

Elephant & Castle Northern Roundabout Improvement Scheme

Stage 3 Road Safety Audit

Ref: 2498.02/008/A3/TLRN/2016

Prepared for:

Sponsorship, TfL Road Space Management (RSM)

By:

Road Safety Audit, TfL Asset Management Directorate

Version	Status	Date
A (Interim)	Audit report issued for police comments and prior to cycle track / crossings being opened	27/04/2016
B	Revised Audit report issued following opening of the cycle track / crossings, site meeting with Met Police and night visit	31/05/2016
C	Revised Audit report issued with alterations to 3.6.1 & 3.6.2 and additional signature boxes added after comments received from the Designer / Client	06/10/2016

1.0 INTRODUCTION

1.1 Commission

- 1.1.1 This report results from a Stage 3 Road Safety Audit carried out on the Elephant & Castle Northern Roundabout improvement scheme.
- 1.1.2 The Audit was undertaken by TfL Road Safety Audit in accordance with the Audit Brief issued by the Client Organisation on 15th April 2016. It took place at the Palestra offices of TfL during April / May 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 scheme was visited before the cycle tracks and crossings had been opened on the afternoon of the 18th April and the morning of 21st April 2016 which covered part of each peak period. During these site visits the weather was bright and the existing road surface was dry.
- 1.1.4 The scheme was re-visited post opening of the cycle tracks and crossings on the 5th May 2016. This visit included part of each peak period, and also incorporated a site visit during the hours of darkness. Catherine Linney from the Metropolitan Police attended the daytime site visit.

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 scheme; 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 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.

- 1.2.5 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:

1.3.2 Design Organisation

Design contact details:

1.3.3 Audit Team

Audit Team Leader:

Audit Team Member:

Audit Team Observer:

1.3.4 Metropolitan Police

Police Contact:

1.3.5 Other Specialist Advisors

Specialist Advisor Details:

1.4 Purpose of the Scheme

- 1.4.1 The purpose of the scheme was to provide safer segregated cycle facilities around the junction by introducing a new road layout and converting the roundabout into a two-way traffic system. Improve on public spaces around the junction and on the peninsular.*

*Taken directly from the Audit Brief.

1.5 Comments received from the Metropolitan Police 1.5.1

Blank from the Metropolitan Police commented that:

- There appears to be confusion regarding the two straight ahead arrows in lanes 2 and 3 for vehicles coming from Elephant and Castle south, southwest of London Road.
 - This item has been covered in problem 3.3.3 of this report.
- Vehicles turning left into Newington Causeway from London Road from lane 2 because buses are blocking lane 1. Main concern here relates to cyclist potentially getting hit cycling away from the ASL in lane 1.
 - This item has been covered in problem 3.3.3 of this report.
- Vehicles stopping on the crossing on the Northwest bound carriageway at the New Kent Road junction, due to traffic build up may contribute to collisions if pedestrians cross out of phase between waiting vehicles
 - This item has been covered in problem 3.6.2 of this report.
- The intended cycle routes are unclear and that this may contribute to cyclist confusion and inconsistent manoeuvres / low utilisation of some of the cycle tracks / facilities. For example the intended route for cyclists from New Kent Road to St Georges Road seems convoluted.
 - This item has been covered in issue 4.1 of this Audit report.
- The cycle crossing over St Georges Road can result in a long wait for cyclists and uncertainty as to whether a demand to cross has been called.
 - This item has been covered in issue 4.14 of this Audit report.
- Buses waiting at the eastbound bus stops on Walworth Road queued back beyond the bus cage and obstructed the dropped kerbs for cyclists to re-enter the carriageway.
 - This item has been covered in issue 4.15 of this Audit report.
- Lack of visibility from the peninsular, crossing towards St Georges Road, cycle stop line being set back and the short intergreen may increase risk to cyclists who go through an amber or changing to red signal particularly if drivers are anticipating the lights.
 - This item has been covered in problems 3.3.5, 3.3.6 and issue 4.1 of this Audit report.

1.6 Special Considerations

- 1.6.1 At the time of the site visit, construction (possibly remedial or utility) works were being undertaken in the main peninsular area of the island, not including the traffic lanes. This may have affected pedestrian and / or cycle desire lines.
- 1.6.2 This report title is derived from the project name 'Elephant and Castle, Northern Roundabout' and to maintain a clear link to the previous Audit reports. Elephant and Castle, Northern Roundabout is now a peninsular and wherever Elephant and Castle is referred to it relates to the lanes which circulate in both directions around the peninsular unless stated otherwise.

- 1.6.3 It is understood that a further scheme is being developed to alter the layout and operation of London Road and that separate proposals are also being developed to increase awareness of other cycle routes around this area.

2.0 ITEMS RAISED IN PREVIOUS ROAD SAFETY AUDITS

The proposals were subject to a Stage 1 Road Safety Audit which was completed by TfL Road Safety Audit, Asset Management Directorate in October 2013 (ref: 1915/008/A3/TLRN/2013). The RSA was revised following significant design alterations in July 2014. Items raised in that report can be summarised as follows:

Problem 3.1.1 Traffic signal layout (London Road j/w Elephant & Castle peninsular) for cyclists may be ambiguous.

The design has significantly altered and therefore, these issues are no longer relevant and will not be raised again in this Stage 3 Audit Report.

Problem 3.1.2 Cycle track (within the footway alongside Elephant & Castle link road) may pose a hazard to cyclists and pedestrians.

The track has been observed in operation and this problem was not observed to materialise. As the potential for conflict still exists, it is recommended that this is monitored in the operation of the completed scheme.

Problem 3.1.3 Insufficient cycle lane facilities (St Georges Road junction with Elephant & Castle peninsular) may pose a hazard to cyclists.

The problem identified a potential for left hook type conflicts as buses turned left across the path of cyclists continuing ahead in the nearside lane. The design has significantly altered since this problem was raised and now provides nearside lane widths which allow cyclists to assert a primary position. This problem was not observed to materialise in the operational scheme and this issue appears to be resolved.

Problem 3.1.4 Combined bus and cycle lane (London Road junction with Elephant & Castle peninsular) may pose a hazard to cyclists.

The Audit Team considers that the merge part of this problem is no longer present but the left hook problem remains in the constructed scheme and therefore this problem is raised again in part within Problem 3.3.3 of this Audit Report.

Problem 3.1.5 Road alignment (Elephant & Castle peninsular opposite Underground Station) may encourage over-running of the cycle lane.

The cycle lane referred to is not present in the final detailed design or the constructed scheme. However the Audit Team have concerns that a similar conflict may arise as cyclists exit the segregated cycle lane / enter the carriageway from the nearside as slightly further downstream buses enter the bus lane / stops to the nearside. Therefore a similar conflict is raised in 3.5.1 of this report.

