the detailed design proposals and is therefore not raised again within this Audit report.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.1	The revised kerb lines at side roads may alter vehicle swept paths and it is not clear if these have been assessed or may result in conflicts between turning vehicles. This issue is considered to remain in part and will therefore be raised again as part of 3.1.2 in this Audit report.
Issue 4.2	Bus borders separated from the footways by cycle lanes may result in difficulties for some users to access the bus stop and may lead to low level cycle / pedestrian conflicts. This issue is considered to remain in part and will therefore be raised again as part of 3.1.3 in this Audit report.
Issue 4.13	The cycle lane is provided on footway for a short section north of the junction it is unclear why this is not retained as an on carriageway facility.

	This issue remains in the detailed design but as the layout on the approach to this junction is off carriageway and returning cyclists to the carriageway / soft segregated facility after the junction /conflict point seems suitable, this issue is not raised again within this Audit report.
Issue 4.14	The scheme tie in south of Palmerston Crescent is unclear and should be clarified. This issue is considered to be resolved and will therefore not be raised again within this Audit report.
Issue 4.15	The southbound bus lane markings indicate a re-start of the bus lane and the markings may need to be altered to reflect the new arrangement. This issue is considered to be resolved as the start of this section of bus lane now includes a taper at the commencement. This will therefore not be raised again within this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that proposed cycle tracks run immediately adjacent to proposed bus stop boarders. Therefore bus passengers would board / alight a bus from / onto the cycle tracks. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions. Visually impaired pedestrians, particularly those alighting from a bus may follow the kerb line and inadvertently enter the carriageway. Visually impaired pedestrian unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the layout of the bus stop boarders / cycle tracks are altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing tramline tactile paving prior to the ramps down to carriageway level and an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineator may lead to collisions with visually impaired pedestrians

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator between the footway and cycle tracks provided at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION
It is recommended that as well as a good visual differentiation between the footway and cycle tracks, a detectable delineator should be provided to ensure that all users are aware of the edge of footway.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: A – A105 Green Lanes junction with Ecclesbourne Gardens

Summary: Lack of cycle facilities past this junction may lead to an increased potential for collisions with cyclists

The Audit Team are concerned that southbound cyclists do not appear to have any onward provision beyond the shared cycle / Zebra crossing to the north of Ecclesbourne Road. It is therefore not clear what cyclists will do if they continue southbound, this may lead to cyclists making various manoeuvres which may be less obvious for motorists to anticipate. The Audit Team are concerned for example, that motorists entering or exiting Ecclesbourne Gardens may see southbound vehicles stopped at the Zebra crossing and start to turn across the southbound lanes and are unlikely to anticipate a cyclist re-entering the carriageway to continue southbound via the shared use cycle / Zebra crossing. This may lead to an increased potential for vehicles to turn across the path of cyclists continuing southbound on the carriageway.

RECOMMENDATION
It is recommended that additional features are provided across the mouth of this junction to highlight the potential presence of cyclists. This may include but is not limited to cycle logo road markings and coloured surfacing?.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: B – A105 Green Lanes, cycle lane across petrol station access

Summary: Cycle track width may be insufficient

The proposed cycle track appears to narrow as it crosses the petrol station access. As the horizontal and vertical alignment changes at this location, a narrowed facility in combination with changing direction and elevation may result in difficulties for some cyclists to stay within the facility. If cyclists struggle to stay within the cycle track they may slow down across the petrol station access which might not be anticipated by vehicles following and attempting to enter the petrol station or they may swerve into the path of another user or be destabilised.

RECOMMENDATION
It is recommended that the width of the cycle track is increased to ensure that it is sufficient to enable cyclists to safely enter this section of the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	

Client Organisation Comments
[Leave blank for Client Organisation's Comments]

3.1.6 PROBLEM

Location: C – A105 Green Lanes, cycle lane across petrol station access

Summary: Semi segregated cycle lane terminates just before this busy vehicular access which may increase left turning collisions between vehicles and cyclists

The proposed semi segregated cycle lane terminates just before this busy access. At such locations it may be difficult for both sets of road users to understand who has priority and this may lead to turning collisions involving cyclists. Cyclists may not anticipate a vehicle turning across their path and may find it difficult to avoid such vehicles in close proximity. This may lead to an increased risk of left hook / failure to give-way type collisions between southbound cyclists and vehicles crossing the track to use the access.

RECOMMENDATION
It is recommended that the priority is clearly defined. Furthermore, research from TRL (PPR703 – Trials of segregation set-back at side roads) indicates that setting back cycle lanes by at least 20m from side roads may improve cyclist safety at junctions.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	

Client Organisation Comments
[Leave blank for Client Organisation's Comments]

3.1.7 PROBLEM

Location: D – A105 Green Lanes south of junction with Broomfield Lane

Summary: Proposed cycle lane may be obstructed as drivers enter this development which may result in cycle collisions

The proposals include a break in the mandatory semi-segregated cycle track to facilitate access to this residential development. The Audit Team are concerned that as the development is gated vehicles waiting for the gates to open are likely to obstruct the cycle track. Cyclists wishing to maintain progress may therefore swerve around the waiting vehicle into the carriageway where they may not suitable sight or be sighted by northbound motorists, particularly due to the crest in the vertical alignment and potential for the bus stop shelter / a waiting bus to reduce intervisibility. This may therefore result in an increased potential for collisions between northbound cyclists and vehicles whilst motorists use this access.

RECOMMENDATION
It is recommended to alter the layout, to minimise the potential for vehicles waiting to enter this development to obstruct the cycle track. Whilst it is appreciated that this mitigation measures extends beyond the highway boundary and may therefore require discussion with the development owner one solution may be to relocate the gates or alter the method of operation so that the gates minimise the delay encountered as vehicles enter.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.8 PROBLEM

Location: E – commencements of full height kerbs south of Broomfield Lane

Summary: Motorists may not notice and collide with the commencement of a full height kerb

The Audit Team are concerned that motorists may not appreciate that the edge of the cycle track includes a full height kerb at this location. This kerbed physical segregation commences within the carriageway running lane and it may not provide suitable features to highlight this physical feature or guide users alongside it. It may therefore, not be clear or conspicuous. Motorists may collide with the kerb or swerve to avoid the features if they are noticed within close proximity, which may result in loss of control type collisions / injury to those on or within the vehicle.

RECOMMENDATION
It is recommended to alter the layout to suitably guide vehicles alongside the kerbs. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) to provide suitable guidance alongside the feature.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 CROSSING FACILITIES

3.2.1 PROBLEM

Location: F – A105 Green Lanes between Ecclesbourne Gardens and Palmerston Crescent

Summary: Proposed Zebra and cycle crossing layouts may result in drivers failing to give-way to cyclists

The Audit Team are concerned that the proposed Zebra and cycle crossing may not be understood by motorists particularly as the layout is new to drivers. The following issues may result in an increased potential for collisions:

- Zebra crossings are well established and the conspicuousness of the thick black and white striped road markings help to clearly indicate that a pedestrian has priority over vehicular traffic in this area. The lack of these markings within the proposed cycle section of the crossing may lead to ambiguity over who has priority and motorists may fail to give-way to cyclists.
- Slow approach speeds by pedestrians enable an approaching motorist to notice they intend to cross, slow down and stop. Cyclists are likely to approach faster than pedestrians and may therefore fail to be noticed by approaching motorists.

These issues may lead to an increased potential for collisions between motorists and cyclists or shunt type collisions as motorists brake hard as they unexpectedly encounter a cyclist attempting to assert priority.

RECOMMENDATION
Provide measures which will allow cyclists to assert priority over motorists. This could include an alternative crossing type, or provide appropriate temporary signing to inform drivers of the intended usage until this layout becomes more commonplace.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.2 PROBLEM

Location: G – A105 Green Lanes proposed Zebra crossing between junctions with Palmerston Crescent & Ecclesbourne Gardens

Summary: Proposed Zebra crossing facility may result in an increased potential for collisions

The southbound carriageway effectively widens to two lanes on approach to the proposed Zebra crossing facility. The Audit Team are concerned that southbound motorists entering the offside lane, effectively overtake vehicles in the nearside lane. These motorists may not clearly see the crossing and may suddenly encounter it as they accelerate past another vehicle. Particularly given that the two lane section quickly returns to a single general traffic lane whilst the bus lane is in operation. The potential for motorists to not notice the Zebra crossing may be exacerbated as the belisha beacons on either side of the carriageway could be obscured by queuing vehicles. If users do not suitably observe the crossing facility they are unlikely to give-way to users in the crossing, particularly cyclists as this part of the crossing is encountered first and less conspicuous than the established Zebra crossing.

The Audit Team are concerned that this layout may result in an increased potential for collisions between southbound motorists, particularly in lane 2 and cyclists or pedestrians on the crossing.

RECOMMENDATION
It is recommended that this layout is altered to ensure that the Zebra crossing is conspicuous to all motorists. This may include, but is not limited to, reducing the southbound carriageway to one lane and / or providing a central reservation to house additional belisha beacons. This recommendation is in addition to those raised in 3.2.1.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.3 PROBLEM

Location: H – A105 Green Lanes junction with Broomfield Lane

Summary: Proposed layout may result in conflicts between pedestrians and cyclists

The northbound cycle route transitions to a segregated on-footway facility on the approach to Broomfield Lane. As this facility reaches the crossing point for eastbound or westbound pedestrians on the southern side of Green Lanes, it appears to become a shared use facility. The Audit Team are concerned that cyclists attempting to make it past the stop-line before the end of an indicated green phase may be reluctant to slow down and this may not be expected for pedestrians who cross within the same phase.

Additionally, cyclists given a green signal may not be aware that they are intended to undertake this manoeuvre in two stages. If cyclists turn right under the initial green light they may conflict with pedestrians crossing under a green signal during the same phase.

The Audit Team are concerned that pedestrian cyclist conflicts may arise. Particularly at the off carriageway south-western corner of this junction, due to the close proximity of the conflicting desire lines.

RECOMMENDATION
It is recommended that increased separation should be provided between the pedestrian and cycle desire lines / likely routes and that two stage right turn (2srt) signs are provided to inform cyclists of their intended manouvre.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 JUNCTIONS

3.3.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The altered kerb lines may result in increased collisions as turning vehicles increasingly encroach into the path of another user

The proposals include various kerb-line alterations which may increase the potential for turning vehicles to encroach into another user's path. This could lead to an increased potential for head on or side impact type collisions as a user turning into or out of the side roads or accesses is encountered by a vehicle travelling in the opposing direction.

RECOMMENDATION
It is recommended to undertake / check swept path analysis and make alterations if necessary to ensure that the vehicles likely to use these roads can undertake typical manoeuvres with minimal intrusion into the path of another vehicle.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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: Various – shared use cycle / footway

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

It is not clear what the extents of the shared use surfaces are as none of the shared use extents appear to be defined. Additionally, at some locations such as either side of Palmerston Crescent, it is not clear what the intended cyclist route is.

In order to avoid cyclists continuing on the footway and the potential for low level cycle / pedestrian conflicts / unexpected cycle manoeuvres, it may be beneficial to clearly determine what the intended cycle routes are. This may include but is not limited to appropriate tactile paving and road markings / signs to indicate the intended routes / manoeuvres.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: 1 – A105 Green Lanes junction with Ecclesbourne Gardens (Sheet 1/47)

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

The proposals include retention of the existing bus lane signs to the south of this junction. Technically, as the bus lane re-starts at this location this should have altered signing on the approach and at the commencement point to warn and notify users of its presence.

It is recommended that the signs are altered to ensure they correctly relate to the proposed layout / bus lane road markings.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: 2 – A105 Green Lanes junction with Oakthorpe Road (Sheet 2/47)

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

The proposals include alterations to the kerb line and location of the traffic signal pole which may result in a narrow effective footway width on the southern footway of Oakthorpe Road.

It may be beneficial to relocate the traffic signal pole closer to the edge of the footway and provide a cranked pole or similar to ensure the signal is visible and has sufficient lateral clearance to the edge of carriageway.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 21/12/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed [redacted]

Position: Principal Road Safety Auditor Date: 21/12/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

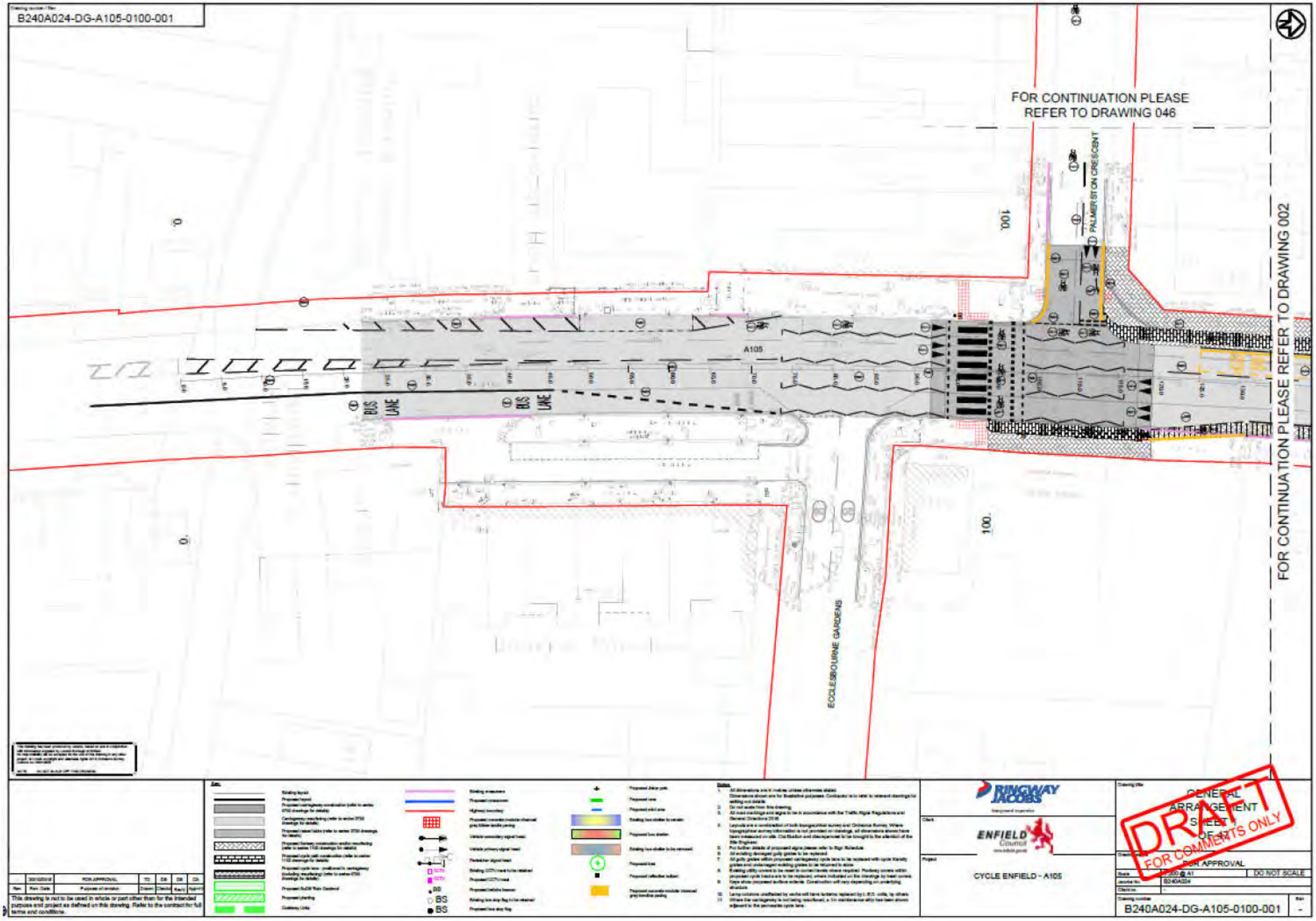
DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-001 Rev -	Cycle Enfield A105 - General Arrangement Sheet 1 of 47
B240A024-DG-A105-0100-002 Rev -	Cycle Enfield A105 - General Arrangement Sheet 2 of 47
B240A024-DG-A105-0200-001 Rev -	Cycle Enfield A105 - Site Clearance Sheet 1 of 47
B240A024-DG-A105-0200-002 Rev –	Cycle Enfield A105 - Site Clearance Sheet 2 of 47
B240A024-DG-A105-0500-001 Rev -	Cycle Enfield A105- Proposed drainage plan Sheet 1 of 47
B240A024-DG-A105-0500-002 Rev -	Cycle Enfield A105- Proposed drainage plan Sheet 2 of 47
B240A024-DG-A105-0700-001 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 1 of 47
B240A024-DG-A105-0700-002 Rev –	Cycle Enfield A105 – Road Pavements General Sheet 2 of 47
B240A024-DG-A105-1100-001 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 1 of 47
B240A024-DG-A105-1100-002 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 2 of 47
B240A024-DG-A105-1200-001 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 1 of 47
B240A024-DG-A105-1200-002 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 2 of 47
B240A024-DG-A105-1300-001 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 1 of 47
B240A024-DG-A105-1300-002 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 2 of 47

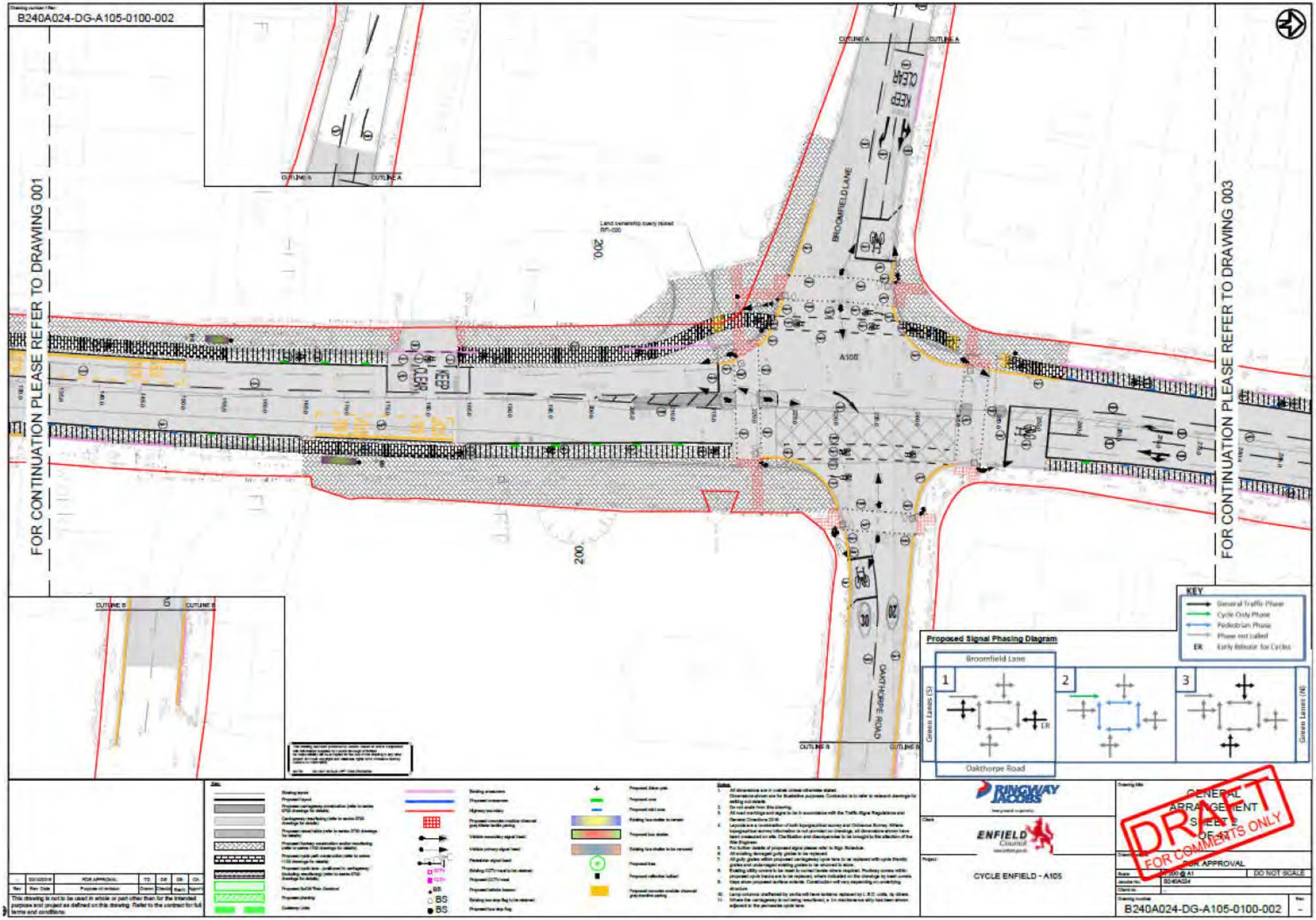
DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	

☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 1

APPENDIX B

Problem Locations


B240A024-DG-A105-0100-001
FOR CONTINUATION PLEASE REFER TO DRAWING 046
FOR CONTINUATION PLEASE REFER TO DRAWING 002
A105
BUS LANE
BUS LANE
PALMERSTON CRESCENT
ECCLESBOURNE GARDENS
100
100
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 1 OF 17
DRAFT
FOR COMMENTS ONLY
FOR APPROVAL
DO NOT SCALE
B240A024-DG-A105-0100-001


B240A024-DG-A105-0100-002
FOR CONTINUATION PLEASE REFER TO DRAWING 001
FOR CONTINUATION PLEASE REFER TO DRAWING 003
BROOMFIELD LANE
A105
OAKTHORPE ROAD
KEEP CLEAR
OUTLINE A
OUTLINE B
Land ownership query noted RFI-020
200
Proposed Signal Phasing Diagram
Broomfield Lane
Oakthorpe Road
Green Lanes (S)
Green Lanes (N)
KEY
General Traffic Phase
Cycle Only Phase
Pedestrian Phase
Phase not called
ER Early Release for Cycles
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 2 OF 17
DRAFT
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Transport for London

Cycle Enfield - Section 2

A105 Between Oakthorpe Road and Aldermans Hill

Stage 2 Road Safety Audit

Ref: 2759.03.02/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	23/12/2016

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 2, A105 Between Oakthorpe Road and Aldermans Hill 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 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 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 16 h December 2016. 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: Paul Rogers – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 2 (Sheet 3) of this route only, along the A105 between Oakthorpe Road and Aldermans Hill.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016. This report covered the whole route and therefore many of the issues raised are not specific to this (Section 2) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

There are no issues raised in the main body of the previous stage 1 Road Safety Audit which are relevant to this specific section of the scheme.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.2 Bus borders separated from the footways by cycle lanes may result in difficulties for some users to access the bus stop and may lead to low level cycle / pedestrian conflicts.

This issue is considered to remain in part and will therefore be raised again as part of 3.1.2 in this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians.

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track.

The Audit Team are concerned that proposed cycle tracks run immediately adjacent to proposed bus stop boarders. Therefore bus passengers would board / alight a bus from / onto the cycle tracks. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions. Visually impaired pedestrians, particularly those alighting from a bus may follow the kerb line and inadvertently enter the carriageway. Visually impaired pedestrian unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the layout of the bus stop boarders / cycle tracks are altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing tramline tactile paving prior to the ramps down to carriageway level and an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineator may lead to collisions with visually impaired pedestrians.

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator between the footway and cycle tracks provided at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION
It is recommended that as well as a good visual differentiation between the footway and cycle tracks a detectable delineator should be provided to ensure that all users are aware of the edge of footway.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: A – Parking restrictions on southbound carriageway near 196 Green Lanes

Summary: Parking permitted across the semi segregated cycle track may result in side swipe or shunt type collisions as cyclists divert into the general traffic lane.

The proposals include various small sections of the semi segregated cycle track which are advisory rather than mandatory and utilise mini orcas and double yellow lines which permit loading only outside of peak hours. The Audit Team are concerned that vehicles parked within the cycle track may result in cyclists diverting out of the track and into the adjacent carriageway running lane. Such manoeuvres may not be anticipated by drivers and an increased potential for collisions between motorists and cyclists may result.

RECOMMENDATION
It is recommended that parking is not permitted across any section of the segregated cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: B – Parking permitted adjacent to cycle track near 230 Green Lanes

Summary: Parking / loading permitted adjacent to the cycle track may result in users exiting or unloading within the cycle track.

The proposals include retention of existing parking bays in this area. There appears to be a buffer of approximately 0.5m between the parking bays and the proposed cycle track. The Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the cycle track which may result in an increased potential for collisions between southbound cyclists and people using / loading to / from the parking bays.

RECOMMENDATION
It is recommended that the buffer is increased to ensure that the cycle path is kept as clear as possible and suitable pedestrian and disabled user access to the parking bays is provided over the cycle track.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.6 PROBLEM

Location: C – commencements of full height kerbs south of Aldermans Hill

Summary: Motorists may not notice and collide with the commencement of full height kerbs.

The Audit Team are concerned that motorists may not appreciate that the edge of the cycle track includes a full height kerb at this location. This kerbed physical segregation commences within the carriageway running lane and it may not provide suitable advance forward notification to highlight this physical feature or guide users alongside it. It may therefore, not be clear or conspicuous. Motorists may collide with the kerb or swerve to avoid the features if they are noticed within close proximity, which may result in loss of control type collisions / injury to those on or within the vehicle.

RECOMMENDATION

It is recommended to alter the layout to suitably guide vehicles alongside the kerbs. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) to provide suitable guidance alongside the feature.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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 – Near building number 210 Green Lanes (Sheet 3/47)

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

The proposed down ramp at the head of the southbound bus stop does not appear to be shown with a road marking to highlight the change in elevation.

It is recommended to amend the drawings to include the ramp road marking to ensure that all ramps are suitably conspicuous.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: 2 – Near building number 212 Green Lanes (Sheet 3/47)

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

The proposals include a bus shelter relocated to facilitate the cycle track.

It is not clear if the proposed shelter maintains an effective footway width. If this is not the case then alterations may be required to either remove the side panels from the shelter and / or relocate it.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 23/12/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 23/

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

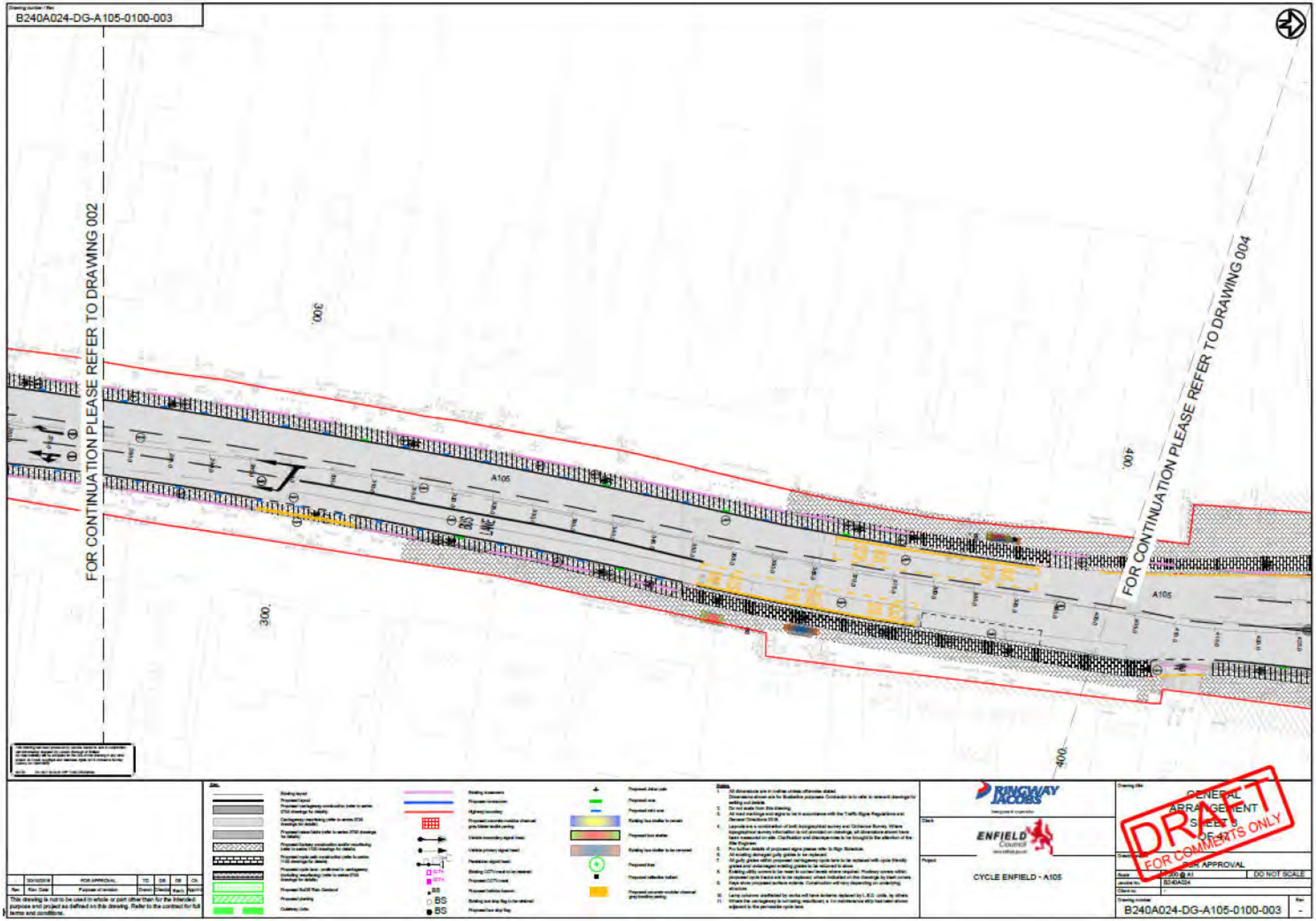
Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-003 Rev -	Cycle Enfield A105 - General Arrangement Sheet 3 of 47
B240A024-DG-A105-0200-003 Rev -	Cycle Enfield A105 - Site Clearance Sheet 3 of 47
B240A024-DG-A105-0500-003 Rev -	Cycle Enfield A105- Proposed drainage plan Sheet 3 of 47
B240A024-DG-A105-0700-003 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 3 of 47
B240A024-DG-A105-1100-003 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 3 of 47
B240A024-DG-A105-1200-003 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 3 of 47
B240A024-DG-A105-1300-003 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 3 of 47

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 2

APPENDIX B

Problem Locations


B240A024-DG-A105-0100-003
FOR CONTINUATION PLEASE REFER TO DRAWING 002
FOR CONTINUATION PLEASE REFER TO DRAWING 004
A105
A105
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300
400
400
BS
BS
DRAFT
FOR COMMENTS ONLY
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 3 OF 4
FOR APPROVAL
1:200 @ A1
DO NOT SCALE
B240A024
B240A024-DG-A105-0100-003
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Transport for London

Cycle Enfield - Section 3

A105 Green Lanes junction with Aldermans Hill

Stage 2 Road Safety Audit

Ref: 2759.03.03/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	23/12/2016

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 3, A105 Green Lanes junction with Aldermans Hill 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 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 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 16 h December 2016. 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: Paul Rogers – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 3 (Sheets 4 & 5) of this route only, along the A105 around the junction with Aldermans Hill.

1.5.2 Full details of the traffic signal staging / timings have not yet been provided and therefore the Audit Team could not fully comment on this element of the proposals.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016. This report covered the whole route and therefore many of the issues raised are not specific to this (Section 3) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.2 General to the scheme – town centre / shopping street areas – Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions.

This problem remains in the detailed design proposals and is therefore raised again within this report as Problem 3.1.2.

There are no issues raised outside of the terms of reference in the previous stage 1 Road Safety Audit which are relevant to this specific section of the scheme.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to the scheme - Town Centre / shopping street areas

Summary: Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions

Within the main shopping streets the proposed cycle lanes will reduce the effective footway widths and segregate pedestrians from crossing points, bus stops and parking / loading bays. Pedestrians not contained or comfortable on the footway area may increasing use the cycle lanes at a greater risk of collision with cyclists. Additionally, pedestrians crossing or waiting / walking immediately adjacent to the proposed cycle lanes may also be at an increased potential for collisions with cyclists.

RECOMMENDATION
It is recommended to provide a defined separation between footway / cycle lane, and cycle lane to carriageway. This may include but is not limited to providing a stepped facility at a different level for each facility. It may also be beneficial to incorporate contrasting colour and/or texture between cycle lane and footway, measures to address cycle speeds to ensure safe pedestrian to cycle interaction.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineation may lead to collisions with visually impaired pedestrians

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator between the footway and cycle tracks provided at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION
It is recommended that as well as a good visual differentiation between the footway and cycle tracks, a detectable delineator should be provided to ensure that all users are aware of the edge of footway.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: A – Parking permitted adjacent to cycle track near 264 Green Lanes

Summary: Parking / loading permitted adjacent to the cycle track may result in users exiting or unloading within the cycle track

The proposals include retention of existing parking bays in this area. There appears to be a buffer of approximately 0.5m between the parking bays and the proposed cycle track. The Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the track which may result in an increased potential for collisions between southbound cyclists and people using / loading to / from the parking bays.

RECOMMENDATION
It is recommended that the buffer is increased to ensure that the cycle path is kept as clear as possible and suitable pedestrian and disabled user access to the parking bays is provided over the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: B – Aldermans Hill eastbound approach to the splitter island / junction with A105 Green Lanes

Summary: Cyclists attempting to enter the right turn lane may be vulnerable to vehicles continuing ahead / entering the left turn lane

The Audit Team are concerned that eastbound motorists keeping to the nearside to use the left turn lane on to Green Lanes may cut across the path of, and collide with, a cyclist attempting to merge over to the offside to use the right turn lane on to Green Lanes. No facilities are provided to clarify the intended route or highlight this potential manoeuvre and the layout / widths on approach may make it difficult for cyclist to assert a primary riding position. As a result, an increased potential for motorists to turn left across the path of a cyclist continuing to the right turn lane may exist.

RECOMMENDATION
It is recommended to ensure that cyclists can safely transition to the right turn lane leading to Green Lanes southbound. This may require, but is not limited to altering the layout so that the left turn lane is a positive diverge and highlights the potential for cyclists to be continuing across the mouth of the junction to the right turn lane.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.6 PROBLEM

Location: C – A105 Green Lanes southbound approach to Aldermans Hill

Summary: Cyclists attempting to turn right in free-flow traffic conditions may be vulnerable to being clipped by passing motorists

The Audit Team are concerned that a southbound cyclist wishing to turn right onto Aldermans Hill may find it difficult to do so when they are not held at a red signal. The segregated cycle track leads in to a full width Advanced Stop Line (ASL) which should provide adequate opportunity for cyclists to make this manoeuvre when southbound traffic is being held at a red signal. However, when they reach the junction during a green phase it is not clear how they will make the transition to the offside. If they stop in-line with the cycle lane then following cyclists would have to swerve around them and they may be vulnerable to conflict with passing vehicles, particularly as this is a left hand bend.

Furthermore, if users attempt to wait to the offside of the cycle lane to enter the ASL once southbound traffic is held then they may be susceptible to being clipped by passing southbound vehicles. Additionally, as the route is unclear, cyclists may make less predictable manoeuvres and may attempt to cross the ahead lane to enter the right turn facility. If they do not suitably sight a southbound vehicle approaching behind them, they may be susceptible to rear end shunt type collisions.

RECOMMENDATION
It is recommended to clarify the intended route for cyclists to turn right from the segregated track on to Aldermans Hill. This may require but is not limited to separately signalling the right turn for cyclists..

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 TRAFFIC SIGNALS

3.2.1 PROBLEM

Location: D – A105 Green Lanes northbound approach to Aldermans Hill

Summary: Traffic signals maybe confusing and could lead to left hook type collisions

The proposals on this approach include a segregated cycle track and full signalisation of the junction. The Audit Team are concerned that motorists in lane one (left turn on to Aldermans Hill) may misinterpret a signal and inadvertently set off in stage one. As this stage releases vehicles in lane two (ahead only) and cyclists within the segregated track, if motorists in lane one inadvertently set off in this stage, it may result in left hook type collisions with cyclists continuing ahead.

RECOMMENDATION

It is recommended to ensure that the traffic signal layout (full details of which have not yet been provided) clarifies that users in lane one are held on a red signal until stage 2. This may include but is not limited to adding extended traffic signal hoods / louvres to minimise the visibility of green signals which are not relevant to lane 1. Additionally it may also be beneficial to relocate the far sided secondary signal so that it is less obvious to motorists in lane one, an option for this may be to make this an offside closely associated secondary.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 ROAD LAYOUT

3.3.1 PROBLEM

Location: E – Aldermans Hill near junction with A105 Green Lanes

Summary: Available width for westbound vehicles past the bus stop may lead to head on type collisions.

The Audit Team are concerned that westbound motorists passing a bus waiting at this stop may encroach into the opposing traffic lane. It may look as though there is sufficient space to pass a waiting bus but oncoming vehicles may be effectively moving over to the offside to enter the right turn lane for A105 Green Lanes. Additionally, as opposing users meet at the rear of the occupied bus stop they would be abutted by a bus on one side and a kerb line on the other, the lack of space for evasive manoeuvres may add to the potential for head on type collisions at this location.

If westbound users do wait behind a bus at this stop, resultant queues may extend back across the controlled crossing facility and potentially back to the main junction. This could result in an increased potential for collisions with opposing traffic flows or pedestrians as these queueing vehicles may end up 'out of phase'.

RECOMMENDATION
It is recommended to ensure sufficient width is available for westbound motorists to pass a waiting bus without encroaching into the opposing traffic lane. This may require shortening the eastern extent of the bus stop and / or moving the centre line which may also require alterations to the proposed southern side of the splitter island kerb-line.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.2 PROBLEM

Location: F – A105 Green Lanes junction with Aldermans Hill

Summary: The alignment for the ahead movements in either direction appears to be inconsistent which may lead to encroachment in to the cycle lane or kerb strikes

The Audit Team are concerned that the radius kinks or tightens as motorists travel through this bend. As a result northbound users may encroach into the cycle lane with a potential for cyclists to be squeezed. The southbound alignment appears to tighten around the traffic island on the southern side of the junction and as a result this may be more vulnerable to kerb strikes. Both conflicts may result in an increased potential for injury to vehicle occupants or cyclists.

RECOMMENDATION
It is recommended to ensure that the alignment is suitably gradual and consistent. This may require alterations to the road markings and / or proposed kerb lines.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.3 PROBLEM

Location: G – Aldermans Hill junction with Devonshire Road

Summary: The proposed alterations may increase the potential for a vehicle turning in to the side road to collide with a cyclist exiting the side road

The Audit Team are concerned that the swept path of a vehicle turning into Devonshire Road may over-run the proposed contra-flow cycle lane which may result in head-on conflicts between motorists entering this side road and cyclists attempting to exit. The potential for conflict may be exacerbated by the existing parking provision on the northern side of the junction which could restrict inter-visibility between motorists turning left into the side road and cyclists on the proposed contra-flow facility.

RECOMMENDATION
It is recommended to ensure that the contra-flow facility is not likely to be over-run by the swept paths of turning vehicles. This may include but is not limited to decreasing the extent of the existing parking so that cyclists can be taken off carriageway outside of the likely swept path of vehicles.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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 – Proposed alterations near building number 262 Green Lanes (Sheet 4/47)

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

The proposed alterations include kerb buildouts to effectively make the parking bays inset. It is not clear what the demand for right turns on to Aldermans Hill are but if the queues extend back to the southern kerb build out, they may restrict the progression of vehicles continuing ahead.

It is recommended to check the anticipated vehicle flows / traffic signal timing to ensure that any resultant queues do not extend to the pedestrian crossing to the north.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: Various – junctions with proposed raised tables

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

Various junctions are proposed to have raised tables implemented. The kerb details indicate that away from crossing points where transition or flush kerbs are proposed the kerbs will have an upstand of 125mm or to match existing. It is not clear therefore what the upstand will be at the raised tables.

It is assumed that these will provide an upstand which is detectable for visually impaired users but which does not present a trip hazard (maximum upstand of 6mm).

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 23/12/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 23/12/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-004 Rev -	Cycle Enfield A105 - General Arrangement Sheet 4 of 47
B240A024-DG-A105-0100-005 Rev -	Cycle Enfield A105 - General Arrangement Sheet 5 of 47
B240A024-DG-A105-0200-004 Rev –	Cycle Enfield A105 - Site Clearance Sheet 4 of 47
B240A024-DG-A105-0200-005 Rev -	Cycle Enfield A105 - Site Clearance Sheet 5 of 47
B240A024-DG-A105-0500-004 Rev -	Cycle Enfield A105- Proposed drainage plan Sheet 4 of 47
B240A024-DG-A105-0500-005 Rev -	Cycle Enfield A105- Proposed drainage plan Sheet 5 of 47
B240A024-DG-A105-0700-004 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 4 of 47
B240A024-DG-A105-0700-005 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 5 of 47
B240A024-DG-A105-1100-004 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 4 of 47
B240A024-DG-A105-1100-005 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 5 of 47
B240A024-DG-A105-1200-004 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 4 of 47
B240A024-DG-A105-1200-005 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 5 of 47
B240A024-DG-A105-1300-004 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 4 of 47
B240A024-DG-A105-1300-005 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 5 of 47

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 3

APPENDIX B

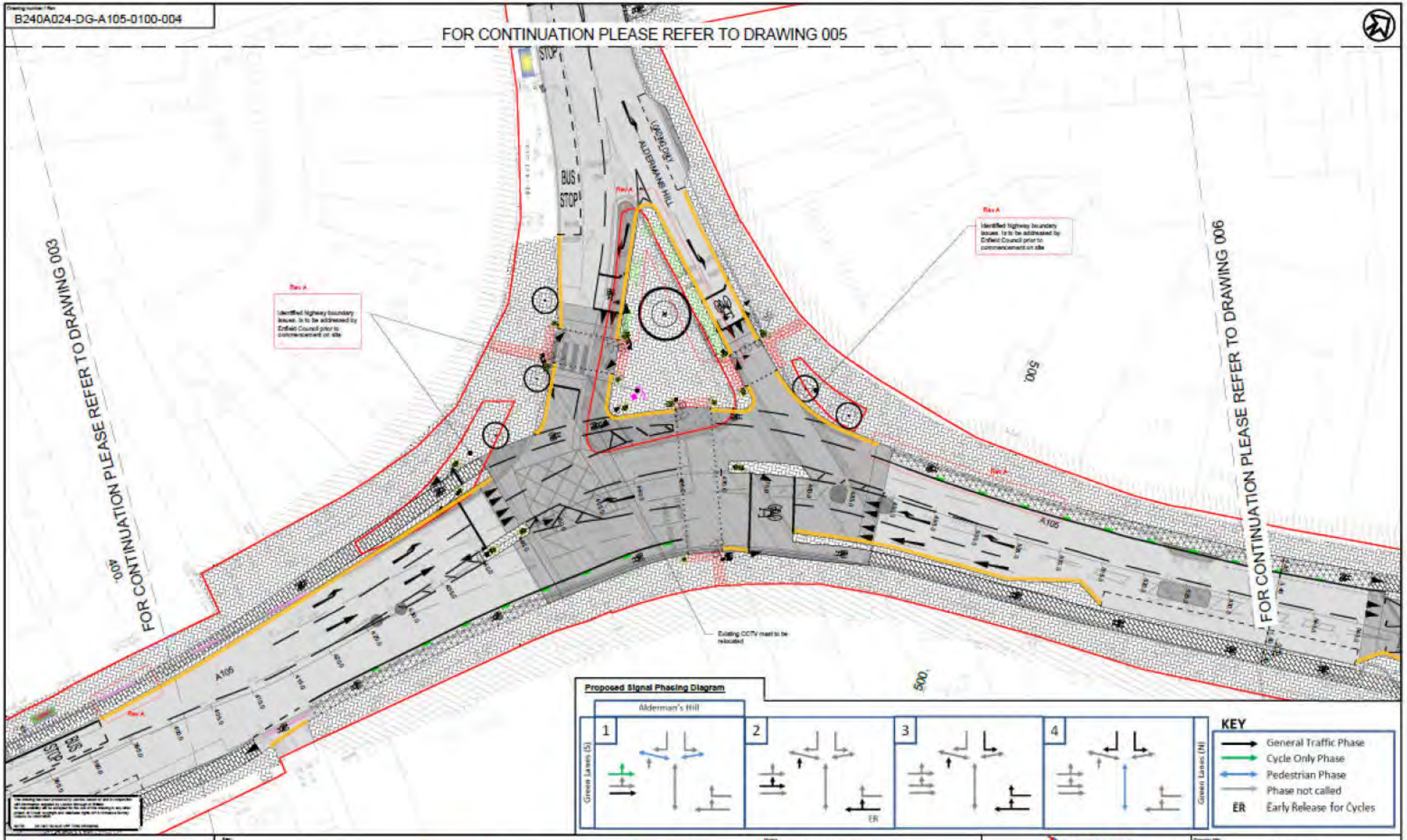
Problem Locations

B240A024-DG-A105-0100-004

FOR CONTINUATION PLEASE REFER TO DRAWING 005

FOR CONTINUATION PLEASE REFER TO DRAWING 003

FOR CONTINUATION PLEASE REFER TO DRAWING 006



DRAFT
FOR COMMENTS ONLY

Rev	Date	Purpose of revision	Drawn	Checked	Rev'd	Approved
A	17/10/2016	FOR APPROVAL	ADC	DB	DB	CA
-	28/09/2016	FOR APPROVAL	TR	PB	DB	CA

This drawing is not to be used in whole or part other than for the intended purposes and project as defined on this drawing. Refer to the contract for full terms and conditions.

RINGWAY JACOBS

ENFIELD Council

Client:

Project: CYCLE ENFIELD - A105

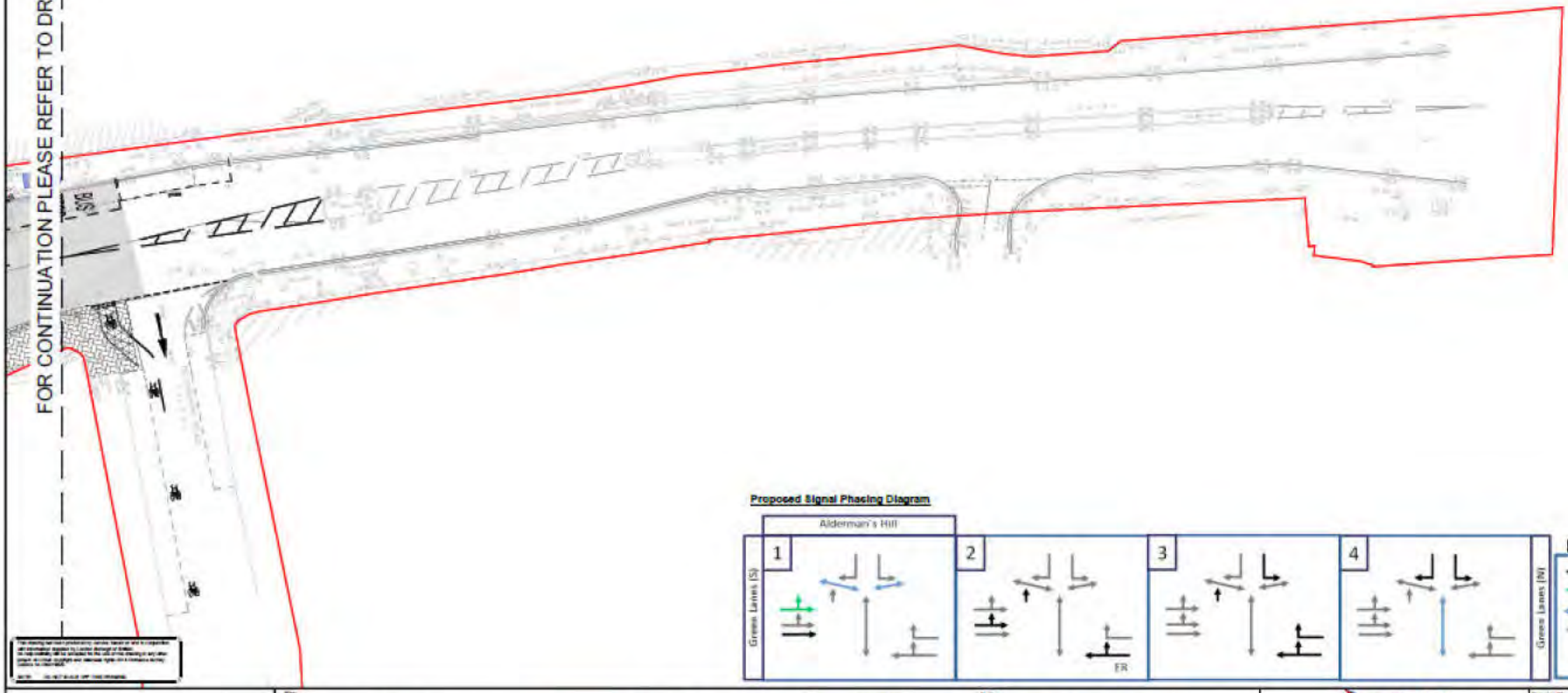
Drawing title: GENERAL ARRANGEMENT SHEET 4 OF 47

Drawing status: FOR APPROVAL

Scale	1:200 @ A1 DO NOT SCALE
Jacobs No.	B240A024
Client No.	-
Drawing number	B240A024-DG-A105-0100-004
Rev	A

B240A024-DG-A105-0100-005

FOR CONTINUATION PLEASE REFER TO DRAWING 004



Proposed Signal Phasing Diagram

KEY

- General Traffic Phase
- Cycle Only Phase
- Pedestrian Phase
- Phase not called
- ER Early Release for Cycles

DRAFT FOR COMMENTS ONLY

Rev	Revision	Purpose of revision	Drawn	Checked	Reviewed	Approved
-	28/05/2024	FOR APPROVAL	PC	PB	SB	CA

RINGWAY JACOBS

ENFIELD Council

CYCLE ENFIELD - A105

GENERAL ARRANGEMENT SHEET 5 OF 47

FOR APPROVAL

Scale	1:200 @ A1
Job no.	B240A024
Client no.	-
Drawing number	B240A024-DG-A105-0100-005
Rev	-

DO NOT SCALE

Transport for London

Cycle Enfield - Section 4

A105 Lodge Drive to Osbourne Road

Stage 2 Road Safety Audit

Ref: 2759.03.04/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	11/01/2017

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 4, A105 Lodge Drive to Osbourne Road 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 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 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 16 h December 2016. 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: Demos Kettenis – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 4 (Sheets 6 - 10) of this route only, along the A105 from the Lodge Drive junction to North of Osbourne Road junction.

1.5.2 Full details of the traffic signal staging / timings have not yet been provided and therefore the Audit Team could not fully comment on this element of the proposals.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016). This report covered the whole route and therefore many of the issues raised are not specific to this (Section 4) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.2	General to the scheme – town centre / shopping street areas – Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions. This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.4.
Problem 3.1.3	Cycle lanes past junction locations - Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.10.
Problem 3.1.4	Side road cycle crossovers at raised junction tables - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict. This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.3.
Problem 3.1.5	Bus stops / loading bays close to side road junctions and accesses – may restrict visibility splays and lead to failure to give-way type collisions. This problem remains in the detailed design proposals and is therefore raised again within this report as part of problem 3.4.2.
Problem 3.8.1	Side roads between Osbourne Road and Devonshire Road – Parking / loading bays close to the junctions may lead to failure to give-way type collisions, or cycle to vehicle conflict. This problem remains in the detailed design proposals and therefore this is raised again as problem 3.4.2 in this Audit Report.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.1	The revised kerb lines at side roads may alter vehicle swept paths and it is not clear if these have been assessed or may result in conflicts between turning vehicles. This issue is considered to remain in part and will therefore be raised again as part of problem 3.4.1 in this Audit report.
Issue 4.2	Bus boarders separated from the footways by cycle lanes may result in difficulties for some users to access the bus stop and may lead to low level cycle / pedestrian conflicts.

This issue is considered to remain in part and will therefore be raised again as part of problem 3.1.2 in this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that the proposed cycle tracks run immediately adjacent to the proposed bus stop boarders. Therefore bus passengers would board / alight a bus from / onto the cycle tracks. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track.

In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions. Visually impaired pedestrians, particularly those alighting from a bus may follow the kerb line and inadvertently enter the carriageway. Visually impaired pedestrian unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the layouts of the bus stop boarders / cycle tracks are altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing tramline tactile paving prior to the ramps down to carriageway level and an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General to the scheme – side road cycle crossovers at raised junction tables

Summary: Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle / vehicle conflicts

At a number of locations the off-road cycle facilities cross side roads at raised table areas. Drivers turning from the main road have a short stacking space between the main road and these cycle crossovers due to the location of the give-way lines to create priority for cyclists. Drivers may be confused by the arrangement and fail to give-way to cyclists, or may stop suddenly and remain partially within the main carriageway, which may lead to late braking nose to tail collisions. The potential for conflicts may be exacerbated at locations where parking is proposed close to the side road between the main carriageway and segregated cycle track.

Drivers entering the main road may be confused by the double give-way feature, and/or stop across the cycle lane, which may lead to nose to tail collisions or cycle to vehicle conflict.

There is inconsistency in the provision of give-ways at such crossing locations and this may confuse users and lead to failure to give-way type conflicts between cycles and vehicles, or vehicle to vehicle type conflicts where give-ways have not been provided as vehicles enter the main road.

RECOMMENDATION
It is recommended that priority at the side roads is clearly designated, and an appropriate stacking space is provided between the main road and cycle crossing to allow vehicles to wait between the main road and cycle crossing without encroaching in to the main carriageway or blocking the cycle crossing (reference London Cycle Design Guide). Any 'floating' loading / parking bays should be located to ensure that sufficient intervisibility is provided between cyclists and motorists. Additionally, it may be beneficial to provide a consistent layout of give-way markings at these locations.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: General to the scheme - Town Centre / shopping street areas

Summary: Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions

Within the main shopping streets the proposed cycle lanes will reduce the effective footway width and segregate pedestrians from crossing points, bus stops and parking / loading bays. Pedestrians not contained or comfortable on the footway area may use the cycle lanes and be at a greater risk of collision with cyclists. Additionally, pedestrians crossing or waiting / walking immediately adjacent to the proposed cycle lanes may also be at an increased potential for collisions with cyclists.

RECOMMENDATION
It is recommended to provide a defined separation between footway / cycle lane, and cycle lane to carriageway. This may include but is not limited to providing a stepped facility at a different level for each facility. It may also be beneficial to incorporate contrasting colour and/or texture between cycle lane and footway; measures to address cycle speeds may be beneficial in ensuring safe pedestrian to cycle interaction.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineation may lead to collisions with visually impaired pedestrians

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator strip between the footway and cycle tracks provided at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION
It is recommended that as well as a good visual differentiation between the footway and cycle tracks, a detectable delineator should be provided to ensure that all users are aware of the edge of footway whilst not presenting a trip hazard.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.7 PROBLEM

Location: General – Parking permitted adjacent to cycle track

Summary: Parking / loading permitted adjacent to the cycle track may result in users exiting or unloading within the cycle track

The proposals include retention of existing parking bays in this area. There appears to be a buffer of approximately 0.5m between the parking bays and the proposed cycle track. The Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the cycle track which may result in an increased potential for collisions between southbound cyclists and people using the parking bays.

RECOMMENDATION
It is recommended that the buffer is increased to ensure that the cycle path is kept as clear as possible and suitable pedestrian and disabled user access to the parking bays is provided over the cycle track.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.8 PROBLEM

Location: A – A105 Green Lanes near junction with Lodge Drive

Summary: Proposed footway loading bay may result in an increased potential for collisions with cyclists

The proposals include a footway loading bay within this area. The Audit Team are concerned that vehicles entering / exiting this bay may:

- Over-run the cycle track as they try to align themselves within the loading bay,
- Not have sufficient visibility of cyclists in the cycle tracks due to the angle of approach / entry and cyclists being in a potential blind spot,
- Result in dooring of cyclists in the cycle tracks.

This may therefore result in increased potential for injuries to cyclists as vehicles utilise this loading bay.

RECOMMENDATION
It is recommended to alter the loading provision so that it does not involve motorists entering (including dooring) or crossing the cycle tracks. This may require an increase in offset from the cycle facility and a physical measure such as a kerb upstand to physically deter vehicles from encroaching in to the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.9 PROBLEM

Location: B – commencements of full height kerbs south of Lodge Road and north of Osborne Road

Summary: Motorists may not notice and collide with the commencement of a full height kerb

The Audit Team are concerned that motorists may not appreciate that the edge of the cycle track includes a full height kerb at this location. This kerbed physical segregation commences within the carriageway running lane and it may not provide a suitable feature to highlight its presence to approaching users or guide users alongside it. It may therefore not be clear or conspicuous. Motorists may collide with the kerb or swerve to avoid the feature if they are noticed within close proximity, which may result in loss of control type collisions / injury to those on or within the vehicle.

RECOMMENDATION
It is recommended to alter the layout to suitably guide vehicles alongside the kerbs. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) to provide suitable guidance alongside the feature.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.10 PROBLEM

Location: C – cycle lanes past junction with Park Avenue and Fox lane

Summary: Segregated cycle lanes terminating just before the side road junction may increase left turning collisions between vehicles and cyclists

The segregated cycle lane returns to the carriageway just before the side road junction. It may be difficult for both sets of road users to understand who has priority and this may lead to turning collisions involving cyclists, particularly as the bus stop and parking located on the southbound approach to junction may reduce inter-visibility of southbound cyclists approaching the junction. Cyclists may find it difficult to avoid vehicles entering or emerging from side roads if constrained by the segregation features, which could lead to increased risk of merging / failure to give-way type collisions.

RECOMMENDATION
It is recommended that the priority is clearly defined. Furthermore, research from TRL (PPR703 – Trials of segregation set-back at side roads) indicates that setting back cycle lanes by at least 20m from side roads may improve cyclist safety at junctions. Such an approach would have an effect on the proposed length of 'floating' parking / loading bays.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	

[Leave blank for Client Organisation's Comments]

3.2 ROAD MARKINGS

3.2.1 PROBLEM

Location: D – A105 Green Lanes junction with Lodge Drive

Summary: Proposed road markings may lead to an increased potential for kerb strikes as southbound vehicles reach the southern side of this junction

The Audit Team are concerned that the proposed give-way markings may increase the potential for southbound drivers to take alignment guidance from these markings and collide with the kerb buildout which protrudes significantly on the southern side of the junction. If drivers collide with the kerb build-out then vehicles occupants may be injured or a rider of a two wheeled vehicle could be dismounted. Additionally, if motorists notice the kerb build-out in close proximity late then evasive action may result in loss of control and / or collisions with oncoming vehicles.

RECOMMENDATION
It is recommended that the road markings are altered to provide positive guidance alongside the kerb build-out.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.2 PROBLEM

Location: E – A105 Green Lanes junction with Park Avenue

Summary: Proposed bifurcation arrow may be misleading and potentially result in shunt type or side swipe type collisions

The Audit Team are concerned that the proposed bifurcation arrow at this location may be misinterpreted as an indication that southbound motorists can continue ahead from what is effectively lane 2. Southbound motorists, particularly those passing a waiting bus, may increase the potential for southbound drivers to assume that the right turn lane is intended for ahead movements, particularly whilst the right turn lane is occupied and therefore the right turn arrows may be obscured. If motorists attempting to continue ahead inadvertently enter the right turn lane this may result in shunt type or side swipe type collisions as motorists may unexpectedly encounter a queue and either brake hard or make a late evasive manoeuvre to avoid the queue / continue to the nearside ahead lane.

RECOMMENDATION
It is recommended that the road markings are altered to clarify the intended manoeuvres. This may include, but is not limited to, removing this bifurcation arrow.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 CROSSING FACILITIES

3.3.1 PROBLEM

Location: F – A105 Green Lanes junction with Devonshire Road

Summary: Proposed crossings may not suitably accommodate pedestrian desire lines

The Audit Team are concerned that the proposed crossing removal / relocation may not suitably accommodate established pedestrian desire lines. For example if pedestrians are travelling broadly east – west along Hazelwood Lane / Devonshire Road or vice versa they may not wish to divert further north to utilise the proposed crossing near the Fox Lane junction. Pedestrians crossing at undetermined locations and without the assistance of crossing facilities may be more vulnerable and less likely to be anticipated by cyclists and motorists which may lead to an increased potential for collisions between the two users.

RECOMMENDATION
It is recommended that alterations are incorporated to make the cycling and pedestrian routes more appealing and to cover the likely desire lines. This may include, but is not limited to, providing additional pedestrian crossing facilities.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.4 JUNCTIONS

3.4.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The altered kerb-lines may result in increased collisions as turning vehicles increasingly encroach into the path of another user

The proposals include various kerb-line alterations which may increase the potential for turning vehicles to encroach into another user's path. This could lead to an increased potential for head on or side impact type collisions as a user turning into or out of the side roads or accesses is encountered by a vehicle travelling in the opposing direction.

RECOMMENDATION
It is recommended to undertake / check swept path analysis and make alterations if necessary to ensure that the vehicles likely to use these roads can undertake typical manoeuvres with minimal intrusion into the path of another vehicle.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.4.2 PROBLEM

Location: General to the scheme – bus stops / loading / parking bays close to side roads

Summary: Stationary vehicles close to side road junctions and accesses may restrict junction visibility splays and lead to failure to give way type collisions

At many locations loading / parking bays are located close to side road junctions and accesses. Stationary vehicles close to side roads may restrict visibility for drivers emerging from the side roads and this may lead to failure to give way type collisions. Similarly, where bus stops are located close to the side roads the Audit Team are concerned that vehicles overtaking waiting buses may not suitably sight vehicles egressing from side roads which may result in side impact type collisions.

RECOMMENDATION
Appropriate visibility splays at side roads should be provided and kept free of obstruction and stationary vehicles. This may require alterations to the positioning and / or extent of the bus stops / parking / loading bays.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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: Various – junctions with proposed raised tables

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

Various junctions are proposed to have raised tables implemented. The kerb details indicate that away from crossing points, where transition or flush kerbs are proposed, the kerbs will have an upstand of 125mm or to match existing. It is not clear therefore what the upstand will be at the raised tables.

It is assumed that these will provide an upstand which is detectable for visually impaired users.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: Various – shared use cycle / footway

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

It is not clear what the extents of the shared use surfaces are as none of the shared use extents appear to be defined.

In order to avoid cyclists continuing on the footway and the potential for low level cycle / pedestrian conflicts / unexpected cycle manoeuvres, it may be beneficial to clearly determine what the intended cycle routes are. This may include but is not limited to appropriate tactile paving, dropped kerbs and road markings / signs to indicate the intended routes / manoeuvres.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: Various – throughout this section

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

Planting / SuDs 'Rain Gardens' are proposed immediately adjacent to the carriageway / cycle lanes at various junctions throughout this section.

The full details of the proposed features have not been provided but it is assumed that these will be of a type / maintained so that they do not restrict visibility or overgrow into the live carriageway areas.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.4 ISSUE

Location: 1 – A105 Green Lanes footway on north-eastern corner of junction with Lodge Drive

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

The traffic signal pole occupies part of the tactile paving area and is set back approximately a metre and a half from the edge of the kerb. This provision may make it difficult for a visually impaired user to find the push button unit.

It is recommended to provide an additional traffic signal pole / push button unit kerbside; this may also require alterations to the alignment of the cycle track and may require relocation of the proposed traffic signal pole to ensure the layout is clear and appropriate for all users.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.5 ISSUE

Location: 2 – A105 Green Lanes footway on western footway at junction with Lodge Drive

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

The proposed cycle track at this location may result in the area between the cycle track and the carriageway not being fully utilised by pedestrians due to the segregation effect that the cycle track may have.

It may therefore be beneficial for pedestrian comfort to re-position the cycle track further east (closer to the kerb) so that it maximises the effective footway width (west of the track) for pedestrians.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.6 ISSUE

Location: 3 – Sign face B03

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

The sign face indicates a segregated dual use footway / cycleway. The sign face appears to show the footway and cycle way the wrong way around. The Audit Team considers this to be a drafting error and this should be resolved during finalisation of the design with the provision of a correctly indicated representation of the sign face.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-006 Rev -	Cycle Enfield A105 - General Arrangement Sheet 6 of 47
B240A024-DG-A105-0100-007 Rev -	Cycle Enfield A105 - General Arrangement Sheet 7 of 47
B240A024-DG-A105-0100-008 Rev -	Cycle Enfield A105 - General Arrangement Sheet 8 of 47
B240A024-DG-A105-0100-009 Rev -	Cycle Enfield A105 - General Arrangement Sheet 9 of 47
B240A024-DG-A105-0100-010 Rev -	Cycle Enfield A105 - General Arrangement Sheet 10 of 47
B240A024-DG-A105-0200-006 Rev -	Cycle Enfield A105 - Site Clearance Sheet 6 of 47
B240A024-DG-A105-0200-007 Rev -	Cycle Enfield A105 - Site Clearance Sheet 7 of 47
B240A024-DG-A105-0200-008 Rev -	Cycle Enfield A105 - Site Clearance Sheet 8 of 47
B240A024-DG-A105-0200-009 Rev -	Cycle Enfield A105 - Site Clearance Sheet 9 of 47
B240A024-DG-A105-0200-010 Rev -	Cycle Enfield A105 - Site Clearance Sheet 10 of 47
B240A024-DG-A105-0500-006 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 6 of 47
B240A024-DG-A105-0500-007 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 7 of 47
B240A024-DG-A105-0500-008 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 8 of 47
B240A024-DG-A105-0500-009 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 9 of 47
B240A024-DG-A105-0500-010 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 10 of 47
B240A024-DG-A105-0700-002 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 6 of 47
B240A024-DG-A105-0700-002 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 7 of 47
B240A024-DG-A105-0700-002 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 8 of 47
B240A024-DG-A105-0700-002 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 9 of 47
B240A024-DG-A105-0700-002 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 10 of 47

B240A024-DG-A105-1100-006 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 6 of 47
B240A024-DG-A105-1100-007 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 7 of 47
B240A024-DG-A105-1100-008 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 8 of 47
B240A024-DG-A105-1100-009 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 9 of 47
B240A024-DG-A105-1100-010 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 10 of 47
	Cycle Enfield A105 - Traffic signs and road markings Sheet 6 of 47
B240A024-DG-A105-1200-007 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 7 of 47
B240A024-DG-A105-1200-008 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 8 of 47
B240A024-DG-A105-1200-009 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 9 of 47
B240A024-DG-A105-1200-010 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 10 of 47
B240A024-DG-A105-1300-006 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 6 of 47
B240A024-DG-A105-1300-007 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 7 of 47
B240A024-DG-A105-1300-008 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 8 of 47
B240A024-DG-A105-1300-009 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 9 of 47
B240A024-DG-A105-1300-010 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 10 of 47

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 4

APPENDIX B

Problem Locations

B240A024-DG-A105-0100-006

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Scale	1:200 @ A1	DO NOT SCALE

CYCLE ENFIELD - A105

GENERAL ARRANGEMENT SHEET 6 OF 47

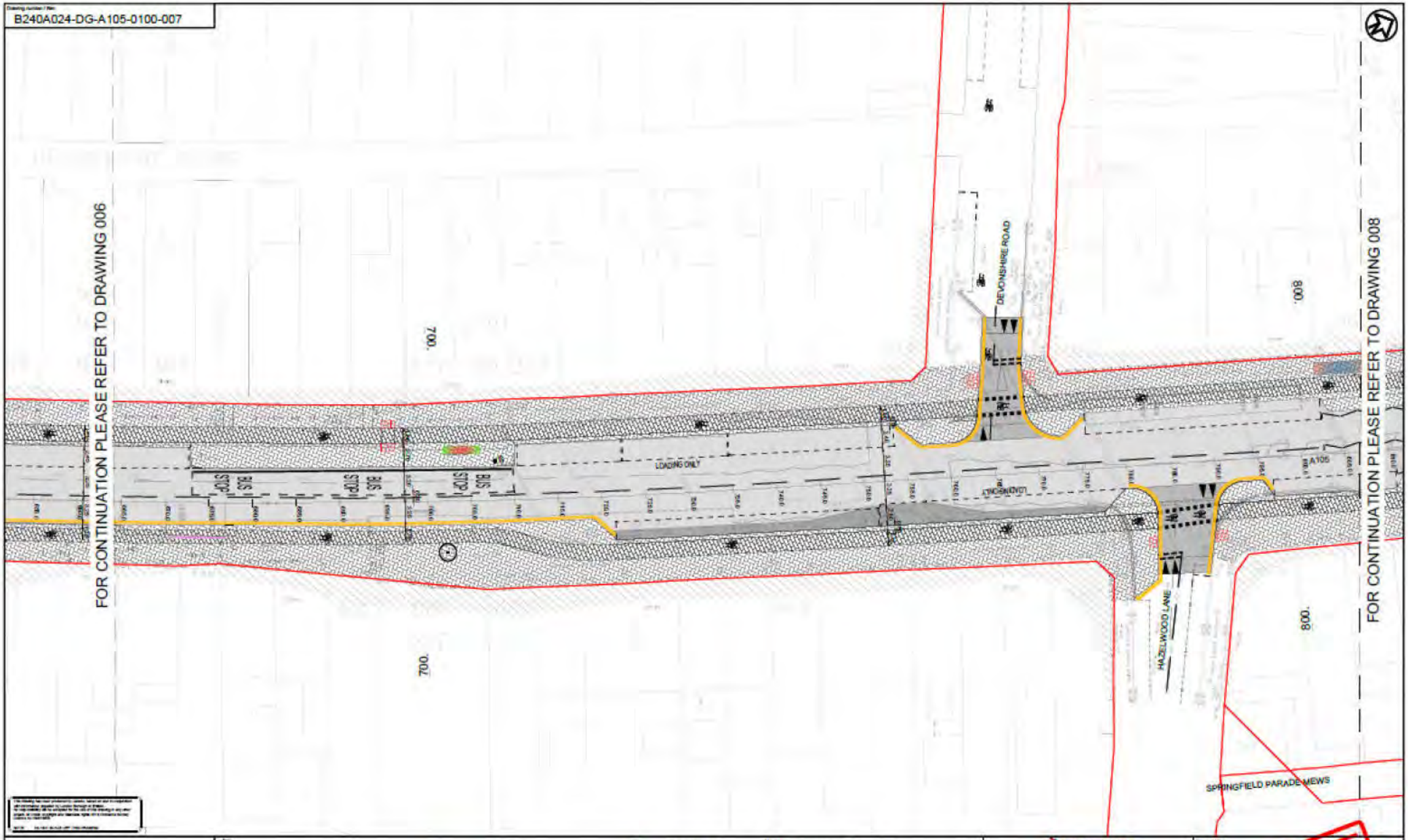
DRAFT FOR COMMENTS ONLY

FOR APPROVAL

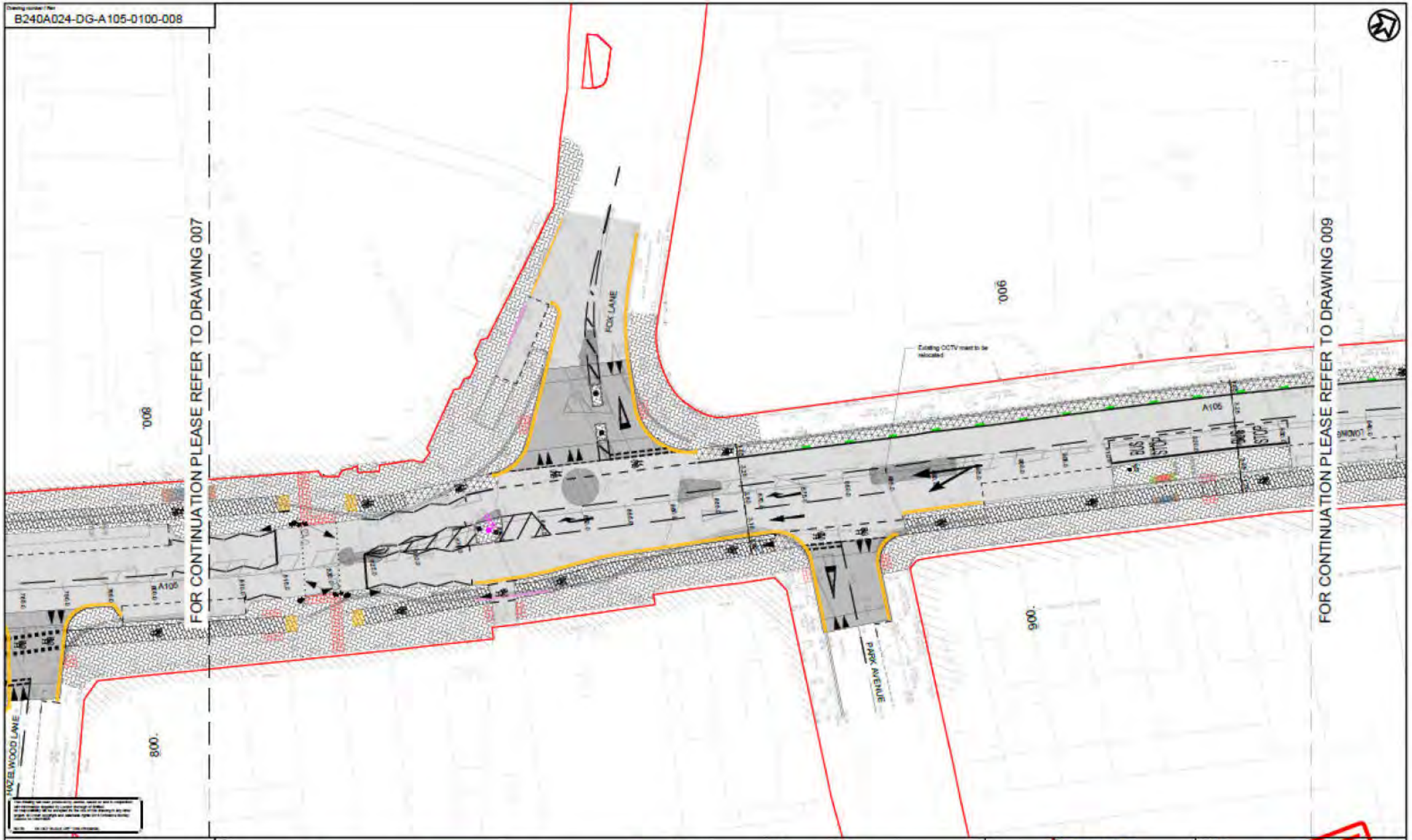
Jacobs No. B240A024

Drawing number: B240A024-DG-A105-0100-006

Rev: -


B240A024-DG-A105-0100-007
FOR CONTINUATION PLEASE REFER TO DRAWING 006
FOR CONTINUATION PLEASE REFER TO DRAWING 008
700.
800.
DEVONSHIRE ROAD
LOADING ONLY
A105
HAZELWOOD LANE
SPRINGFIELD PARADE MEWS
BUS STOP
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 7 OF 47
DRAFT
FOR COMMENTS ONLY
FOR APPROVAL
DO NOT SCALE
B240A024-DG-A105-0100-007

B240A024-DG-A105-0100-008



Notes

1. All dimensions are in metres unless otherwise stated. Dimensions shown are for illustrative purposes. Contractor is to refer to relevant drawings for setting out details.
2. Do not scale from this drawing.
3. All road markings and signs to be in accordance with the Traffic Signs Regulations and General Directions 2016.
4. Layouts are a combination of both topographical survey and Ordnance Survey. Where topographical survey information is not provided on drawings, all dimensions shown have been measured on site. Cite Section and discrepancies to be brought to the attention of the Site Engineer.
5. For further details of proposed signal plans please refer to Sign Schedule.
6. All existing damaged gully grates to be replaced.
7. All gully grates within proposed carriageway cycle lane to be replaced with cycle friendly grates and undamaged existing grates to be returned to stores.
8. Existing utility covers to be reset to suited levels where required. Footway covers within proposed cycle tracks are to be replaced, where indicated on the drawings by bleed arrows. Keys show proposed surface extents. Construction will vary depending on underlying structure.
9. Lamp columns unaffected by works will have luminaire replaced by L.B.E. while, by others. Where the carriageway is not being resurfaced, a 1m maintenance strip has been shown adjacent to the permeable cycle lane.
10. [illegible]
11. Where the carriageway is not being resurfaced, a 1m maintenance strip has been shown adjacent to the permeable cycle lane.

RINGWAY JACOBS

ENFIELD Council

CYCLE ENFIELD - A105

DRAFT FOR COMMENTS ONLY

GENERAL ARRANGEMENT SHEET 8 OF 42

FOR APPROVAL

Scale	1:200 @ A1
Jacobs No.	B240A024
Client No.	-
Drawing number	B240A024-DG-A105-0100-008
Rev	-

DO NOT SCALE

B240A024-DG-A105-0100-009

Drawing title: GENERAL ARRANGEMENT SHEET 9 OF 47

DRAFT FOR COMMENTS ONLY

Project: CYCLE ENFIELD - A105

Client: ENFIELD Council

RINGWAY JACOBS

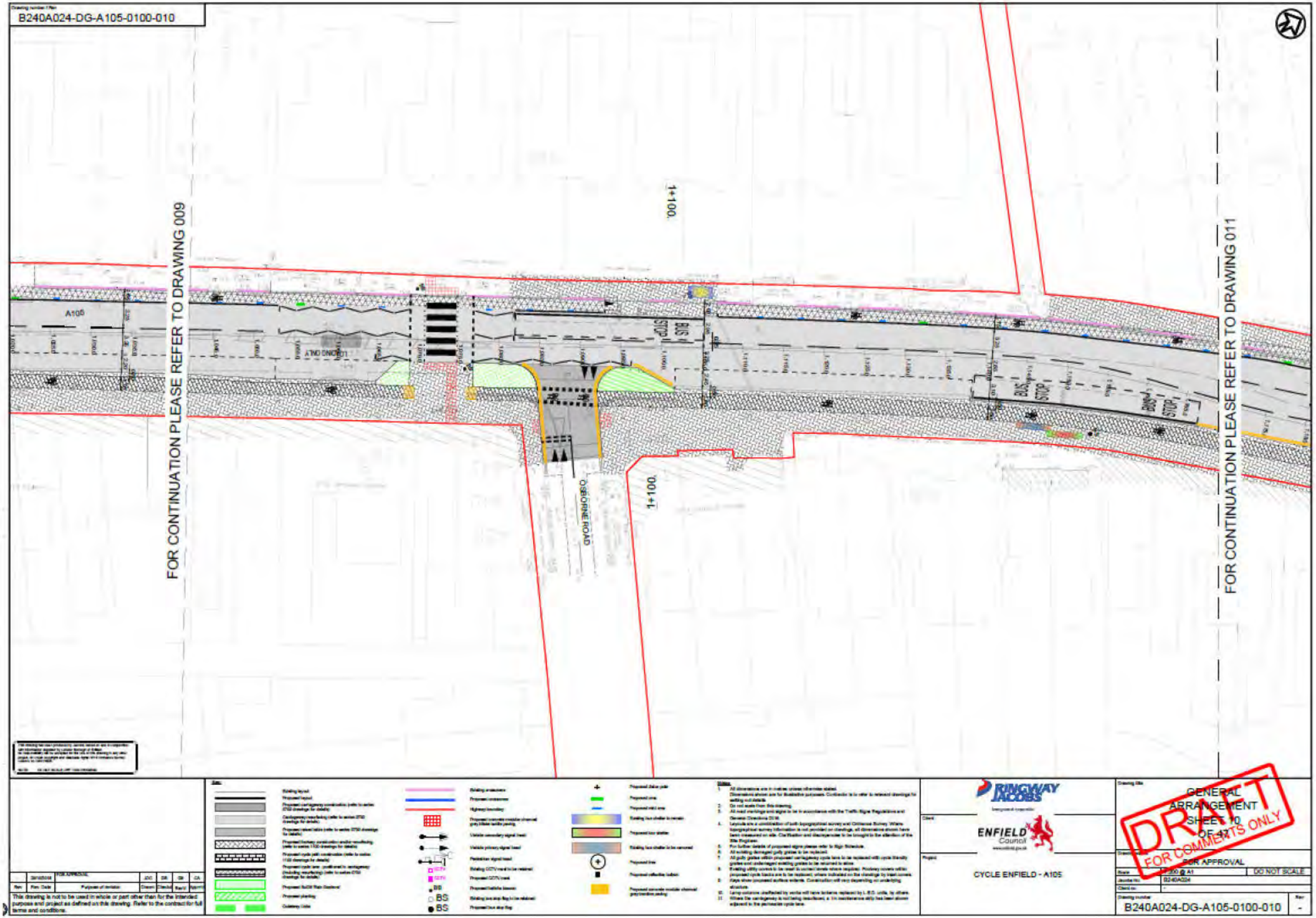
FOR APPROVAL

DO NOT SCALE

Drawing number: B240A024-DG-A105-0100-009

Rev: -

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.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FOR CONTINUATION PLEASE REFER TO DRAWING 009
FOR CONTINUATION PLEASE REFER TO DRAWING 011
1+100
1+100
A105
OSBORNE ROAD
BUS STOP
BUS STOP
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 10 OF 42
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FOR COMMENTS ONLY
FOR APPROVAL
DO NOT SCALE
B240A024-DG-A105-0100-010

Transport for London

Cycle Enfield - Section 5

A105 Green Lanes junction with Bourne Hill / Hedge Lane

Stage 2 Road Safety Audit

Ref: 2759.03.05/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	11/01/2017

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 5, A105 Green Lanes junction with Bourne Hill / Hedge Lane 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 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 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 16 h December 2016. 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 5 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:	Demos Kettenis – London Borough of Enfield

1.3.2 Design Organisation

Design contact details:	Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader:	Shane Martin – TfL Road Safety Audit
Audit Team Member:	Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 5 (Sheet 11) of this route only, the A105 Green Lanes junction with Bourne Hill / Hedge Lane.

1.5.2 Full details of the traffic signal staging / timings have not yet been provided and therefore the Audit Team could not fully comment on this element of the proposals.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016). This report covered the whole route and therefore many of the issues raised are not specific to this (Section 5) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.2 General to the scheme – town centre / shopping street areas – Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.2.

Problem 3.7.1 Green Lanes (North and South) at the junction with Bourne Hill – Separator islands may not be obvious to all road users, leading to collisions with the island.

This problem appears to have been resolved and is therefore not raised again within this report.

Problem 3.7.2 Junction with Bourne Hill and Green Lanes – Right turning cyclists not utilising the two stage right turn (2SRT) could be in conflict with other traffic movements.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.5.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.1 The revised kerb lines at side roads may alter vehicle swept paths and it is not clear if these have been assessed or may result in conflicts between turning vehicles.

This issue is considered to remain in part and will therefore be raised again as part of 3.2.1 in this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to the scheme - Town Centre / shopping street areas

Summary: Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions

Within the main shopping streets the proposed cycle lanes will reduce the effective footway widths and segregate pedestrians from crossing points, bus stops and parking / loading bays. Pedestrians not contained or comfortable on the footway area may increasing use the cycle lanes at a greater risk of collision with cyclists. Additionally, pedestrians crossing or waiting / walking immediately adjacent to the proposed cycle lanes may also be at an increased potential for collisions with cyclists.

RECOMMENDATION
It is recommended to provide a defined separation between footway / cycle lane, and cycle lane to carriageway. This may include but is not limited to providing a stepped facility at a different level for each facility. It may also be beneficial to incorporate contrasting colour and/or texture between cycle lane and footway; measures to address cycle speeds may be beneficial to ensure safe pedestrian to cycle interaction.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineator may lead to collisions with visually impaired pedestrians

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator between the footway and cycle tracks provided at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION
It is recommended that as well as a good visual differentiation between the footway and cycle tracks, a detectable delineator should be provided to ensure that all users are aware of the edge of footway whilst not presenting a trip hazard.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: A – Green Lanes southbound entry to Hedge Lane

Summary: Semi-segregated cycle lane terminates just before the left turn slip road which may increase left turning collisions between vehicles and cyclists

The proposed layout results in the semi segregated cycle lane returning to the carriageway just before the left turn slip for motorists to turn left from Green Lanes on to Hedge Lane. The proposed road markings indicate this is a bus gate but no other corresponding signs or road markings clarify this and it is therefore anticipated that some general traffic will also use this area. It may be difficult for both sets of road users to understand who has priority and this may lead to left hook type collisions as motorists potentially turn across the path of cyclists attempting to continue ahead.

The signalised junction ahead also results in an increased potential for cyclists to be travelling faster than vehicles whom may be queuing in traffic. Left turning drivers may struggle to see or anticipate a cyclist undertaking on the nearside, which may exacerbate the potential for left hook type collisions.