- Problem 3.1.6** Internal feeder lane may encourage cyclists to adopt an unsafe position within the carriageway (Elephant & Castle peninsular j/w London Road) on the approach.
- The design has significantly altered and therefore, this issue is no longer relevant and will not be raised again in this Audit Report.
- Problem 3.1.7** Potential for pedestrians (floating bus stop on Newington Causeway) to step into, or stand close to the cycle lane.
- This floating bus stop has been observed in operation and this problem was not observed to materialise. As the potential for conflict still exists, it is recommended that this is monitored in the operation of the completed scheme.
- Problem 3.1.8** Change in level (floating bus stop on Newington Causeway) may pose a hazard to visually impaired pedestrians.
- This floating bus stop has been observed in operation and this problem was not observed to materialise but we did not witness the scheme being utilised by visually impaired users. As the potential for conflict still exists, it is recommended that this is monitored in the operation of the completed scheme.
- Problem 3.2.1** Signal timings (London Road junction with Elephant and Castle peninsular) may be ambiguous to pedestrians.
- The design has significantly altered and therefore, this issue is no longer relevant and will not be raised again in this Audit Report.
- Problem 3.3.1** Removal of pedestrian guardrail (Link road between Elephant and Castle southern and northern roundabouts) may pose a hazard to pedestrians.
- The design has significantly altered and the Pedestrian Guard Railing (PGR) was actually retained. Therefore, this problem is no longer relevant and will not be raised again in this Audit Report. However, a related issue is raised as 4.12 regarding pedestrians crossing around this PGR.
- Problem 3.3.2** Left turn ban (Newington Causeway j/w Elephant and Castle peninsular) may encourage unsafe turning manoeuvres.
- The constructed scheme has been altered to physically deter this manoeuvre and it was not observed to occur during the site visits. It is however considered worthwhile that monitoring is undertaken to determine if the alternative route or banned manoeuvres become a problem.

The proposals were subject to a Stage 2 Road Safety Audit completed by TfL Road Safety Audit, Asset Management Directorate in March 2015 (ref: 2209/008/A3/TLRN/2015). Items raised in that report can be summarised as follows:

Problem 3.1.1 Proposed cycle stacking area (London Rd junction with Peninsular) may result in increased collisions between circulatory traffic and cyclists.

The Client and Design Organisation accepted the recommendation and commented that the design has been altered to make the cycle crossing operate one-way towards London Road only which effectively doubles the capacity for waiting cyclists. A revised capacity assessment has been undertaken including the projected increase in cycling and it is noted that this will be monitored post implementation to ensure all cyclists can clear effectively.

Whilst this crossing had been commissioned at the latest site visit it was observed that very few cyclists actually utilised the crossing. This may have been in part due to the temporary barriers which were in place in close proximity which may have deterred some users from entering this area. Additionally there does not appear to be much signing to promote use of this route. It appears that the actual usage of this facility by cyclists is very low and therefore this problem has not been observed. A related issue is however raised as part of problem 3.3.9 in this Audit report.

Problem 3.1.2 Proposed 'buses only' right turn facility is uncontrolled (London Rd junction with Peninsular) and may result in collisions with cyclists using the controlled cycle crossing facility.

The Client and Design Organisation part-accepted the problem and commented that the network impact of changing this to traffic signal controlled would be too significant. The give way arrangement is deemed to be the optimum solution and monitoring will be undertaken to ensure that traffic clears the give-way before the subsequent traffic signal phase.

This problem has altered slightly as the majority of cyclists appear to utilise the bus right turn facility rather than the cycle crossing. However, the resultant potential for collisions remains and therefore this issue is effectively re-raised as part of problem 3.3.4 in this Audit report.

Problem 3.1.3 Proposed left turn only nearside bus and cycle lane (London Rd junction with Peninsular) may result in increased collisions with cyclists continuing ahead.

The Client and Design Organisation rejected the recommendation and commented that the bus lane has been designed to promote a primary riding position by cyclists which will not allow for a bus to position alongside a cyclist to then turn left across the cyclists path. The cycle lane marking at the entrance to St Georges Road has now been removed in accordance with the latest cycle guidance.

Concerns have been raised from the Police and observed on site relating to cyclists continuing ahead from this lane. Therefore, a related problem is raised as 3.3.3 in this Audit Report.

- Problem 3.2.1 Users may attempt to exit (Peninsular in to Newington Causeway) in two lanes which may result in increased 'side swipe' type collisions.

The Client and Design Organisation accepted the recommendation and commented that advanced signing has been proposed to state the permitted movements, destinations and assist with lane choice. There is potential for road marking alterations following monitoring of the scheme in operation.

Concerns have been raised from the Police and observed on site relating to the various manoeuvres which users undertake from each of these lanes and the potential for side swipe type collisions which may result. Therefore, a related problem is raised as 3.3.3 in this Audit Report.

- Problem 3.2.2 Layout on (Newington Causeway northeast bound) approach to the physical island which segregates the cycle lane and general traffic lane may result in collisions with the feature.

The Client and Design Organisation accepted the recommendation and commented that the design was altered to reduce the segregated island length. A hatch marking and a 'Jilson' bollard have been provided.

The Audit Team are concerned that the 'Jilson' bollard may not be suitably conspicuous and therefore a related issue is raised within section 4.2 in this Audit Report.

- Problem 3.2.3 Location of pedestrian crossing and cycle by-pass (across the mouth of the Peninsular junction with Newington Causeway) may result in collisions between pedestrians and cyclists.

The Client and Design Organisation part accepted the recommendation. In response to the first part of the problem Pedestrian Guard Railing has been provided within the staggered pedestrian refuge island. In relation to cyclists and pedestrians colliding due to the proximity of the cycle left turn by-pass and pedestrian crossing, it was stated that the proximity of pedestrians and cyclists will be monitored once the scheme is operational.

The problem identified has not been observed to materialise in the operational scheme. This may however, in part be related to the low numbers of cyclists observed to utilise the section of cycle track to the east of Newington Causeway. It is therefore recommended that this issue is monitored in the operational scheme and suitable remedial measures developed if required.

- Problem 3.2.4 Increased side swipe type collisions (Newington Causeway approach to Peninsular) may result from poor lane discipline.

The Client and Design Organisation accepted the recommendation stating that the nearside lane marking will gain additional text to state 'A3 Only' and additional signage will be considered. The road marking text has now been provided in the constructed scheme.

This problem appears to have been resolved and will therefore not be raised again as part of this Road Safety Audit.

- Problem 3.2.5 Cycle lane layout (Newington Causeway south of Rockingham Street) across the access may result in cycle collisions.