RECOMMENDATION
If the left turn slip is intended to be used by buses only then this should be made more conspicuous with additional signs and road markings. It may be beneficial to clarify priorities between cyclists on the track and left turning vehicles. As the current gap that cyclists have to cross is long it may be beneficial to alter the layout to reduce the distance over which they are exposed to turning movements which may also have the added benefit of reducing vehicle speeds and potentially making this less appealing for general traffic. This would require careful consideration of the movements which buses undertake and the implications on swept paths of vehicles.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: B – Green Lanes junction with Bourne Hill / Hedge Lane

Summary: Two stage right turn may lead to confusion and potential collisions

The proposed layout includes two stage right turns (2SRT) from Bourne Hill and Hedge Lane. The Audit Team are concerned that the road markings alone may not clearly convey the intended manoeuvre and that once at the intended waiting position before making the second stage of the right turn cyclists may not be able to clearly see a relevant traffic signal. This is particularly relevant for users trying to travel southbound (from Bourne Hill) as the lack of secondary traffic signal may make it difficult for them to know when it is safe to proceed. If cyclists attempt to proceed at the wrong time they may face an increased potential for collisions with passing vehicles.

RECOMMENDATION
It is recommended to provide signs to clearly indicate the intended manoeuvres for cyclists and also to ensure that a relevant traffic signal is clearly visible to encourage cyclists to set off at the most appropriate time.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 JUNCTIONS

3.2.1 PROBLEM

Location: C - A105 Physical Islands / turning points within the junction

Summary: The altered kerb lines may result in increased collisions as turning vehicles increasingly encroach into the path of another user

The proposals include various kerb line alterations which may increase the potential for turning vehicles to encroach into another user's path or collide with a kerbed island. This could lead to an increased potential for head on, side impact type collisions or collisions with physical islands / revised kerb lines.

RECOMMENDATION
It is recommended to undertake / check swept path analysis and make alterations if necessary to ensure that the vehicles likely to use these roads can undertake typical manoeuvres with minimal intrusion into the path of another vehicle or over-running / scrubbing of kerbs.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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: Various – shared use cycle / footway

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

It is not clear what the extents of the shared use surfaces are, as none of the shared use extents appear to be defined.

In order to avoid cyclists continuing on the footway and the potential for low level cycle / pedestrian conflicts / unexpected cycle manoeuvres, it may be beneficial to clearly determine what the intended shared use areas and cycle routes are. This may include but is not limited to appropriate tactile paving, dropped kerbs and road markings / signs to indicate the intended routes and extents of shared use areas.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: 1 – Green Lanes junction with Hedge Lane / Bourne Hill

Reason considered to be outside the Terms of Reference: Existing problem rather than a defined road safety concern.

The proposals include an Advanced Stop Line and a two stage right turn (2SRT) for for cyclists exiting Bourne Hill but only a two stage right turn for cyclists exiting Hedge Lane.

The lack of an ASL for cyclists exiting Hedge Lane may make them more vulnerable to left hook type collisions, or for a driver of a HGV not to see them (in close proximity to the front of a HGV) as they pull away from the lights. This is not raised in section 3 as it is an existing issue but as cycling uptake may increase as a result of the overall scheme it may be beneficial to assess and if feasible include an ASL for cyclists on Hedge Lane.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: 2 – Green Lanes junction left turn slip to Hedge Lane

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

The proposals include an uncontrolled crossing facility which crosses the rear end of a bus stand cage. It is possible that a visually impaired user utilising a tapping stick may identify the crossing point (tactile paving) and begin to cross and not identify the presence of the rear overhang of a bus.

It may therefore, be beneficial to relocate the bus stand further forwards so that it does not cover the crossing carpet.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin [redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 11

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour [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 2 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:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

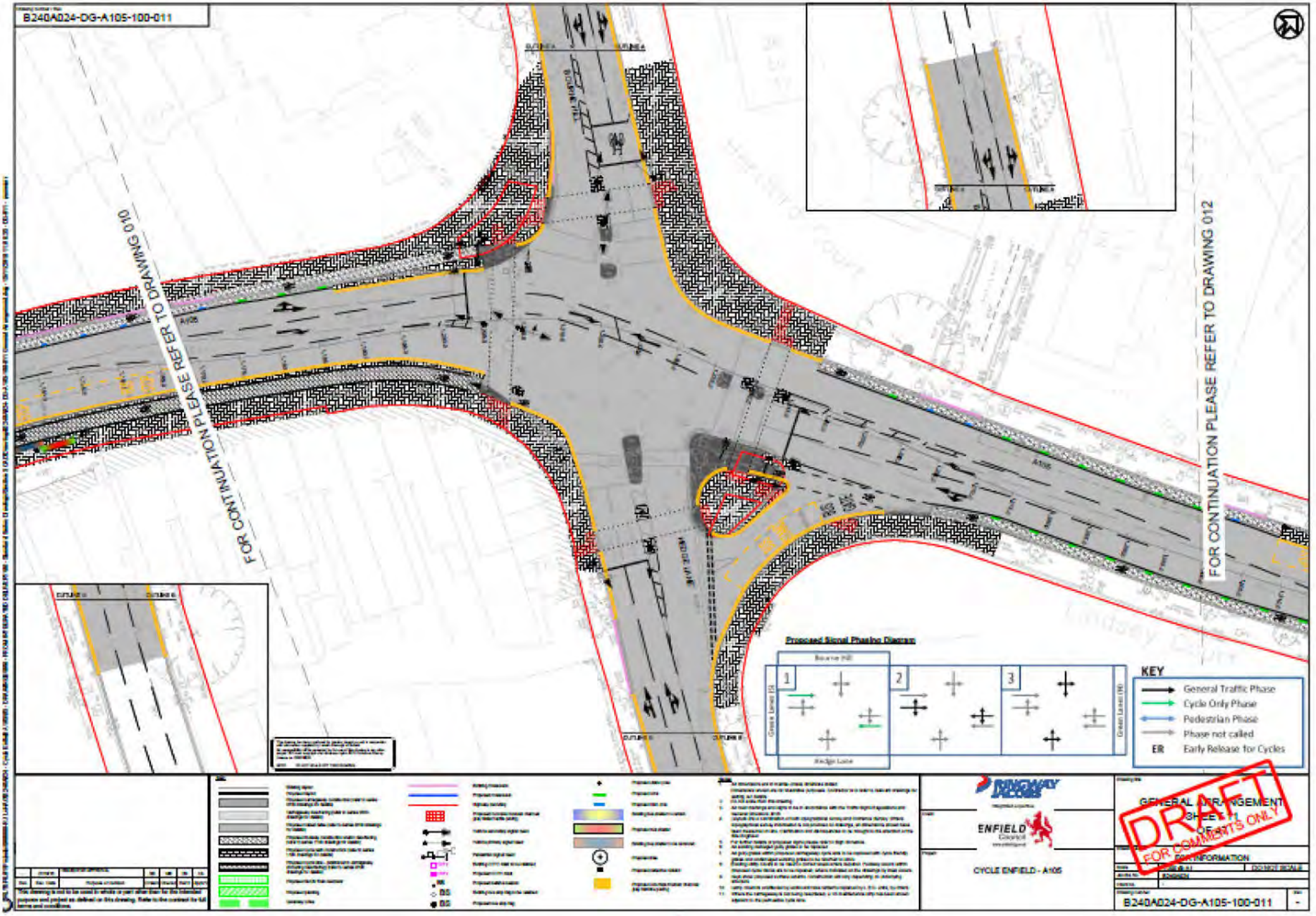
Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-011 Rev -	Cycle Enfield A105 - General Arrangement Sheet 11 of 47
B240A024-DG-A105-0200-011 Rev -	Cycle Enfield A105 - Site Clearance Sheet 11 of 47
B240A024-DG-A105-0500-011 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 11 of 47
B240A024-DG-A105-0700-011 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 11 of 47
B240A024-DG-A105-1100-011 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 11 of 47
B240A024-DG-A105-1200-011 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 11 of 47
B240A024-DG-A105-1300-011 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 11 of 47

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 5

APPENDIX B

Problem Locations


B240A024-OG-A105-100-011
FOR CONTINUATION PLEASE REFER TO DRAWING 010
FOR CONTINUATION PLEASE REFER TO DRAWING 012
Proposed Signal Phasing Diagram
KEY
General Traffic Phase
Cycle Only Phase
Pedestrian Phase
Phase not called
ER Early Release for Cycles
DRAFT
FOR COMMENTS ONLY
GENERAL ARRANGEMENT
SHEET 11 OF
FOR INFORMATION
DO NOT SCALE
CYCLE ENFIELD - A105
B240A024-OG-A105-100-011

Transport for London

Cycle Enfield - Section 6

A105 Oaktree Avenue to Carpenters Gardens

Stage 2 Road Safety Audit

Ref: 2759.03.06/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	11/01/2017

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 6, A105 Oaktree Avenue to Carpenters Gardens 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 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 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 16 h December 2016. 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 6 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:	Demos Kettenis – London Borough of Enfield

1.3.2 Design Organisation

Design contact details:	Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader:	Shane Martin – TfL Road Safety Audit
Audit Team Member:	Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 6 (Sheets 12 - 17) of this route only, along the A105 from Oaktree Avenue to outside Sainsbury's in proximity to Carpenters Gardens.

1.5.2 Full details of the traffic signal staging / timings have not yet been provided and therefore the Audit Team could not fully comment on this element of the proposals.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016). This report covered the whole route and therefore many of the issues raised are not specific to this (Section 6) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.1 Combined zebra / cycle crossing facilities – Proposed zebra and cycle crossing layouts may result in drivers failing to give way to cyclists.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.2.1.

Problem 3.1.3 Cycle lanes past junction locations - Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.2.

Problem 3.1.4 Side road cycle crossovers at raised junction tables - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.4.

Problem 3.1.5 Bus stops / loading bays close to side road junctions and accesses – may restrict visibility splays and lead to failure to give way type collisions.

This problem remains in the detailed design proposals and is therefore raised again within this report as part of problem 3.3.2.

Problem 3.6.2 Zebra crossing outside Sainsburys – Proximity of bus stops to the zebra crossing reduces forward visibility and may lead to failure to give way type collisions involving cyclists.

This problem remains in the detailed design proposals and therefore this is raised again as problem 3.2.3 in this Audit Report.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.1 The revised kerb lines at side roads may alter vehicle swept paths and it is not clear if these have been assessed or may result in conflicts between turning vehicles.

This issue is considered to remain in part and will therefore be raised again as part of problem 3.3.1 in this Audit report.

Issue 4.2 Bus boarders separated from the footways by cycle lanes may result in difficulties for some users to access the bus stop and may lead to low level cycle / pedestrian conflicts.

	This issue is considered to remain in part and will therefore be raised again as part of problem 3.1.3 in this Audit report.
Issue 4.11	South of Eaton Park Road Removal of this pedestrian refuge island may result in pedestrians crossing close to the parking bays or bus stops.
	This issue is considered to remain in part and will therefore be raised again as part of problem 3.2.4 in this Audit report.
Issue 4.12	Zebra crossing south of Stonard Road – High vehicle speeds may be incompatible with the proposed zebra crossing.
	This issue is considered to remain in part and will therefore be raised again as part of problem 3.2.5 in this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Semi segregated cycle lanes terminating just before the side road junction may increase left turning collisions between vehicles and cyclists

The proposed semi segregated cycle lanes return to the general carriageway just before various side road junctions. It may be difficult for both sets of road users to understand who has priority and this may lead to turning collisions involving cyclists. Cyclists may not anticipate and vehicles turning across their path in close proximity to them leaving the semi segregated cycle lane, which could lead to increased risk of side impact collisions as motorists cross the path of cyclists.

RECOMMENDATION
It is recommended that the priority is clearly defined. Furthermore, research from TRL (PPR703 – Trials of segregation set-back at side roads) indicates that setting back cycle lanes by at least 20m from side roads may improve cyclist safety at junctions.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that proposed cycle tracks run immediately adjacent to proposed bus stop boarders. Therefore bus passengers would board / alight a bus from / onto the cycle tracks. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions. Visually impaired pedestrians, particularly those alighting from a bus may follow the kerb line and inadvertently enter the carriageway. Visually impaired pedestrian unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the layouts of the bus stop boarders / cycle tracks are altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing tramline tactile paving prior to the ramps down to carriageway level and an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: General to the scheme – side road cycle crossovers at raised junction tables

Summary: Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle / vehicle conflicts

The off-road cycle facilities cross this side road at a raised table area, drivers turning from the main road have a short stacking space between the main road and these cycle crossovers. No give way markings are present as vehicles enter Sherbrook Gardens, neither is there sufficient stacking space to accommodate a vehicle without it overhanging on to the main road. Therefore, drivers may be confused by the arrangement and / or reluctant to give way to cyclists as it results in them remaining partially within the main carriageway, which may lead to late braking nose to tail collisions. The potential for conflicts may be exacerbated by the proposed parking relatively close to the side road between the main carriageway and segregated cycle track.

Drivers entering the main road may be confused by the lack of give way markings and therefore an unclear priority. As a result motorists may fail to give way to traffic on the main road or stop across the cycle lane, which may lead to nose to tail collisions or cycle to vehicle conflict.

RECOMMENDATION

If such cycle priority is to be provided at side roads then this should be clearly designated, an appropriate stacking space should be provided between the main road and cycle crossing to allow vehicles to wait between the main road and cycle crossing without encroaching in to the main carriageway or blocking the cycle crossing (reference London Cycle Design Guide). Any 'floating' loading / parking bays should be located to ensure that sufficient intervisibility is provided between cyclists and motorists. Additionally, it may be beneficial to provide additional give way markings consistently as vehicles enter the main road.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineation may lead to collisions with visually impaired pedestrians

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator between the footway and cycle tracks proposed at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION
It is recommended that as well as a good visual differentiation between the footway and cycle tracks, a detectable delineator should be provided to ensure that all users are aware of the edge of footway whilst not presenting a trip hazard.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.7 PROBLEM

Location: General – Parking permitted adjacent to cycle track

Summary: Parking / loading permitted adjacent to the cycle track may result in users exiting or unloading within the cycle track

The proposals include retention of existing parking bays There appears to be a buffer of approximately 0.5m between the parking bays and the proposed cycle track. The Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the cycle track which may result in an increased potential for collisions between southbound cyclists and people using / loading to / from the parking bays.

RECOMMENDATION
It is recommended that the buffer is increased to ensure that the cycle path is kept as clear as possible and suitable pedestrian and disabled user access to the parking bays is provided over the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.8 PROBLEM

Location: Various – commencements of full height kerbs

Summary: Motorists may not notice and collide with the commencement of full height kerbs

The Audit Team are concerned that motorists may not appreciate that the edge of the cycle track includes a full height kerb alongside the 'floating bus stop' facility. This kerbed physical segregation commences within the carriageway running lane and it does not include a suitable vertical feature to highlight its presence or guide users alongside it. It may therefore, not be clear or conspicuous particularly during the hours of darkness. Motorists may collide with the kerb or swerve to avoid the features if they are noticed within close proximity, which may result in loss of control type collisions / injury to those on or within the vehicle.

RECOMMENDATION
It is recommended to alter the layout to suitably guide vehicles alongside the kerbs. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) to provide suitable guidance alongside the feature.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 CROSSING FACILITIES

3.2.1 PROBLEM

Location: A – South of junction with Barrowell Green

Summary: Proposed parallel zebra and cycle crossing may result in drivers failing to give way to cyclists

The Audit Team are concerned that the proposed parallel zebra and cycle crossing may not be understood by motorists particularly as the layout is new to drivers. The following issues may result in an increased potential for collisions:

- Zebra crossings are well established and the conspicuousness of the thick black and white striped road markings help to clearly indicate that a pedestrian has priority over vehicular traffic in this area. The lack of these markings within the proposed cycle section of the crossing may lead to ambiguity over who has priority and motorists may fail to give way to cyclists it is also noted that no cycle road marking logos are proposed .
- Slow approach speeds by pedestrians enable an approaching motorist to notice they intend to cross, slow down and stop. Cyclists are likely to approach faster than pedestrians and may therefore fail to be noticed by approaching motorists.
- Motorists turning left out of Barrowell Green encounter the cycle element of the crossing immediately as they enter the A105 Green Lanes, they may not appreciate or expect to encounter a crossing in such close proximity, particularly as this element of the crossing is less conspicuous.
- The routes / dropped kerb facilities intended for cyclists to enter the cycle element of the crossing from the cycle track / carriageway are not clearly defined. This may result in cyclists using undetermined and inconsistent routes which may result in increased collisions with pedestrians.

These issues may lead to an increased potential for collisions between motorists and cyclists or shunt type collisions as motorists brake hard as they unexpectedly encounter a cyclist attempting to assert priority. It is also noted that the cycle part of the proposed crossing does not include cycle symbol road markings as prescribed in TSRGD 2016.

RECOMMENDATION

Provide measures which will allow cyclists to assert priority over motorists. This could include an alternative crossing type, or provide appropriate temporary signing etc to inform drivers of the intended usage until this layout becomes more commonplace. It may also be beneficial to relocate the crossing further away from the side roads and ensure the crossing complies with TSRGD 2016 which includes cycle symbols and to.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.2 PROBLEM

Location: B – South of junction with Barrowell Green

Summary: Proposed parallel zebra and cycle crossing may result in collisions between pedestrians and cyclists

The Audit Team are concerned that the proposed parallel zebra and cycle crossing layout may result in pedestrians unexpectedly encountering a cyclist crossing their path. Examples include on the western side of the crossing, cyclists continuing southbound are effectively guided straight across the area where pedestrians exit the carriageway. Also, users travelling north or southbound on the eastern footway may not anticipate cyclists crossing their path as they attempt to enter the cycle crossing.

Additionally, as the shared use extents on the eastern side of the crossing do not appear to be defined and as cyclists may make various / inconsistent manoeuvres to enter / exit the footway this may be difficult for pedestrians to anticipate which may further add to the potential for collisions between cyclists and pedestrians.

RECOMMENDATION
It is recommended to clarify the intended routes for cyclists and provide features to make these clear to both users, it may also be beneficial to clearly define the extents of the shared use area. This may require but is not limited to cycle logo markings to highlight the potential presence and intended route for cyclists and tactile paving / low level signs to indicate the extents of the shared use area on the eastern side of the crossing.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.3 PROBLEM

Location: C - Zebra crossing outside Sainburys

Summary: Proximity of bus stops to the zebra crossing reduces forward visibility and may lead to failure to give way type collisions involving cyclists

Bus stops on both sides of the crossing are located upstream of the zebra crossing location. When buses occupy the stops there may be poor forward visibility to the pedestrian waiting areas of the crossing for approaching drivers. Poor visibility may lead to drivers failing to stop at the crossing when a pedestrian is crossing, with consequent risk of pedestrian injury.

RECOMMENDATION

It is recommended that alterations are incorporated to ensure that adequate forward visibility should be provided to the pedestrian waiting areas on the approach to the crossing. This could be achieved by relocating the bus stops to a 'tail to tail' orientation.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.4 PROBLEM

Location: D – A105 Green Lanes near junction with Eaton Park Road

Summary: Removal of this crossing facility may result in pedestrians crossing at undetermined locations and an increased risk of potential collisions with motorists

The Audit Team are concerned that an existing pedestrian desire-line appears to exist at this informal crossing point. As the existing pedestrian refuge island and dropped kerbs are proposed to be removed as part of the scheme proposals users may cross around this area but at undetermined locations such as beside the proposed parking bays, where they may have reduced intervisibility between approaching vehicles. Additionally, the lack of dropped kerbs may result in some users such as those with pushchairs or wheelchairs potentially having difficulties and taking longer to exit the carriageway. Therefore if pedestrians continue to cross at this location they may be at an increased risk of collisions with vehicles. Also pedestrians rushing to cross may be less likely to notice the 'orcas' which may exacerbate the potential for trips and falls highlighted in 3.1.1.

RECOMMENDATION
It is recommended to determine the pedestrian desire-lines and ensure that they are suitably catered for. This may include, but is not limited to providing additional crossing facilities.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.5 PROBLEM

Location: E – A105 Green Lanes near junction with Stonard Road

Summary: Proposed zebra crossing facility may not be compatible with vehicle speeds, which may result in collisions with pedestrians

The Audit Team are concerned that the existing speeds along this section appear as though they may be higher than the recommended maximum 35mph (LTN 1/95). If the 85th percentile speeds do exceed this then installation of a zebra crossing could lead to pedestrians being less likely to be able to assert priority over oncoming vehicles and / or for vehicles to not stop in time as a pedestrian tries to assert priority. This may therefore result in an increased potential for collisions with pedestrians, particularly whilst the bus stop (northeast bound approach) or parking bays (southwest bound approach) are not occupied, as these may have a traffic calming effect and reduce vehicle speeds on approach.

RECOMMENDATION

It is recommended to provide features to ensure that the approach speeds are suitable for the crossing type proposed. This may include, but is not limited to, providing more formalised / permanent speed reduction measures on approach to the crossing facility such as kerb build outs for the bus stop / parking bays.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 JUNCTIONS

3.3.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The altered kerb lines may result in increased collisions as turning vehicles increasingly encroach into the path of another user

The proposals include various kerb line alterations which may increase the potential for turning vehicles to encroach into another user's path. This could lead to an increased potential for head on or side impact type collisions as a user turning into or out of the side roads or accesses is encountered by a vehicle travelling in the opposing direction.

RECOMMENDATION
It is recommended to undertake / check swept path analysis and make alterations if necessary to ensure that the vehicles likely to use these roads can undertake typical manoeuvres with minimal intrusion into the path of another vehicle.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.2 PROBLEM

Location: General to the scheme – bus stops / loading / parking bays close to side roads

Summary: Stationary vehicles close to side road junctions and accesses may restrict junction visibility splays and lead to failure to give way type collisions

At many locations the loading / parking bays are located close to side road junctions and accesses. Stationary vehicles close to side roads may restrict visibility for drivers emerging from the side roads and this may lead to failure to give way type collisions. Similarly, where bus stops are located close to the side roads the Audit Team are concerned that vehicles overtaking waiting buses may not suitably observe vehicles egressing from side roads which may result in side impact type collisions.

RECOMMENDATION
It is recommended to ensure that appropriate visibility splays at side roads should be provided and kept free of obstruction and stationary vehicles. This may require alterations to the positioning and / or extent of the bus stops / parking / loading bays.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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: Various – junctions with proposed raised tables

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

Various junctions are proposed to have raised tables implemented. The kerb details indicate that away from crossing points where transition or flush kerbs are proposed the kerbs will have an upstand of 125mm or to match existing. It is not clear therefore what the upstand will be at the raised tables.

It is assumed that a detectable upstand will be provided away from pedestrian crossing points.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: Various – shared use cycle / footway

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

It is not clear what the extents of the shared use surfaces are as none of the shared use extents appear to be defined. Additionally, at some locations it is not clear what the intended cyclist route is.

In order to avoid cyclists continuing on the footway and the potential for low level cycle / pedestrian conflicts / unexpected cycle manoeuvres, it may be beneficial to clearly determine what the intended cycle routes are. This may include but is not limited to appropriate tactile paving, dropped kerbs and road markings / signs to indicate the intended routes / manoeuvres.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: Various – throughout this section

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

Planting / SuDs 'Rain Gardens' are proposed immediately adjacent to the carriageway / cycle lanes at various junctions throughout this section.

The full details of the proposed features have not been provided but it is assumed that these will be of a type / maintained so that they do not restrict visibility or overgrow into the live carriageway areas.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-012 Rev -	Cycle Enfield A105 - General Arrangement Sheet 12 of 47
B240A024-DG-A105-0100-013 Rev -	Cycle Enfield A105 - General Arrangement Sheet 13 of 47
B240A024-DG-A105-0100-014 Rev -	Cycle Enfield A105 - General Arrangement Sheet 14 of 47
B240A024-DG-A105-0100-015 Rev -	Cycle Enfield A105 - General Arrangement Sheet 15 of 47
B240A024-DG-A105-0100-016 Rev -	Cycle Enfield A105 - General Arrangement Sheet 16 of 47
B240A024-DG-A105-0100-017 Rev -	Cycle Enfield A105 - General Arrangement Sheet 17 of 47
B240A024-DG-A105-0200-012 Rev -	Cycle Enfield A105 - Site Clearance Sheet 12 of 47
B240A024-DG-A105-0200-013 Rev -	Cycle Enfield A105 - Site Clearance Sheet 13 of 47
B240A024-DG-A105-0200-014 Rev -	Cycle Enfield A105 - Site Clearance Sheet 14 of 47
B240A024-DG-A105-0200-015 Rev -	Cycle Enfield A105 - Site Clearance Sheet 15 of 47
B240A024-DG-A105-0200-016 Rev -	Cycle Enfield A105 - Site Clearance Sheet 16 of 47
B240A024-DG-A105-0200-017 Rev -	Cycle Enfield A105 - Site Clearance Sheet 17 of 47
B240A024-DG-A105-0500-012 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 12 of 47
B240A024-DG-A105-0500-013 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 13 of 47
B240A024-DG-A105-0500-014 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 14 of 47
B240A024-DG-A105-0500-015 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 15 of 47
B240A024-DG-A105-0500-016 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 16 of 47
B240A024-DG-A105-0500-017 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 17 of 47

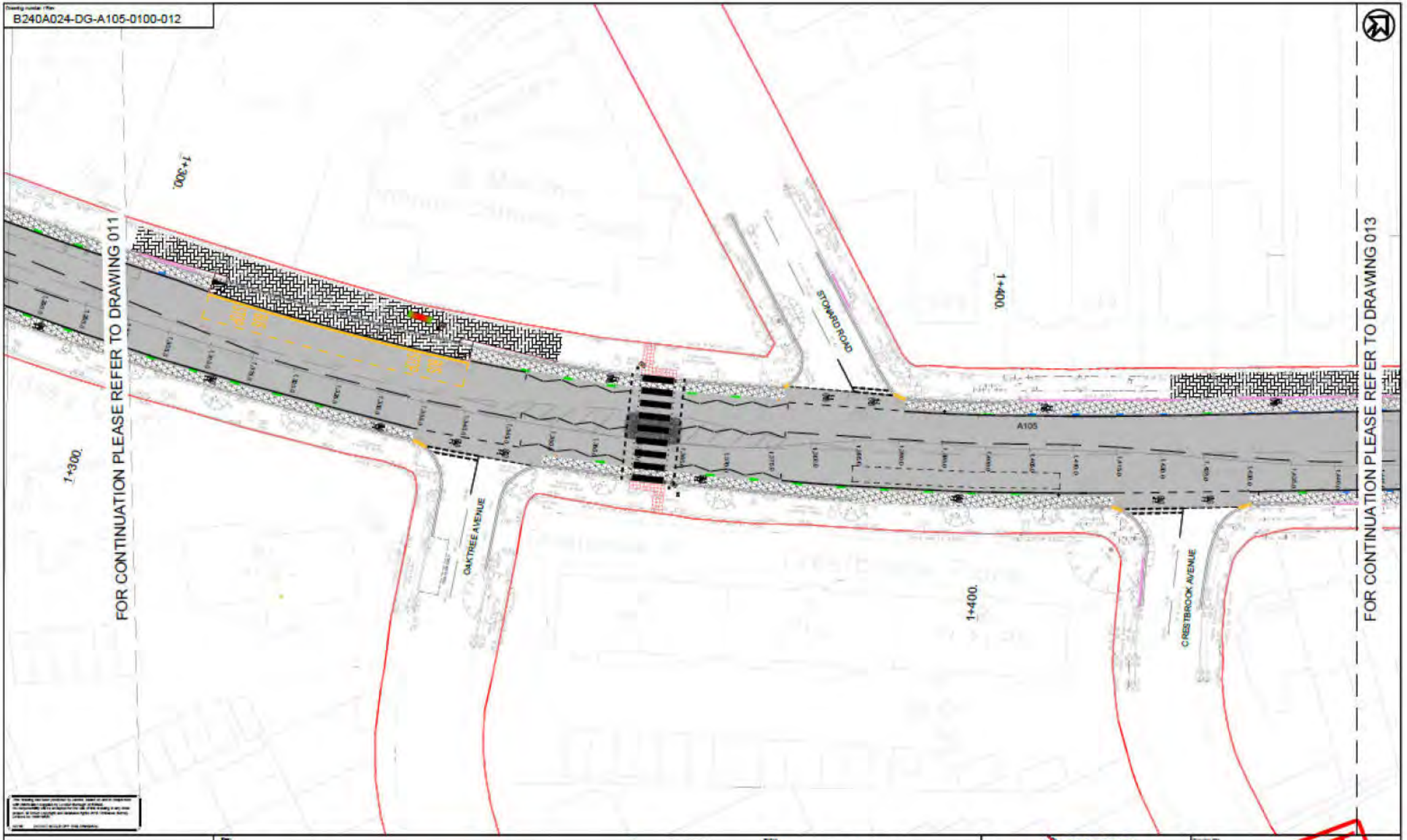
B240A024-DG-A105-0700-012 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 12 of 47
B240A024-DG-A105-0700-013 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 13 of 47
B240A024-DG-A105-0700-014 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 14 of 47
B240A024-DG-A105-0700-015 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 15 of 47
B240A024-DG-A105-0700-016 Rev –	Cycle Enfield A105 – Road Pavements General Sheet 16 of 47
B240A024-DG-A105-0700-017 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 17 of 47
B240A024-DG-A105-1100-012 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 12 of 47
B240A024-DG-A105-1100-013 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 13 of 47
B240A024-DG-A105-1100-014 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 14 of 47
B240A024-DG-A105-1100-015 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 15 of 47
B240A024-DG-A105-1100-016 Rev –	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 16 of 47
B240A024-DG-A105-1100-017 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 17 of 47
B240A024-DG-A105-1200-012 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 12 of 47
B240A024-DG-A105-1200-013 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 13 of 47
B240A024-DG-A105-1200-014 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 14 of 47
B240A024-DG-A105-1200-015 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 15 of 47
B240A024-DG-A105-1200-016 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 16 of 47
B240A024-DG-A105-1200-017 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 17 of 47

B240A024-DG-A105-1300-012 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 12 of 47
B240A024-DG-A105-1300-013 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 13 of 47
B240A024-DG-A105-1300-014 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 14 of 47
B240A024-DG-A105-1300-015 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 15 of 47
B240A024-DG-A105-1300-016 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 16 of 47
B240A024-DG-A105-1300-017 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 17 of 47

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 6

APPENDIX B

Problem Locations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1+400
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A105
OAKTREE AVENUE
CRESTBROOK AVENUE
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 12 OF 47
DRAFT
FOR COMMENTS ONLY
FOR APPROVAL
DO NOT SCALE
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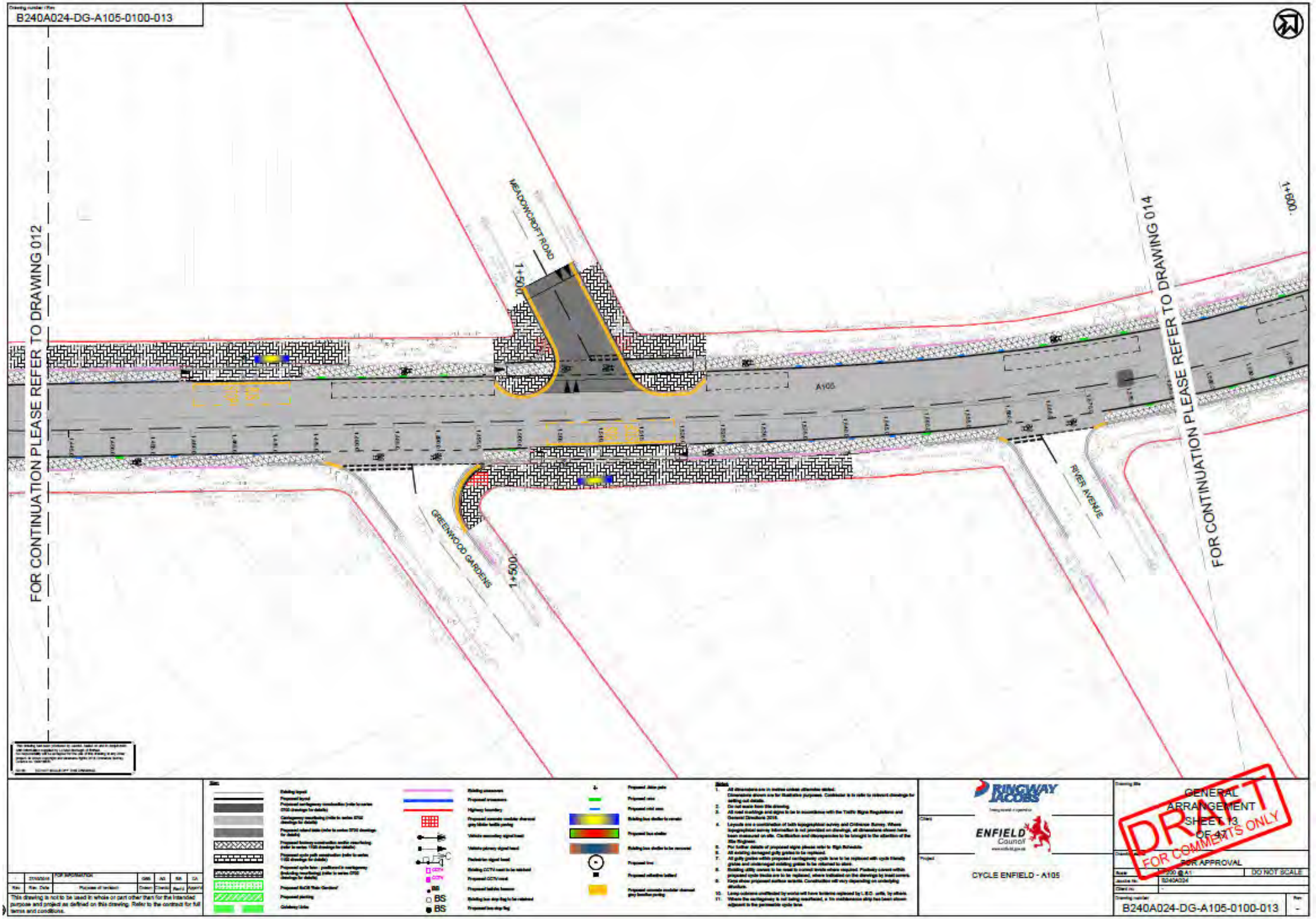
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A105
1+600
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RIVER AVENUE
GREENWOOD GARDENS
1+500
DRAFT
FOR COMMENTS ONLY
RINGWAY JACOBS
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CYCLE ENFIELD - A105
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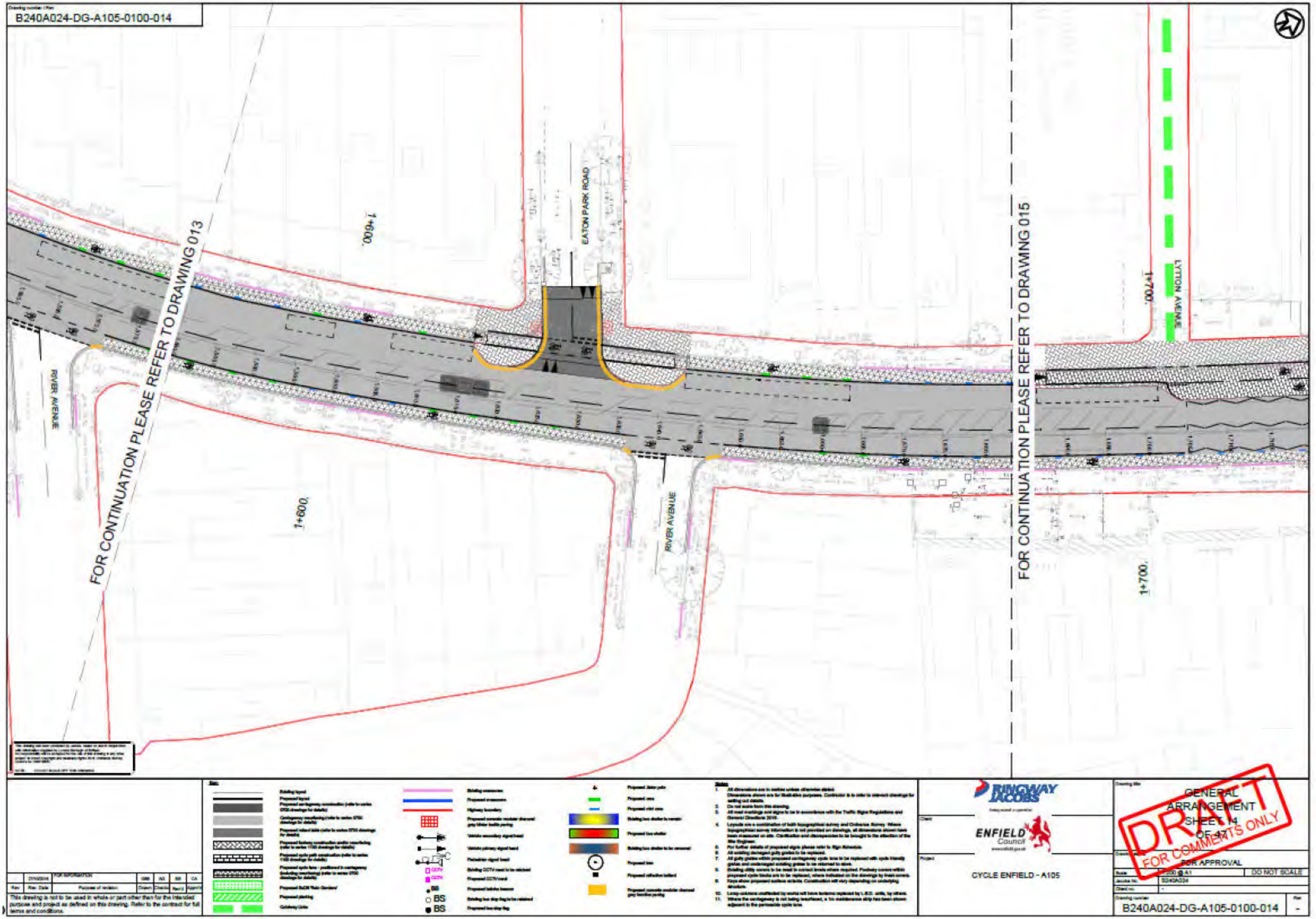
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RIVER AVENUE
RIVER AVENUE
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1+600
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FOR CONTINUATION PLEASE REFER TO DRAWING 015
RINGWAY JACOBS
ENFIELD Council
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GENERAL ARRANGEMENT SHEET 14 OF 17
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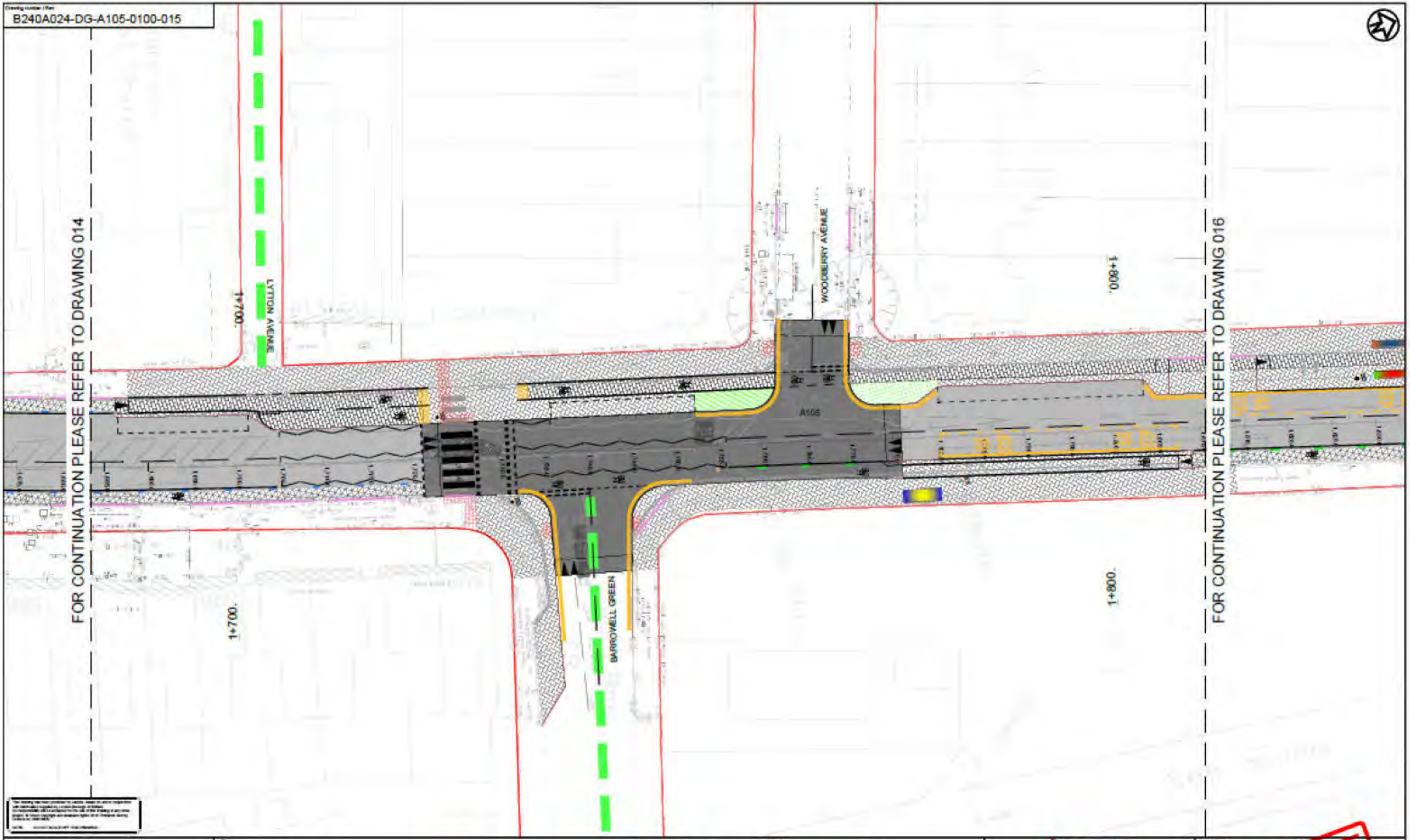
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WOODBERRY AVENUE
BARROWELL GREEN
A105
1+700
1+800
1+900
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
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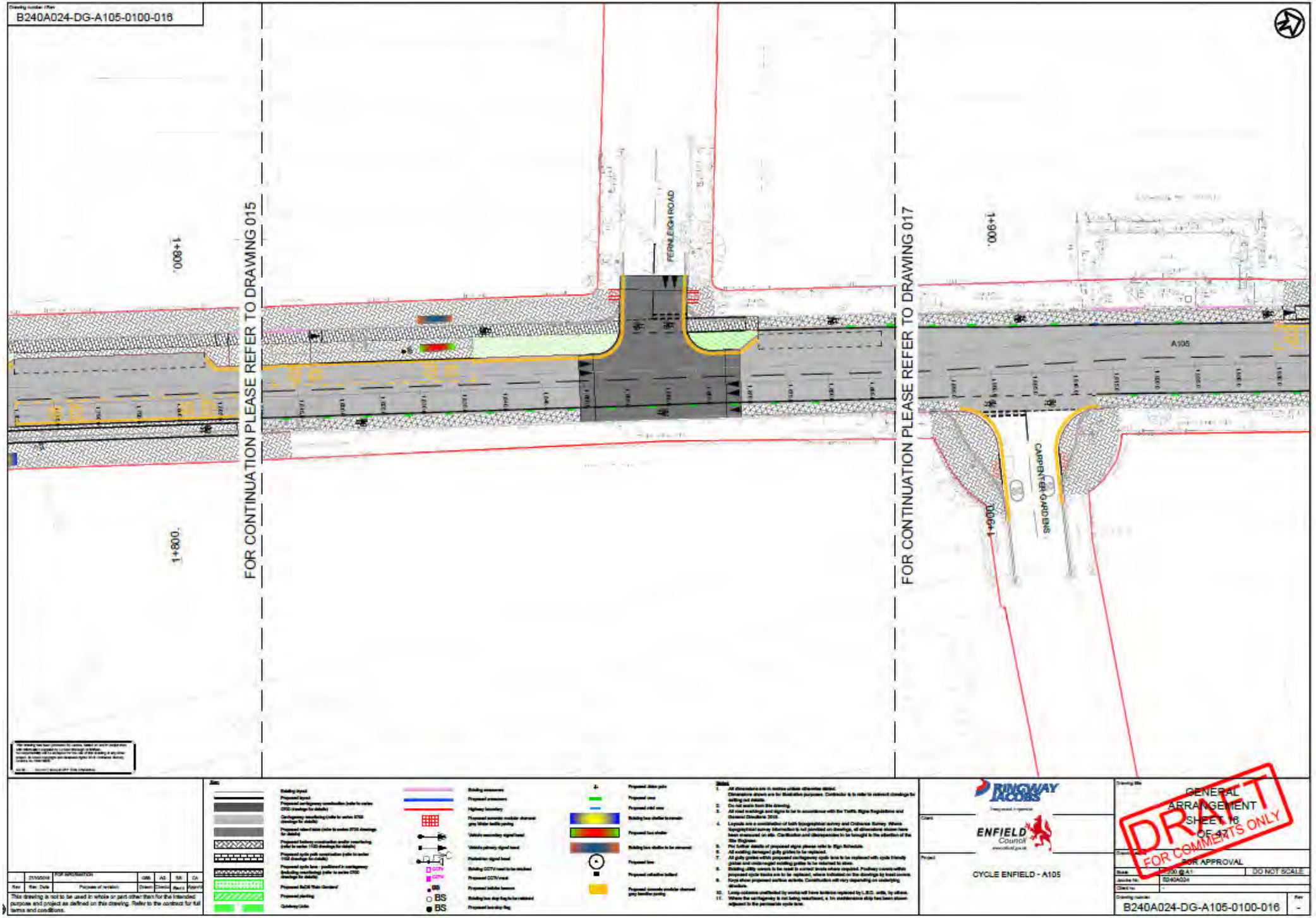
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CARPENTERS GARDENS
A105
1+800
1+900
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 16 OF 47
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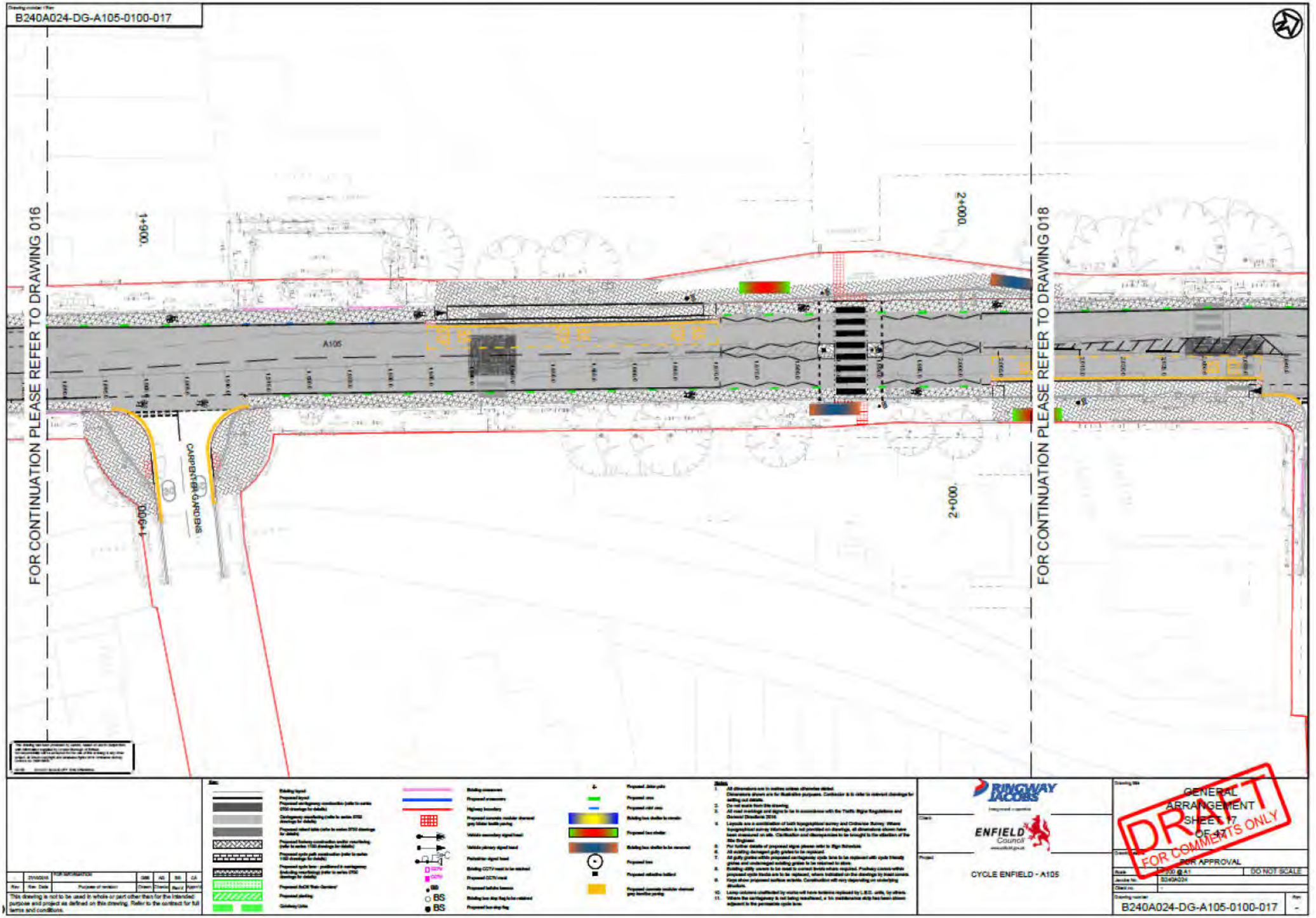
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CARPENTERS GARDENS
1+900
2+000
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 17 OF 47
DRAFT
FOR COMMENTS ONLY
FOR APPROVAL
DO NOT SCALE
B240A024-DG-A105-0100-017