The Client and Design Organisation part accepted the recommendation stating that visibility for exiting vehicles is not considered an issue and that vehicle speeds are anticipated to be low. The relocation of the bus stop may not be feasible and therefore the problem is intended to be monitored once the scheme is operational.

The Audit Team agree that both vehicular flows and speeds appear to be low at this location and this problem was not witnessed to materialise during the site visits. It is however considered beneficial to continue to monitor this potential problem.

- Problem 3.2.6 Cycle lane (Newington Causeway, northern extent of northbound segregation) layout and proximity to the bus stop may result in increased cycle / bus collisions as they attempt to cross one another's path.

The Client and Design Organisation part accepted the recommendation stating that the relocation of the bus stop is unlikely to be feasible. The layout is provided elsewhere including at two locations around Elephant & Castle and the protection of the segregated section is considered safer than without.

The segregation island for the cycle track has now been reduced at the northern extent and this problem was not witnessed to materialise during the site visits. It is however considered beneficial to continue to monitor this potential problem.

- Problem 3.2.7 Left turn ban (Newington causeway junction with Peninsular) may encourage unsafe turning manoeuvres.

The Client and Design Organisation rejected the recommendation stating that additional advanced signing has been provided, and that monitoring will be undertaken to determine if any further actions are required post completion of the scheme.

The Audit Team did not witness this problem to occur during the site visit. It is however considered beneficial to continue to monitor this potential problem.

- Problem 3.3.1 Layout (anticlockwise Peninsular lanes between Newington Causeway and London Road) may result in side swipe type collisions.

The Client and Design Organisation part accepted the recommendation stating that swept path analysis showed minor lane encroachment may occur for articulated vehicles. The required kerb re-alignment to resolve this would require a traffic signal modification which would have had too much of a significant network impact. The use of a 'Jilson' bollard is considered the design which best optimises safety.

The Audit Team did not witness this problem to occur during the site visit. It is however considered beneficial to continue to monitor this potential problem.

- Problem 3.3.2 Cycle manoeuvres (northwest bound between New Kent Road and London Road) may lead to conflict with westbound vehicles.

The Client and Design Organisation part accepted the recommendation stating that the recommended traffic signal modification would have had too much of a significant network impact. Furthermore the recommendation does not fit in with the schemes aims and may be complicated by the future planned works relating to the underground station. Clear signage will be introduced to clarify the intended route for cyclists and increase awareness for pedestrians.

The cycle cut through area has not been provided in the constructed scheme but the issue of cyclists attempting to cross the three anti-clockwise lanes out of phase was observed. This could result in potential collisions and therefore this related problem is raised as part of 3.3.9 in this Audit report.

- Problem 3.3.3 Layout (Anti-clockwise Peninsular lanes, south of London Road) may result in side swipe type collisions or collisions with the segregation island.

The client and design organisation accepted the recommendation stating that a 'Jilson pole' or road marking will be provided to help delineate route.

This had not been provided at the time of the most recent site visit. This is considered to remain as a potential problem and is therefore raised again as Problem 3.3.10.

- Problem 3.4.1 Reduced southbound visibility (St Georges Road from Peninsular) for users in the offside right turn lane may result in increased risk of conflict with northbound vehicles.

The Client and Design Organisation part accepted the recommendation stating that the standard continuous give way line

was considered more likely to be understood and complied with. Signals or a single lane approach were not deemed feasible, swept path analysis had been considered and that on balance this design optimises safety.

The Audit Team consider that this problem has been given suitable consideration, however it is recommended that this potential problem is monitored in the operational scheme and remedial measures developed if necessary to mitigate any problems.

- Problem 3.4.2 Proposed layout (Northbound bus and cycle lane between St Georges Road and London Road) may result in an increased potential for cyclists to be squeezed as buses travel alongside and lane width narrows.

The Client and Design Organisation part accepted the recommendation stating that alterations have been made to provide a consistent lane width across St Georges Road junction to assist with cyclists taking a primary riding position and that the cycle road markings across the mouth of the junction have been removed in accordance with revised cycle design guidance.

The Audit Team consider that this problem has been given suitable consideration and measures taken to suitably mitigate the problem. However, it is recommended that this potential problem is monitored in the operational scheme and remedial measures developed if necessary.

- Problem 3.4.3 Layout of cycle crossing (south of St Georges Road) may lead to cycle collisions.

The Client and Design Organisation rejected the recommendation stating that the traffic signal modifications were not feasible due to the network impact and that cycle flows are anticipated to be low, Furthermore, additional signing strategy should encourage cyclists to avoid Elephant & Castle via an alternative cycle network and that this problem will be monitored post opening to ensure that cyclists can clear the waiting area.

It is not clear if the signing mentioned has been completed although the Audit Team are aware of Southwark quiet-ways proposals being developed which may assist. The cycle track was observed to operate without the problems identified occurring in the eastbound direction. An issue relating to the potential miss-interpretation of signals is raised within 4.8 of this Audit report. The issue relating to capacity does not seem to have materialised due to the traffic signal staging meaning that eastbound cyclists clear safely and westbound cycle flows being extremely low.

- Problem 3.4.4 Proximity of pedestrian crossing (South of St Georges Road) to cycle lane may result in cycle and pedestrian collisions.

The Client and Design Organisation part accepted the recommendation stating that they accept there is a potential issue but that the track forms an essential part of the scheme and that the conflict can be mitigated by use of materials to differentiate and provide a clear priority for pedestrians.

The Audit Team consider that this problem was not observed to materialise in the completed scheme. However, as the potential for conflict remains, it is recommended that this potential problem is monitored in the operational scheme and remedial measures developed if necessary to mitigate any problems.

- Problem 3.5.1 Cyclists may be squeezed (New Kent Road crossing) as lane width decreases.

The Client and Design Organisation accepted the recommendation stating that additional cycle logos will be provided.

The Audit Team did not witness this problem to occur during the site visit. It is noted that observed levels of cycling in this section of the cycling track are very low. It is considered beneficial to continue to monitor this potential problem.

- Problem 3.6.1 Effective removal of bus lane (Elephant & Castle Link Road northbound) may result in increased collisions.

The Client and Design Organisation rejected the recommendation stating that the segregated cycle track should help mitigate collisions and that the proposed design reflects the layout of the opposite carriageway which does not demonstrate a resultant collision problem.

This problem was not witnessed to materialise during the site visit / observations. It is considered beneficial to continue to monitor this potential problem.

- Problem 3.6.2 Cycle track layout (western side of Elephant & Castle Link Road) may pose a hazard to cyclists and pedestrians.

The Client and Design Organisation part accepted the recommendation stating that the scope for modification of the cycle track is limited due to physical constraints and that the footway width and capacity increases over 33%, that the cycle track will be demarcated in the same way as the carriageway and that fewer cyclists on carriageway should result in reduced collisions.