Transport for London

A105 Green Lanes J/W Highfield Road

Cycle Enfield - Section 7

Stage 2 Road Safety Audit

Ref: 2759.02.07/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	25/11/2016

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the A105 Green Lanes junction with Highfield Road, Cycle Enfield - Section 7 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 14th November 2016. It took place at the Palestra offices of TfL on 15th November 2016 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 15 h November 2016. 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: Paul Rogers – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 7 (Sheet 18) of this route only, A105 Green Lanes at the staggered junction with Highfield Road and the Sainsbury's Access.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016. This report covered the whole route and therefore many of the issues raised are not specific to this (Section 7) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.3 Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists

This problem remains and is therefore raised as 3.1.2 within this Audit Report.

Problem 3.6.2 Zebra crossing outside Sainsbury's - Proximity of bus stops to the zebra crossing reduces forward visibility and may lead to failure to give way type collisions involving cyclists

The zebra crossing falls outside of the area covered within this section, however as no replacement is shown within these proposals an issue relating to this is raised as 4.1 within this Audit Report.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.9 The pedestrian refuges either side of Clapton Road (one of which falls within this section) appear to be removed which may affect pedestrian desire lines.

This is a potential problem in the detailed design and is therefore raised as part of 3.2.1 in this Audit report.

Issue 4.10 Drivers emerging into the junction area (from Duncan Court) may not be able to adequately perceive an appropriate time to emerge.

This is a potential problem in the detailed design and is therefore raised as part of 3.3.1 in this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians.

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle track. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that proposed cycle tracks run immediately adjacent to proposed bus stop boarders. Therefore bus passengers would board / alight a bus from / onto the cycle tracks. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions. Visually impaired pedestrians, particularly those alighting from a bus may follow the kerb line and inadvertently enter the carriageway. Visually impaired pedestrian unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the layout of the bus stop boarders / cycle tracks is altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing tramline tactile paving prior to the ramps down to carriageway level and an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: A – A105 Green Lanes j/w Highfield Road (Sheet 18/47)

Summary: Segregated cycle lane terminates just before side road junction which may increase left turning collisions between vehicles and cyclists

The proposed segregated southbound cycle lane is returned to the carriageway just before this side road junction. It may be difficult for both sets of road users to understand who has priority and this may lead to turning collisions involving cyclists. Cyclists may assume that they are protected and have priority and may not anticipate vehicles entering or emerging from the side road, which could lead to increased risk of merging / failure to give way type collisions.

RECOMMENDATION
Research from TRL (PPR703 – Trials of segregation set-back at side roads) indicates that setting back cycle lanes by at least 20m from side roads may improve cyclist safety at junctions.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 CROSSING FACILITIES

3.2.1 PROBLEM

Location: General throughout this junction area (A105 Green Lanes j/w Highfield Road – Sheet 18/47)

Summary: Removal of zebra crossing and pedestrian refuge islands on the A105 Green Lanes may result in increased collisions with pedestrians.

The proposals include the removal of a zebra crossing and a pedestrian refuge island within this section. The Audit Team are concerned that this area appears to have pedestrian attractors on both sides of the A105 Green Lanes carriageway and therefore pedestrian desire lines are likely to be established. Pedestrians may continue to cross the A105 in this area without assistance, at undesignated locations, are more likely to attempt to cross in a single movement and may be less likely to be anticipated by motorists. The potential for collisions is considered to be exacerbated by the strong pedestrian desire lines and motorists being likely to be focused on the traffic signals and various manoeuvres being undertaken in this area. This may result in an increased potential for collisions between pedestrians attempting to cross the A105 and vehicles.

RECOMMENDATION
It is recommended to ensure that suitable crossing facilities are provided as close as possible to pedestrian desire lines. This may include, but is not limited to, incorporating controlled pedestrian crossing facilities across the A105 Green Lanes as part of the signalisation of this junction.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 TRAFFIC SIGNALS

3.3.1 PROBLEM

Location: B – A105 Green Lanes southbound approach to junction with Sainsbury's access (Sheet 18/47)

Summary: Proposed traffic signal layout may not be conspicuous and may lead to shunt or overshoot type collisions.

The Audit Team are concerned that the nearside primary and closely associated secondary traffic signals may be obscured by a large vehicle, particularly given that vehicles may queue to access the adjacent petrol station. Furthermore, the secondary signal within the traffic island between opposing traffic flows on the southern side of the junction may be obscured by a northbound vehicle turning right into the petrol station. Therefore this may result in an increased potential for motorists to not suitably sight a traffic signal and either brake late with an increased potential for shunt type collisions or fail to adhere to a red traffic signal with an increased potential for collisions with opposing flows within the junction.

RECOMMENDATION

It is recommended to ensure that at least a single offside primary traffic signal is clearly visible from each approach lane to the junction. This may include but is not limited to providing a traffic island to house an offside primary traffic signal or an extended height traffic signal pole or mast arm.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.2 PROBLEM

Location: C – A105 Green Lanes northbound approach to junction with Sainsbury's access (Sheet 18/47)

Summary: Proposed traffic signal layout may not be conspicuous and may lead to shunt or overshoot type collisions.

The nearside signals are cycle specific and the offside signals are those intended for vehicular traffic. The Audit Team are concerned that the lack of nearside traffic signals for general traffic may result in motorists incorrectly following the nearside cycle specific traffic signals. This may lead to them entering the junction out of phase and at an increased potential for collisions with opposing traffic flows. This could be exacerbated if the offside primary traffic signal is obscured, for example if a large vehicle occupied the right turn lane for Highfield Road. This may exacerbate the potential for motorists to not comply with the correct traffic signal and may result in an increased potential for late braking and shunt type collisions or side impact type collisions with an opposing traffic flow.

RECOMMENDATION

It is recommended to ensure that at least a single nearside primary traffic signal is clearly visible from each approach lane to the junction. This may include but is not limited to providing a traffic island to house an nearside primary traffic signal or an extended height traffic signal pole or mast arm.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.3 PROBLEM

Location: D – A105 Green Lanes exit from Duncan Court (Sheet 18/47)

Summary: Proposed traffic signal layout may not be conspicuous and may lead to shunt or overshoot type collisions.

The Audit Team are concerned that users turning left out of Duncan Court do so in close proximity to the southbound Advanced Stop Line (ASL). Their orientation and the lack of an offside primary traffic signal may result in them not suitably sighting a traffic signal and either braking late with an increased potential for shunt type collisions or failing to adhere to a red traffic signal with an increased potential for collisions with opposing flows within the junction.

RECOMMENDATION
It is recommended to ensure that at least a single primary traffic signal is clearly visible from each approach to the junction. This may include, but is not limited to, providing a nearside primary traffic signal and adding louvres to the cycle specific signal so that it is not clearly visible for motorists.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.4 BUS STOPS

3.4.1 PROBLEM

Location: E – A105 Green Lanes south of junction with Highfield Road (Sheet 18/47)

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that the proposed cycle track runs immediately adjacent to the proposed bus stop boarder. Therefore bus passengers would board / alight a bus from / onto the cycle track. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions.

RECOMMENDATION
It is recommended that the layout of the bus stop boarder / cycle track is altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.5 CYCLING FACILITIES

3.5.1 PROBLEM

Location: F – A105 Green Lanes junction with Highfield Road (Sheet 18/47)

Summary: Motorists may not notice the kerbed segregation islands.

The Audit Team are concerned that motorists may not appreciate that the segregation at this location becomes a kerbed physical feature which appears to occupy part of the carriageway running lanes in each direction. No measures to highlight this physical feature or guide users alongside it are proposed, it may therefore not be clear or conspicuous. Motorists may collide with the kerb or swerve to avoid the feature if they notice it in close proximity, which may result in loss of control and injury to those on or within the vehicle.

RECOMMENDATION

It is recommended to alter the layout to suitably guide vehicles alongside the kerbed islands. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) and altering the path of the orcas / mandatory cycle lane marking so that it 'ties in' to the physical island providing suitable guidance alongside the feature.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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 – A105 eastern footway crossing Highfield Road (side road)

Reason considered to be outside the Terms of Reference: Existing issue for consideration.

The Audit Team noted that this side road does not have tactile paving.

In order to provide a more consistent message for visually impaired users along this route it may be beneficial to provide tactile paving across all side road crossings.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: 2 – A105 Green Lanes junction with Sainsbury's Access (Sheet 18/47)

Reason considered to be outside the Terms of Reference: Issue for clarification / consideration.

Various kerb lines are to be amended and these appear as though they may result in difficulties for drivers of larger vehicles to negotiate the junction and / or over-running of the kerbs. No vehicle swept-path analysis has been provided to the Audit Team.

It is therefore recommended that swept path analysis is carried out and alterations made where necessary to ensure large vehicles are able to manoeuvre the proposed kerb layout without over-running the kerbs.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: 3 – A105 Green Lanes junction with Sainsbury's Access (Sheet 18/47)

Reason considered to be outside the Terms of Reference: Issue for clarification / consideration.

The tactile paving across the access road to Sainsbury's is misaligned and may mislead a visually impaired pedestrian. It is also noted that the footway on the northern side of this access road is narrow and the proposed traffic signal may result in further effective narrowing.

It is recommended that the alignment of the tactile paving is altered so that it correctly guides visually impaired users and that a cranked pole is provided to maximise the available footway width.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.4 ISSUE

Location: 4 – A105 Green Lanes junction with Sainsbury's Access (Sheet 18/47)

Reason considered to be outside the Terms of Reference: Issue for clarification / consideration.

Existing trees at the rear of the footway on each A105 approach to the junction may obscure the clear visibility of the traffic signals, particularly when the tree is in bloom / leaves are present.

It is recommended that the trees are maintained to ensure that approaching motorists have adequate visibility of the traffic signals. Note it is appreciated that the traffic signal for northbound vehicles is located between opposing lanes but the recommendation in 3.3.3 may result in a nearside provision to which this issue may be applicable.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.5 ISSUE

Location: 5 – A105 Green Lanes junction with Sainsbury's Access (Sheet 18/47)

Reason considered to be outside the Terms of Reference: Issue for clarification / consideration.

The proposed layout may result in northbound cyclists having to wait for a long period for a green signal. This may result in cyclists taking to the main carriageway to avoid being held at a red signal.

It may be beneficial to extend the segregated section on the northbound approach to the traffic signals to deter cyclists from exiting the segregated cycle lane.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.6 ISSUE

Location: 6 – segregated on footway cycle track beside bus boarder

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

The typical cross section of the on footway cycle track indicates that 3 rows of granite setts will be provided alongside the edges of the track. It is considered that these are likely to provide a reasonable tonal contrast and a texture / tactile difference to highlight the cycle track / edge of footway.

It is assumed that these will be laid almost flush (maximum upstand of less than 6mm) so that they do not present a trip hazard for pedestrians.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 25/11/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 25/11/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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 Organisations endorsement of my proposals.

Name:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

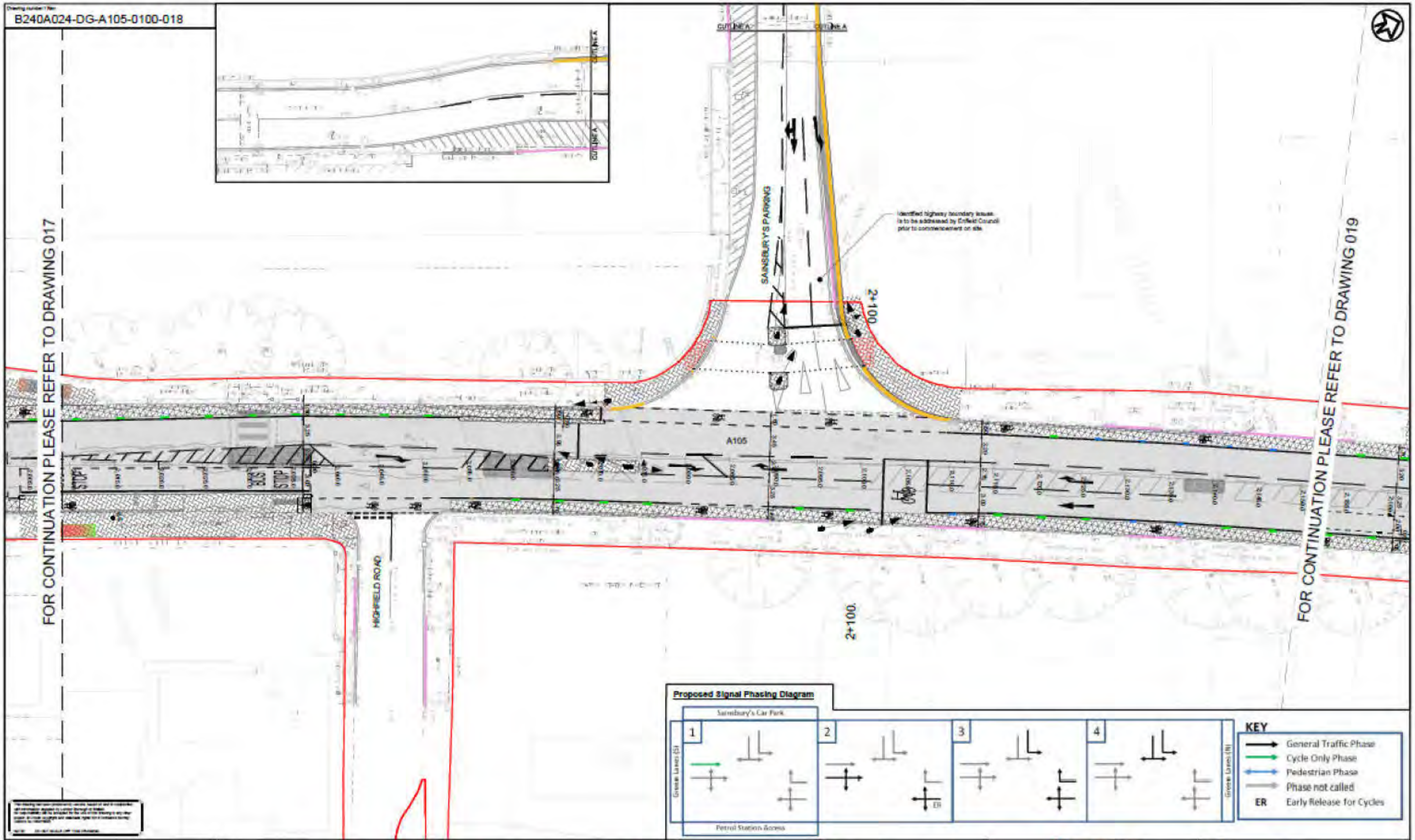
DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-018 Rev -	Cycle Enfield A105 - General Arrangement Sheet 18 of 47
B240A024-DG-A105-0200-018 Rev -	Cycle Enfield A105 - Site Clearance Sheet 18 of 47
B240A024-DG-A105-0500-018 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 18 of 47
B240A024-DG-A105-0700-018 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 18 of 47
B240A024-DG-A105-1100-018 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 18 of 47
B240A024-DG-A105-1200-018 Rev -	Cycle Enfield A105 - Traffic signs and road markings Sheet 18 of 47
B240A024-DG-A105-1300-018 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 18 of 47

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 7

APPENDIX B

Problem Locations

B240A024-DG-A105-0100-018



FOR APPROVAL

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Client: Enfield Council

Project: CYCLE ENFIELD - A105

Drawing title: GENERAL ARRANGEMENT SHEET 18 OF 47

Drawing status: FOR APPROVAL

Scale: 1:200 @ A1 — DO NOT SCALE

Jacobs No: B240A024

Drawing number: B240A024-DG-A105-0100-018

Rev: -

Transport for London

Cycle Enfield - Section 8

A105 Queens Avenue / Compton Road

Stage 2 Road Safety Audit

Ref: 2759.03.08/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	11/01/2017

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 8, A105 Queens Avenue junction with Compton Road 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 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 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 16 h December 2016. 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 8 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: Demos Kettenis – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 8 (Sheet 19) of this route only, on the A105 Green Lanes at the junction with Queens Avenue / Compton Road.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016). This report covered the whole route and therefore many of the issues raised are not specific to this (Section 8) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.2 General to the scheme – town centre / shopping street areas – Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.7

Problem 3.1.4 Side road cycle crossovers at raised junction tables - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.2.

Problem 3.1.5 Bus stops / loading bays close to side road junctions and accesses – may restrict visibility splays and lead to failure to give way type collisions.

This problem remains in the detailed design proposals and is therefore raised again within this report as part of problem 3.2.2.

Problem 3.6.2 Compton Road – Loading bay and bus stop located close to the junction may lead to failure to give way type collisions.

This problem remains in the detailed design proposals and therefore this is raised again as problem 3.2.2 in this Audit Report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to the scheme – side road cycle crossovers at raised junction tables

Summary: Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle / vehicle conflicts

The off-road cycle facilities cross the side roads at raised table areas, drivers turning from the main road have a short stacking space between the main road and these cycle crossovers. No give way markings are present as vehicles enter the side roads, neither is there sufficient stacking space to accommodate a vehicle without it overhanging on to the main road. Therefore, drivers may be confused by the arrangement and / or reluctant to give way to cyclists as it results in them remaining partially within the main carriageway, which may lead to late braking nose to tail collisions. The potential for conflicts may be exacerbated by the proposed parking relatively close to the side road between the main carriageway and segregated cycle track.

Drivers entering the main road may be confused by the lack of give way markings and therefore an unclear priority. As a result motorists may fail to give way to traffic on the main road or stop across the cycle lane, which may lead to nose to tail collisions or cycle to vehicle conflict.

RECOMMENDATION

If such cycle priority is to be provided at side roads then this should be clearly designated, an appropriate stacking space should be provided between the main road and cycle crossing to allow a single vehicle to wait between the main road and cycle crossing without encroaching in to the main carriageway or blocking the cycle crossing (reference London Cycle Design Guide). Any 'floating' loading / parking bays should be located to ensure that sufficient intervisibility is provided between cyclists and motorists. Additionally, it may be beneficial to provide additional give way markings consistently as vehicles enter the main road.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineation may lead to collisions with visually impaired pedestrians

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator between the footway and cycle tracks provided at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION
It is recommended that as well as a good visual differentiation between the footway and cycle tracks, a detectable delineator should be provided to ensure that all users are aware of the edge of footway whilst not presenting a trip hazard.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: General – Parking permitted adjacent to cycle track

Summary: Parking / loading permitted adjacent to the cycle track may result in users exiting or unloading within the cycle track

The proposals include retention of existing parking bays. There appears to be a buffer of approximately 0.5m between the parking bays and the proposed cycle track. The Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the cycle track which may result in an increased potential for collisions between southbound cyclists and people using / loading to / from the parking bays.

RECOMMENDATION
It is recommended that the buffer is increased to ensure that the cycle path is kept as clear as possible and suitable pedestrian and disabled user access to the parking bays is provided over the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.6 PROBLEM

Location: Various – commencements of full height kerbs

Summary: Motorists may not notice and collide with the commencement of full height kerbs

The Audit Team are concerned that motorists may not appreciate that the edge of the cycle track includes a full height kerb alongside the 'floating bus stop' facility. This kerbed physical segregation commences within the carriageway running lane and it does not include a suitable vertical feature to highlight its presence or guide users alongside it. It may therefore, not be clear or conspicuous particularly during the hours of darkness. Motorists may collide with the kerb or swerve to avoid the features if they are noticed within close proximity, which may result in loss of control type collisions / injury to those on or within the vehicle.

RECOMMENDATION
It is recommended to alter the layout to suitably guide vehicles alongside the kerbs. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) to provide suitable guidance alongside the feature.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.7 PROBLEM

Location: A – Cycle track through shopping area north of j/w Compton Road

Summary: Narrowed footway areas in shopping streets may bring cyclists and pedestrians closer together and lead to pedestrian to cycle collisions

Within the main shopping streets the cycle lanes will reduce footways and segregate pedestrians from crossing points, bus stops and parking / loading bays. Pedestrians using or crossing the cycle lanes may be at a greater risk of collision with cyclists. This is of particular concern at, but not limited to, the area of narrowed footway to the north of the junction with Compton Road west of the bus stop. The constrained footway area which results from the proposed on footway cycle track may exacerbate the potential for collisions between cyclists and pedestrians.

RECOMMENDATION
It is recommended to alter the layout of the cycle track to ensure that the effective width of footway remains suitable to accommodate the high footfall in this area. This may include, but is not limited to, altering the alignment of the cycle track to maximise the available footway width.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 JUNCTIONS

3.2.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The altered kerb lines may result in increased collisions as turning vehicles increasingly encroach into the path of another user

The proposals include various kerb line alterations which may increase the potential for turning vehicles to encroach into another user's path. This could lead to an increased potential for head on or side impact type collisions as a user turning into or out of the side roads or accesses is encountered by a vehicle travelling in the opposing direction.

RECOMMENDATION
It is recommended to undertake / check swept path analysis and make alterations if necessary to ensure that the vehicles likely to use these roads can undertake typical manoeuvres with minimal intrusion into the path of another vehicle.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.2 PROBLEM

Location: B – bus stops / loading / parking bays close to Compton Road

Summary: Stationary vehicles close to the junction may restrict junction visibility splays and lead to failure to give way type collisions

The proposed layout includes loading / parking bays to the south and a bus stop to the north of the junction with Compton Road. The Audit Team are concerned that stationary vehicles close to side roads may restrict visibility for drivers emerging from the side roads and this may lead to failure to give way / side impact type collisions.

RECOMMENDATION
Appropriate visibility splays at side roads should be provided and kept free of obstruction and stationary vehicles. This may require alterations to the positioning and / or extent of the bus stops / parking / loading bays.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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: Various – junctions with proposed raised tables

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

Various junctions are proposed to have raised tables implemented. The kerb details indicate that away from crossing points where transition or flush kerbs are proposed the kerbs will have an upstand of 125mm or to match existing. It is not clear therefore what the upstand will be at the raised tables.

It is assumed that these will provide a detectable upstand for blind / partially sighted users.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: Various – shared use cycle / footway

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

It is not clear what the extents of the shared use surfaces are as none of the shared use extents appear to be defined. Additionally, at some locations it is not clear what the intended cyclist route is.

In order to avoid cyclists continuing on the footway and the potential for low level cycle / pedestrian conflicts / unexpected cycle manoeuvres, it may be beneficial to clearly determine what the intended cycle routes are. This may include but is not limited to appropriate tactile paving, dropped kerbs and road markings / signs to indicate the intended routes / manoeuvres.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: General – Compton Road junction

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

It is not clear what the demand for cyclists to turn right on to the cycle track or continue east or westbound along these side roads. No provision is proposed for example for an eastbound cyclist on Compton Road to continue eastbound via the A105 onto Queens Avenue.

It is assumed that no provision is proposed as the cycle volumes / demands for these manoeuvres are low. It may be beneficial to monitor these movements post implementation to determine if and how cyclists undertake such manoeuvres and if any additional mitigation measures are required.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

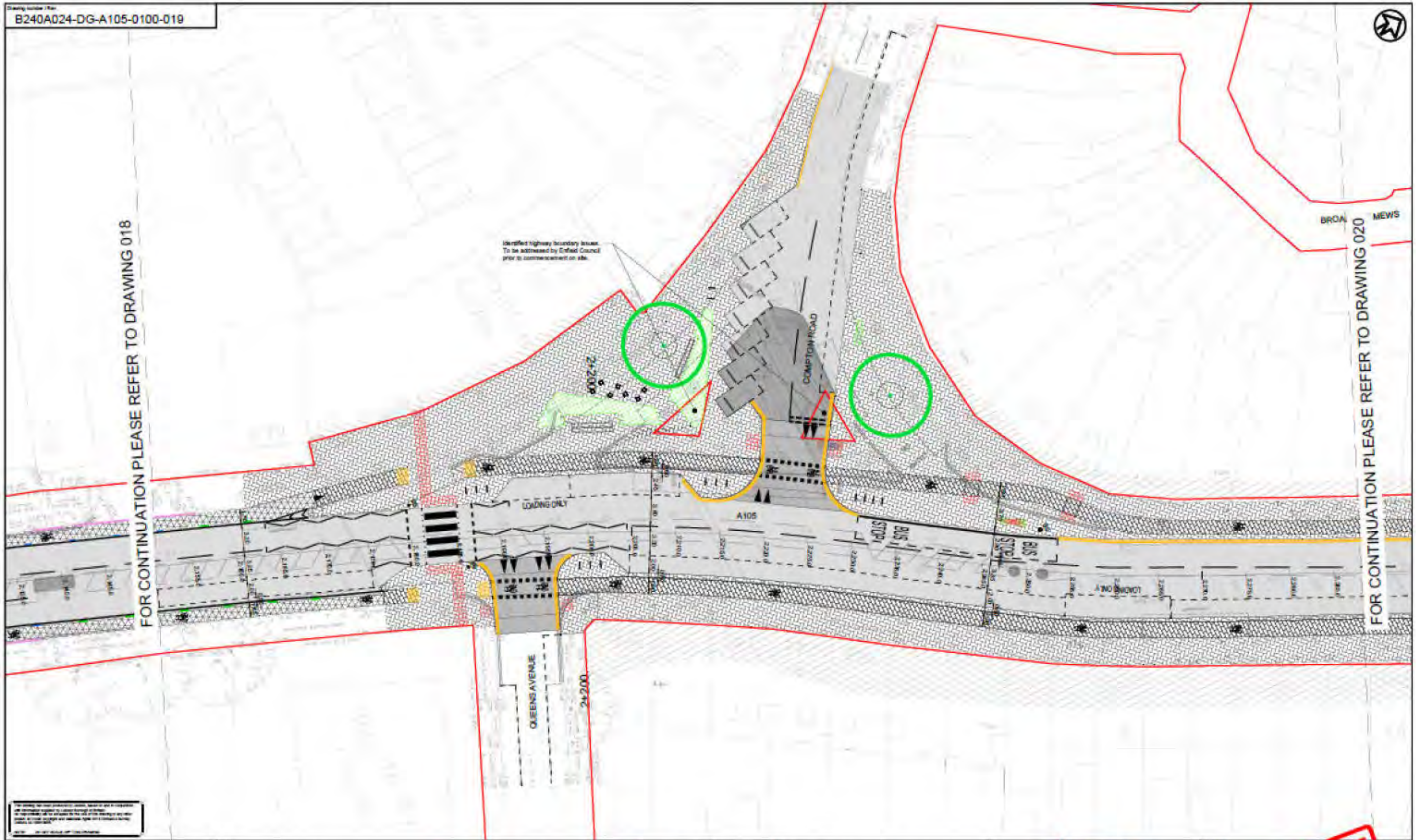
DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-019 Rev -	Cycle Enfield A105 - General Arrangement Sheet 19 of 47
B240A024-DG-A105-0200-019 Rev -	Cycle Enfield A105 - Site Clearance Sheet 19 of 47
B240A024-DG-A105-0500-019 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 19 of 47
B240A024-DG-A105-0700-019 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 19 of 47
B240A024-DG-A105-1100-019 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 19 of 47
B240A024-DG-A105-1200-019 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 19 of 47
B240A024-DG-A105-1300-019 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 19 of 47

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 8

APPENDIX B

Problem Locations

B240A024-DG-A105-0100-019



This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

RINGWAY JACOBS

ENFIELD Council

CYCLE ENFIELD - A105

GENERAL ARRANGEMENT SHEET 19 OF 47

DRAFT FOR COMMENTS ONLY

FOR APPROVAL

DO NOT SCALE

B240A024

B240A024-DG-A105-0100-019

-

Transport for London

A105 Green Lanes J/W Station Road / Fords Grove

Cycle Enfield - Section 9

Stage 2 Road Safety Audit

Ref: 2759.02.09/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	25/11/2016

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the A105 Green Lanes J/W Station Road / Fords Grove, Cycle Enfield - Section 9 proposals.

1.1.2 The Audit was undertaken by TfL Road Safety Audit in accordance with the Audit Brief issued by the Client Organisation on 14th November 2016. It took place at the Palestra offices of TfL on 15th November 2016 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 15 h November 2016. 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: Paul Rogers – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 9 (Sheet 20) of this route only, A105 Green Lanes junction with Station Road and Fords Grove.

1.5.2 Full details of the traffic signal staging / timings have not yet been provided and therefore the Audit Team could not fully comment on this element of the proposals.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016. This report covered the whole route and therefore many of the issues raised are not specific to this (Section 9) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.4 Side road cycle crossovers at raised junction tables - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict.

This problem appears to remain in the detailed design proposals and therefore this is raised again as 3.1.2 in this Audit Report.

Problem 3.5.1 Station Road entry treatment - Cycle crossing close to the ramped exit from Green Lanes may mean the rear end of a car remains on the main carriageway with consequent risk of vehicle to vehicle collisions

The layout has been altered to incorporate the recommendation and this potential problem is mitigated. Therefore, this problem is not raised again within this Audit Report.

Problem 3.5.2 At the junction of Station Road / Fords Grove with Green Lanes- Right turn cyclists unaware of / ignoring the proposed 2SRT, could potentially be in conflict with other traffic movements at the junction leading to vehicle to cycle and cycle to cycle collisions

This problem appears to remain in the detailed design proposals and therefore this is raised again as 3.1.3 in this Audit Report.

No issues were raised in the ‘Outside of terms of reference’ (Section 4) of that report which relate to this section of the proposals

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians.

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed, this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Visually impaired pedestrians may inadvertently enter the carriageway via cycle track ramps

The Audit Team are concerned that proposed cycle track ramps may lead to a visually impaired pedestrian inadvertently enter the carriageway, particularly if they follow the line of the kerb when exiting a bus. Visually impaired pedestrians unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the cycle track ramps are altered. This may include, but is not limited to, providing tramline tactile paving prior to, or on the ramps down to carriageway level.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	

Client Organisation Comments
[Leave blank for Client Organisation's Comments]

3.1.3 PROBLEM

Location: A – side road cycle crossovers at raised junction tables

Summary: Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict

At a number of locations the off-road cycle facilities cross side roads at raised table areas. Drivers turning from the main road have a short stacking space between the main road and these cycle crossovers due to the location of the give way lines to create priority for cyclists. Drivers may be confused by the arrangement and fail to give way to cyclists, or may stop suddenly and remain partially within the main carriageway, which may lead to late braking nose to tail collisions.

Drivers entering the main road may be confused by the double give way feature, and/or stop across the cycle lane, which may lead to nose to tail collisions or cycle to vehicle conflict.

There is inconsistency in the provision of give ways for cyclists at such crossing locations and this may confuse users and lead to failure to give way type conflicts between cycles and vehicles.

RECOMMENDATION

If such cycle priority is to be provided at side roads then an appropriate stacking space should be provided between the main road and cycle crossing to allow a single vehicle to wait between the main road and cycle crossing without encroaching in to the main carriageway or blocking the cycle crossing (reference London Cycle Design Guide).

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: B – At the junction of Station Road / Fords Grove with Green Lanes

Summary: Right turn cyclists unaware of / ignoring the proposed 2SRT, could potentially be in conflict with other traffic movements at the junction leading to vehicle to cycle and cycle to cycle collisions.

It is proposed to introduce 'two-stage right turn' (2SRT) facilities for cyclists turning right from Green Lanes. It is not known if an 'early release' signal feature is incorporated as part of the 2SRT facility. There is a concern that cyclists turning right from Green Lanes might not be aware of / ignore the proposed 2SRT, leading to vehicle to cycle and cycle to cycle collisions at the junction.

RECOMMENDATION

It is recommended that 'early release' signals should be provided for the 2SRT facilities. The need for right turn facilities for cyclists making the manoeuvre from both Fords Grove and Station Road directions should be assessed and, if appropriate they should be consistent with the proposed facilities for the other right turn manoeuvres.

Ensure that cyclists approaching the junction are informed of the facility, by providing 2SRT direction signs. It should be ensured that cyclists can see an appropriate signal head when making the right turn manoeuvre in two stages.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: C – A105 Green Lanes left turn slip to Station Road

Summary: Motorists may not see / appreciate cyclists on the cycle track attempting to assert priority.

The Audit Team are concerned that motorists turning left from the A105 Green Lanes towards Station Road may not anticipate or see approaching cyclists and may therefore not give way as the cycle route crosses this left turn slip road. The alignment of the track results in northbound cyclists approaching almost from behind a left turning vehicle. Therefore, a driver may have to look far over their left shoulder to try and view an approaching cyclist, this may not be possible for those with reduced neck movement, drivers of a van or similar which may have restricted visibility such as due to having a panelled or 'box' rear. Additionally, the approach path of cyclists / alignment of the vehicle giving may mean that approaching cyclists are not conspicuous, particularly as they may be approaching at a speed higher than the vehicle turning left. Therefore this layout may result in an increased potential for left turning vehicles to not give way and to collide with cyclists crossing the slip between sections of the track as a result.

RECOMMENDATION

It is recommended that alterations are made to ensure that approaching cyclists can be clearly sighted by those indicated to give-way. This may involve but is not limited to altering the alignment of the northbound cycle track and / or the left turn slip.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.6 PROBLEM

Location: D – A105 Green Lanes south of junction with Station Road

Summary: Loading bays adjacent to the cycle track may result in users exiting or unloading within the cycle track

The proposals include retention of existing parking bays on the southern side of the junction to the nearside of the southbound traffic lanes. There appears to be a buffer of approximately 0.5m between the parking bays and the proposed cycle path. The Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the track which may result in an increased potential for collisions between southbound cyclists and people using / loading to / from the parking bays.

RECOMMENDATION
It is recommended that the buffer is increased to ensure that the cycle path is kept as clear as possible and suitable pedestrian and disabled user access to the parking bays is provided over the cycle track.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.7 PROBLEM

Location: E – Left turn slip to Fords Grove from the A105 Green Lanes

Summary: Proposed hatch / approach to left turn slip may result in collisions with the proposed planting area.

The proposed layout may result in southbound motorists not noticing the left turn slip for Fords Grove until they are in close proximity to it, particularly whilst the bus stop is occupied. If motorists notice the left turn slip / that the nearside lane is ahead only as they pass a waiting bus at the stop, they may make last minute manoeuvres. Sudden turning manoeuvres may lead to loss of control or collisions with the proposed planting area at the head of the splitter island, particularly given that the hatching on approach is minimal and no vertical feature to highlight the splitter island is present.

RECOMMENDATION
It is recommended to alter the layout on approach to ensure that the left turn slip is conspicuous and provides suitable deflection / guidance either side of the proposed planting. This may require relocating the bus stop and / or providing alterations to the road markings and a vertical illuminated feature to highlight the island.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.8 PROBLEM

Location: F – Fords Grove approach to the A105 Green Lanes

Summary: Layout may result in an increased potential for 'left hook' type collisions if cyclists attempt to continue ahead from the nearside.