This problem was not witnessed to materialise during the site visit / observations. It is considered beneficial to continue to monitor this potential problem.

Problem 3.7.1 Proximity of cycle track to pedestrian crossing (Newington Butts junction with Walworth Road) may result in collisions between cyclists and pedestrians.

The Client and Design Organisation part accepted the recommendation stating that the track has been revised to accommodate the 'One Elephant' development, relocation of the facility cannot be considered due to network impact, track is one-way, visibility is good and pedestrian crossing points and cycle track are in contrasting colours to help mitigate conflicts and there is sufficient space for pedestrians to wait in the footway.

This problem was not witnessed to materialise during the site visit / observations. It is considered beneficial to continue to monitor this potential problem.

Various road safety recommendations have not been fully incorporated into the constructed scheme but the Client / Designers responses have demonstrated that they have been considered and will be monitored once the scheme is operational. Therefore, where the potential problem remains but the Audit Team have no further recommendations, these have not been re-raised in this Audit report on the basis that they have already been considered and continued monitoring will be undertaken.

An Interim Stage 3 RSA was completed on the scheme but as this was undertaken on a layout which was significantly incomplete items that remain relevant have been incorporated in to this report.

3.0 ITEMS RAISED AT THIS STAGE 3 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 GENERAL

3.1.1 PROBLEM

Location: General – Crossing facilities throughout scheme area

Summary: Potential for increased collisions due to pedestrians and cyclists crossing out of phase.

Pedestrians and cyclists were witnessed to cross out of phase at the majority of crossings throughout the scheme. This may be in part due to the relatively long waiting times encountered. Pedestrians and cyclists crossing out of phase may be at an increased risk of collisions with opposing vehicle flows.

RECOMMENDATION

Check traffic signal timing to ensure that it is optimised for all users and make modifications to reduce pedestrian wait times

Design Organisation Response	Accepted / Part Accepted / Rejected
<p>OM Comments - This is an OM issue as it relates to signal timings and pedestrian wait time. Accept the issue and the recommendation and timings will be fully reviewed during the UTC SCOOT enabling process (at present the junctions are operating on Fixed Time awaiting UTC SCOOT infrastructure installation). (19/08/16)</p> <p>TI Comments – Scoot designs currently being finalised and issued to signal contractor for installation. (30/08/16)</p>	

Client Organisation Comments
<p>The problem identified is a common one across London. Pedestrians crossing out of phase is not currently illegal and pedestrians do so at their own risk. However, recognising that this could be exacerbated with prolonged wait times, I am satisfied that every effort has been made by the team to balance the needs of all users of the highway, including providing the minimum pedestrian wait time possible to balance the needs of all highway users at the junction. In addition, SCOOT will be up and running by early 2017 and this should provide further refinement to the facilities provided.</p>

3.2 LONDON ROAD

3.2.1 PROBLEM

Location: A – London Road junction with Elephant & Castle

Summary: The layout and resultant vehicle manoeuvres as vehicles enter from London Road may result in increased collisions.

The London Road southeast bound approach flares to three lanes from the nearside on the approach to the peninsular. The nearside lane is marked for left turning traffic, with the middle and offside lanes marked for right turning traffic. An Advance Stop Line (ASL) is provided across the nearside lane, with an offside feeder lane between the nearside and middle lanes to facilitate cycle access to the anti-clockwise segregated facility. Bus stops are located within the nearside lane. The number of buses at this location results in the nearside lane being continuously occupied by buses. This results in the following issues:

- a) Buses occupying the nearside lane results in general traffic not being able to enter the lane to turn left. As a result, drivers were observed to turn left from the middle lane across the path of vehicles exiting from the nearside lane. This could result in side swipe / left hook type collisions. This is of particular concern for cyclists in the feeder lane whose path would be crossed by traffic turning left from the middle lane.
- b) Buses occupying the nearside lane obstruct the nearside advanced direction sign and the road markings which denote the intended manoeuvres from each lane are often obscured by waiting vehicles. It was also noted that visibility to the signs was partially obscured by trees on the footway. This may exacerbate a) above as drivers are unaware of the junction layout ahead.
- c) Forward visibility to the nearside traffic signals is reduced by buses in the nearside lane. Should the offside primary signal be obstructed by traffic in the offside lane, then vehicles in the middle lane may not have visibility to any signal. This could result in an increased risk of red light violations with a potential for collisions with pedestrians attempting to cross or other traffic flows, or rear end type collisions if a driver sees the signal late and brakes hard.

RECOMMENDATION

Ensure that the layout can be used as intended. This may include but is not limited to

- Relocating the bus stops.
- Altering the cycling provision to minimise the risk of left hook type collisions, this may include removal or relocation of the cycle feeder lane and provision of an early release for cyclists.
- Altering lane designations and / or providing additional / relocated signing to increase awareness of the intended manoeuvres and promote suitable lane choice.
- Taking measures to ensure that motorists can clearly see and comply with the traffic signals.

Design Organisation Response	Accepted / Part Accepted / Rejected
------------------------------	-------------------------------------

RJ acknowledge the problem highlighted by the Safety Audit Team and would agree with recommendations suggested to address the problem. RJ would in turn recommend further studies and investigations to determine a final proposal.	
---	--

Client Organisation Comments

The problem is accepted as described. Potential recommendations of relocating bus stops may not be possible owing to the volume of Bus facilities that use the junction. However, we are working with Bus colleagues to review the operation of the three bus stops at this location with a view to reducing to total number of bus facilities that use the southernmost stop. This may reduce the number of buses in the left hand lane south of the traffic signals at the Ontario Street junction on London road.

There is a scheme that is looking at the entire length of London road and as part of this we will look at the options for addressing this problem.

3.2.2 PROBLEM

Location: B – Facility for cyclists to enter the London Road carriageway northwest bound

Summary: Potential for collisions as cyclists navigate buses around this facility.

The facility for northwest bound cyclists to re-enter London Road was observed to be regularly obstructed by northwest bound buses waiting to enter the bus stop. This may result in cyclists either:

- a) Entering the carriageway between queuing buses where they may be at an increased potential for collisions with passing vehicles due to the reduced visibility, or;
- b) Utilising an alternative route such as re-joining via the dropped kerbs for the pedestrian crossing point further south at an increased potential for collisions with pedestrians or vehicles entering London Road particularly as cyclists may struggle to easily view approaching vehicles far over their right shoulder.