The Audit Team are concerned that the proposed layout may result in cyclists staying kerbside and attempting to continue ahead westbound through the junction. As this lane is a designated left turn lane cyclists attempting to continue ahead may be at an increased risk of left hook type collisions as motorists attempt to turn left, potentially across the path of these cyclists.

RECOMMENDATION
It is recommended to provide suitable additional features to facilitate the likely demand for the ahead movement by cyclists. This may include, but is not limited to, an advanced stop line and / or early release for cyclists. If these features are not feasible then an alternative may be to provide cycle logos to provide guidance to assist cyclists to assert a primary position to continue in the appropriate lane before this approach widens to two lanes.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.9 PROBLEM

Location: G – Left turn slip to Fords Grove from the A105 Green Lanes

Summary: Proposed zebra and cycle crossing may result in drivers failing to give-way to cyclists

The Audit Team are concerned that the proposed zebra and cycle crossing may not be understood by motorists particularly as the layout is new to drivers. The following issues may result in an increased potential for collisions:

- Zebra crossings are well established and the conspicuousness of the thick black and white striped road markings help to clearly indicate that a pedestrian has priority over vehicular traffic in this area. The lack of these markings within the proposed cycle section of the crossing may lead to ambiguity over who has priority and motorists may fail to give way to cyclists.
- Slow approach speeds by pedestrians enable an approaching motorist to notice they intend to cross, slow down and stop. Cyclists are likely to approach faster than pedestrians and may therefore fail to be noticed by approaching motorists.

These issues may lead to an increased potential for collisions between motorists and cyclists or shunt type collisions as motorists brake sharply as they unexpectedly encounter a cyclist attempting to assert priority.

RECOMMENDATION
Provide measures which will allow cyclists to assert priority over motorists. This could include an alternative crossing type, or provide appropriate temporary signing to inform drivers of the intended usage until this layout becomes more commonplace. At this location if this crossing type is retained it may be beneficial to reverse the layout so that motorists encounter the more conventional part of the zebra crossing before the cycle crossing.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.10 PROBLEM

Location: H – Access across the cycle track on the left turn slip for Fords Grove

Summary: Layout may result in both users assuming priority and collisions between cyclists and motorists

The Audit Team are concerned that the vehicular access over the segregated cycle track does not have a priority assigned. If both users assume priority then an increased potential for collisions between cyclists on the track and vehicles using the access may result.

RECOMMENDATION
It is recommended to clearly define the priority at this location.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 PEDESTRIAN CROSSING FACILITIES

3.2.1 PROBLEM

Location: I – Proposed controlled pedestrian crossing on southern side of the junction

Summary: Proposed reverse stagger pedestrian crossings may result in increased collisions with pedestrians.

The proposed reverse stagger pedestrian crossing encourages pedestrians to walk away from approaching traffic within the central reservation area. This may result in reduced awareness of approaching vehicles as pedestrians enter the second part of the crossing. Furthermore, this layout tends to rely on the provision of pedestrian guard railing to enforce the use of the stagger and deter users from crossing between stationary, accelerating or decelerating vehicles.

The proposed layout may therefore result in an increased potential for collisions between pedestrians and motorists.

RECOMMENDATION
Provide pedestrian crossing facilities which encourage safe crossing manoeuvres. This may include but is not limited to the provision of conventional staggered pedestrian crossings. If this cannot be achieved then pedestrian guard railing may be required to encourage safer use of the reversed staggered layout.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.2 PROBLEM

Location: J – Station Road crossings

Summary: Proximity of tactile paving facilities may confuse blind or partially sighted users and lead to these users colliding with cyclists or motorised vehicles.

On the triangular splitter island, the tactile paving layout across the cycle lane is very close to that for the signalled crossing of Green Lanes. This may mean that blind or partially sighted users are confused by the merged layout and inadvertently walk into live carriageway or the cycle lane without realising.

Similarly, on the south-western footway, the tactile paving at the cycle lane is in close proximity to the dropped crossing facility for the Station Road left slip lane. Again, this may mean that blind or partially sighted users are confused by the merged layout and inadvertently walk into live carriageway or the cycle lane without realising.

RECOMMENDATION
It is recommended that the tactile paving layouts in close proximity to each other are relocated to clarify the layouts for vulnerable users.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.3 PROBLEM

Location: K – A105 Green Lanes junction with Station Road / Fords Grove

Summary: Proposed crossings may not suitably accommodate pedestrian desire lines.

The proposed layout may be too inconvenient for pedestrians, for example if a pedestrian exiting a southbound bus followed the designated crossing points to get to the north western side of the A105 Green Lanes they would have to make six crossing manoeuvres (including crossing sections of cycle lane). Similarly, to get to the Southern side of Fords Grove using designated crossing points it would be ten separate crossing manoeuvres. This may be very cumbersome and potentially confusing for visually impaired users, particularly given that some of the tactile paving sections are very close to one another. It is considered that non visually impaired pedestrians are likely to disregard the designated crossing points and instead cross on desire lines. Pedestrians crossing at undetermined locations and without the assistance of crossing facilities may be more vulnerable and less likely to be anticipated by cyclists and motorists which may lead to an increased potential for collisions between the two users.

RECOMMENDATION
It is recommended that alterations are incorporated to make the cycling and pedestrian routes more appealing and to cover the likely desire lines. This may include but is not limited to providing pedestrian crossing facilities. Desire lines that may be present in the proposed layout but which do not appear to be accommodated, include, but may not be limited to, crossing the A105 to / from the bus stop to the north of the junction and crossing Fords Grove to the east of the junction.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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 cycle routes in both directions on the A105 Green Lanes junction with Station Road / Fords Grove (Sheet 20/47)

Reason considered to be outside the Terms of Reference: Level of service / likely usage comment rather than a defined road safety concern.

The proposed layout may be considered too inconvenient for cyclists attempting to keep momentum through the junction. For example southbound cyclists approaching the junction could be 'held up' or delayed as other users cross their path at various points, such as:

1. Pedestrians crossing near the bus stop, north side of the junction,
2. Vehicles using the crossover for 'Capitol House' car park,
3. If road users wait across the cycle / zebra crossing,
4. Pedestrians crossing the cycle path within the splitter island to the west of the cycle / zebra crossing,
5. The cycle stop line as cyclists re-enter the carriageway.

This may result in cyclists taking to the carriageway on approach to the junction where they are given very little assistance.

It is appreciated that a significant level of intervention is provided to encourage segregated cycling and that provision on carriageway may be perceived as guidance to deviate from the designated and predominantly segregated cycle routes. Therefore, it is recommended that the use of the cycle facilities and cyclists remaining on carriageway at this junction are carefully monitored with a view to developing proposals if necessary.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: Various – throughout the junction

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

Planting / SuDs 'Rain Gardens' are proposed within this junction immediately adjacent to the carriageway / cycle lanes.

The full details of the proposed features have not been provided but it is assumed that these will be of a type / maintained so that they do not restrict visibility or overgrow into the live carriageway areas.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: Various – throughout the junction

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

No details of swept path analysis have been provided. Access in to the left turn slip for Station Road and from the right turn pocket for Fords Grove appear as though they may be difficult for larger vehicles to complete without over-running kerbs.

It is recommended that the swept path analysis is checked and alterations are incorporated if required.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.4 ISSUE

Location: Various – throughout the junction

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

The typical cross section of the on footway cycle track indicates that 3 rows of granite setts will be provided alongside the edges of the track. It is considered that these are likely to provide a reasonable tonal contrast and a texture / tactile difference to highlight the cycle track / edge of footway.

It is assumed that these will be laid almost flush (maximum upstand of less than 6mm) so that they do not present a trip hazard for pedestrians.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.5 ISSUE

Location: 1 – Western crossing on the southern side of the junction.

Reason considered to be outside the Terms of Reference: Drawing anomaly

Full details of the traffic signals have not yet been provided but the Audit Team note that the western part of the staggered pedestrian crossing on the southern side of the junction is not indicated with any green time. The phasing also shows that southbound vehicles are given a green signal to turn right on to Station Road during the same phase as pedestrians are given a green signal to cross Station Road.

It is assumed that these issues will be rectified as part of the continued design. This may require additional 'catch' stop lines as well as rectifying the traffic signal staging.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 25/11/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted] ([redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour

[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 25/

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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 Organisations endorsement of my proposals.

Name:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

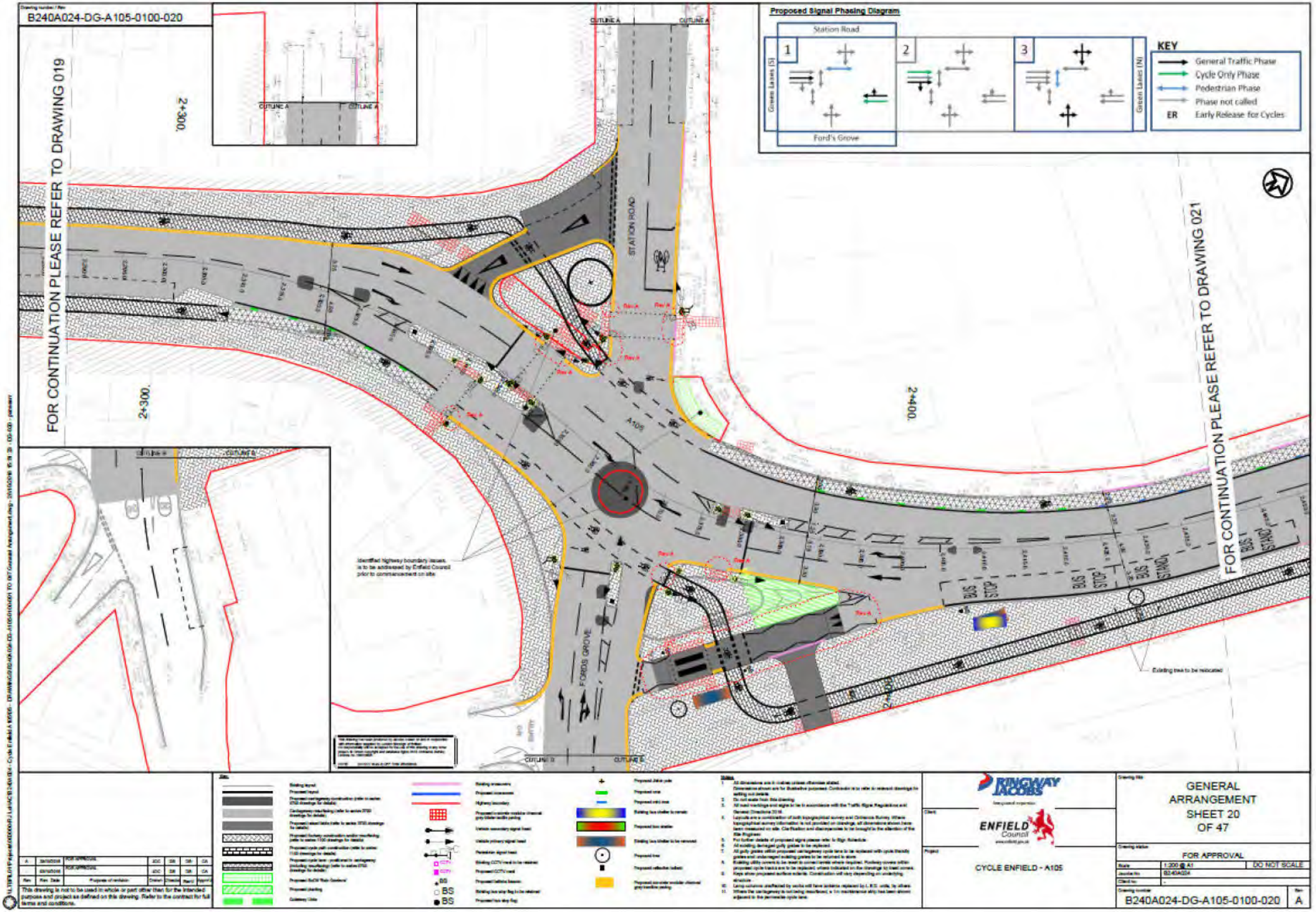
Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-020 Rev A	Cycle Enfield A105 - General Arrangement Sheet 20 of 47
B240A024-DG-A105-0200-020 Rev –	Cycle Enfield A105 - Site Clearance Sheet 20 of 47
B240A024-DG-A105-0500-020 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 20 of 47
B240A024-DG-A105-0700-020 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 20 of 47
B240A024-DG-A105-1100-020 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 20 of 47
B240A024-DG-A105-1200-020 Rev A	Cycle Enfield A105 - Traffic signs and road markings Sheet 20 of 47
B240A024-DG-A105-1300-020 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 20 of 47
B240A024-DG-A105-1400-020 Rev A	Cycle Enfield A105 – MCHW Series 1400 Schedule of Electrical Works Section 9 of 14

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 9

APPENDIX B

Problem Locations


B240A024-DG-A105-0100-020
FOR CONTINUATION PLEASE REFER TO DRAWING 019
FOR CONTINUATION PLEASE REFER TO DRAWING 021
Proposed Signal Phasing Diagram
Station Road
Ford's Grove
Green Lanes (S)
Green Lanes (N)
KEY
General Traffic Phase
Cycle Only Phase
Pedestrian Phase
Phase not called
ER Early Release for Cycles
STATION ROAD
A105
FORDS GROVE
2+300
2+400
Identified highway boundary issues is to be addressed by Enfield Council prior to commencement on site
Existing tree to be relocated
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 20 OF 47
FOR APPROVAL
DO NOT SCALE
B240A024-DG-A105-0100-020
A

Transport for London

Cycle Enfield - Section 10

A105 Radcliffe Road to Sherbrook Gardens

Stage 2 Road Safety Audit

Ref: 2759.03.10/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	11/01/2017
B	Audit report up issued to remove comments after 3.1.8 and add an extra problem as 3.1.9	12/01/2017

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 10, A105 Radcliffe Road to Sherbrook Gardens 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 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 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 16 h December 2016. 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 10 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: Demos Kettenis – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 10 (Sheets 21 - 24) of this route only, along the A105 from Radcliffe Road to Sherbrook Gardens.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016). This report covered the whole route and therefore many of the issues raised are not specific to this (Section 10) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.1 Combined zebra / cycle crossing facilities – Proposed zebra and cycle crossing layouts may result in drivers failing to give way to cyclists.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.2.1.

Problem 3.1.3 Cycle lanes past junction locations - Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.2.

Problem 3.1.4 Side road cycle crossovers at raised junction tables - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.7

Problem 3.1.5 Bus stops / loading bays close to side road junctions and accesses – may restrict visibility splays and lead to failure to give way type collisions.

This problem remains in the detailed design proposals and is therefore raised again within this report as part of problem 3.3.2.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.8 The pedestrian refuge south of Vicars Moor Lane appears to be removed as part of the scheme and pedestrian desire lines may not be suitably accommodated.

This issue is considered to be resolved as a replacement controlled crossing facility is proposed to the south of Shrubbery Gardens.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Segregated cycle lanes terminating just before the side road junction may increase left turning collisions between vehicles and cyclists

The semi segregated cycle lanes return to the general carriageway just before various side road junctions. It may be difficult for both sets of road users to understand who has priority and this may lead to turning collisions involving cyclists. Cyclists may not anticipate and vehicles turning across their path in close proximity to them leaving the semi segregated cycle lane, which could lead to increased risk of side impact collisions as motorists cross the path of cyclists. This problem may be exacerbated when combined with reduced visibility referred to in problem 3.3.2 such as at Firs Lane where southbound vehicles overtaking a stationary bus and then turning left are unlikely to suitably observe a southbound cyclists entering the carriageway to the nearside of the bus.

RECOMMENDATION

It is recommended that the priority is clearly defined. Furthermore, research from TRL (PPR703 – Trials of segregation set-back at side roads) indicates that setting back cycle lanes by at least 20m from side roads may improve cyclist safety at junctions. Such an approach would have an effect on the proposed length of 'floating' parking / loading bays.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that proposed cycle tracks run immediately adjacent to proposed bus stop boarders. Therefore bus passengers would board / alight a bus from / onto the cycle tracks. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions. Visually impaired pedestrians, particularly those alighting from a bus may follow the kerb line and inadvertently enter the carriageway. Visually impaired pedestrian unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the layout of the bus stop boarders / cycle tracks are altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing tramline tactile paving prior to the ramps down to carriageway level and an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineation may lead to collisions with visually impaired pedestrians

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator between the footway and cycle tracks provided at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION
It is recommended that as well as a good visual differentiation between the footway and cycle tracks, a detectable delineator should be provided to ensure that all users are aware of the edge of footway whilst not presenting a trip hazard.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: General – Parking permitted adjacent to cycle track

Summary: Parking / loading permitted adjacent to the cycle track may result in users exiting or unloading within the cycle track

The proposals include retention of existing parking bays in this area. There appears to be a buffer of approximately 0.5m between the parking bays and the proposed cycle track. The Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the cycle track which may result in an increased potential for collisions between southbound cyclists and people using / loading to / from the parking bays.

RECOMMENDATION
It is recommended that the buffer is increased to ensure that the cycle path is kept as clear as possible and suitable pedestrian and disabled user access to the parking bays is provided over the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.6 PROBLEM

Location: Various – commencements of full height kerbs

Summary: Motorists may not notice and collide with the commencement of full height kerbs

The Audit Team are concerned that motorists may not appreciate that the edge of the cycle track includes a full height kerb alongside the 'floating' bus stops. This kerbed physical segregation commences within the carriageway running lane and it does not include suitable features to highlight its presence or guide users alongside it, particularly during dark conditions. It may therefore not be clear or conspicuous. Motorists may collide with the kerb or swerve to avoid the features if they are noticed within close proximity, which may result in loss of control type collisions / injury to those on or within the vehicle.

RECOMMENDATION
It is recommended to alter the layout to suitably guide vehicles alongside the kerbs. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) to provide suitable guidance alongside the feature.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.7 PROBLEM

Location: A – Sherbrook Gardens, side road cycle crossover at raised junction table

Summary: Drivers turning from the main road to the side road may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle / vehicle conflicts

The off-road cycle facilities cross this side road at a raised table area, drivers turning from the main road have a short stacking space between the main road and these cycle crossovers. No give way markings are present as vehicles enter Sherbrook Gardens, neither is there sufficient stacking space to accommodate a vehicle without it overhanging on to the main road. Therefore, drivers may be confused by the arrangement and / or reluctant to give way to cyclists as it results in them remaining partially within the main carriageway, which may lead to late braking nose to tail collisions. The potential for conflicts may be exacerbated by the proposed parking relatively close to the side road between the main carriageway and segregated cycle track.

Drivers entering the main road may be confused by the lack of give way markings and therefore an unclear priority. As a result motorists may fail to give way to traffic on the main road or stop across the cycle lane, which may lead to nose to tail collisions or cycle to vehicle conflict.

RECOMMENDATION

If such cycle priority is to be provided at side roads then this should be clearly designated, an appropriate stacking space should be provided between the main road and cycle crossing to allow vehicles to wait between the main road and cycle crossing without encroaching in to the main carriageway or blocking the cycle crossing (reference London Cycle Design Guide). Any 'floating' loading / parking bays should be located to ensure that sufficient intervisibility is provided between cyclists and motorists. Additionally, it may be beneficial to provide additional give way markings consistently as vehicles enter the main road.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.8 PROBLEM

Location: B – Parking restrictions on northbound carriageway near 801 Green Lanes

Summary: Parking permitted across the semi segregated cycle track may result in side swipe or shunt type collisions as cyclists divert into the general traffic lane.

The proposals include various small sections of the semi segregated cycle track which are advisory rather than mandatory and utilise mini orcas and double yellow lines which permit loading only outside of peak hours. The Audit Team are concerned that vehicles parked within the cycle track may result in cyclists diverting out of the track and into the adjacent carriageway running lane. Such manoeuvres may not be anticipated by drivers and an increased potential for collisions between motorists and cyclists may result.

RECOMMENDATION
It is recommended that parking is not permitted across any section of the segregated cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.9 PROBLEM

Location: C – Southbound cycle lane south of Radcliffe Road

Summary: Alignment of cycle track may lead to cyclists becoming dismounted.

The proposals include a kink in the cycle track at this location which is abrupt and could lead to a cyclist either being destabilised if they brake hard and / or turn sharply which could lead to injuries if they are dismounted or collide with a kerb.

RECOMMENDATION
It is recommended to soften the alignment and / or provide measures to slow cyclists as they approach the 'kink' in the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 CROSSING FACILITIES

3.2.1 PROBLEM

Location: D – South of junction with Shrubbery Gardens

Summary: Proposed zebra and cycle crossing may result in drivers failing to give way to cyclists

The Audit Team are concerned that the proposed zebra and cycle crossing may not be understood by motorists particularly as the layout is new to drivers. The following issues may result in an increased potential for collisions:

- Zebra crossings are well established and the conspicuousness of the thick black and white striped road markings help to clearly indicate that a pedestrian has priority over vehicular traffic in this area. The lack of these markings within the proposed cycle section of the crossing may lead to ambiguity over who has priority and motorists may fail to give way to cyclists.
- Slow approach speeds by pedestrians enable an approaching motorist to notice they intend to cross, slow down and stop. Cyclists are likely to approach faster than pedestrians and may therefore fail to be noticed by approaching motorists.
- Motorists turning right out of Shrubbery Gardens encounter the cycle element of the crossing as they enter the A105 Green Lanes, they may not appreciate or expect to encounter a crossing in such close proximity, particularly as this element of the crossing is less conspicuous.
- The routes / dropped kerb facilities intended for cyclists to enter the cycle element of the crossing from the cycle track / carriageway are not clearly defined. This may result in cyclists using undetermined and inconstant routes which may result in increased collisions with pedestrians.

These issues may lead to an increased potential for collisions between motorists and cyclists or shunt type collisions as motorists brake hard as they unexpectedly encounter a cyclist attempting to assert priority. It is also noted that the cycle part of the proposed crossing indicates kerbs with an upstand of 25mm rather than flush kerbs and does not include cycle symbol road markings as prescribed in TSRGD 2016.

RECOMMENDATION

Provide measures which will allow cyclists to assert priority over motorists. This could include an alternative crossing type, or provide appropriate temporary signing etc to inform drivers of the intended usage until this layout becomes more commonplace. It may also be beneficial to ensure that the cycle crossing kerbs have an upstand of no more than 6mm, that the cycle crossing carpet includes cycle symbols and to relocate the crossing further away from the side road.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 JUNCTIONS

3.3.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The altered kerb-lines may result in increased collisions as turning vehicles increasingly encroach into the path of another user

The proposals include various kerb line alterations which may increase the potential for turning vehicles to encroach into another user's path. This could lead to an increased potential for head on or side impact type collisions as a user turning into or out of the side roads or accesses is encountered by a vehicle travelling in the opposing direction.

RECOMMENDATION
It is recommended to undertake / check swept path analysis and make alterations if necessary to ensure that the vehicles likely to use these roads can undertake typical manoeuvres with minimal intrusion into the path of another vehicle.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.2 PROBLEM

Location: General to the scheme – bus stops / loading / parking bays close to side roads

Summary: Stationary vehicles close to side road junctions and accesses may restrict junction visibility splays and lead to failure to give way type collisions

At many locations loading / parking bays are located close to side road junctions and accesses. Stationary vehicles close to side roads may restrict visibility for drivers emerging from the side roads and this may lead to failure to give way type collisions. Similarly, where bus stops are located close to the side roads the Audit Team are concerned that vehicles overtaking waiting buses may not suitably observe vehicles egressing from side roads which may result in side impact type collisions.

RECOMMENDATION
Appropriate visibility splays at side roads should be provided and kept free of obstruction and stationary vehicles. This may require alterations to the positioning and / or extent of the bus stops / parking / loading bays.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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: Various – junctions with proposed raised tables

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

Various junctions are proposed to have raised tables implemented. The kerb details indicate that away from crossing points where transition or flush kerbs are proposed the kerbs will have an upstand of 125mm or to match existing. It is not clear therefore what the upstand will be at the raised tables.

It is assumed that these will provide a detectable upstand for visually impaired users.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: Various – shared use cycle / footway

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

It is not clear what the extents of the shared use surfaces are as none of the shared use extents appear to be defined. Additionally, at some locations it is not clear what the intended cyclist route is.

In order to avoid cyclists continuing on the footway and the potential for low level cycle / pedestrian conflicts / unexpected cycle manoeuvres, it may be beneficial to clearly determine what the intended cycle routes are. This may include but is not limited to appropriate tactile paving, dropped kerbs and road markings / signs to indicate the intended routes / manoeuvres.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: Various – throughout this section

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

Planting / SuDs 'Rain Gardens' are proposed immediately adjacent to the carriageway / cycle lanes at various junctions throughout this section.

The full details of the proposed features have not been provided but it is assumed that these will be of a type / maintained so that they do not restrict visibility or overgrow into the live carriageway areas.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.4 ISSUE

Location: 1 – Cycle track crossing junction with River Bank

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

The cycle track across this side road junction (albeit very lightly trafficked) does not have any cycle symbols. This seems inconsistent with other junctions and it may be beneficial to provide cycle logo road markings to highlight the potential presence of cyclists.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 11/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted] ([redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: xx/[redacted]

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[redacted] [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 2 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:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-021 Rev -	Cycle Enfield A105 - General Arrangement Sheet 21 of 47
B240A024-DG-A105-0100-022 Rev -	Cycle Enfield A105 - General Arrangement Sheet 22 of 47
B240A024-DG-A105-0100-023 Rev -	Cycle Enfield A105 - General Arrangement Sheet 23 of 47
B240A024-DG-A105-0100-024 Rev -	Cycle Enfield A105 - General Arrangement Sheet 24 of 47
B240A024-DG-A105-0200-021 Rev -	Cycle Enfield A105 - Site Clearance Sheet 21 of 47
B240A024-DG-A105-0200-022 Rev -	Cycle Enfield A105 - Site Clearance Sheet 22 of 47
B240A024-DG-A105-0200-023 Rev -	Cycle Enfield A105 - Site Clearance Sheet 23 of 47
B240A024-DG-A105-0200-024 Rev -	Cycle Enfield A105 - Site Clearance Sheet 24 of 47
B240A024-DG-A105-0500-021 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 21 of 47
B240A024-DG-A105-0500-022 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 22 of 47
B240A024-DG-A105-0500-023 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 23 of 47
B240A024-DG-A105-0500-024 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 24 of 47
B240A024-DG-A105-0700-021 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 21 of 47
B240A024-DG-A105-0700-022 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 22 of 47
B240A024-DG-A105-0700-023 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 23 of 47
B240A024-DG-A105-0700-024 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 24 of 47
B240A024-DG-A105-1100-021 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 21 of 47
B240A024-DG-A105-1100-022 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 22 of 47
B240A024-DG-A105-1100-023 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 23 of 47
B240A024-DG-A105-1100-024 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 24 of 47

B240A024-DG-A105-1200-021 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 21 of 47
B240A024-DG-A105-1200-022 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 22 of 47
B240A024-DG-A105-1200-023 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 23 of 47
B240A024-DG-A105-1200-024 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 24 of 47

B240A024-DG-A105-1300-021 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 21 of 47
B240A024-DG-A105-1300-022 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 22 of 47
B240A024-DG-A105-1300-023 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 23 of 47
B240A024-DG-A105-1300-024 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 24 of 47

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 10

APPENDIX B

Problem Locations

RINGWAY JACOBS

ENFIELD Council

CYCLE ENFIELD - A105

GENERAL ARRANGEMENT SHEET 21 OF 47

DRAFT FOR COMMENTS ONLY

FOR APPROVAL

1:200 @ A1 | DO NOT SCALE

B240A024

B240A024-DG-A105-0100-021 | -

Rev	Rev. Date	Purpose of revision	Drawn	Checked	Rev'd	Approved
	23/03/2016	FOR INFORMATION	GMB	AG	SS	CA

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

RINGWAY JACOBS

ENFIELD Council

CYCLE ENFIELD - A105

GENERAL ARRANGEMENT SHEET 22 OF 47

DRAFT FOR COMMENTS ONLY

FOR APPROVAL

1:500 @ A1 | DO NOT SCALE

B240A024-DG-A105-0100-022 | -

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

B240A024-DG-A105-0100-023

RINGWAY JACOBS

ENFIELD Council

Project: CYCLE ENFIELD - A105

GENERAL ARRANGEMENT SHEET 23 OF 47

DRAFT FOR COMMENTS ONLY

FOR APPROVAL

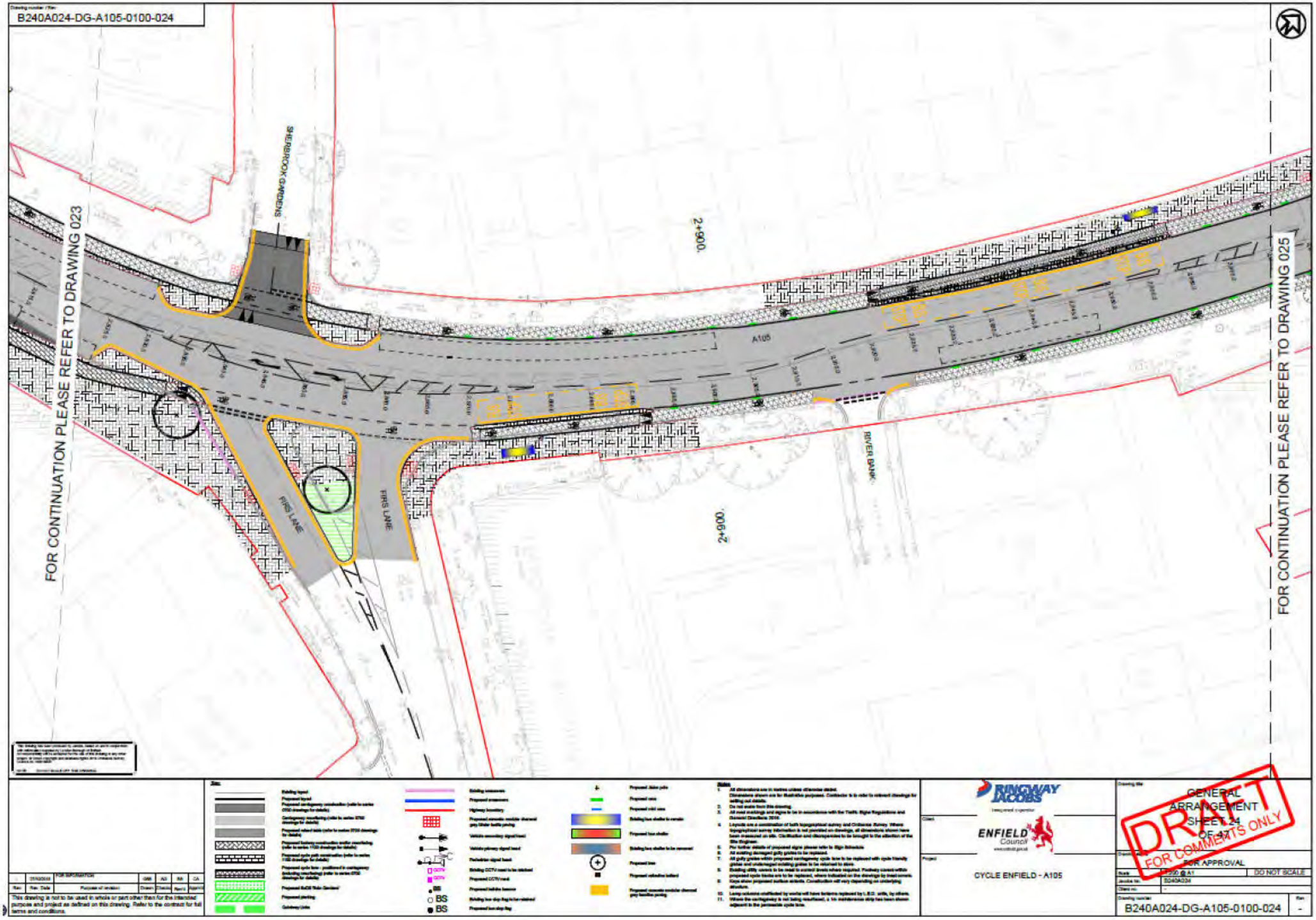
Scale: 1:200 @ A1 | DO NOT SCALE

Job No: B240A024

Drawing number: B240A024-DG-A105-0100-023

Rev: -

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.


B240A024-DG-A105-0100-024
FOR CONTINUATION PLEASE REFER TO DRAWING 023
FOR CONTINUATION PLEASE REFER TO DRAWING 025
SHERBROOK GARDENS
A105
FIRS LANE
FIRS LANE
RIVER BANK
2+900
2+900
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 24 OF 47
DRAFT
FOR COMMENTS ONLY
FOR APPROVAL
DO NOT SCALE
B240A024-DG-A105-0100-024

Transport for London

A105 Ridge Avenue, Enfield

Cycle Enfield A105

Stage 2 Road Safety Audit

Ref: 2759.01/032/A10/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by: Shane Martin, Audit Team Leader

Checked by: Fadzil Ismail, Audit Team Member

Approved by: Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	06/10/2016

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the A105 Ridge Avenue, Enfield, Cycle Enfield A105 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 9h September 2016. It took place at the Palestra offices of TfL on 30th September 2016 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 30h September 2016. 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:	Paul Rogers – London Borough of Enfield

1.3.2 Design Organisation

Design contact details:	Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader:	Shane Martin – TfL Road Safety Audit
Audit Team Member:	Fadzil Ismail – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 11 of this route only, from the junction with Green Dragon Lane to west of the junction with Berkeley Gardens.

1.5.2 Works were already underway at the junction with Devonshire Gardens. This did not stop the Audit from being undertaken although the Audit Team could not observe this area in normal operation as temporary traffic management was in place.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016. This report covered the whole route and therefore many of the issues raised are not specific to this (Section 11) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.1 General to the scheme - Proposed zebra and cycle crossing layouts may result in drivers failing to give way to cyclists

This problem remains in the detailed design proposals and is therefore raised again within this report as Problem 3.2.1.

Problem 3.1.4 General to the scheme - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict

This problem remains in the detailed design proposals and is therefore raised again within this report as Problem 3.1.3.

Problem 3.1.5 General to the scheme - Stationary vehicles close to side road junctions and accesses may restrict junction visibility splays and lead to failure to give way type collisions

This problem remains in the detailed design proposals and is therefore raised again within this report as Problem 3.1.2.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.1 Kerb line alterations may require swept path analysis [and alterations] to minimise potential for conflicts.

This issue may still present a problem within the detailed design and this is therefore raised as 4.1 in this Audit report.

Issue 4.2 Bus stop borders separated from footways by cycle lanes may lead to conflicts between pedestrians and cyclists and / or trip hazards.

This issue may still present a problem within the detailed design and this is therefore raised as 3.4.1 in this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians.

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle track. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed, this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: A – A105 Ridge Avenue junctions with Bridge Parade and Bridge Gate

Summary: Parked vehicles close to side road junctions / accesses may restrict junction visibility splays and lead to left hook type collisions

The parking bays are located close to side road junctions / accesses, and vehicles parked at the western extent of these bays may obstruct visibility. The Audit Team are concerned that the reduced visibility may result in vehicles turning into these side roads not suitably sighting cyclists utilising the semi-segregated mandatory cycle track, which is positioned behind the parking bays. Therefore, an increased potential for collisions between motorists turning into these side roads and cyclists travelling westbound along the semi-segregated cycle lane may result.

RECOMMENDATION
It is recommended to ensure that appropriate visibility splays are provided. This may involve but is not limited adjusting the length of the parking bays or relocating them. It may be beneficial to investigate the feasibility of relocating the parking bays to the northern side of the carriageway instead.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: B – A105 Ridge Avenue junction with Devonshire Gardens

Summary: Drivers turning to or from the side road may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict

The proposed segregated cycle track at this location crosses the side road on a raised table. Drivers turning from the main road have a short stacking space between the main road and the cycle crossover due to the location of the cycle track. Drivers may be confused by the arrangement and fail to give way to cyclists, or may stop suddenly and remain partially within the main carriageway, which may lead to late braking nose to tail collisions.

Drivers entering the main road may be confused by the give way arrangement, and stop across the cycle track, which may lead to nose to tail collisions or cycle to vehicle conflict.

RECOMMENDATION
If such cycle priority is to be provided at side roads then an appropriate stacking space should be provided between the main road and cycle crossing to allow vehicles to wait between the main road and cycle crossing without encroaching in to the main carriageway or blocking the cycle crossing. If this isn't feasible then it may be beneficial to provide a more conventional nearside on carriageway cycle lane layout.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 CROSSING FACILITIES

3.2.1 PROBLEM

Location: C – A105 Green Lanes / Ridge Avenue near junction with Green Dragon Lane

Summary: Proposed zebra and cycle crossing layouts may result in drivers failing to give way to cyclists

The Audit Team are concerned that the proposed zebra and cycle crossing may not be understood by motorists particularly as the layout is new to drivers. The following issues may result in an increased potential for collisions:

- Zebra crossings are well established and the conspicuousness of the thick black and white striped road markings help to clearly indicate that a pedestrian has priority over vehicular traffic in this area. The lack of these markings within the proposed cycle section of the crossing may lead to ambiguity over who has priority and motorists may fail to give way to cyclists.
- Slow approach speeds by pedestrians enable an approaching motorist to notice they intend to cross, slow down and stop. Cyclists are likely to approach faster than pedestrians and may therefore fail to be noticed by approaching motorists.

These issues may lead to an increased potential for collisions between motorists and cyclists or shunt type collisions as motorists brake sharply as they unexpectedly encounter a cyclist attempting to assert priority.

RECOMMENDATION
Provide measures which will allow cyclists to assert priority over motorists. This could include an alternative crossing type, or provide appropriate temporary signing to inform drivers of the intended usage until this layout becomes more commonplace.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.2 PROBLEM

Location: D – A105 Green Lanes / Ridge Avenue junction with Green Dragon Lane

Summary: Proposed narrowing of pedestrian refuge island may result in an increased potential for pedestrians to vehicle collisions if pedestrians overhang the island.

The Audit Team are concerned that the revised narrowed pedestrian refuge island within Green Dragon Lane is narrow at approx. 1.2m. Users such as those pushing a pushchair or wheelchair may overhang in to the carriageway and therefore be at an increased risk of collisions with passing vehicles.

RECOMMENDATION
It is recommended that alterations are incorporated to ensure that all users can be suitably contained within the pedestrian refuge island. This may involve altering the kerb line modifications so that suitable width can be provided within the pedestrian refuge island.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 TRAFFIC ISLANDS

3.3.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The absence of guide posts may lead to an increased potential for collisions with the segregation islands

The Audit Team are concerned that various proposed physical islands are indicated at widths where they do not accommodate a vertical illuminated feature with appropriate lateral clearances. Furthermore, the road markings at these islands tie into the kerb-line rather than providing suitable guidance alongside them. If the islands are not conspicuous, an increased potential for kerb strikes, hard braking or evasive manoeuvres may result if users do not correctly determine the extent of the islands. This could lead to injuries to vehicle occupants, shunt type collisions or collisions with other road users. This is of particular concern during the hours of darkness, when the conspicuousness of the islands may be reduced.

RECOMMENDATION
It is recommended that the road markings, signs and / or islands are altered to ensure that suitable guidance is provided to ensure the islands are conspicuous. This may require the provision of a retro-reflective guide post, localised widening of the segregation island and modifications to the road markings.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.4 BUS STOPS

3.4.1 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that the proposed cycle tracks run immediately adjacent to the proposed bus stop boarders. Therefore bus passengers would board / alight a bus from / onto the cycle track. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions.

RECOMMENDATION
It is recommended that the layout of the bus stop boarders / cycle tracks is altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.4.2 PROBLEM

Location: E – Bus borders where vehicle crossovers cross the cycle track.

Summary: Cyclists on the raised section of track may be destabilised by ramps for vehicle crossovers.

The Audit Team are concerned that the dropped kerbs for vehicle crossovers at the bus borders appear to transition from carriageway to footway level over a short distance. As this ramp is within the cycle track it may result in cyclists encountering a sudden cross-fall which is unlikely to be expected and may result in cyclists being destabilised.

RECOMMENDATION
It is recommended that the layout of the bus stop boarders / cycle tracks is altered to ensure that cyclists do not encounter a cross-fall which could destabilise them. Typically, the maximum cross-fall permitted within a cycle lane is 1:20.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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: Various – Side roads with the A105 Ridge Avenue

Reason considered to be outside the Terms of Reference: Existing issue for consideration.

The Audit Team noted that various existing side road junctions do not have tactile paving.

In order to provide a more consistent message for visually impaired users along this route it may be beneficial to provide tactile paving across all side road crossings. It is appreciated that the proposed tactile paving is at locations where resurfacing is being undertaken and therefore this may fall outside of the scope of this scheme.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: 1 – Green Dragon Lane junction with Ridge Avenue (Sheet 25)

Reason considered to be outside the Terms of Reference: Issue for clarification / consideration.

Various kerb lines are to be amended and these appear as though they may result in difficulties for drivers of larger vehicles and / or over-running of the kerbs. No vehicle swept-path analysis has been provided to the Audit Team.

It is therefore recommended that swept path analysis is carried out and alterations made where necessary to ensure large vehicles are able to manoeuvre the proposed kerb layout without over-running the kerbs.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: 2 – Green Dragon Lane junction with Ridge Avenue (Sheet 25)

Reason considered to be outside the Terms of Reference: Technical / compliance issue

The detailed design drawings indicate various road markings within the controlled area for the cycle / pedestrian zebra crossing. It is the Audit Teams understanding that the only permitted road markings within this area are the cycle symbols.

It may be beneficial to ensure that the road markings comply with the Traffic Signs Regulations and General Directions (TSRGD) 2016.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.4 ISSUE

Location: 3 – Green Dragon Lane junction with Ridge Avenue (Sheet 25)

Reason considered to be outside the Terms of Reference: Capacity / suitability issue

The detailed design drawings indicate that the tactile paving / uncontrolled crossing width across Green Dragon Lane is narrow at approximately 1.6m wide. This may not provide suitable width to accommodate users such as those with wheelchairs or buggies to comfortably pass one another.

It may be beneficial to check anticipated pedestrian utilisation and ensure that this crossing suitably accommodates this.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.5 ISSUE

Location: 4 – Green Dragon Lane junction with Ridge Avenue (Sheet 25)

Reason considered to be outside the Terms of Reference: Capacity / suitability issue

The detailed design drawings indicate that the road markings on Green Dragon Lane are proposed to be altered to formalise two lanes on approach to the junction with the A105 Green Lanes / Ridge Avenue. The lane widths appear to be narrow and whilst any collisions are likely to be very low speed and therefore damage only, encouraging two lanes of traffic through a narrow section may result in increased damage only collisions.

It may be beneficial to check the swept path analysis / available widths to ensure that two lanes can pass / turn from this area unimpeded.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.6 ISSUE

Location: 5 – Green Dragon Lane junction with Ridge Avenue (Sheet 25)

Reason considered to be outside the Terms of Reference: Issue for consideration.

The Audit Team noted during the site visit that motorists exiting Green Dragon Lane were particularly busy during morning peak, and many were witnessed to force their way out onto the A105. This often results in users on the A105 having to wait for users exiting to clear. It is not known if this occurs throughout the day.

Whilst it is appreciated that this is an existing issue which is not likely to be impacted by the proposals it may be beneficial to investigate the feasibility of a traffic signals measure to improve the junction.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.7 ISSUE

Location: 6 – Green Dragon Lane junction with Ridge Avenue (Sheet 25)

Reason considered to be outside the Terms of Reference: Issue for clarification.

The Audit Team noted during the site visit that there is an existing bi-directional cycle track between Bush Hill and Green Dragon Lane. Whilst the resurfacing and reinstatement of this cycle track is proposed it is not clear if the road markings are to be reinstated. It is therefore not clear what this layout will consist of or how this will interact with the proposed bi-directional cycle track.

Furthermore, the Audit Team have considered that the proposed cycle track and uncontrolled pedestrian crossings across the track may not be used as intended due to the established pedestrian desire lines and the convoluted / impractical nature of the crossings if used as intended.

It may be beneficial to investigate the feasibility of making this area shared use. Additionally, whilst the crossing facility suggests that cyclists can use the southern footway area, no features clarify the extents. Therefore it is also recommended that the signing / extent of the shared use area is clarified.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 06/10/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Fadzil Ismail [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 06/10/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: fadzilismail[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 2 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 Organisations endorsement of my proposals.

Name:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

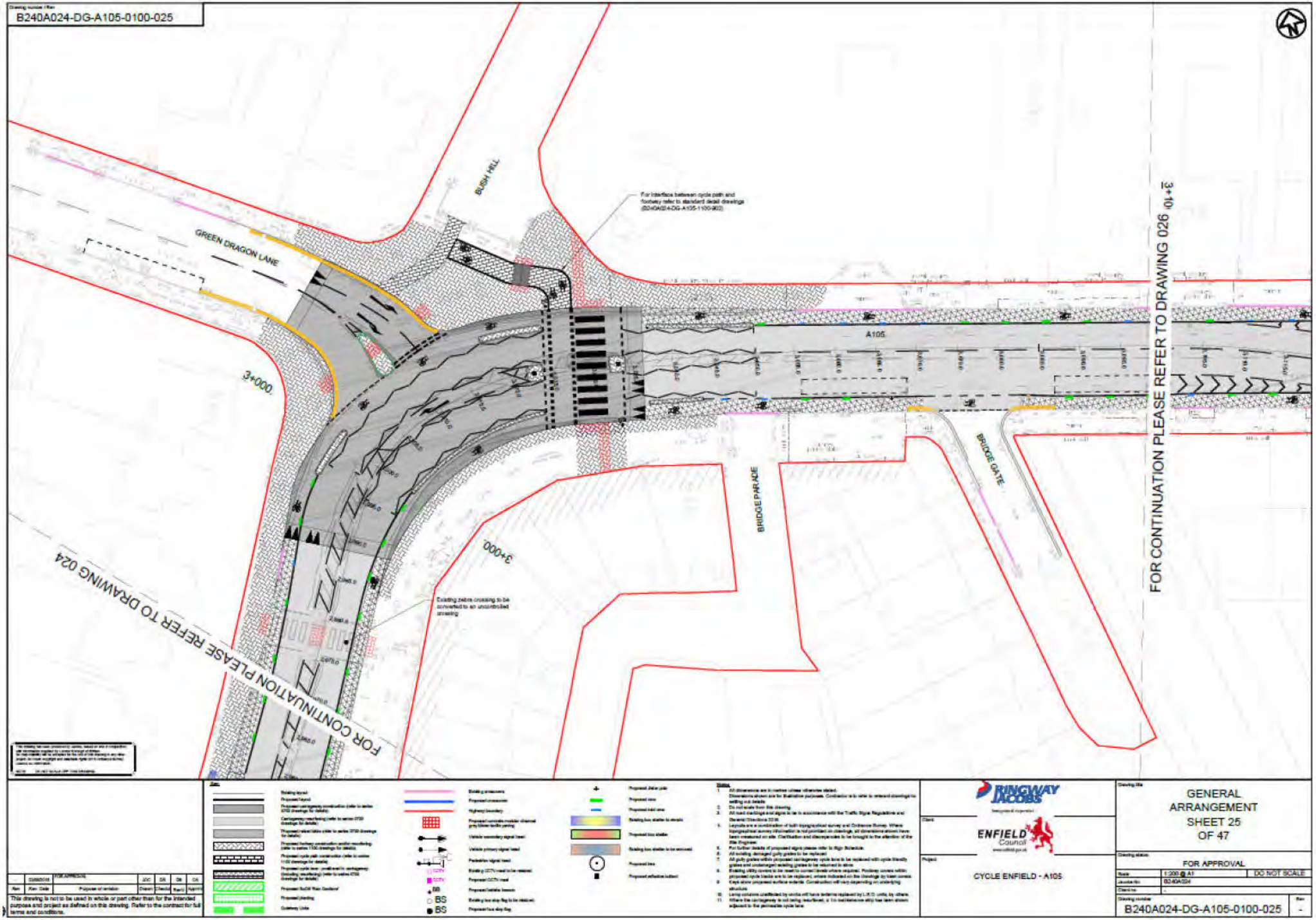
DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-025 Rev	Cycle Enfield A105 General Arrangement Sheet 25 of 47
B240A024-DG-A105-0100-026 Rev	Cycle Enfield A105 General Arrangement Sheet 26 of 47
B240A024-DG-A105-0100-027 Rev	Cycle Enfield A105 General Arrangement Sheet 27 of 47
B240A024-DG-A105-0100-028 Rev	Cycle Enfield A105 General Arrangement Sheet 28 of 47
B240A024-DG-A105-0100-029 Rev	Cycle Enfield A105 General Arrangement Sheet 29 of 47
B240A024-DG-A105-0200-025 Rev	Cycle Enfield A105 Site Clearance Sheet 25 of 47
B240A024-DG-A105-0200-026 Rev	Cycle Enfield A105 Site Clearance Sheet 26 of 47
B240A024-DG-A105-0200-027 Rev	Cycle Enfield A105 Site Clearance Sheet 27 of 47
B240A024-DG-A105-0200-028 Rev	Cycle Enfield A105 Site Clearance Sheet 28 of 47
B240A024-DG-A105-0200-029 Rev	Cycle Enfield A105 Site Clearance Sheet 29 of 47
B240A024-DG-A105-0500-025 Rev	Cycle Enfield A105 Proposed drainage plan Sheet 25 of 47
B240A024-DG-A105-0500-026 Rev	Cycle Enfield A105 Proposed drainage plan Sheet 26 of 47
B240A024-DG-A105-0500-027 Rev	Cycle Enfield A105 Proposed drainage plan Sheet 27 of 47
B240A024-DG-A105-0500-028 Rev	Cycle Enfield A105 Proposed drainage plan Sheet 28 of 47
B240A024-DG-A105-0500-029 Rev	Cycle Enfield A105 Proposed drainage plan Sheet 29 of 47
B240A024-DG-A105-1100-025 Rev	Cycle Enfield A105 Kerbs footways and paved areas Sheet 25 of 47
B240A024-DG-A105-1100-026 Rev	Cycle Enfield A105 Kerbs footways and paved areas Sheet 26 of 47
B240A024-DG-A105-1100-027 Rev	Cycle Enfield A105 Kerbs footways and paved areas Sheet 27 of 47
B240A024-DG-A105-1100-028 Rev	Cycle Enfield A105 Kerbs footways and paved areas Sheet 28 of 47
B240A024-DG-A105-1100-029 Rev	Cycle Enfield A105 Kerbs footways and paved areas Sheet 29 of 47
B240A024-DG-A105-1200-025 Rev	Cycle Enfield A105 Traffic signs and road markings Sheet 25 of 47
B240A024-DG-A105-1200-026 Rev	Cycle Enfield A105 Traffic signs and road markings Sheet 26 of 47
B240A024-DG-A105-1200-027 Rev	Cycle Enfield A105 Traffic signs and road markings Sheet 27 of 47
B240A024-DG-A105-1200-028 Rev	Cycle Enfield A105 Traffic signs and road markings

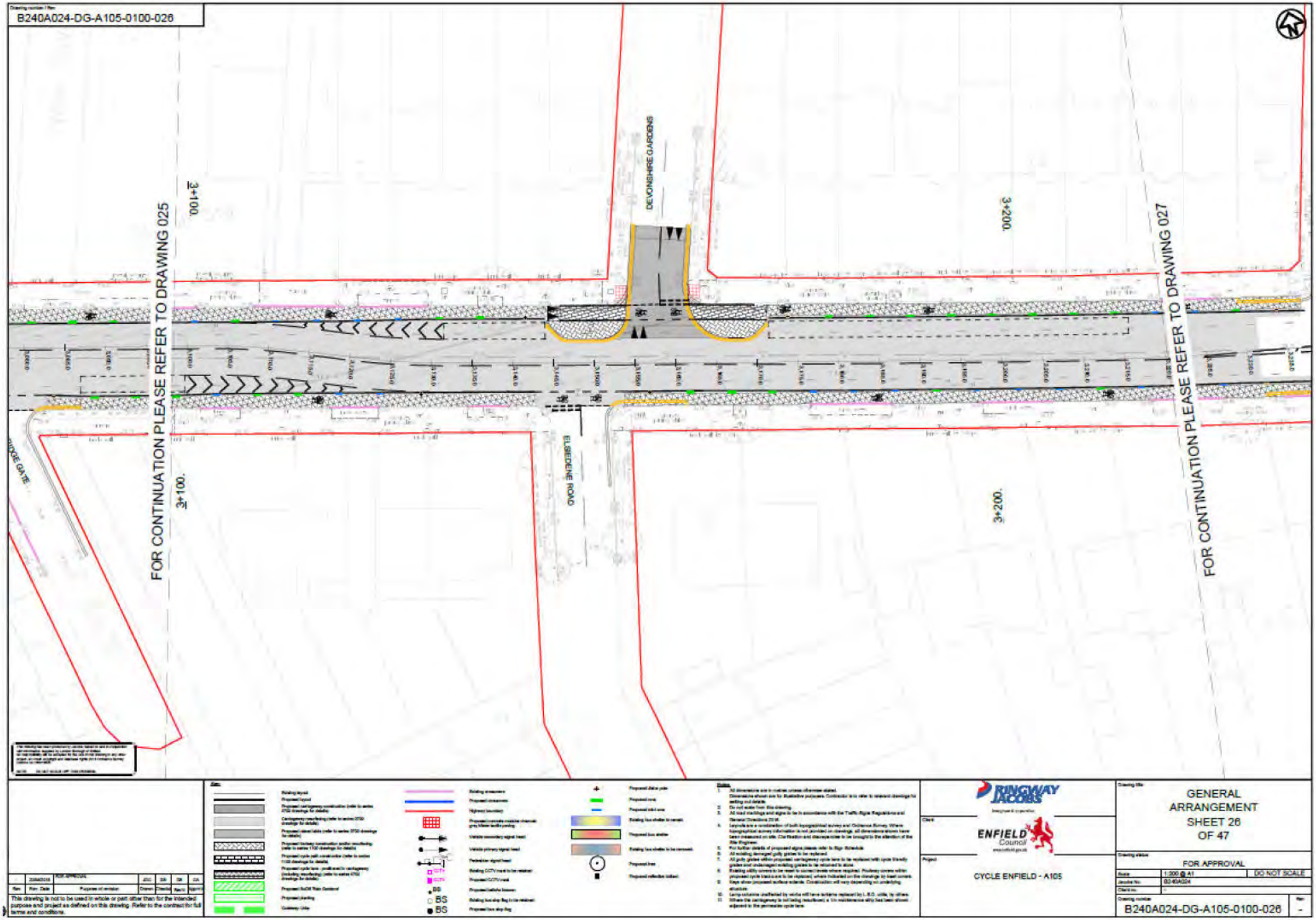
	Sheet 28 of 47
B240A024-DG-A105-1200-029 Rev	Cycle Enfield A105 Traffic signs and road markings Sheet 29 of 47
B240A024-DG-A105-1300-025 Rev	Cycle Enfield A105 Lighting Sheet 25 of 47
B240A024-DG-A105-1300-026 Rev	Cycle Enfield A105 Lighting Sheet 26 of 47
B240A024-DG-A105-1300-027 Rev	Cycle Enfield A105 Lighting Sheet 27 of 47
B240A024-DG-A105-1300-028 Rev	Cycle Enfield A105 Lighting Sheet 28 of 47
B240A024-DG-A105-1300-029 Rev	Cycle Enfield A105 Lighting Sheet 29 of 47

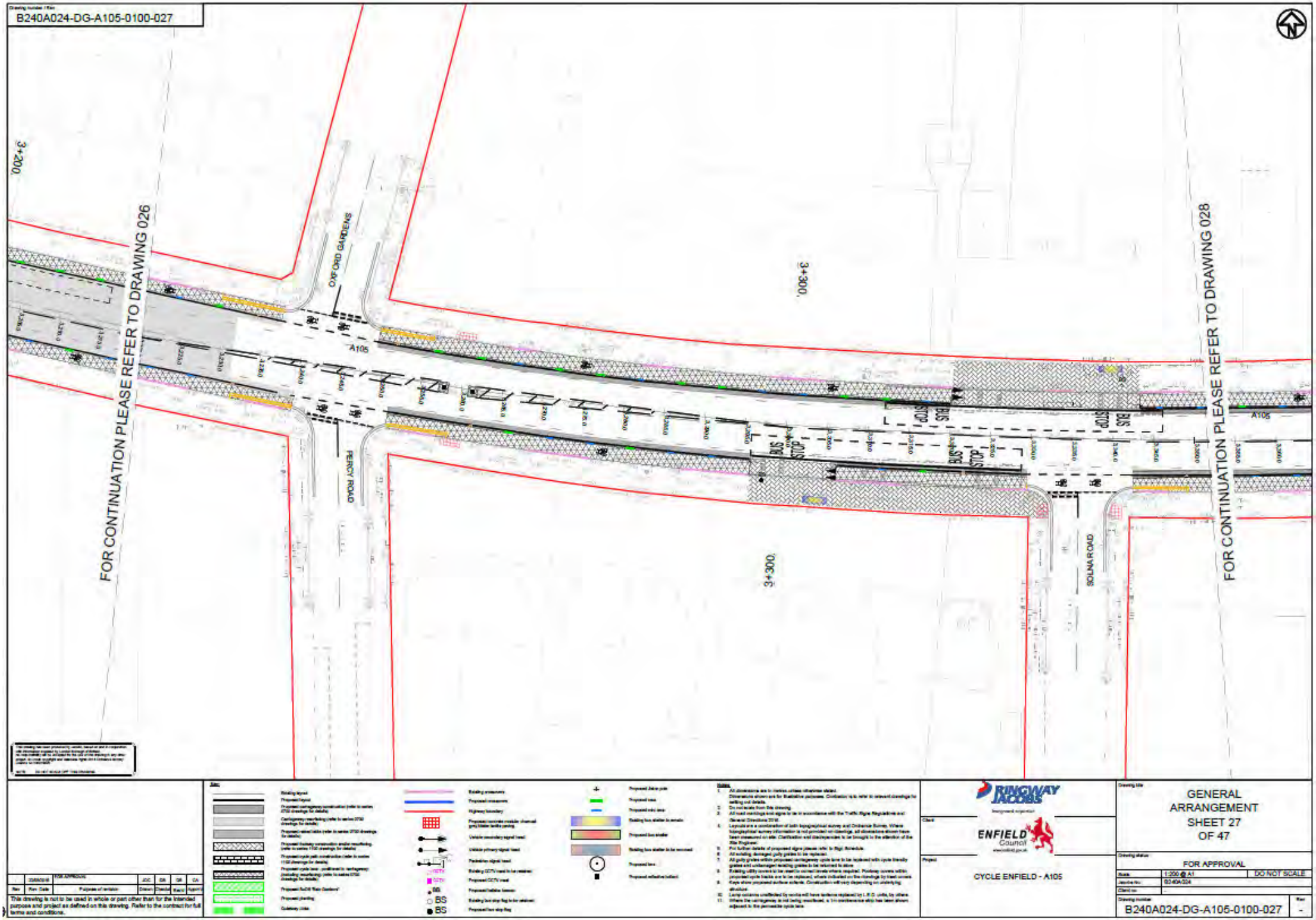
DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule - Section 11 - REV _ A105 Enfield - Sign Schedule - Section 11

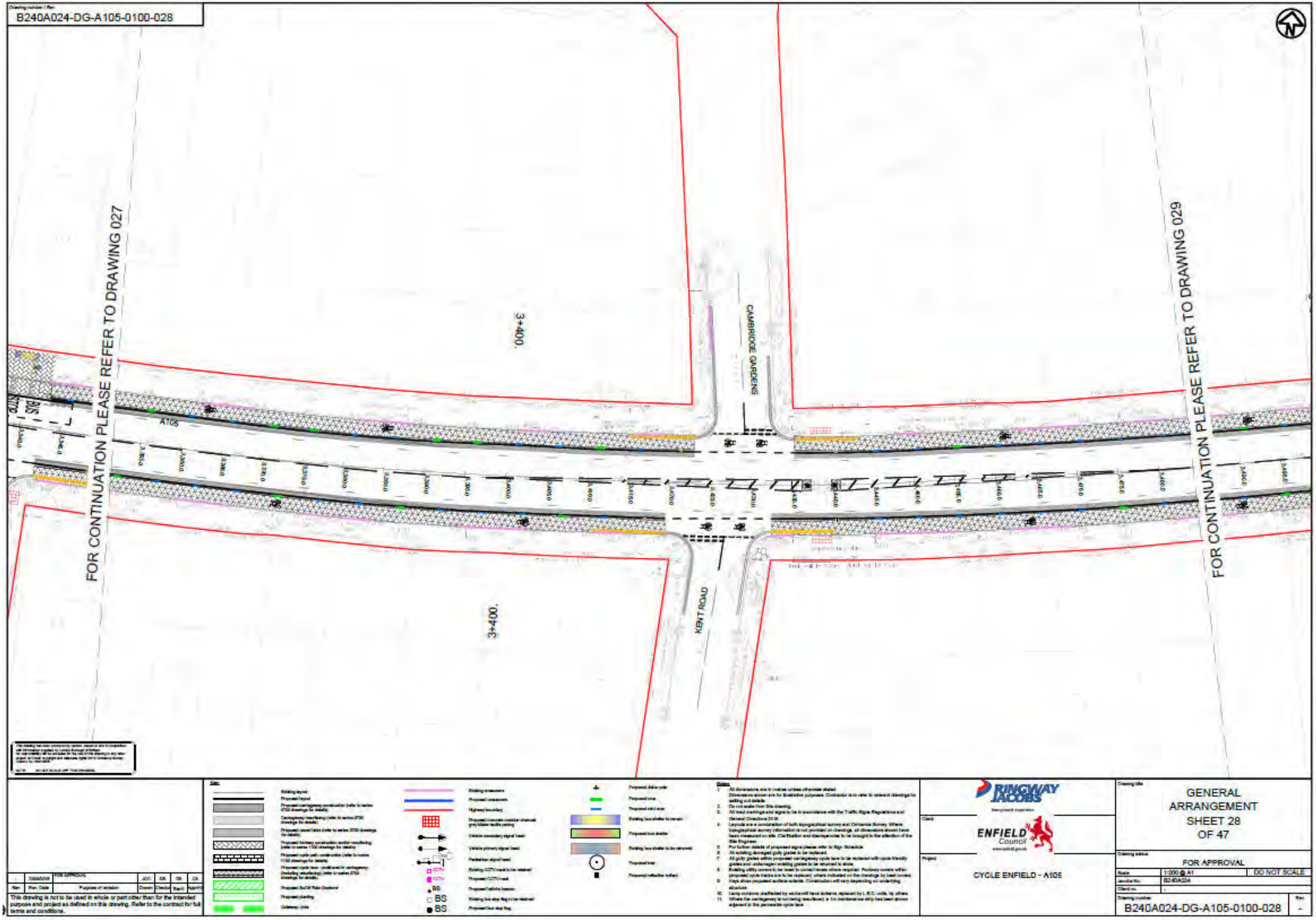
APPENDIX B

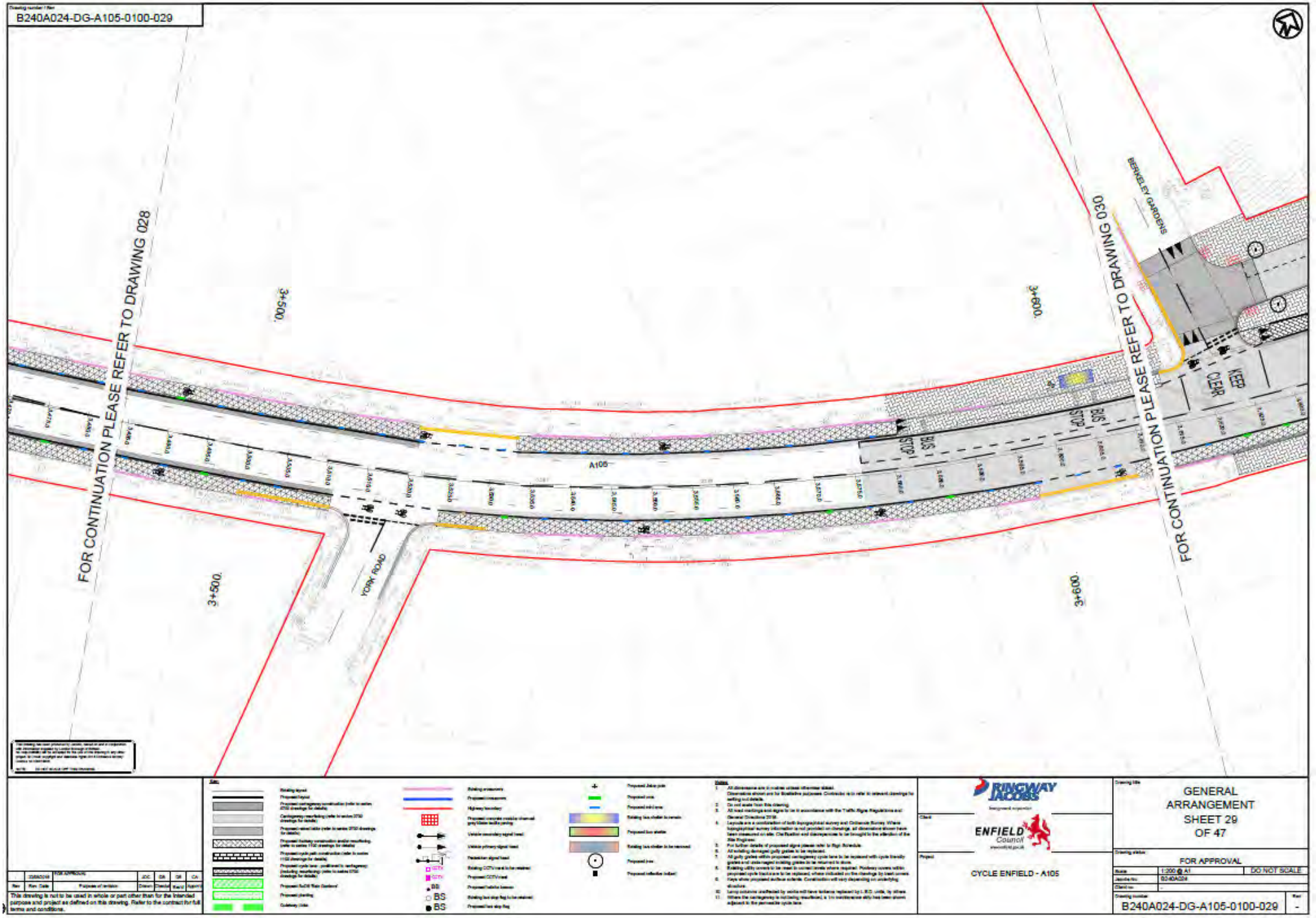
Problem Locations


B240A024-DG-A105-0100-025
BUSH HILL
GREEN DRAGON LANE
A105
3+000
3+000
BRIDGE PARADE
BRIDGE GATE
FOR CONTINUATION PLEASE REFER TO DRAWING 026
FOR CONTINUATION PLEASE REFER TO DRAWING 024
Existing zebra crossing to be converted to an uncontrolled crossing
For interface between cycle path and footway refer to standard detail drawings (B240A024-DG-A105-1100-902)
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 25 OF 47
FOR APPROVAL
DO NOT SCALE
B240A024-DG-A105-0100-025


B240A024-DG-A105-0100-026
FOR CONTINUATION PLEASE REFER TO DRAWING 025
FOR CONTINUATION PLEASE REFER TO DRAWING 027
DEVONSHIRE GARDENS
ELSBERDENE ROAD
3+100
3+200
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 26 OF 47
FOR APPROVAL
DO NOT SCALE
1:200 @ A1
B240A024
B240A024-DG-A105-0100-026


B240A024-DG-A105-0100-027
3+200
3+300
3+300
OXFORD GARDENS
A105
FERCY ROAD
SOLNA ROAD
BUS STOP
BUS STOP
BUS STOP
BUS STOP
A105
FOR CONTINUATION PLEASE REFER TO DRAWING 026
FOR CONTINUATION PLEASE REFER TO DRAWING 028
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 27 OF 47
FOR APPROVAL
1:200 @ A1
DO NOT SCALE
B240A024-DG-A105-0100-027
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.


B240A024-DG-A105-0100-028
FOR CONTINUATION PLEASE REFER TO DRAWING 027
FOR CONTINUATION PLEASE REFER TO DRAWING 029
A105
CAMBRIDGE GARDENS
KENT ROAD
3+400
3+400
GENERAL ARRANGEMENT SHEET 28 OF 47
FOR APPROVAL
DO NOT SCALE
CYCLE ENFIELD - A105
B240A024-DG-A105-0100-028


B240A024-DG-A105-0100-029
FOR CONTINUATION PLEASE REFER TO DRAWING 028
FOR CONTINUATION PLEASE REFER TO DRAWING 030
3+500
3+600
A105
YORK ROAD
BERNERS GARDENS
BUS STOP
KEEP CLEAR
GENERAL ARRANGEMENT
SHEET 29
OF 47
FOR APPROVAL
CYCLE ENFIELD - A105
RINGWAY JACOBS
ENFIELD Council
1:200 @ A1
DO NOT SCALE
B240A024
B240A024-DG-A105-0100-029
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Transport for London

A105 from Berkeley Gardens to Borden Avenue Cycle Enfield - Section 12

Stage 2 Road Safety Audit

Ref: 2759.02.12/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	25/11/2016

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the A105 from Berkeley Gardens to Borden Avenue, Cycle Enfield - 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 14th November 2016. It took place at the Palestra offices of TfL on 15th November 2016 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 15 h November 2016. 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: Paul Rogers – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 12 (Sheets 30, 31 & 32) of this route only, A105 Ridge Avenue / Village Road junction with Bush Hill Road / Church Street and approaches.

1.5.2 A Quietway route is proposed which crosses the A105 on Church Street / Bush Hill Road, no details of these proposals are indicated and are therefore not subject to this Stage 2 Road Safety Audit.

1.5.3 Full details of the traffic signal staging / timings have not yet been provided and therefore the Audit Team could not fully comment on this element of the proposals.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016). This report covered the whole route and therefore many of the issues raised are not specific to this (Section 12) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.3 Cycle lanes past junction locations - Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists

This problem remains and is therefore raised as problem 3.1.2 within this Audit Report.

Problem 3.4.1 Bush Hill Road / Avenue Parade access - Two-way cycle lane past side road access may increase the potential for turning collisions involving cyclists

The layout has been altered to incorporate part of the recommendation and the potential for collisions appears to be mitigated. However, as there is a recommendation which could further reduce the potential for collisions this is raised as part of problem 3.3.1 in this Audit Report.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.6 Cycle routes, pedestrian crossing facilities and tie-ins to the Quietway scheme (on the side roads) appear to be unclear.

This layout has been altered significantly and the pedestrian and cycle facilities are now clarified. The tie in to the Quietway scheme is still unclear and this is raised as part of 4.2 in this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians.

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed, this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to the scheme – cycle lanes past junction locations

Summary: Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists

At a number of locations, segregated cycle lane / bypasses are returned to the carriageway just before side road junction locations. At such locations it may be difficult for both sets of road users to understand who has priority and this may lead to turning collisions involving cyclists, particularly where bus stop bypasses are located on the approach to junctions and where 'floating' parking / loading areas are close to junctions. Cyclists may find it difficult to avoid vehicles entering or emerging from side roads if constrained by the segregation features, which could lead to increased risk of merging / failure to give way type collisions.

RECOMMENDATION
Research from TRL (PPR703 – Trials of segregation set-back at side roads) indicates that setting back cycle lanes by at least 20m from side roads may improve cyclist safety at junctions. Such an approach would have an effect on bus stop locations and the cycle bypass facilities provided at them. There is also likely to be an effect on the length of 'floating' parking / loading bays.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General to scheme, multiple locations

Summary: Visually impaired pedestrians may inadvertently enter the carriageway via cycle track ramps / flush sections at raised tables.

The Audit Team are concerned that proposed cycle track ramps / sections which are completely flush with raised junction tables may lead to a visually impaired pedestrian inadvertently entering the carriageway. Visually impaired pedestrian unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the cycle track ramps / flush sections are altered. This may include, but is not limited to, providing tramline tactile paving prior to the ramps down to carriageway level.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: A - Bush Hill Road – Avenue Parade access

Summary: Two-way cycle lane past side road access may increase the potential for turning collisions involving cyclists

The two-way cycle lane past the shopping parade vehicular exit increases the complexity of decision making for drivers making turns from the access. Drivers may not be able to wait at a right angle to the give-way line and have to gap seek between two traffic lanes as well as both directions of. Pedestrians are also likely to be attempting to cross here. The Audit Team are concerned that vehicles egressing may find it difficult to find a suitable gap and may pull out not noticing an approaching motorist, cyclist or pedestrian as they attempt to exit / turn on to Bush Hill Road. This may increase the likelihood of collisions involving cyclists, pedestrians and other road users at this location.

RECOMMENDATION

It is recommended that the layout is altered so that more simple interactions occur. This may include, but is not limited to, making the cycle lanes one-way, with a more conventional with flow cycle track on each side of the carriageway. Alternatively, if that is not feasible it may be beneficial to make the exit from the shopping parade left turn only and alter the northern extent of the parking bay to enable vehicles to better align at the give way.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: B – A105 Village Road opposite northeast of junction with Bush Hill Road (Sheet 30/47)

Summary: Northeast bound motorists may not notice the kerbed segregation island.

The Audit Team are concerned that northeast bound motorists may not appreciate that the segregation at this location becomes a kerbed physical segregation which commences within the carriageway running lane. No features to highlight this physical feature or guide users alongside it are proposed, it may therefore not be clear or conspicuous. Northeast bound users may collide with the kerb or swerve to avoid the feature if they notice it in close proximity, which may result in loss of control type collisions and injury to those on or within the vehicle.

RECOMMENDATION
It is recommended to alter the layout to suitably guide vehicles alongside the kerbed island. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) and altering the path of the orcas / mandatory cycle lane marking so that it suitably highlights and 'ties in' to the physical island providing suitable guidance alongside the feature.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 BUS STOPS

3.2.1 PROBLEM

Location: C – A105 Ridge Avenue junction with Berkeley Gardens (Sheet 30/47)

Summary: Bus stop located close to side road may restrict junction visibility splays and lead to left hook type collisions

The northeast bound bus stop is located close to Berkeley Gardens (side road junction) whilst occupied by a bus this may obstruct visibility. The Audit Team are concerned that the reduced visibility may result in vehicles turning into the side road not suitably sighting cyclists exiting the off carriageway cycle route across the side road. Therefore, an increased potential for collisions between motorists turning into the side road and cyclists travelling northeast bound between the two sections of off carriageway cycle facilities at this location.

RECOMMENDATION
It is recommended to ensure that appropriate visibility splays are provided. This may involve, but is not limited to, relocating the bus stop.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2.2 PROBLEM

Location: D – A105 Ridge Avenue southwest of junction with Berkeley Gardens (Sheet 30/47)

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that the proposed cycle track runs immediately adjacent to the proposed bus stop boarder. Therefore bus passengers would board / alight a bus from / onto the cycle track. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased risk of collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions.

RECOMMENDATION

It is recommended that the layout of the bus stop boarder / cycle track is altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 TRAFFIC SIGNALS

3.3.1 PROBLEM

Location: E – A105 Ridge Avenue northbound approach to junction with Bush Hill Road (Sheet 30/47)

Summary: Proposed traffic signal layout may not be conspicuous and may lead to shunt or overshoot type collisions.

The Audit Team are concerned that the nearside primary and offside / far sided secondary traffic signals may be obscured by large vehicles,. Therefore this may result in an increased potential for motorists, particularly those in the offside lane during busy periods may not suitably sight a traffic signal. This may result in late braking and an increased potential for shunt type collisions or failure to adhere to a red traffic signal with an increased potential for collisions with opposing flows within the junction or pedestrians crossing.

RECOMMENDATION

It is recommended to ensure that at least a single primary traffic signal is clearly visible from each approach lane to the junction. This may include but is not limited to providing a traffic island to house an offside primary traffic signal or an extended height traffic signal pole or mast arm.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.4 PARKING

3.4.1 PROBLEM

Location: F – A105 Village Road parking bays to the nearside of the southwest bound lanes approaching Bush Hill Road (Sheet 30/47)

Summary: Proposed parking bays may result in increased collisions

The Audit Team are concerned that vehicles entering / exiting the proposed on footway parking bays may:

- Over-run on to the adjacent cycle track to align themselves within the bays,
- Have reduced inter-visibility to cyclists on the adjacent track due to the proximity of the bus shelter,
- Not have sufficient visibility of cyclists in the cycle tracks due to the angle of approach / entry and cyclists being in a potential blind spot,
- Result in dooring of cyclists in the cycle tracks.

This may therefore result in increased potential for injuries to cyclists as vehicles utilise these parking bays.

RECOMMENDATION
It is recommended to alter the parking provision so that it does not involve motorists entering (including dooring) or crossing the cycle tracks.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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 cycle routes in both directions on the A105 Ridge Avenue / Village Road junction with Bush Hill Road (Sheet 30/47)

Reason considered to be outside the Terms of Reference: Unclear pedestrian provision.

The proposed layout may be considered too inconvenient for cyclists attempting to keep momentum through the junction. For example southwest bound cyclists approaching the junction could be 'held up' or delayed as other users cross their path such as:

1. Pedestrians accessing / congregating around the bus stop area
2. Pedestrians accessing / congregating around the pedestrian crossing (across Village Road)
3. Opposing cyclists crossing diagonally to the south-eastern side of the junction (give-way indicated)
4. Opposing cyclists attempting to cross westbound, entering from Church Street and potentially crossing the path of southwest bound cyclists
5. Pedestrians accessing / congregating around the pedestrian crossing (across both sections of Church Street)

This may result in cyclists taking to the carriageway near to the bus stops on each approach where they are given very little assistance.

It is appreciated that a significant level of intervention is provided to encourage segregated cycling and that provision on carriageway may be perceived as guidance to deviate from the designated and predominantly segregated cycle routes. Therefore, it is recommended that the use of the cycle facilities and cyclists remaining on carriageway at this junction are carefully monitored with a view to developing proposals if necessary.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: Various – throughout segregated on footway cycle tracks

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

The typical cross section of the on footway cycle track indicates that 3 rows of granite setts will be provided alongside the edges of the track. It is considered that these are likely to provide a reasonable tonal contrast and a texture / tactile difference to highlight the cycle track / edge of footway.

It is assumed that these will be laid almost flush (maximum upstand of less than 6mm) so that they do not present a trip hazard for pedestrians.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: 1 – Bush Hill Road junction with Avenue Parade.

Reason considered to be outside the Terms of Reference: Unclear pedestrian provision.

The proposed layout at the northern extent of Avenue Parade vehicular exit on to Bush Hill Road appears to have a section of bi-directional cycle track which is raised to footway level. This is slightly unclear as a ramp is only indicated on Avenue Parade side and not on Bush Hill Road side of the raised track.

The existing pedestrian route from the large island between Avenue Parade and Bush Hill Road / Ridge Avenue may be unclear. Particularly for visually impaired users who are likely to encounter the ramped section of carriageway across Avenue Parade, the tramline tactile paving for the cycle track and pedestrian tactile paving across the cycle track but none leading to an onward footway.

This is considered to be a reduced level of service, which may cause confusion and potential discomfort rather than mislead pedestrians into a potential hazard. However, it is recommended that these issues are considered alongside the recommendation to problem 3.3.1.

There is also a give way road marking indicated to the north of this area which crosses the vehicular access to No.2 Bush Hill Road. As this is a vehicular crossover to a house it is considered that this has been indicated in error.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.4 ISSUE

Location: 2 – A105 Ridge Avenue / Village Road junction with Bush Hill Road (Sheet 30/47)

Reason considered to be outside the Terms of Reference: Issue for consideration.

The tactile paving for controlled crossing points appears to have been provided inconsistently within the junction. At various locations the 'stem' has been reduced in length so that it terminates before the likely cyclist route. However, at the locations indicated the 'stem' has been continued to the rear of the footway area. Whilst the extended stems may comply with guidance they are considered to be excessive and inconsistent with the current provision, the provision elsewhere within the junction and less likely to guide visually impaired users away from the likely routes for cyclists.

It is therefore recommended that a consistent method is used for the tactile paving 'stems' this may include but is not limited to terminating them prior to the likely cycle routes.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.5 ISSUE

Location: 3 – A105 Ridge Avenue / Village Road junction with Church Street / Bush Hill Road (Sheet 30/47)

Reason considered to be outside the Terms of Reference: Issue for consideration.

The proximity and alignment of the cycle track may result in confusion for a visually impaired pedestrian. Locations where this has been identified as a potential issue include:

- Northeast bound across Bush Hill Road,
- Southbound across the left turn filter on Church Street (pedestrians may end up in the cycle track / lane),
- Northeast bound pedestrians walking kerbside southwest of Berkeley Gardens (pedestrians may inadvertently enter the carriageway)

It is therefore recommended that tramline tactile paving may be beneficial to inform visually impaired users that they are entering a designated cycle lane.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.6 ISSUE

Location: 4 – A105 Ridge Avenue / Village Road junction with Church Street / Bush Hill Road (Sheet 30/47)

Reason considered to be outside the Terms of Reference: Issue for consideration.

The proposed 'ramps' are located immediately adjacent to the controlled pedestrian crossing carpets. It is possible therefore that a pedestrian straying from the crossing carpets / crossing the studs such as to avoid another pedestrian may unexpectedly encounter the ramp and could be destabilised.

It is therefore recommended to increase the distance between the crossing carpet and the 'ramps'.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 25/11/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour

[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 25

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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 Organisations endorsement of my proposals.

Name:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-030 Rev A	Cycle Enfield A105 - General Arrangement Sheet 30 of 47
B240A024-DG-A105-0100-031 Rev -	Cycle Enfield A105 - General Arrangement Sheet 31 of 47
B240A024-DG-A105-0100-032 Rev -	Cycle Enfield A105 - General Arrangement Sheet 32 of 47
B240A024-DG-A105-0200-030 Rev –	Cycle Enfield A105 - Site Clearance Sheet 30 of 47
B240A024-DG-A105-0200-031 Rev –	Cycle Enfield A105 - Site Clearance Sheet 31 of 47
B240A024-DG-A105-0200-032 Rev –	Cycle Enfield A105 - Site Clearance Sheet 32 of 47
B240A024-DG-A105-0500-030 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 30 of 47
B240A024-DG-A105-0500-031 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 31 of 47
B240A024-DG-A105-0500-032 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 32 of 47
B240A024-DG-A105-0700-030 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 30 of 47
B240A024-DG-A105-0700-031 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 31 of 47
B240A024-DG-A105-0700-032 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 32 of 47
B240A024-DG-A105-1100-030 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 30 of 47
B240A024-DG-A105-1100-031 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 31 of 47
B240A024-DG-A105-1100-032 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 32 of 47
B240A024-DG-A105-1200-030 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 30 of 47
B240A024-DG-A105-1200-031 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 31 of 47
B240A024-DG-A105-1200-032 Rev A	Cycle Enfield A105 - Traffic signs and road markings Sheet 32 of 47
B240A024-DG-A105-1300-030 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 30 of 47
B240A024-DG-A105-1300-031 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan

B240A024-DG-A105-1300-032 Rev A	Sheet 31 of 47 Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan
B240A024-DG-A105-1400-012 Rev A	Sheet 32 of 47 Cycle Enfield A105 – MCHW Series 1400 Schedule of Electrical Works Section 12 of 14

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 12

APPENDIX B

Problem Locations

B240A024-DG-A105-0100-030

Rev	Rev. Date	Purpose of revision	Drawn	Checkd	Rev'd	Apprv'd
A	[illegible]	FOR APPROVAL	[illegible]	[illegible]	[illegible]	CA
-	[illegible]	FOR APPROVAL	[illegible]	AG	[illegible]	CA

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

RINGWAY JACOBS

ENFIELD Council

CYCLE ENFIELD - A105

GENERAL ARRANGEMENT SHEET 30 OF 47

FOR APPROVAL

Scale: 1:200 @ A1 — DO NOT SCALE

Jacobs No.: B240A024

Drawing number: B240A024-DG-A105-0100-030 — Rev: A

Transport for London

A105 North Of Borden Avenue to Walnut Grove Cycle Enfield - Section 13

Stage 2 Road Safety Audit

Ref: 2759.02.13/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	25/11/2016

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the A105 North of Borden Avenue to Walnut Grove, Cycle Enfield - Section 13 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 14th November 2016. It took place at the Palestra offices of TfL on 15th November 2016 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 15 h November 2016. 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: Paul Rogers – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 13 (Sheets 33 to 38) of this route only, along the A105 Village Road north of the junction with Borden Avenue to southeast of the junction with Bush Hill.