RECOMMENDATION

Ensure that cyclists can safely utilise the facility provided. This may involve but is not limited to relocating the facility or bus stop.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the problem highlighted by the Safety Audit Team and whilst RJ would agree that the relocation of either the bus stop or the dropped kerb would address the problem locally, RJ would in turn recommend that further studies and investigations are required to determine if the relocation of the bus stop or the dropped kerb are feasible and acceptable to the wider key stakeholders.	
Client Organisation Comments	
It is accepted that buses block the dropped kerb that allows cycles to re-enter the carriageway from the shared space, particularly at peak times.	
It is not accepted that the facility is unsafe, however, and that there is a requirement to “ensure that cyclists can safely use the facility” as it is possible to use the facility in a safe manner simply by observing the highway code and exhibiting safe behaviour and reasonable to expect that cyclists use the facility provided in a safe manner. For example, if the facility is blocked by a bus, a cyclist will either need wait for it to clear or if deciding it is safe to proceed by exiting between two buses, cyclists will need to look for overtaking vehicles before exiting between buses.	
Additionally, the risk of vehicles overtaking a stationary bus at this location is low as the road is restricted to buses and cycles only. If a stationary bus is blocking the facility, the rear of the bus will likely be adjacent to the southern traffic island restricting the width sufficiently to prevent other buses from overtaking. Given that the only other vehicles allowed to use this road are cycles, that they would be the	

only vehicles small enough to overtake, that total NB cycle numbers here are low and use of the facility is extremely low, the collision risk of this scenario is low.

Relocating this bus stop further up London road is not possible owing to the lack of available space and removing the stop completely is not feasible because of the significant impact it would have on bus passengers using the facility.

3.3 ELEPHANT AND CASTLE PENINSULAR (circulatory lanes)

3.3.1 PROBLEM

Location: C – Pedestrian crossing between London Road and Newington Causeway

Summary: Collisions between pedestrians on the crossing and vehicles.

Vehicles were witnessed to continue across this pedestrian crossing after the pedestrian crossing green phase had begun. This is considered to be as a consequence of the congestion resulting from the problems identified in 3.2.1 and traffic therefore not moving freely through this area. During the site visits pedestrians seemed aware of this and waited for vehicles to clear before they started to cross. However, pedestrians may see the 'green man' and attempt to cross not appreciating that vehicles may still be clearing this area of carriageway. This may therefore result in an increased potential for collisions between pedestrians and vehicles.

RECOMMENDATION

Alter the traffic signals to ensure that pedestrians do not observe a green pedestrian traffic signal unless it is safe for them to cross. This may involve but is not limited to providing detection equipment to ensure that the pedestrian green aspect is not displayed until all vehicles have cleared the crossing area and / or altering the timing of the traffic signals / inter-green period.

Design Organisation Response	Accepted / Part Accepted / Rejected
TI Comments - All Red detectors to be commissioned to allow extra time for vehicles to clear the pedestrian crossing points before pedestrian phases commence. (30/08/16)	
Client Organisation Comments	
Accepted. The Designers proposal is appropriate mitigation to address this problem.	

3.3.2 PROBLEM

Location: D – Pedestrian crossing between London Road and Newington Causeway

Summary: Collisions between pedestrians on the crossing and vehicles.

Some pedestrians do not appreciate that this crossing operates in two separately controlled phases and pedestrians were witnessed to observe a traffic signal on the far side of the road and wrongly interpret this as an invite to cross both crossings. This may lead to an increased potential for collisions between pedestrians and passing vehicles.

RECOMMENDATION

Alter the traffic signals to ensure that pedestrians do not observe a green pedestrian traffic signal unless it is safe for them to cross. This may involve but is not limited to

providing additional louvres to ensure that the pedestrians aspects are only visible to the intended recipients.

Design Organisation Response	Accepted / Part Accepted / Rejected
<p>TI Comments - Louvres to be added to all green man aspects at this crossing point (louvres were originally installed but not replaced following pole knockdown) (30/08/16)</p>	
Client Organisation Comments	
<p>Accepted. The Designers proposal is appropriate mitigation to address this problem.</p>	

3.3.3 PROBLEM

Location: E – London Road junction with Elephant and Castle

Summary: Side swipe or left hook type collisions may result from inconsistent manoeuvres from each lane.

The nearside anticlockwise lane is marked as left turn only for buses and cyclists with lanes two and three on this approach marked for the ahead movement. The following issues were noted on site:

- a) Powered two wheelers and cyclists continued around the circulatory lanes from the nearside bus lane. As a result, riders are squeezed against the nearside kerb as they reached the eastern side of the junction with London Road as traffic turns left into Newington Butts from the general traffic lanes. This may result in cyclists being struck by left turning traffic.
- b) Vehicles in the offside ahead lane attempting to turn left into Newington Causeway across the path of traffic in the nearside lane continuing around the gyratory with a potential for conflict as a result.
- c) Vehicles in the offside ahead lane attempting to turn left into Newington Causeway at the same time as vehicles in the nearside general traffic lane. This may result in side swipe type collisions as both streams attempt to enter the single traffic lane within Newington Causeway at the same time

RECOMMENDATION

Modify the road marking and sign provision on the approach to the junction to better notify drivers of the intended destinations from each lane, with a view to minimise lane changing and achieve more consistent manoeuvres.

Continued monitoring to determine the full extent of the issue along with investigations to develop potential remedial measures may also be required.

Design Organisation Response	Accepted / Part Accepted / Rejected
<p>RJ acknowledge the problem highlighted by the Safety Audit Team and can confirm that additional signs and road markings have been implemented (as the constraints of the new road layout would allow) to provide further information to road users of the lane discipline.</p> <p>RJ agree that continued monitoring is required.</p>	
Client Organisation Comments	
<p>Accepted. The recommended mitigation has been implemented.</p>	

3.3.4 PROBLEM

Location: F – London Road junction with Elephant and Castle

Summary: Collisions between vehicles travelling clockwise around the peninsular and cyclists attempting to enter London Road.

An uncontrolled right turn facility has been provided within this traffic signal controlled junction which permits buses and cyclists to enter London Road from the anticlockwise lanes of Elephant & Castle. During the site visit many cyclists were witnessed to utilise this area and the Audit Team are concerned that cyclists will choose this facility rather than the traffic signal controlled cycle crossing facility, either to avoid potential delays or if the capacity within the refuge area is already full with cyclists. The Audit Team are concerned that cyclists using the right turn lane rather than the cycle crossing may result in the following problems:

- The crossing distance across the path of three lanes of traffic from the clockwise peninsular may result in cyclists encountering a vehicle before they can complete their crossing.
- As stated in 3.3.3, road users are observed to continue ahead from the nearside left turn only lane. Cyclists attempting to cross may not anticipate this.

These problems may result in collisions between cyclists crossing from the right turn lane and road users continuing around the clockwise circulatory lanes in this section of the Peninsular.

RECOMMENDATION

It is understood that the signalisation of the right turn facility into London Road is not deemed feasible. Therefore it is recommended that alterations are incorporated to encourage the use of the controlled cycle crossing facility. This may involve but is not limited to providing additional guidance to encourage use of the cycle crossing facility, this may include additional signing and / or advice to users verbally or through targeted leaflets in this vicinity.

Design Organisation Response	Accepted / Part Accepted / Rejected
------------------------------	-------------------------------------

RJ acknowledge the problem highlighted by the Safety Audit Team and if signalisation of the right turn facility is not feasible, then RJ would recommend a combined approach of additional guidance, enforcement and education, along with continued monitoring to determine if this problem is mitigated by these measures.

Client Organisation Comments

It is accepted that there is a collision risk for cyclists as described above. As stated, it is not feasible to signalise this movement for buses and cycles on the main carriageway owing to the lack of available highway space.

The number of cycles making the WB to NB movement at this location is low. This coupled with the provision of the adjacent signalised cycle facility to allow cycles to make this movement without having to gap accept, therefore, mitigates this risk to as low as reasonably practicable.

3.3.5 PROBLEM

Location: G – Pedestrian and cycle crossings south of St Georges Road

Summary: Inter-visibility between the eastern side of the crossings and southbound vehicles may result in collisions.

Inter-visibility between pedestrians (and particularly cyclists) waiting on the eastern side of the crossing facility, and southbound drivers is restricted by the London Underground vent structure and the alignment of the southbound carriageway. Visibility is also partially restricted by the signal, lighting and CCTV poles. Visibility to the nearside traffic signals is also reduced. Southbound drivers appeared to approach the crossing at speed – this may be as a result of having been held up for queuing traffic on the approaches to the junction and then being released onto the peninsular carriageway which was clear.

The Audit Team are concerned that the available inter-visibility may not be sufficient for the approach speed of traffic. A number of pedestrians were observed to cross the carriageway out of phase, making use of gaps in the platooning traffic. Pedestrians were observed to step out into the carriageway when they thought it was clear, to then be faced by oncoming southbound traffic. This may result in collisions between pedestrians / cyclists and southbound traffic.

RECOMMENDATION

Provide measures to maximise inter-visibility between pedestrians / cyclists and southbound drivers. This may include but is not limited to providing a buildout on the eastern side to increase the available visibility, or providing measures to slow vehicle approach speeds on the peninsular.

Design Organisation Response	Accepted / Part Accepted / Rejected
------------------------------	-------------------------------------

RJ acknowledge the problem highlighted by the Safety Audit Team and would recommend that further studies and investigations are required to determine if proposals such as,

- providing a build-out
- realignment of the controlled crossing
- modification of signal timings to reduce pedestrian waiting time, and
- the introduction of speed reducing measures (RJ understands that this area was originally proposed to be a 20mph speed limit post scheme implementation)

are feasible and acceptable to the wider key stakeholders.

[OM Comments – Agreed to consider and review signal timings during the final implementation of the signal works and will look to reduce pedestrian wait times and provide good pedestrian linking wherever possible. \(29/09/16\)](#)

Client Organisation Comments

The risk to pedestrians deciding to cross out of phase at this location is recognised. It is not possible to relocate the faraday memorial as it is a grade 2 listed building. Therefore, the signal timings review suggested above is accepted. However, it is not possible to provide a build-out without impacting the bus flow into the bus stops on Newington Butts.

Realigning the crossing would increase the time taken for pedestrians to cross,

resulting in increased journey times across all modes.

The junction will be subject to a 20mph speed limit trial, though it is not felt that this alone will sufficiently mitigate the risk as it relies on drivers observing the 20mph limit in an area where there is no complementary enforcement infrastructure.

Whilst it is accepted that there is a risk to pedestrians deciding to cross out of phase at this location, the proposed physical interventions at this location will themselves have significant wider impacts. Therefore, the client team will keep this location under review and if a long term safety problem is identified then further studies will be required to look into possible further mitigation and resulting impacts.

3.3.6 PROBLEM

Location: H – Pedestrian and cycle crossings south of St Georges Road

Summary: The short traffic signal intergreen period combined with the likely usage may result in collisions.

The Audit Team are concerned that the short intergreen between the vehicular phase and pedestrian / cycle crossing phases may exacerbate the potential for collisions at this location. Pedestrians or cyclists entering the crossing at the end of or slightly beyond the pedestrian / cycle green phase may think they have time to cross but may quickly be encroached upon by approaching vehicles. This may result in collisions between vehicles and pedestrians or cyclists.

RECOMMENDATION

Increase the intergreen period between the vehicular and pedestrian / cycle crossing phases to ensure that users entering at or slightly over the end of the pedestrian / cycle crossing phases are not opposed by the vehicular flow.

Design Organisation Response	Accepted / Part Accepted / Rejected
TI Comments – Inter-greens have been increased. (30/08/16)	
Client Organisation Comments	
Accepted. The recommended mitigation has been implemented.	

3.3.7 PROBLEM

Location: I – St Georges Road junction with Elephant & Castle

Summary: Right turns may result in side swipe type collisions.

The radius of the right turn for anti-clockwise vehicles to enter St Georges Road was observed to result in vehicles (particularly larger vehicles) from the nearside lane cutting across the offside lane. This resulted in users holding back to wait out of the way of larger vehicles until they had passed. If a user in the offside lane does not anticipate the straddling or cutting across lanes then side swipe type collisions may result. The Audit Team are particularly concerned that the vulnerable nature of road users such as a rider of a two wheeled vehicle may still result in serious injuries despite the low speed involved.

RECOMMENDATION

Investigate and introduce measures to encourage lane discipline and discourage powered two wheelers travelling alongside large vehicles whilst turning.

Design Organisation Response	Accepted / Part Accepted / Rejected

RJ acknowledge the problem highlighted by the Safety Audit Team and would recommend that further studies and investigations are required to determine a final proposal to address this observed problem.

Client Organisation Comments

The turning movement was tracked at design stage to ensure that sufficient space is available for two large vehicles turning at the same time. From the Road Safety Auditor's description, the junction is being used correctly by the majority of road users, particularly with reference to the observation of road users holding back while a large vehicle is turning, in line with the Highway Code Rules 170 and 221. It is accepted that there could be a circumstance that drivers do not keep correct lane discipline combined with drivers not adhering to the Highway Code with specific reference to Rules 170 and 221 which could result in a collision. However, it is felt that the junction is operating within the safely designed parameters and any collision occurring at this location would not be as a result of the road layout, rather a combination of multiple poor driving behaviours, which is extremely difficult to mitigate with engineering. The collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risk materialises as a pattern, further investigation will be undertaken.