1.5.2 Full details of the traffic signal staging / timings have not yet been provided and therefore the Audit Team could not fully comment on this element of the proposals.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016. This report covered the whole route and therefore many of the issues raised are not specific to this (Section 13) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.3	Cycle lanes past junction locations - Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists This problem remains and is therefore raised as 3.1.3 within this Audit Report.
Problem 3.1.4	Side road cycle crossovers at raised junction tables - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict. This problem appears to remain in the detailed design proposals and therefore this is raised again as 3.1.4 in this Audit Report.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.3	The pedestrian refuge is to be relocated and pedestrian desire lines may not be accommodated. This issue is considered to remain in part and will therefore be raised again as part of 4.1 in this Audit report.
Issue 4.4	The northbound bus boarder and cycle bypass lane appears to be located at the private driveways of 87 / 89 and 93 London Road. This issue is considered to be resolved and will therefore not be raised again within this Audit report.
Issue 4.5	The southbound bus boarder and cycle bypass lane appears to be located at the private driveway of Westwood Court. This issue is considered to be resolved and will therefore not be raised again within this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians.

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to the scheme – cycle lanes past junction locations

Summary: Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists

At a number of locations, segregated cycle lane / bypasses are returned to the carriageway just before side road junction locations. At such locations it may be difficult for both sets of road users to understand who has priority and this may lead to turning collisions involving cyclists, particularly where bus stop bypasses are located on the approach to junctions and where 'floating' parking / loading areas are close to junctions. Cyclists may find it difficult to avoid vehicles entering or emerging from side roads if constrained by the segregation features, which could lead to increased risk of merging / failure to give way type collisions.

RECOMMENDATION
Research from TRL (PPR703 – Trials of segregation set-back at side roads) indicates that setting back cycle lanes by at least 20m from side roads may improve cyclist safety at junctions. Such an approach would have an effect on bus stop locations and the cycle bypass facilities provided at them. There is also likely to be an effect on the length of 'floating' parking / loading bays.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General to scheme, multiple locations

Summary: Loading bays across the semi segregated cycle track may result in side swipe or shunt type collisions as cyclists divert into the general traffic lane.

The proposals include various small sections of the semi segregated cycle track which are advisory rather than mandatory and utilise mini orcas and double yellow lines which permit loading only outside of peak hours. The Audit Team are concerned that vehicles parked within the cycle track may result in cyclists diverting out of the track and into the adjacent carriageway running lane. Such manoeuvres may not be anticipated by drivers and an increased potential for collisions between motorists and cyclists may result.

RECOMMENDATION
It is recommended that parking is not permitted across any section of the segregated cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: General to the scheme – side road cycle crossovers at raised junction tables

Summary: Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict

At a number of locations the off-road cycle facilities cross side roads at raised table areas. Drivers turning from the main road have a short stacking space between the main road and these cycle crossovers due to the location of the give way lines to create priority for cyclists. Drivers may be confused by the arrangement and fail to give way to cyclists, or may stop suddenly and remain partially within the main carriageway, which may lead to late braking nose to tail collisions.

Drivers entering the main road may be confused by the double give way feature, and/or stop across the cycle lane, which may lead to nose to tail collisions or cycle to vehicle conflict.

There is inconsistency in the provision of give ways for cyclists at such crossing locations and this may confuse users and lead to failure to give way type conflicts between cycles and vehicles.

RECOMMENDATION
If such cycle priority is to be provided at side roads then an appropriate stacking space should be provided between the main road and cycle crossing to allow a single vehicle to wait between the main road and cycle crossing without encroaching in to the main carriageway or blocking the cycle crossing (reference London Cycle Design Guide).

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that proposed cycle tracks run immediately adjacent to proposed bus stop boarders. Therefore bus passengers would board / alight a bus from / onto the cycle tracks. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions. Visually impaired pedestrians, particularly those alighting from a bus may follow the kerb line and inadvertently enter the carriageway. Visually impaired pedestrian unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the layout of the bus stop boarders / cycle tracks are altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing tramline tactile paving prior to the ramps down to carriageway level and an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.6 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus boarder layout across the cycle lane / track may result in increased collisions.

The Audit Team are concerned that the proposed layout of the bus boarder across the cycle lane may result in drivers not appreciating the kerb upstand and an increased potential for kerbs strikes. This could result in loss of control, injury to vehicle occupants or for those on board powered two wheelers to be dismounted. Additionally, visually impaired pedestrians,

RECOMMENDATION
It is recommended that the layout of the bus stop boarders / cycle tracks are altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.7 PROBLEM

Location: Various - bus stop boarders with raised sections of cycle track

Summary: Motorists may not notice the kerbed segregation island.

The Audit Team are concerned that motorists may not appreciate that the edge of the cycle track includes a full height kerb at various bus stop borders. This kerbed physical segregation commences within the carriageway running lane and no features to highlight this physical feature or guide users alongside it are proposed, It may therefore not be clear or conspicuous. Motorists may collide with the kerb or swerve to avoid the features if they are noticed within close proximity, which may result in loss of control type collisions and injury to those on or within the vehicle.

RECOMMENDATION
It is recommended to alter the layout to suitably guide vehicles alongside the kerbs. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) and altering the path of the orcas / mandatory cycle lane marking so that it suitably highlights and 'ties in' to the physical island providing suitable guidance alongside the feature.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 PEDESTRIAN CROSSING FACILITIES

3.2.1 PROBLEM

Location: A – A105 Village Road vehicular access to property number 71 (Sheet 34/47)

Summary: Potential for collisions with proposed pedestrian refuge island due to close proximity of off street parking.

The proposed tactile paving, dropped kerbs and pedestrian refuge island align with a vehicular access to the front of house number 71 Village Road. The Audit Team are concerned that if motorists attempt to access via the drop kerb (no formalised crossover is present) then this may lead to increased collisions between pedestrians and vehicles particularly those reversing entering or exiting the parking.

Vehicles exiting may find it difficult to do so due to the pedestrian refuge island, if the island is over-run then damage may make it less conspicuous with an increased potential for swerving and potential loss of control or kerb strikes as a result.

RECOMMENDATION
It is recommended that measures are taken to ensure that the crossing is likely to be safe and appealing to all users. This may include but is not limited to providing bollards or similar to prevent vehicular miss-use or relocating the crossing facility.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 CYCLING FACILITIES

3.3.1 PROBLEM

Location: B – Village Road junction with Conifer Gardens (Sheet 33/47)

Summary: Motorists turning in to Conifer Gardens may not appreciate cyclists on the nearside of the southbound carriageway.

The Audit Team are concerned that motorists turning in to Conifer Gardens may not appreciate the potential presence of southbound cyclists travelling along the nearside cycle track. Southbound vehicles may be slow moving or stationary at this location due to the close proximity of the zebra crossing to the south. Therefore, particularly whilst southbound traffic is slow moving, cyclists may be travelling faster than the adjacent vehicles. This may result in an increased potential for vehicles to turn across the path of cyclists commonly know as a 'left hook' type collision or for right turns across the path of cyclists with an increased potential for injury to these users as a result.

RECOMMENDATION
It is recommended that additional features are provided to highlight the potential presence of cyclists across the mouth of this junction. This may include but is not limited to cycle logo road markings.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.2 PROBLEM

Location: C – A105 Village Road junction with Park Avenue / Village Road (Sheet 35/47)

Summary: Motorists turning right from Village Road (side road) towards the A105 Village Road may not notice cyclists crossing Park Avenue between sections of the southbound segregated cycle track on the A105 Village Road.

The Audit Team are concerned that motorists turning right from Village Road (side road) may be focusing on finding gaps between vehicular traffic approaching in each direction and may pull out across the path of cyclists without appreciating their presence or the requirement to give-way to them. This may result in side impact type collisions between motorists and cyclists. Additionally, if motorists brake hard to avoid collisions, an increased potential for shunt type collisions may result.

RECOMMENDATION
It is recommended to make alterations to reduce the potential for such collisions; this may include, but is not limited to, making Village Road (side road) entry only or left turn only.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.3 PROBLEM

Location: D – A105 Village Road junction with Park Avenue (Sheet 35/47)

Summary: Motorists turning in to Park Avenue may have restricted visibility of a southbound cyclist on the track due to the proposed tree.

The Audit Team are concerned that motorists turning in to Park Avenue from the A105 Village Road may have restricted visibility of cyclists travelling southbound on the cycle track depending upon the proposed tree trunk girth and height of the tree canopy. If the tree obscures visibility between cyclists attempting to assert priority over the side road and approaching vehicles it may result in an increased potential for collisions between vehicles entering Park Avenue and southbound cyclists crossing between the two sections of segregated cycle track. Additionally, if motorists brake hard to avoid collisions, an increased potential for shunt type collisions may result.

RECOMMENDATION

It is recommended to ensure that the proposed tree does not significantly impair visibility between motorists entering Park Avenue and cyclists travelling south between sections of the segregated cycle track. This may include selecting a tree which has a small trunk girth and a canopy which does not extend low enough to obscure the view of a cyclist. It is considered important that this is considered for future growth and consideration may also include relocating the proposed tree.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.4 PROBLEM

Location: E – A105 Village Road northbound cycle track between junction with Sittingbourne Avenue and Faversham Avenue (Sheet 36/47)

Summary: Northbound cyclists may have insufficient effective width and may not be able to suitably sight / avoid pedestrians crossing between the bus shelter and cage.

The proposed northbound cycle track between the junctions of Sittingbourne Avenue and Faversham Avenue appears to run very closely to existing mature trees. It is not clear if these have been fully considered in terms of the impact that roots may have on the obtainable width or the effective width which the vertical obstructions that the tree trunks create. Furthermore, as a bus stop border and shelter are provided either side of the proposed cycle track, the trees may result in an increased potential for reduced visibility between pedestrians walking between the bus shelter / border, and cyclists on the track. Therefore, the potential combination of reduced effective width of the cycle track and reduced visibility between pedestrians and cyclists may result in increased risk of collisions between cyclists and pedestrians.

RECOMMENDATION

It is recommended to alter the cycle track so that the effective width is sufficient and that the potential for collisions with pedestrians is minimised. This may include, but is not limited to repositioning the cycle track to the rear of the mature trees and relocating the bus stop shelter so that it is close to kerbside.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.5 PROBLEM

Location: F – A105 Village Road near junction with Sittingbourne Avenue and Faversham Avenue (Sheet 36/47)

Summary: Proposed on footway parking may result in an increased potential for collisions with cyclists

The proposals include various on footway parking bays within this area. The Audit Team are concerned that vehicles entering / exiting these bays may:

- Cross the semi segregated sections of cycle tracks,
- Not have sufficient visibility of cyclists in the cycle tracks due to the angle of approach / entry and cyclists being in a potential blind spot,
- Not have sufficient visibility of cyclists in the cycle tracks due to the trees which may restrict visibility between vehicles emerging from the bays and cyclists approaching,
- Result in dooring of cyclists in the cycle tracks.

This may therefore result in increased potential for injuries to cyclists as vehicles utilise these parking bays.

RECOMMENDATION
It is recommended to alter the parking provision so that it does not involve motorists entering (including dooring) or crossing the cycle tracks. This may require an increase in offset from the cycle facility and relocation of the bays away from trees to maintain appropriate forward visibility.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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: Various – throughout segregated on footway cycle tracks

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

The typical cross section of the on footway cycle track indicates that 3 rows of granite setts will be provided alongside the edges of the track. It is considered that these are likely to provide a reasonable tonal contrast and a texture / tactile difference to highlight the cycle track / edge of footway.

It is assumed that these will be laid almost flush (maximum upstand of less than 6mm) so that they do not present a trip hazard for pedestrians.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: 1 – A105 Village Road proposed pedestrian refuge island north of junction with Teynham Avenue (Sheet 34/47)

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

The proposed pedestrian refuge island to the north of Teynham Avenue may result in difficulties for users of the parking bay on the frontage of house number 71 to exit on to the carriageway without colliding with the pedestrian refuge island / features within the island. Such collisions are considered unlikely to result in injuries to vehicle occupants but may result in damage and ongoing maintenance issue with the refuge island.

It is noted that no formalised vehicular crossover appears to be present but it may be worthwhile to check the vehicular swept paths and / or make alterations to enable or restrict such manoeuvres.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 25/11/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 25/11/2016

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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 Organisations endorsement of my proposals.

Name:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

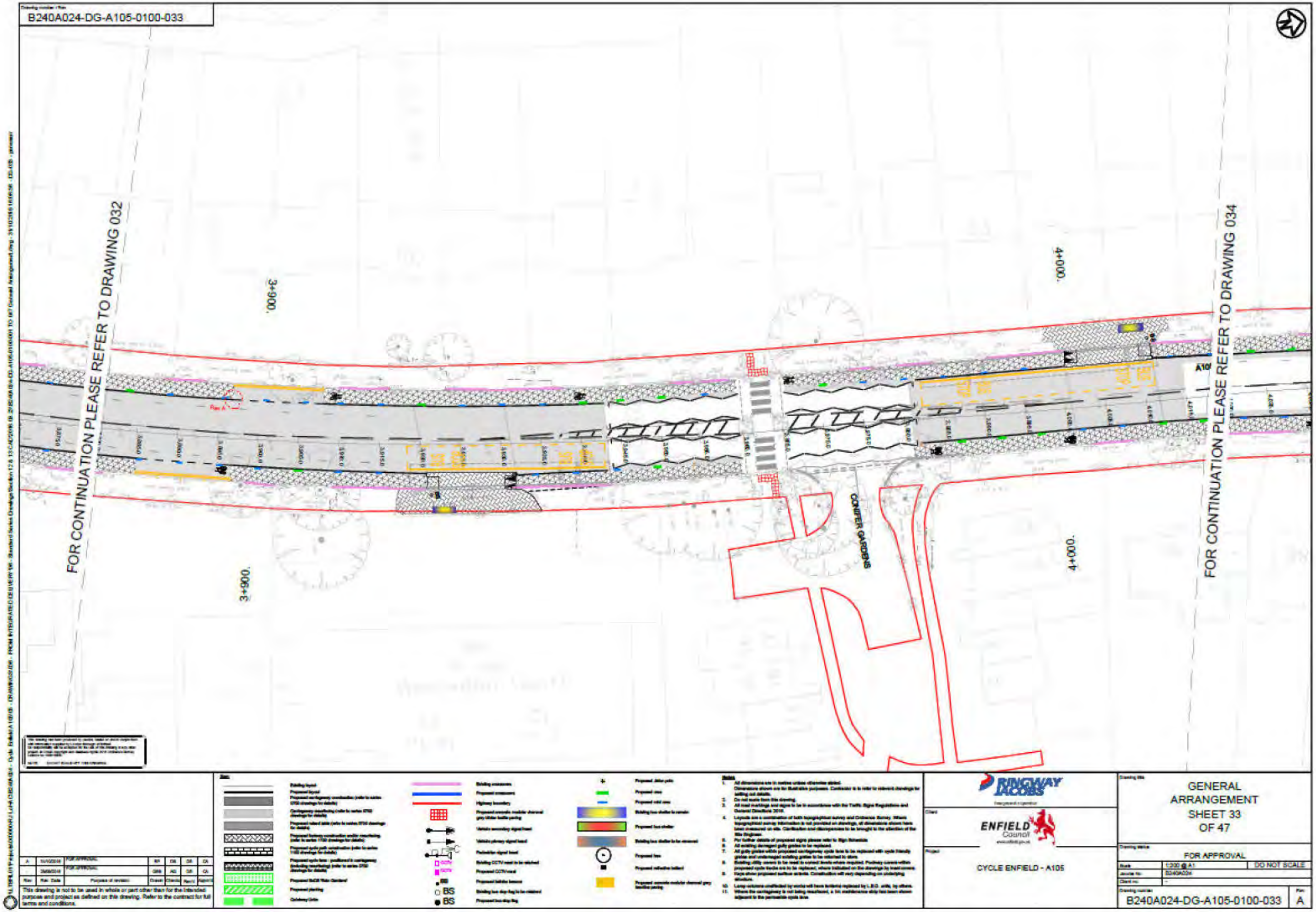
DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-033 Rev A	Cycle Enfield A105 - General Arrangement Sheet 33 of 47
B240A024-DG-A105-0100-034 Rev A	Cycle Enfield A105 - General Arrangement Sheet 34 of 47
B240A024-DG-A105-0100-035 Rev –	Cycle Enfield A105 - General Arrangement Sheet 35 of 47
B240A024-DG-A105-0100-036 Rev –	Cycle Enfield A105 - General Arrangement Sheet 36 of 47
B240A024-DG-A105-0100-037 Rev A	Cycle Enfield A105 - General Arrangement Sheet 37 of 47
B240A024-DG-A105-0100-038 Rev –	Cycle Enfield A105 - General Arrangement Sheet 38 of 47
B240A024-DG-A105-0200-033 Rev -	Cycle Enfield A105 - Site Clearance Sheet 33 of 47
B240A024-DG-A105-0200-034 Rev –	Cycle Enfield A105 - Site Clearance Sheet 34 of 47
B240A024-DG-A105-0200-035 Rev –	Cycle Enfield A105 - Site Clearance Sheet 35 of 47
B240A024-DG-A105-0200-036 Rev –	Cycle Enfield A105 - Site Clearance Sheet 36 of 47
B240A024-DG-A105-0200-037 Rev –	Cycle Enfield A105 - Site Clearance Sheet 37 of 47
B240A024-DG-A105-0200-038 Rev –	Cycle Enfield A105 - Site Clearance Sheet 38 of 47
B240A024-DG-A105-0500-033 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 33 of 47
B240A024-DG-A105-0500-034 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 34 of 47
B240A024-DG-A105-0500-035 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 35 of 47
B240A024-DG-A105-0500-036 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 36 of 47
B240A024-DG-A105-0500-037 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 37 of 47
B240A024-DG-A105-0500-038 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 38 of 47
B240A024-DG-A105-0700-033 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 33 of 47
B240A024-DG-A105-0700-034 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 34 of 47
B240A024-DG-A105-0700-035 Rev –	Cycle Enfield A105 – Road Pavements General Sheet 35 of 47
B240A024-DG-A105-0700-036 Rev –	Cycle Enfield A105 – Road Pavements General Sheet 36 of 47
B240A024-DG-A105-0700-037 Rev -	Cycle Enfield A105 – Road Pavements General

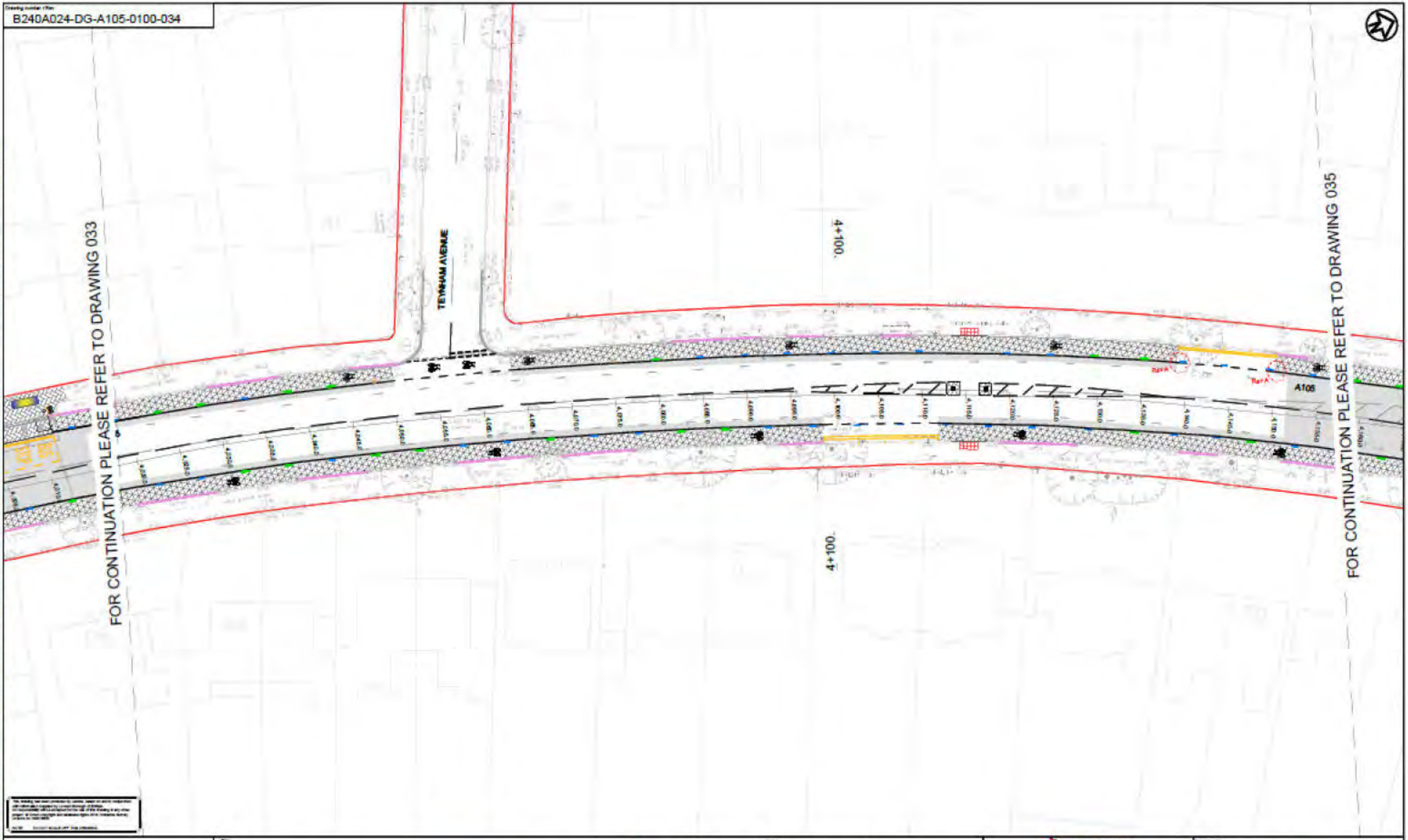
	Sheet 37 of 47
B240A024-DG-A105-0700-038 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 38 of 47
B240A024-DG-A105-1100-033 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 33 of 47
B240A024-DG-A105-1100-034 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 34 of 47
B240A024-DG-A105-1100-035 Rev –	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 35 of 47
B240A024-DG-A105-1100-036 Rev –	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 36 of 47
B240A024-DG-A105-1100-037 Rev –	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 37 of 47
B240A024-DG-A105-1100-038 Rev –	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 38 of 47
B240A024-DG-A105-1200-033 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 33 of 47
B240A024-DG-A105-1200-034 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 34 of 47
B240A024-DG-A105-1200-035 Rev A	Cycle Enfield A105 - Traffic signs and road markings Sheet 35 of 47
B240A024-DG-A105-1200-036 Rev A	Cycle Enfield A105 - Traffic signs and road markings Sheet 36 of 47
B240A024-DG-A105-1200-037 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 37 of 47
B240A024-DG-A105-1200-038 Rev A	Cycle Enfield A105 - Traffic signs and road markings Sheet 38 of 47
B240A024-DG-A105-1300-033 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 33 of 47
B240A024-DG-A105-1300-034 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 34 of 47
B240A024-DG-A105-1300-035 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 35 of 47
B240A024-DG-A105-1300-036 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 36 of 47
B240A024-DG-A105-1300-037 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 37 of 47
B240A024-DG-A105-1300-038 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 38 of 47
B240A024-DG-A105-1400-012 Rev A	Cycle Enfield A105 – MCHW Series 1400 Schedule of Electrical Works Section 13 of 14

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 13

APPENDIX B

Problem Locations


B240A024-DG-A105-0100-033
FOR CONTINUATION PLEASE REFER TO DRAWING 032
FOR CONTINUATION PLEASE REFER TO DRAWING 034
3+900
4+000
CONIFER GARDENS
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 33 OF 47
FOR APPROVAL
1:200 @ A1
DO NOT SCALE
B240A024-DG-A105-0100-033
A



Rev	Rev. Date	Purpose of revision	Drawn	Checked	Appr'd	Approved
A	31/10/2018	FOR APPROVAL	KP	DB	GR	GA
	29/06/2018	FOR APPROVAL	GBB	AD	GR	GA

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Key

Notes

1. All dimensions are in metres unless otherwise stated.
2. Dimensions shown are for illustrative purposes. Contractor is to refer to relevant drawings for setting out details.
3. Do not scale from this drawing.
4. All road markings and signs to be in accordance with the Traffic Signs Regulations and General Directions 2016.
5. Layouts are a combination of both topographical survey and Ordnance Survey. Where topographical survey information is not provided on drawings, all dimensions shown have been measured on site. Clarification and discrepancies to be brought to the attention of the Site Engineer.
6. For further details of proposed signs please refer to Sign Schedule.
7. All existing damaged gully grates to be replaced.
8. All gully grates within proposed northbound cycle lane to be replaced with cycle friendly grates and undamaged existing grates to be returned to store.
9. Existing utility covers to be reset to correct levels where required. Footway covers within proposed cycle tracks are to be replaced, where indicated on the drawings by insert covers. Kerb show proposed surface extents. Construction will vary depending on underlying structure.
10. Lamp columns unaffected by works will have brickwork replaced by L.B.D. utility, by others.
11. Where the verge/grass is not being resurfaced, a 1m maintenance strip has been shown adjacent to the permeable cycle lane.

RINGWAY JACOBS

ENFIELD Council

Client

Project

CYCLE ENFIELD - A105

Drawing title

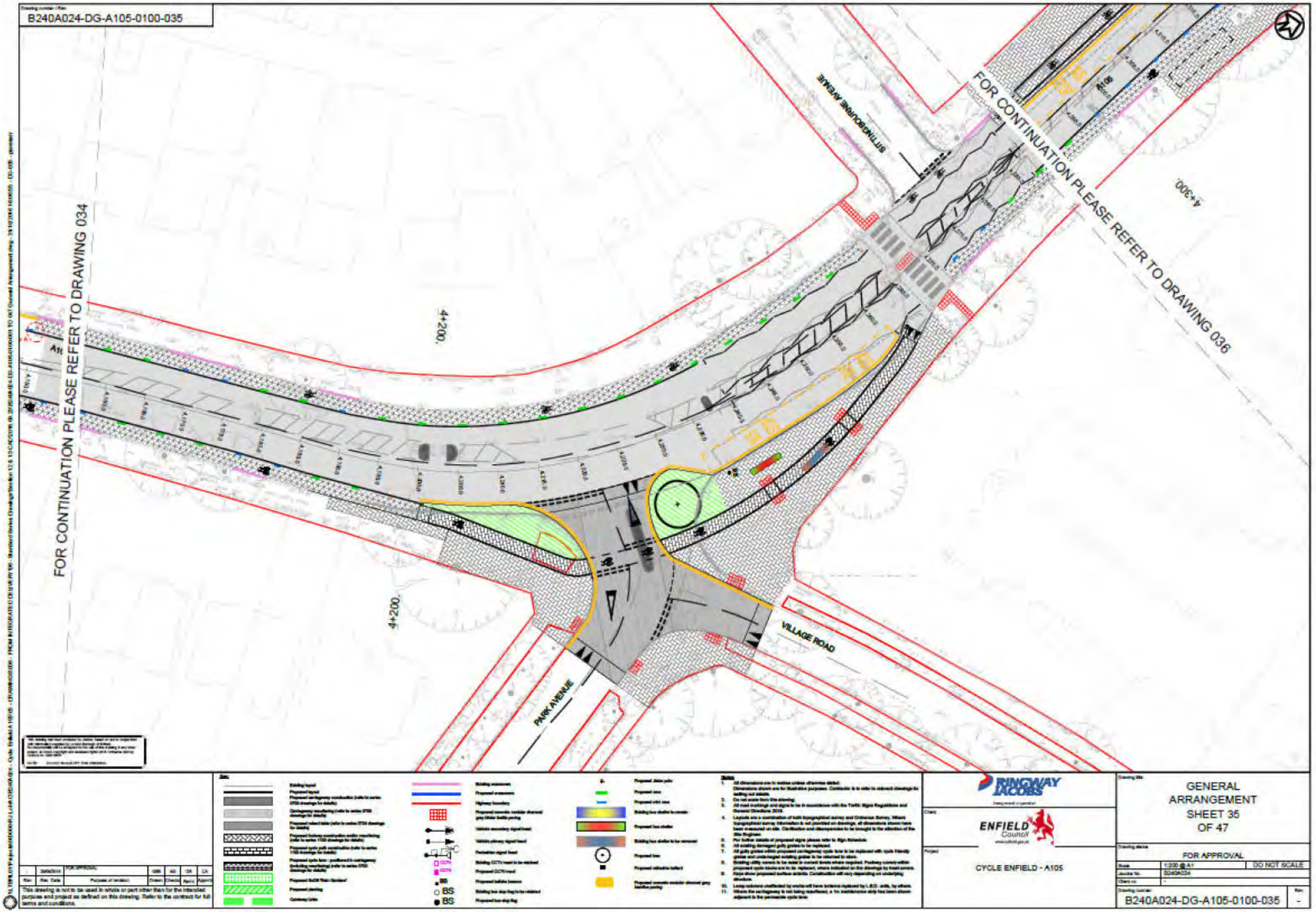
GENERAL ARRANGEMENT SHEET 34 OF 47

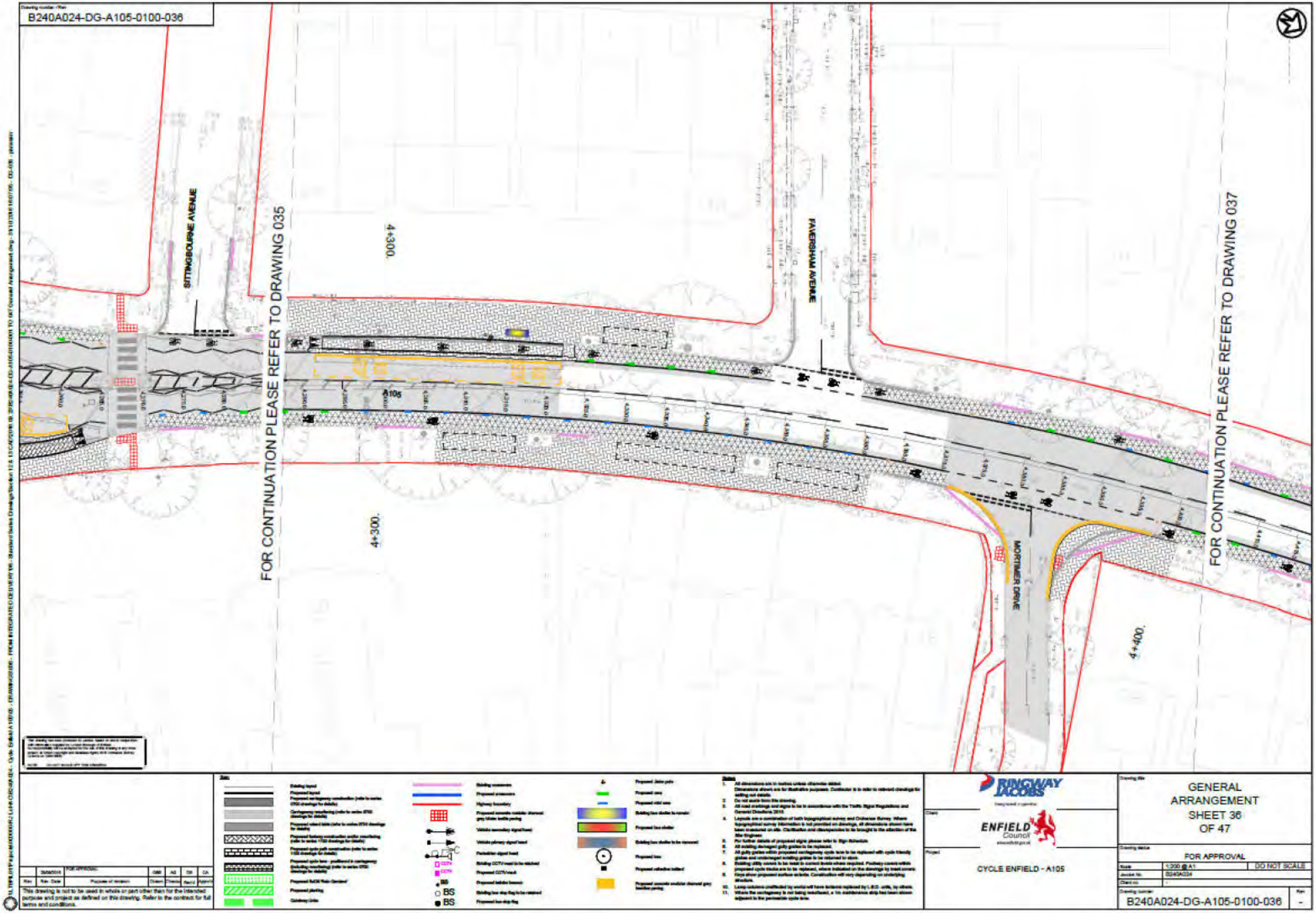
Drawing status

FOR APPROVAL

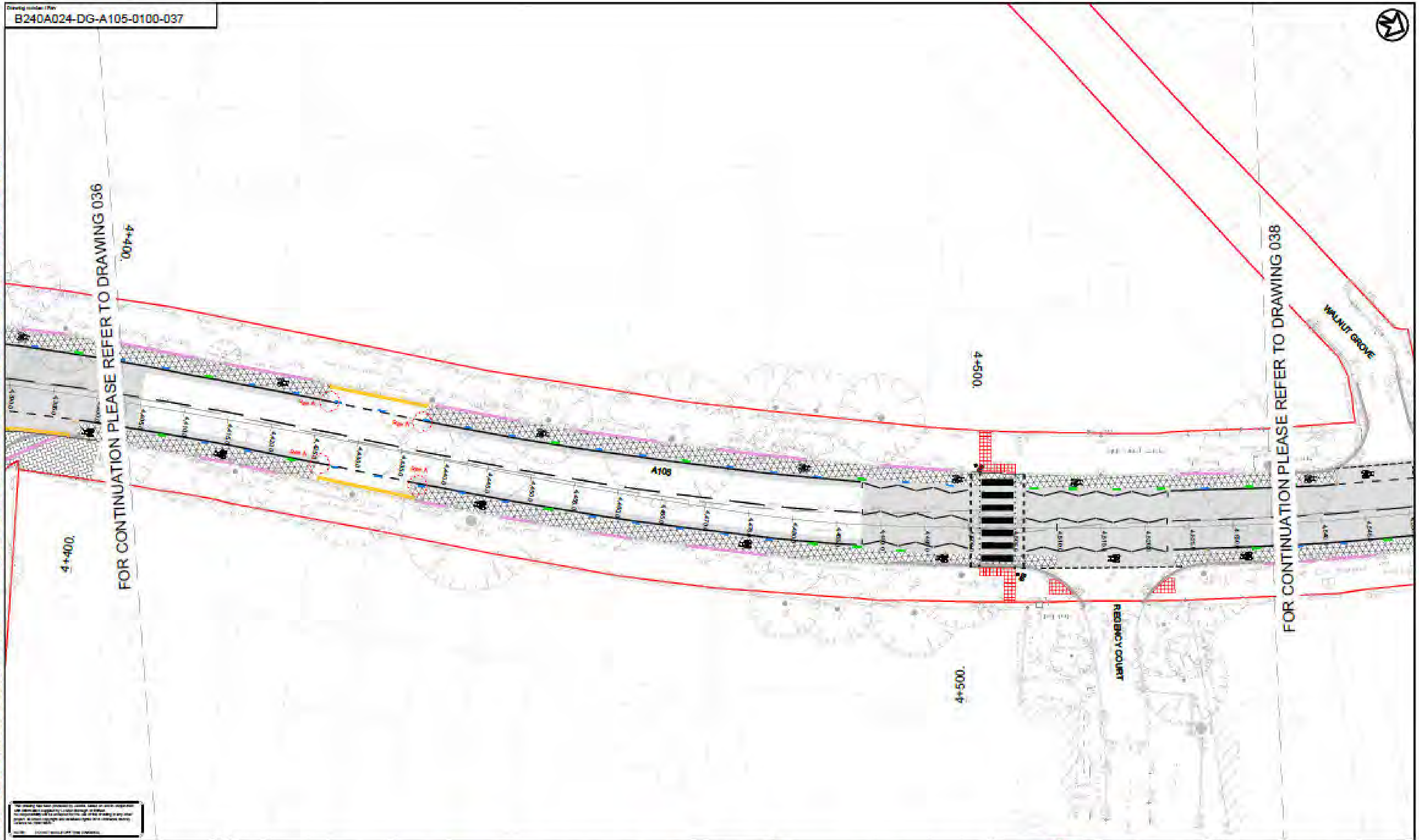
Scale	1:200 @ A1
Jacobs No.	B240A024
Client no.	-
Drawing number	B240A024-DG-A105-0100-034
Rev.	A

DO NOT SCALE


B240A024-DG-A105-0100-035
FOR CONTINUATION PLEASE REFER TO DRAWING 034
FOR CONTINUATION PLEASE REFER TO DRAWING 036
SITTINGBOURNE AVENUE
VILLAGE ROAD
PARK AVENUE
4+200
4+300
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 35 OF 47
FOR APPROVAL
DO NOT SCALE
B240A024-DG-A105-0100-035


B240A024-DG-A105-0100-036
SITTINGBOURNE AVENUE
FAVERSHAM AVENUE
A105
4+300
4+300.
4+400.
MORTIMER DRIVE
FOR CONTINUATION PLEASE REFER TO DRAWING 035
FOR CONTINUATION PLEASE REFER TO DRAWING 037
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 36 OF 47
FOR APPROVAL
1:200 @ A1
DO NOT SCALE
B240A024
B240A024-DG-A105-0100-036

B240A024-DG-A105-0100-037



Rev	Rev. Date	Purpose of revision	Drawn	Check'd	Rev'd	Apprv'd
A	31/10/2016	FOR APPROVAL				
-	26/04/2016	FOR APPROVAL				

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

RINGWAY JACOBS

Client: ENFIELD Council

Project: CYCLE ENFIELD - A105

Drawing title: GENERAL ARRANGEMENT SHEET 37 OF 47

Drawing status: FOR APPROVAL

Scale: 1:200 @ A1 — DO NOT SCALE

Jacobs No.: B240A024

Drawing number: B240A024-DG-A105-0100-037

Rev: A

B240A024-DG-A105-0100-038

Rev	Rev. Date	Purpose of revision	Drawn	Check'd	Rev'd	Apprv'd
-		FOR APPROVAL				

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

RINGWAY JACOBS

Client: ENFIELD Council

Project: CYCLE ENFIELD - A105

Drawing title: GENERAL ARRANGEMENT SHEET 38 OF 47

Drawing status: FOR APPROVAL

Scale: 1:200 @ A1 — DO NOT SCALE

Drawing number: B240A024-DG-A105-0100-038

Rev: -

Transport for London

Cycle Enfield - Section 14

A105 Bush Hill to Roseneath Walk

Stage 2 Road Safety Audit

Ref: 2759.03.14/032/A105/BOR/2016

Prepared for:

London Borough of Enfield

By:

Road Safety Audit, TfL Asset Management Directorate

Prepared by:	Shane Martin, Audit Team Leader
Checked by:	Kevin Seymour, Audit Team Member
Approved by:	Andrew Coventry

Version	Status	Date
A	Audit report issued to Client	12/01/2017

1.0 INTRODUCTION

1.1 Commission

1.1.1 This report results from a Stage 2 Road Safety Audit carried out on the Cycle Enfield - Section 14, A105 Bush Hill to Roseneath Walk 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 25th November 2016. It took place at the Palestra offices of TfL on 16th December 2016 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 16 h December 2016. 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 14 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: Demos Kettenis – London Borough of Enfield

1.3.2 Design Organisation

Design contact details: Deepak Sharma - Jacobs

1.3.3 Audit Team

Audit Team Leader: Shane Martin – TfL Road Safety Audit

Audit Team Member: Kevin Seymour – 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

The purpose of the scheme is to provide 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 This Audit Report covers Section 14 (Sheets 39 – 44) of this route only, along the A105 from Bush Hill to Roseneath Walk.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit carried out in March 2016 by TfL Road Safety Audit, Asset Management Directorate (Ref 2524/032/A105/BOR/2016). This report covered the whole route and therefore many of the issues raised are not specific to this (Section 14) part of the proposals. Items raised in the previous Audit Report deemed relevant to this section can be summarised as follows:

Problem 3.1.1 Combined zebra / cycle crossing facilities – Proposed zebra and cycle crossing layouts may result in drivers failing to give way to cyclists.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.2.1.

Problem 3.1.3 Cycle lanes past junction locations - Segregated cycle lanes terminating just before side road junctions may increase left turning collisions between vehicles and cyclists.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.2.

Problem 3.1.4 Side road cycle crossovers at raised junction tables - Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle to vehicle conflict.

This problem remains in the detailed design proposals and is therefore raised again within this report as problem 3.1.4.

Problem 3.1.5 Bus stops / loading bays close to side road junctions and accesses – may restrict visibility splays and lead to failure to give way type collisions.

This problem remains in the detailed design proposals and is therefore raised again within this report as part of problem 3.3.2.

Problem 3.2.1 Zebra Crossing near Village Road – narrow footways may bring cyclists and pedestrians into conflict.

This problem does not appear to be present in the detailed design proposals but a similar issue relating to conflicts between cyclists and pedestrians is raised as part of problem 3.2.1 and issue 4.2.

Problem 3.3.1 Zebra crossing near Bush Hill – Poor visibility at the bend may lead to failure to give way type collisions involving pedestrians.

This problem is resolved in the detailed design proposals and is therefore not raised again within this report.

Problem 3.3.2 Bush Hill and Uvedale Road – Inconsistent cycle crossing facilities may lead to late braking nose to tail or failure to give way type collisions.

This problem is resolved in the detailed design proposals and is therefore not raised again within this report.

Items raised in the Stage 1 Road Safety Audit report that are outside the Terms of Reference:

Issue 4.1	The revised kerb lines at side roads may alter vehicle swept paths and it is not clear if these have been assessed or may result in conflicts between turning vehicles. This issue is considered to remain in part and will therefore be raised again as part of problem 3.3.1 in this Audit report.
Issue 4.2	Bus boarders separated from the footways by cycle lanes may result in difficulties for some users to access the bus stop and may lead to low level cycle / pedestrian conflicts. This issue is considered to remain in part and will therefore be raised again as part of problem 3.1.3 in this Audit report.