3.3.8 PROBLEM

Location: J – St Georges Road junction with Elephant & Castle

Summary: Pedestrian desire line away from the crossing facility.

Pedestrians have been witnessed to cross the mouth of this junction rather than utilise the controlled crossing facility which is set back within St Georges Road. This results in pedestrians having to run to complete or abandon the crossing attempt as vehicles enter the junction, sometimes at speed. Pedestrians who fall or do not clear the carriageway quickly enough are at an increased risk of collisions with vehicles.

RECOMMENDATION

As the provision of pedestrian deterrent such as cycle stands to encourage pedestrians to utilise the crossing facility provided.

Design Organisation Response	Accepted / Part Accepted / Rejected
-------------------------------------	--

RJ acknowledge the problem highlighted by the Safety Audit Team.

In principal, the use of cycle stands or similar street furniture as a pedestrian deterrent would be supported, but it may not have the desired effect here if the crossing location is the ultimate problem.

RJ would recommend further studies and investigations to determine a final proposal.

[OM Comments – Agreed to consider and review signal timings during the final implementation of the signal works and will look to reduce pedestrian wait times and provide good pedestrian linking wherever possible. \(29/09/16\)](#)

Client Organisation Comments

Safe crossing facilities have been provided to cross St. George's Road. The problem described may not be mitigated with the introduction of cycle stands or similar. Pedestrian Guard Rail (PGR) is really the only effective method of forcing pedestrians to use the facilities provided. However, it is not advisable to install PGR

at locations where cyclists may be crushed against this in the instance of a vehicle collision, so this would not be supported as a solution. Installation of cycle stands or similar, non-continuous barriers will likely be ineffective to mitigate the few individuals who decide to take the risk of crossing at this location. It is felt that the signal timing review may reduce the likelihood of collision at this location, and the collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risk materialises as a pattern, further investigation will be undertaken.

3.3.9 PROBLEM

Location: K – Newington Causeway junction with Elephant & Castle

Summary: Cyclists traversing from the nearside cycle track may result in side swipe or shunt type collisions.

Cyclists travelling anti-clockwise either in the peninsular lanes and / or in the segregated cycle track were witnessed to not stop at a red signal and instead make their way across the three circulatory lanes towards London Road. Cyclists appeared to do this knowingly, as the other vehicles travelling anti-clockwise had stopped this was perceived as an opportunity to cross the busy traffic lanes. The Audit Team are concerned that cyclists performing this manoeuvre may not anticipate vehicles entering from Newington Causeway and an increased potential for side swipe type collisions between with cyclists may result. Furthermore, if drivers brake hard to avoid cyclists, shunt type collisions may also result.

RECOMMENDATION

Provide features to encourage use of the cycle crossing. It may also be beneficial to encourage strategic use of enforcement resources to encourage cycle compliance with this stop line.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the problem highlighted by the Safety Audit Team and would recommend that further studies and investigations are required to determine a final proposal to address this observed problem.	
Client Organisation Comments	
Safe cycle crossing facilities have been provided at this location that are clear and observable to all who wish to use them. This includes a red light bypass for ahead cycles and a separately staged signalised crossing facility for cycles wishing to access London Road. Signals at this location are also very clear to all road users, including cyclists. If some cyclists choose to deliberately disobey the red light, it is not something that can be mitigated with engineering measures.	

3.3.10 PROBLEM

Location: L – Opposite London Road junction with Elephant & Castle

Summary: The gap in the segregated cycle track is not conspicuous.

A gap is present in the segregation between the anti-clockwise vehicular and cycle track to enable cyclists to enter from London Road. The gap is not conspicuous from London Road and this may contribute to only some cyclists (generally less than half) entering the segregated track. The Audit Team are concerned that this may leave cyclists more vulnerable to side swipe type collisions as they may be more likely to continue in the anti-clockwise general traffic lanes which may not be expected by a following vehicle. Additionally, the recommencement of the segregation island may be vulnerable to being hit or clipped as drivers potentially do not alter their path in time to avoid the feature.

RECOMMENDATION

Provide features to increase conspicuousness of the gap / entry point to the segregated cycle track. This may include but is not limited to provision of an illuminated guide post and / or additional signing / road markings.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the problem highlighted by the Safety Audit Team and can confirm that additional cycle signs have been installed to increase cyclist awareness of the segregated facility. RJ would in turn recommend continued monitoring of this observed issue.	
Client Organisation Comments	
Accepted. The recommended mitigation has been implemented.	

3.4 NEWINGTON CAUSEWAY

3.4.1 PROBLEM

Location: M – Newington Causeway approach to Elephant & Castle

Summary: Sign obscures view of traffic signals.

A congestion charging sign has been mounted in a way that it obscures the view of the offside traffic signals on this approach to the peninsular. As the nearside traffic signals are slightly disassociated with the carriageway due to the cycle segregation island which continues to the stop line, a greater reliance may be placed upon the offside traffic signals. If users do not clearly see or interpret a red traffic signal this may result in increased shunt, or overshoots which could lead to pedestrian collisions as motorists either brake hard or do not stop at a red traffic signal.

RECOMMENDATION

Alter the location or mounting height of the sign to ensure that the offside traffic signals are not obscured.

Design Organisation Response	Accepted / Part Accepted / Rejected
After a site visit to look at this specific problem highlighted by the Safety Audit Team, RJ would agree that the sign obstructs the view of the offside traffic signal heads from the end of the bus lane for approximately 10m. RJ would consider this to problem to be low risk, as motorists were observed to be	

complying with the signals and road markings on the approach to this controlled crossing. There is good visibility of the signal head before and after the 'eclipse section', which is essentially due to the road alignment.

Lowering the mounting height of the congestion charge sign would possibly eliminate the 'eclipse section' for HGV drivers.

RJ would recommend lowering the sign mounting height and further monitoring to determine if this problem develops / continues.

Client Organisation Comments

Accepted. The recommended mitigation by the designer should be implemented.

3.5 ELEPHANT & CASTLE LINK

3.5.1 PROBLEM

Location: N – Elephant & Castle Link south of St Georges Road

Summary: Side-swipe type collisions may occur as southbound cyclists attempt to re-enter the carriageway to the offside as buses attempt to enter the bus stops to the nearside.

Side swipe type collisions may result as at the end of the southbound segregated cycle track, cyclists effectively move towards the offside due to busy bus stops ahead. At the same location buses are likely to be moving to the nearside to enter the bus lane and stops. This introduces a potential for side swipe type collisions between buses and cyclists.

RECOMMENDATION

Alter the layout to provide measures to offer protection to cyclists leaving the segregated track.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the problem highlighted by the Safety Audit Team and would recommend that further studies and investigations are required to determine a final proposal to address this observed problem.	