3.0 ITEMS RAISED AT THIS STAGE 2 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 CYCLING FACILITIES

3.1.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The use of 'Orcas' as a segregation measure may lead to trips / falls for cyclists and pedestrians

The proposals include 'Orcas' as a semi / soft segregation measure alongside the cycle tracks. The Audit Team are concerned that the 'Orcas' may not be adequately visible to road users, particularly pedestrians, cyclists and powered-two-wheelers.

Pedestrians crossing the carriageway may fail to appreciate the raised nature of the 'Orcas', with a potential for trips and falls within the carriageway.

Riders of two wheeled vehicles may fail to appreciate that the 'Orcas' are raised, particularly in inclement weather. Riders may become destabilised as they over-run the features, leading to an increased potential to become unseated, with a resultant potential for personal injury.

The potential for injury is exacerbated as the features are situated in positions where they are encouraged to be traversed, such as outside residential accesses.

RECOMMENDATION
It is recommended that any potential trip hazards are removed; this may require the use of an alternative type of segregation measure.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.2 PROBLEM

Location: General to scheme, multiple locations

Summary: Segregated cycle lanes terminating just before the side road junction may increase left turning collisions between vehicles and cyclists

The cycle lanes return to the general carriageway just before various side road junctions. It may be difficult for both sets of road users to understand who has priority and this may lead to turning collisions involving cyclists. Cyclists may not anticipate and vehicles turning across their path in close proximity to them leaving the semi segregated cycle lane, which could lead to increased risk of side impact collisions as motorists cross the path of cyclists.

RECOMMENDATION
It is recommended that the priority is clearly defined. Furthermore, research from TRL (PPR703 – Trials of segregation set-back at side roads) indicates that setting back cycle lanes by at least 20m from side roads may improve cyclist safety at junctions.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.3 PROBLEM

Location: General to scheme, multiple locations

Summary: Bus passengers boarding or alighting may result in collisions with cyclists on the track

The Audit Team are concerned that the proposed cycle tracks run immediately adjacent to proposed bus stop boarders. Therefore bus passengers would board / alight a bus from / onto the cycle tracks. This may result in cyclists diverting away from the cycle track whilst their path is obscured, which may result in increased collisions with pedestrians or vehicles who may not expect cyclists diverting from the track. In addition, bus passengers alighting may not anticipate or be able to see approaching cyclists immediately adjacent to the bus, which may result in cycle to pedestrian type collisions. Visually impaired pedestrians, particularly those alighting from a bus may follow the kerb line and inadvertently enter the carriageway. Visually impaired pedestrian unknowingly within the carriageway are at an increased potential for collisions with motorists.

RECOMMENDATION
It is recommended that the layout of the bus stop boarders / cycle tracks are altered to mitigate the potential interactions with bus passengers. This may include, but is not limited to, providing tramline tactile paving prior to the ramps down to carriageway level and an increased separation between the boarding / alighting area and the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.4 PROBLEM

Location: General to the scheme – side road cycle crossovers at raised junction tables

Summary: Drivers turning from main roads to side roads may brake late due to cyclists crossing side roads, leading to nose to tail collisions, or cycle / vehicle conflicts

At a number of locations the off-road cycle facilities cross side roads at raised table areas. Drivers turning from the main road have a short stacking space between the main road and these cycle crossovers due to the location of the give way lines to create priority for cyclists. Drivers may be confused by the arrangement and fail to give way to cyclists, or may stop suddenly and remain partially within the main carriageway, which may lead to late braking nose to tail collisions.

Drivers entering the main road may be confused by the double give way feature, and/or stop across the cycle lane, which may lead to nose to tail collisions or cycle to vehicle conflict.

There is inconsistency in the provision of give ways at such crossing locations and this may confuse users and lead to failure to give way type conflicts between cycles and vehicles, or vehicle to vehicle type conflicts where give-ways have not been provided as vehicles enter the main road.

RECOMMENDATION
It is recommended that if such cycle priority is to be provided at side roads then this should be clearly designated, an appropriate stacking space should be provided between the main road and cycle crossing to allow vehicles to wait between the main road and cycle crossing without encroaching in to the main carriageway or blocking the cycle crossing (reference London Cycle Design Guide). Additionally, it may be beneficial to provide additional give way markings consistently as vehicles enter the main road.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.5 PROBLEM

Location: General – various footway level sections of cycle track

Summary: Potential lack of delineation may lead to collisions with visually impaired pedestrians

The Audit Team are concerned that the proposed measures do not appear to indicate a delineator between the footway and cycle tracks provided at footway level. This could lead to visually impaired pedestrians inadvertently entering these sections of cycle lanes or potentially entering the carriageway via the ramp between the two facilities. Cyclists on the cycle track or motorists on the carriageway are unlikely to anticipate a visually impaired pedestrian and this may therefore result in increased collisions between these users.

RECOMMENDATION
It is recommended that as well as a good visual differentiation between the footway and cycle tracks, a detectable delineator should be provided to ensure that all users are aware of the edge of footway whilst not presenting a trip hazard.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.7 PROBLEM

Location: General – Parking permitted adjacent to cycle track

Summary: Parking / loading permitted adjacent to the cycle track may result in users exiting or unloading within the cycle track

The proposals include retention of existing parking bays in this area. There appears to be a buffer of approximately 0.5m between the parking bays and the proposed cycle track. The Audit Team are concerned that pedestrians, users unloading and disabled users entering / exiting these vehicles, may do so within the cycle track which may result in an increased potential for collisions between southbound cyclists and people using / loading to / from the parking bays.

RECOMMENDATION
It is recommended that the buffer is increased to ensure that the cycle path is kept as clear as possible and suitable pedestrian and disabled user access to the parking bays is provided over the cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.1.8 PROBLEM

Location: Various – commencements of full height kerbs

Summary: Motorists may not notice and collide with the commencement of full height kerbs

The Audit Team are concerned that motorists may not appreciate that the edge of the cycle track includes a full height kerb alongside the 'floating' bus stops. This kerbed physical segregation commences within the carriageway running lane and it may not include a suitable vertical feature to highlight its presence or guide users alongside it, particularly in dark conditions. It may therefore, not be clear or conspicuous. Motorists may collide with the kerb or swerve to avoid the features if they are noticed within close proximity, which may result in loss of control type collisions / injury to those on or within the vehicle.

RECOMMENDATION
It is recommended to alter the layout to suitably guide vehicles alongside the kerbs. This may include but is not limited to providing a vertical illuminated feature such as an Illuminated Guide Post (IGP) to provide suitable guidance alongside the feature.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.2 CROSSING FACILITIES

3.2.1 PROBLEM

Location: General – parallel zebra and cycle crossing

Summary: Proposed parallel zebra and cycle crossings may result in drivers failing to give way to cyclists

The Audit Team are concerned that the proposed parallel zebra and cycle crossings may not be understood by motorists particularly as the layout is new to drivers. The following issues may result in an increased potential for collisions:

- Zebra crossings are well established and the conspicuousness of the thick black and white striped road markings help to clearly indicate that a pedestrian has priority over vehicular traffic in this area. The lack of these markings within the proposed cycle section of the crossing may lead to ambiguity over who has priority and motorists may fail to give way to cyclists.
- Slow approach speeds by pedestrians enable an approaching motorist to notice they intend to cross, slow down and stop. Cyclists are likely to approach faster than pedestrians and may therefore fail to be noticed by approaching motorists.
- Motorists turning out of side road junctions encountering the crossings in close proximity may fail to give way, particularly the cycle element of the crossing which is less conspicuous.
- The routes / dropped kerb facilities intended for cyclists to enter the cycle crossing from the cycle track / carriageway are not clearly defined. This may result in cyclists using undetermined and inconstant routes which may result in increased collisions with pedestrians.

These issues may lead to an increased potential for collisions between motorists and cyclists or shunt type collisions as motorists brake hard as they unexpectedly encounter a cyclist attempting to assert priority. It is also noted that the cycle part of the proposed crossing indicates kerbs with an upstand of 25mm rather than flush kerbs and does not include cycle symbol road markings as prescribed in TSRGD 2016.

RECOMMENDATION

It is recommended to provide measures which will allow cyclists to assert priority over motorists. This could include an alternative crossing type, or provide appropriate temporary signing etc to inform drivers of the intended usage until this layout becomes more commonplace. It may also be beneficial to include cycle symbols and to relocate the crossing further away from the side roads.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3 JUNCTIONS

3.3.1 PROBLEM

Location: General to scheme, multiple locations

Summary: The altered kerb lines may result in increased collisions as turning vehicles increasingly encroach into the path of another user

The proposals include various kerb line alterations which may increase the potential for turning vehicles to encroach into another user's path. This could lead to an increased potential for head on or side impact type collisions as a user turning into or out of the side roads or accesses is encountered by a vehicle travelling in the opposing direction.

RECOMMENDATION
It is recommended to undertake / check swept path analysis and make alterations if necessary to ensure that the vehicles likely to use these roads can undertake typical manoeuvres with minimal intrusion into the path of another vehicle.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.2 PROBLEM

Location: A – Bus stop close to Park Crescent

Summary: Stationary vehicles close to side road junctions may restrict junction visibility splays and lead to failure to give way type collisions

Bus stops are proposed close to this side road junction. Stationary vehicles close to side roads may restrict visibility for drivers emerging from the side roads and this may lead to failure to give way type collisions. The Audit Team are concerned that vehicles passing waiting buses may not suitably observe vehicles egressing from this side road which may result in side impact type collisions.

RECOMMENDATION
It is recommended that appropriate visibility splays at side roads should be provided and kept free of obstruction and stationary vehicles. This may require alterations to the positioning and / or extent of these bus stops.

Design Organisation Response	Accepted / Part Accepted / Rejected
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

3.3.3 PROBLEM

Location: B – access to Roseneath Walk

Summary: Potential ambiguity over priorities may lead to collisions between vehicles and pedestrians / cyclists

It appears that the existing slip road area between Roseneath Walk and the main carriageway is to be converted to footway with a cycle path but also facilitates vehicular access to the property frontages. It is not clear whether motorists, pedestrians or cyclists have priority in this area or to what extent vehicles are permitted to use the footway area. Therefore this may lead to an increased potential for collisions between vehicles which may not be expected by pedestrians or cyclists particularly those with visual impairments.

RECOMMENDATION
It is recommended to provide a clear priority and defined extents to which vehicles are permitted. To ensure that the extents which vehicles may be present is clear to all users this may include, but is not limited to providing a detectable kerb upstand between the area to be used as carriageway and the footway and cycle track.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

End of list of problems identified and recommendations offered in this Stage 2 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 2 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: Various – junctions with proposed raised tables

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

Various junctions are proposed to have raised tables implemented. The kerb details indicate that away from crossing points where transition or flush kerbs are proposed the kerbs will have an upstand of 125mm or to match existing. It is not clear therefore what the upstand will be at the raised tables.

It is assumed that these will provide a detectable upstand for visually impaired users.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.2 ISSUE

Location: Various – shared use cycle / footway

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

It is not clear what the extents of the shared use surfaces are as none of the shared use extents appear to be defined. Additionally, at some locations it is not clear what the intended cyclist route is. For example, the parallel zebra / cycle crossing south of Village Road indicates that cyclists can cross on to the footway but does not define the extents of the shared use area.

In order to avoid cyclists continuing on the footway and the potential for low level cycle / pedestrian conflicts / unexpected cycle manoeuvres, it may be beneficial to clearly determine what the intended cycle routes are. This may include but is not limited to appropriate tactile paving and road markings / signs to indicate the intended routes / manoeuvres.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.3 ISSUE

Location: Various – throughout this section

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

Planting / SuDs 'Rain Gardens' are proposed immediately adjacent to the carriageway / cycle lanes at various junctions throughout this section.

The full details of the proposed features have not been provided but it is assumed that these will be of a type / maintained so that they do not restrict visibility or overgrow into the live carriageway areas.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

4.4 ISSUE

Location: Various – Tactile paving provisions

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

The proposed tactile paving layouts may be confusing such as the sections at the northeastern section at Roseneath Walk which are very close together and may be difficult for visually impaired users to distinguish between. Additionally the 'tail' or 'stem' of the tactile paving on the eastern side of the zebra crossing north of Lincoln Road and south of Bush Hill extend to the rear of the wide footway which seems excessive and inconsistent with the surrounding area. It may therefore be beneficial to review the tactile paving to ensure that a suitable and consistent provision is provided to aid visually impaired users.

Design Organisation Response	**Accepted / Part Accepted / Rejected**
[Leave blank for Design Organisation's Response]	
Client Organisation Comments	
[Leave blank for Client Organisation's Comments]	

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: Shane Martin [redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 12/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: shane.martin[redacted]

AUDIT TEAM MEMBER:

Name: Kevin Seymour
[redacted] Signed: [redacted]

Position: Principal Road Safety Auditor Date: 12/01/2017

Organisation: Transport for London, Road Safety Audit
Asset Management Directorate

Address: 4th Floor Palestra, 197 Blackfriars Road, London, SE1 8NJ

Contact: kevinseymour[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 2 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:

Position:

Organisation:

Signed: **Dated:**

5.3 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

5.4 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed: **Dated:**

APPENDIX A

Documents Forming the Audit Brief

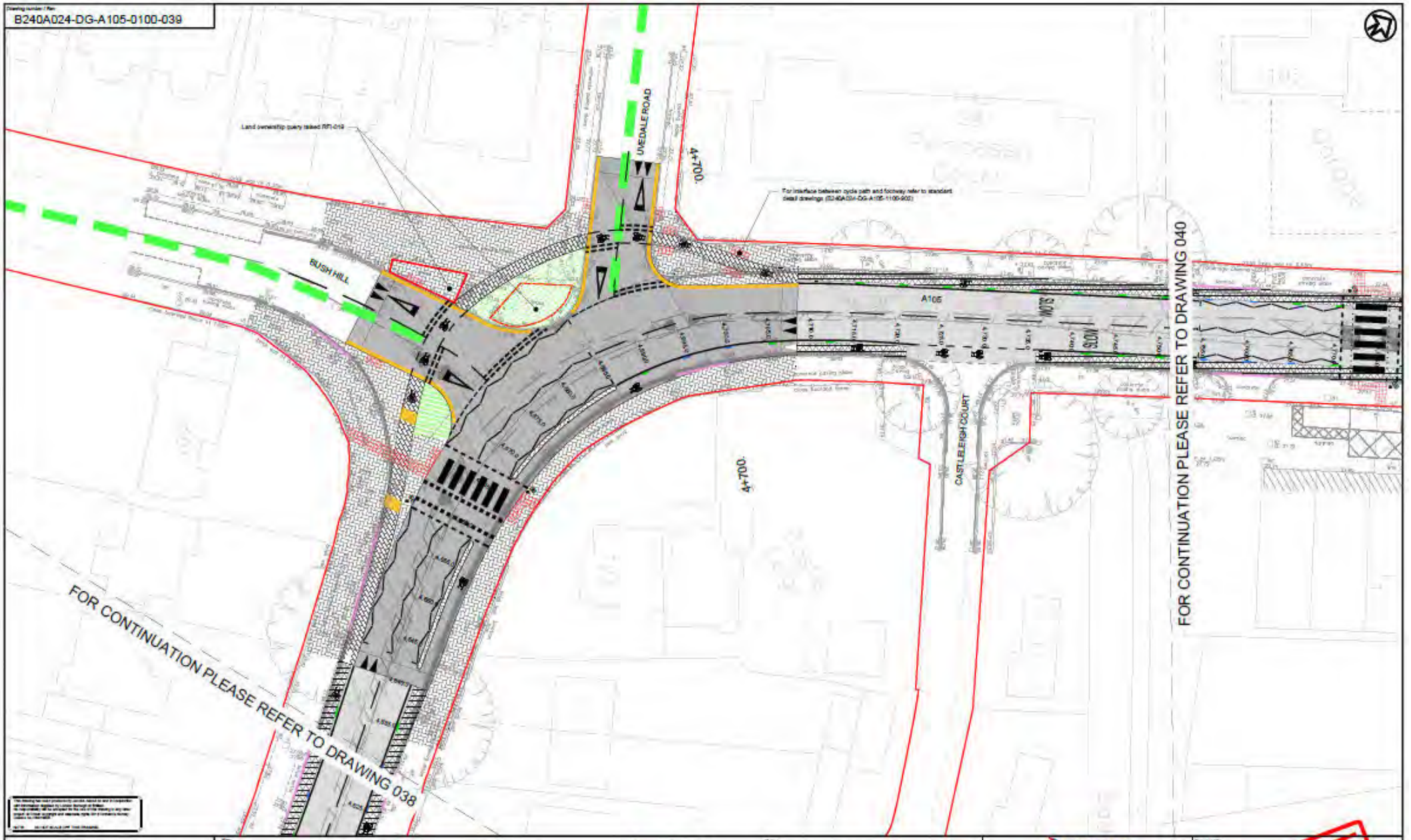
DRAWING NUMBER	DRAWING TITLE
B240A024-DG-A105-0100-039 Rev -	Cycle Enfield A105 - General Arrangement Sheet 39 of 47
B240A024-DG-A105-0100-040 Rev -	Cycle Enfield A105 - General Arrangement Sheet 40 of 47
B240A024-DG-A105-0100-041 Rev -	Cycle Enfield A105 - General Arrangement Sheet 41 of 47
B240A024-DG-A105-0100-042 Rev -	Cycle Enfield A105 - General Arrangement Sheet 42 of 47
B240A024-DG-A105-0100-043 Rev -	Cycle Enfield A105 - General Arrangement Sheet 43 of 47
B240A024-DG-A105-0100-044 Rev -	Cycle Enfield A105 - General Arrangement Sheet 44 of 47
B240A024-DG-A105-0200-039 Rev -	Cycle Enfield A105 - Site Clearance Sheet 39 of 47
B240A024-DG-A105-0200-040 Rev -	Cycle Enfield A105 - Site Clearance Sheet 40 of 47
B240A024-DG-A105-0200-041 Rev -	Cycle Enfield A105 - Site Clearance Sheet 41 of 47
B240A024-DG-A105-0200-042 Rev -	Cycle Enfield A105 - Site Clearance Sheet 42 of 47
B240A024-DG-A105-0200-043 Rev -	Cycle Enfield A105 - Site Clearance Sheet 43 of 47
B240A024-DG-A105-0200-044 Rev -	Cycle Enfield A105 - Site Clearance Sheet 44 of 47
B240A024-DG-A105-0500-039 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 39 of 47
B240A024-DG-A105-0500-040 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 40 of 47
B240A024-DG-A105-0500-041 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 41 of 47
B240A024-DG-A105-0500-042 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 42 of 47
B240A024-DG-A105-0500-043 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 43 of 47
B240A024-DG-A105-0500-044 Rev A	Cycle Enfield A105- Proposed drainage plan Sheet 44 of 47
B240A024-DG-A105-0700-039 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 39 of 47
B240A024-DG-A105-0700-040 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 40 of 47
B240A024-DG-A105-0700-041 Rev -	Cycle Enfield A105 – Road Pavements General

	Sheet 41 of 47
B240A024-DG-A105-0700-042 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 42 of 47
B240A024-DG-A105-0700-043 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 43 of 47
B240A024-DG-A105-0700-044 Rev -	Cycle Enfield A105 – Road Pavements General Sheet 44 of 47
B240A024-DG-A105-1100-039 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 39 of 47
B240A024-DG-A105-1100-040 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 40 of 47
B240A024-DG-A105-1100-041 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 41 of 47
B240A024-DG-A105-1100-042 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 42 of 47
B240A024-DG-A105-1100-043 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 43 of 47
B240A024-DG-A105-1100-044 Rev -	Cycle Enfield A105 - Kerbs footways and paved areas Sheet 44 of 47
B240A024-DG-A105-1200-039 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 39 of 47
B240A024-DG-A105-1200-040 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 40 of 47
B240A024-DG-A105-1200-041 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 41 of 47
B240A024-DG-A105-1200-042 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 42 of 47
B240A024-DG-A105-1200-043 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 43 of 47
B240A024-DG-A105-1200-044 Rev B	Cycle Enfield A105 - Traffic signs and road markings Sheet 44 of 47
B240A024-DG-A105-1300-039 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 39 of 47
B240A024-DG-A105-1300-040 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 40 of 47
B240A024-DG-A105-1300-041 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 41 of 47
B240A024-DG-A105-1300-042 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 42 of 47
B240A024-DG-A105-1300-043 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 43 of 47
B240A024-DG-A105-1300-044 Rev A	Cycle Enfield A105 – MCHW Series 1300 Road Lighting Column & Bracket Mainline Layout Plan Sheet 44 of 47

DOCUMENTS	DETAILS (where appropriate)
☒ Safety Audit Brief	
☐ Site Location Plan	
☐ Traffic signal details	
☐ TfL signal safety checklist	
☐ Departures from standard	
☒ Previous Road Safety Audits	2524/032/A105/BOR/2016
☐ Previous Designer Responses	
☐ Collision data	
☐ Collision plot	
☐ Traffic flow / modelling data	
☐ Pedestrian flow / modelling data	
☐ Speed survey data	
☒ Other documents	A105 Enfield - Proposed Road Marking Schedule A105 Enfield - Sign Schedule - Section 14

APPENDIX B

Problem Locations



RINGWAY JACOBS

ENFIELD Council

CYCLE ENFIELD - A105

GENERAL ARRANGEMENT SHEET 39 OF 47

DRAFT FOR COMMENTS ONLY

FOR APPROVAL

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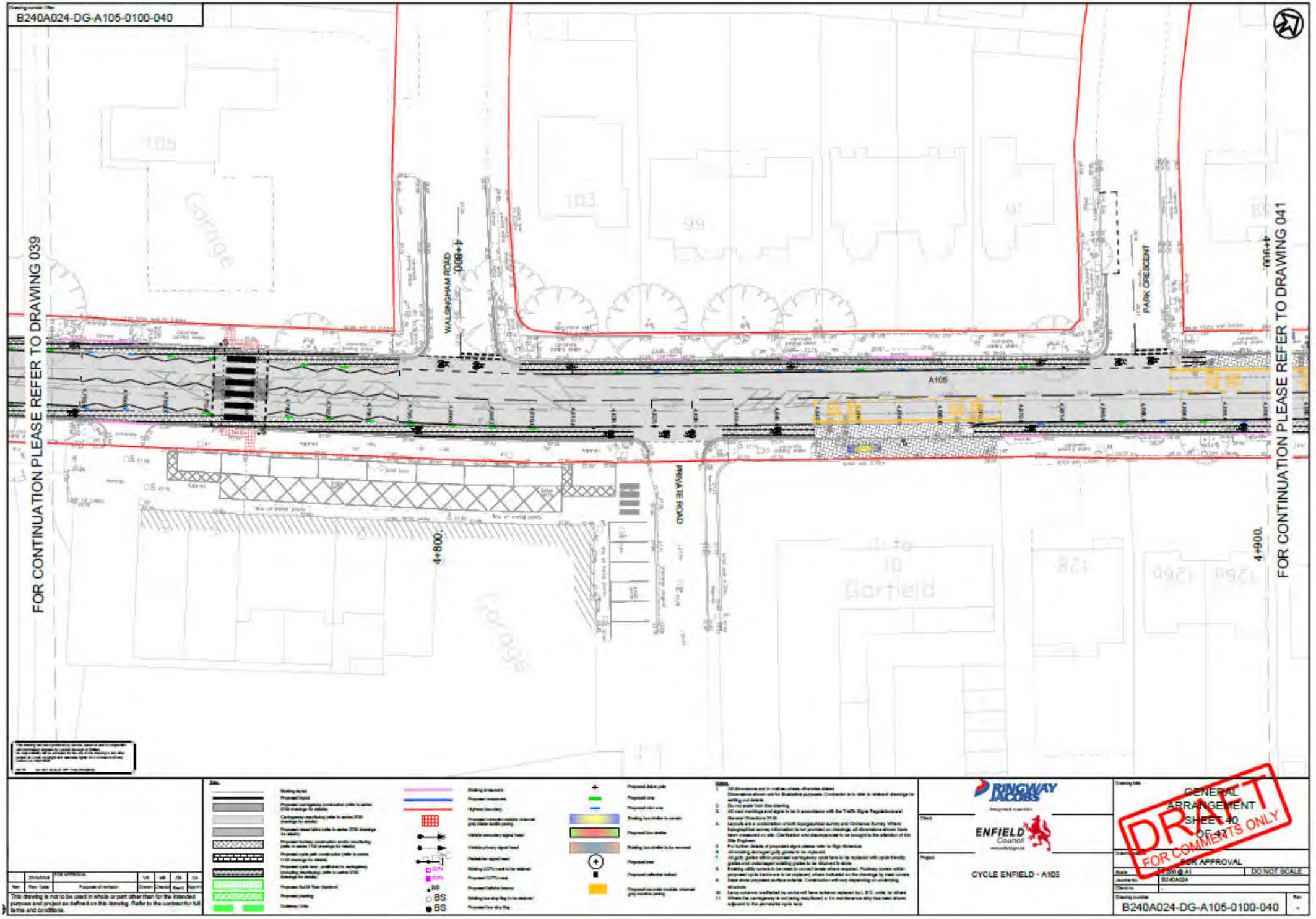
Jacobs No.	B240A024	
Client no.	-	

Drawing number: B240A024-DG-A105-0100-039 Rev -

Rev	Revision Date	Purpose of revision	Drawn	Checked	Rev'd	Appr'd
-	27/04/2018	FOR APPROVAL	VR	MR	DB	CA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FOR CONTINUATION PLEASE REFER TO DRAWING 039
FOR CONTINUATION PLEASE REFER TO DRAWING 041
WALSINGHAM ROAD
PARK CRESCENT
PRIVATE ROAD
A105
4+800
4+900
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 40 OF 47
DRAFT
FOR COMMENTS ONLY
FOR APPROVAL
DO NOT SCALE
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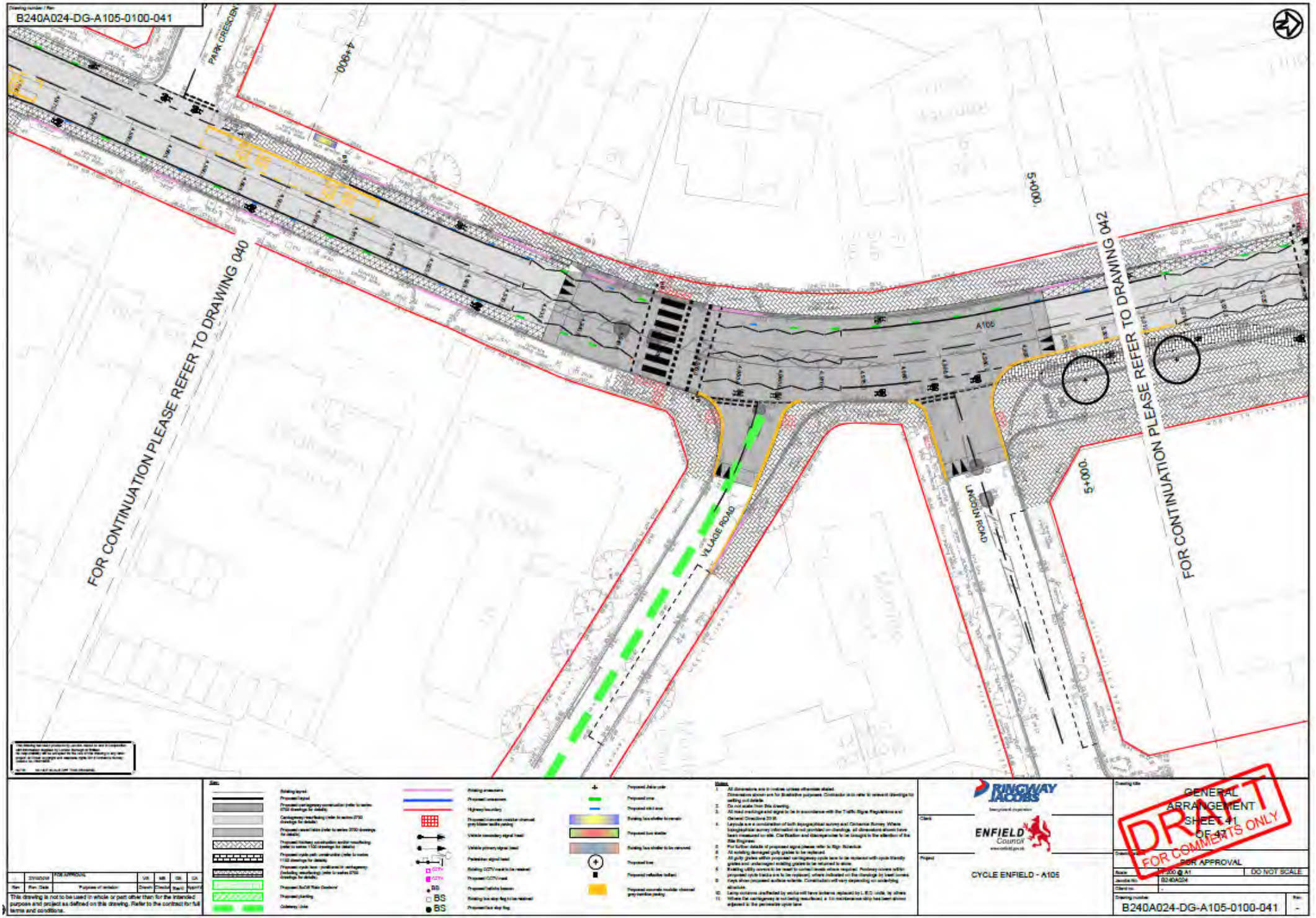
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.


B240A024-DG-A105-0100-041
PARK CRESCENT
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5+000
A105
FOR CONTINUATION PLEASE REFER TO DRAWING 040
FOR CONTINUATION PLEASE REFER TO DRAWING 042
VILLAGE ROAD
LINCOLN ROAD
5+000
DRAFT
FOR COMMENTS ONLY
FOR APPROVAL
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 41 OF 47
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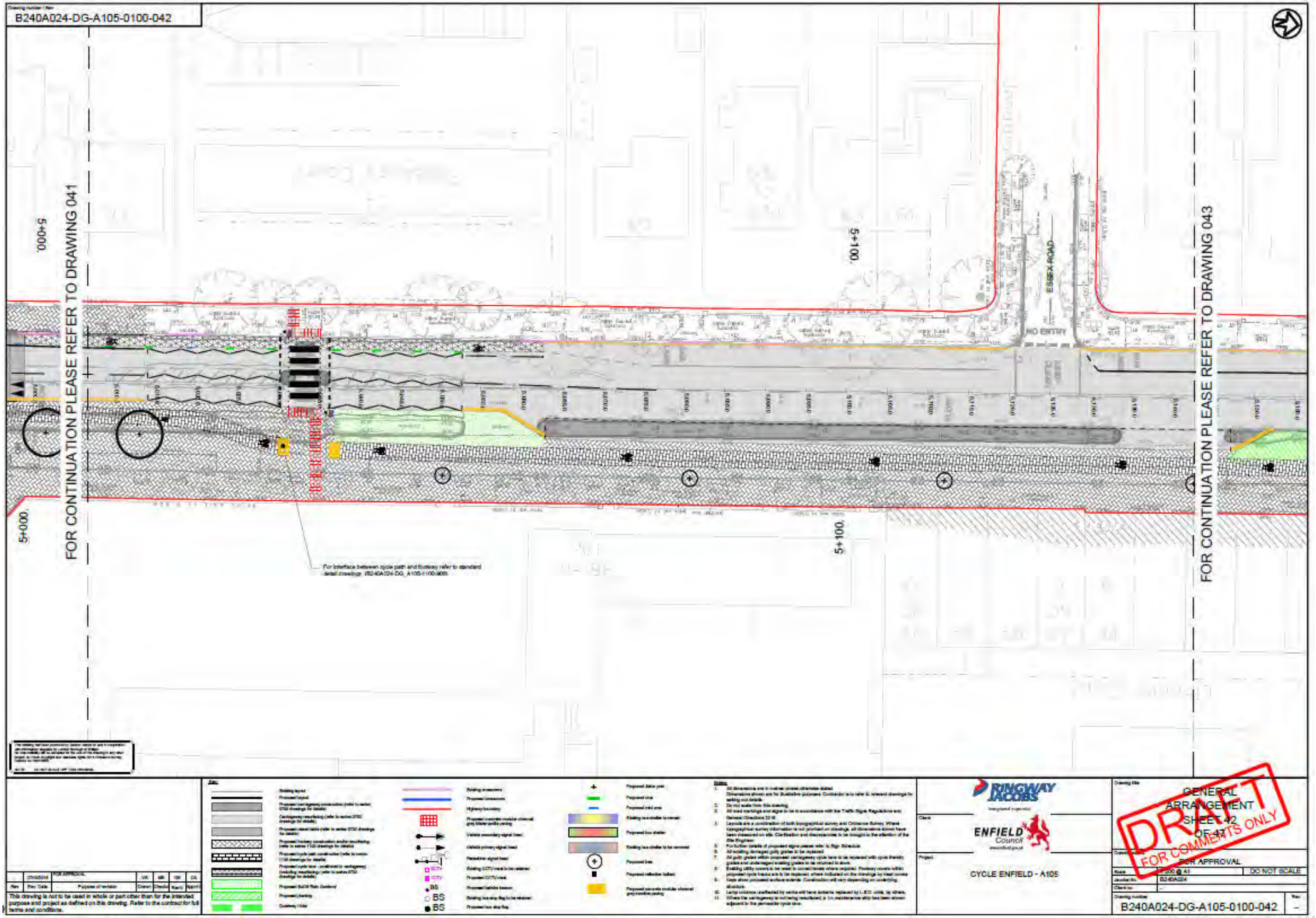
B240A024-DG-A105-0100-042
FOR CONTINUATION PLEASE REFER TO DRAWING 041
FOR CONTINUATION PLEASE REFER TO DRAWING 043
5+000
5+100
ESSEX ROAD
NO ENTRY
For interface between cycle path and footway refer to standard detail drawings (B240A024-DG_A105-0100-005)
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
GENERAL ARRANGEMENT SHEET 42 OF 47
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FOR COMMENTS ONLY
FOR APPROVAL
DO NOT SCALE
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B240A024-DG-A105-0100-042
This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

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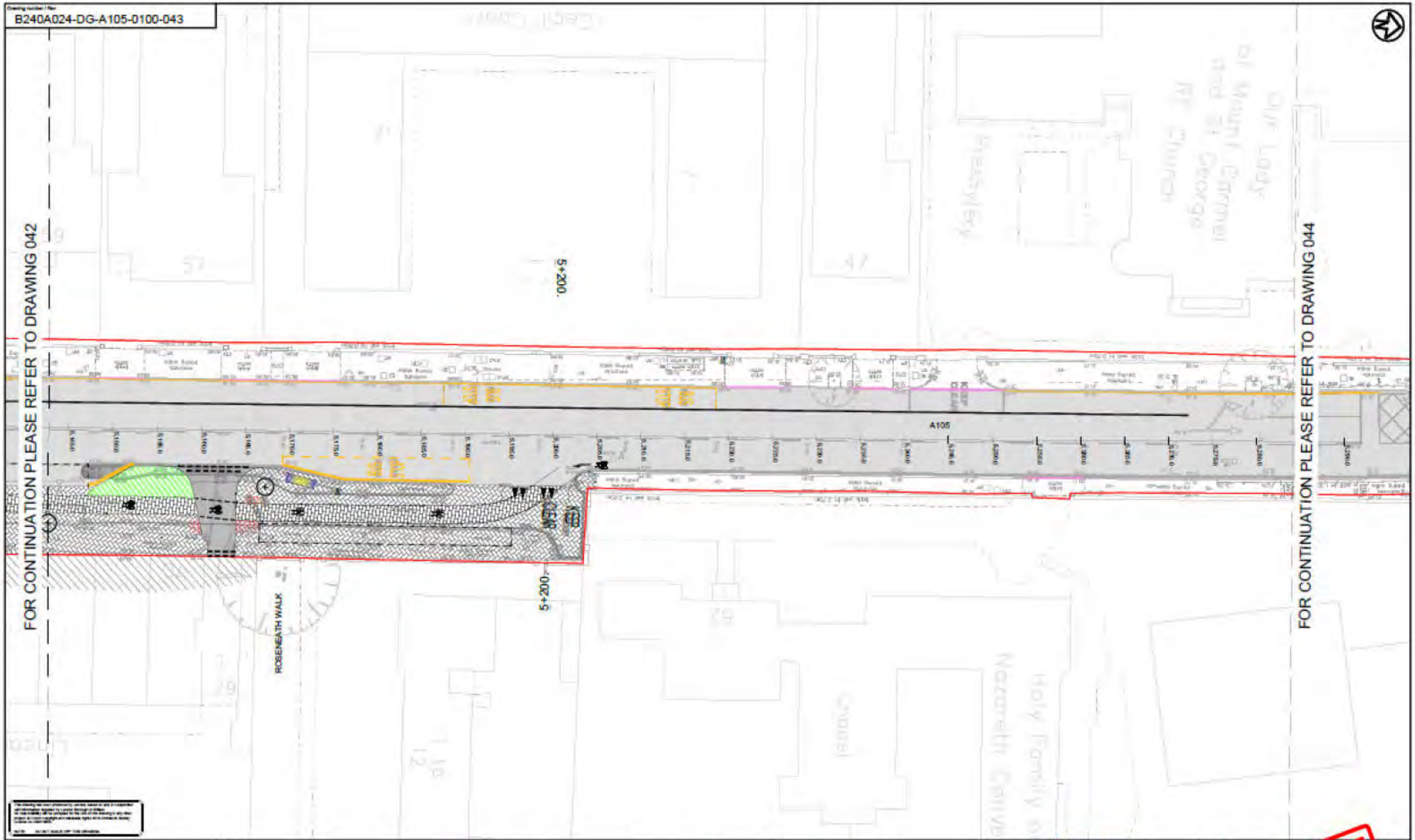


This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Client: ENFIELD Council

Project: CYCLE ENFIELD - A105

Drawing title: GENERAL ARRANGEMENT SHEET 43 OF 47

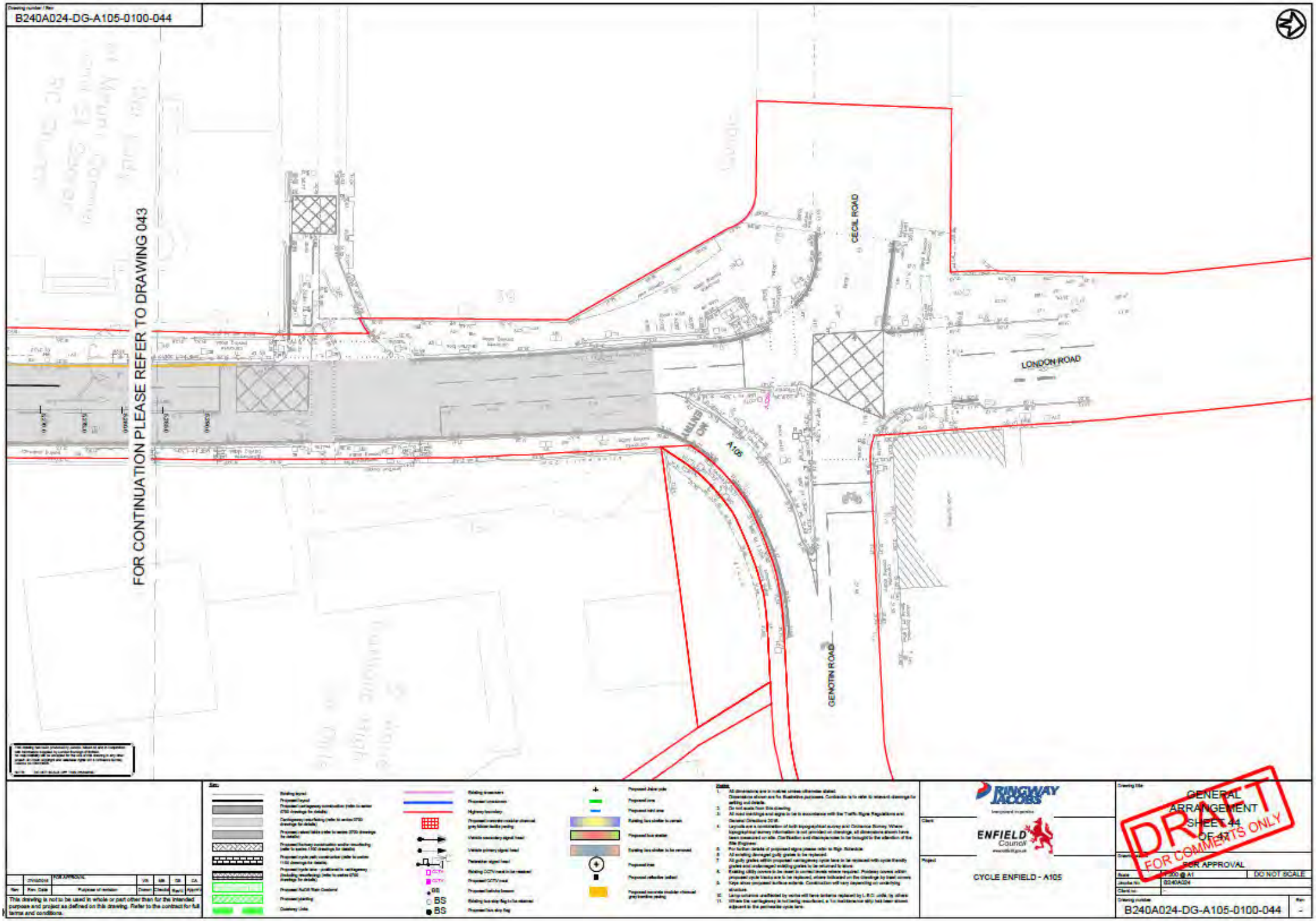
FOR APPROVAL

DRAFT FOR COMMENTS ONLY

Scale: 1:200 @ A1 | DO NOT SCALE

Drawing number: B240A024-DG-A105-0100-043

Rev: -


B240A024-DG-A105-0100-044
FOR CONTINUATION PLEASE REFER TO DRAWING 043
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LONDON ROAD
A105
GENOTIN ROAD
DRAFT
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NOT FOR APPROVAL
GENERAL ARRANGEMENT SHEET 44 OF 47
RINGWAY JACOBS
ENFIELD Council
CYCLE ENFIELD - A105
DO NOT SCALE
B240A024-DG-A105-0100-044