Client Organisation Comments

It is accepted that there is a risk that this type of collision could occur in this location. It is not possible, however, to design out all risks in all schemes. The design has allowed for sufficient width and longitudinal space for cycles and buses to merge in this location so it is felt that while the risk remains, cyclists and Bus drivers also need to be aware of each other in this location in line with the Highway Code and that the road layout would not be a significant contributory factor if a collision occurred.

The collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risk materialises as a pattern, further investigation will be undertaken.

3.6 NEW KENT ROAD

3.6.1 PROBLEM

Location: O – New Kent Road pedestrian crossing at Elephant & Castle

Summary: Restricted visibility for eastbound vehicles may result in collisions with pedestrians, shunt or traffic signal overshoot type collisions.

The layout of the constructed crossing may result in potential for collisions due to:

- The horizontal alignment combined with the proximity of the building to the north of the northern side of this crossing, results in limited inter-visibility between eastbound vehicles and southbound pedestrians. As a result, pedestrians attempting to cross southbound out of phase were witnessed to step out into the cycle track to gain better visibility. This may result in increased conflicts between cyclists and pedestrians.
- The orientation of the traffic signals appears to focus on the eastbound immediate approach, to the sacrifice of the visibility for users on the section of the approach which is almost southbound for vehicles travelling clockwise around the peninsular. This may result in an increased potential for a red traffic signal to not be noticed until in close proximity which may result in hard braking, shunts and overshoot type conflicts.

Therefore the crossing provided may result in increased collisions.

RECOMMENDATION

Alterations may include, but are not limited to,

- Altering the lane widths and alignment and / or provision of a kerb build out on the northern extent of the crossing to increase visibility.
- Altering the traffic signal aspects to ensure that they are suitably visible on throughout this approach. It may also be beneficial to provide an offside secondary signal as this position may be more obvious on the medium approach.

Design Organisation Response	Accepted / Part Accepted / Rejected
------------------------------	-------------------------------------

RJ acknowledge the problem highlighted by the Safety Audit Team and although no occurrences were observed during an RJ site visit, RJ would recommend that further studies and investigations are required to determine a final proposal to address this problem. This final proposal will also encompass the problem to be addressed in 3.6.2.

TI Comments - Alignment of signal heads to be adjusted. (30/08/16)

Client Organisation Comments

The signal heads have been adjusted to provide maximum visibility for oncoming traffic and is considered to be operating safely and in line with expected operational parameters for this infrastructure. The signal heads can be clearly seen at the correct distance for a 30mph road. The highway width in this location would not allow a kerb build-out without sacrificing the segregated cycle lane so is not considered as an appropriate action to take in this instance.

The collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risk materialises as a pattern, further investigation will be undertaken.

3.6.2 PROBLEM

Location: P – New Kent Road pedestrian crossing at Elephant & Castle

Summary: Long pedestrian crossing cycle times may result in increased collisions as a result of crossing between queuing traffic, reduced visibility and vulnerability within the pedestrian refuge island.

The relatively long pedestrian waiting time for a pedestrian green phase may contribute to pedestrians crossing out of phase and increased collisions as:

- The westbound traffic lanes have been observed to form a queue in either of the two lanes, whilst the adjacent lane is relatively free flowing. This results in an increased potential for pedestrians crossing between the waiting / held up lane of vehicles to have reduced inter-visibility with an approaching vehicle in the adjacent lane which may result in increased collisions.
- Vehicles regularly queueing across this crossing may further increase the potential for pedestrians to cross in close proximity to the front of a large vehicle and therefore may not be visible to the driver.
- Pedestrians who did not complete their crossing in a single phase appeared to be vulnerable to being clipped by passing vehicles. Due to the minimal width within the central reservation area and swept path of some clockwise vehicles which can encroach over this area.

The above factors may result in an increased potential for collisions at this pedestrian crossing facility.

RECOMMENDATION

Alterations may include, but are not limited to,

- Reducing the amount of time pedestrians have to wait for a pedestrian green phase.
- Widening and or better defining the pedestrian refuge area in the centre of the crossing.
- Incorporating measures to reduce congestion such as better linking of traffic signals or if this is not feasible reducing the traffic lanes from two to one.

Design Organisation Response	Accepted / Part Accepted / Rejected
<p>RJ acknowledge the problem highlighted by the Safety Audit Team and would recommend that further studies and investigations are required to determine a final proposal to address this observed problem.</p> <p>A wider pedestrian refuge island and a kerb realignment on the north side to reduce crossing width would improve the existing pedestrian facility, but the need to see what is feasible and acceptable to the wider key stakeholders.</p> <p>OM Comments - Recommendation 1 (reducing the pedestrian wait time) is for OM. Agreed, and as 3.1.1, signal timings will be fully reviewed during the SCOOT enabling process. (19/08/16)</p> <p>TI Comments - Scoot designs currently being finalised and issued to signal contractor for installation. (30/08/16)</p>	
Client Organisation Comments	
<p>The Designer, OM and TI comments are accepted and ongoing signal timing refinements may further mitigate the risk of this occurring, but not completely. It is not possible, however, to design out all risks in all schemes and it is felt that the current</p>	

design is safe to operate in its current form, recognising that the collision risk described under the Auditor's second summary point has occurred during the construction phase of the project with fatal consequences.

The collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risk materialises as a pattern, further investigation will be undertaken.

End of list of problems identified and recommendations offered in this Stage 3 Road Safety Audit

4.0 ISSUES IDENTIFIED DURING THE STAGE 3 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 – cycle crossing facilities.

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

The police commented, and the Audit Team agree that:

- The intended cycle routes / manoeuvres are not clearly depicted and that this may contribute to inconsistent manoeuvres and low utilisation of some sections of track and cycle crossings. This is particularly relevant to the intended route from New Kent Road to St Georges Road or Elephant and Castle Link for which various manoeuvres were observed many of which did not utilise the cycle track or crossing. It is also noted that no formal facility is provided to permit cycle access from New Kent Road in to the shared use area within the peninsular.
- The cycle stop lines within the central peninsular area are formed of white block pavements and set relatively far back from the relevant traffic signals, which weren't conspicuous to cyclists. Therefore, the layouts may not be very intuitive for cyclists, particularly those not familiar with the area.

It may therefore be worthwhile reviewing the traffic signal provision at cycle crossings and cycle signage throughout the scheme with an aim to ensuring that the layout is intuitive and encourages consistent, predictable and safe manoeuvres.

Design Organisation Response	Accepted / Part Accepted / Rejected
	RJ acknowledge the issues raised by the Safety Audit Team and will discuss with TfL to determine what additional cycle signage, if any, could be provided to improve way-finding.
Client Organisation Comments	
Cyclists have been observed using the facilities correctly and it is accepted that cyclists have multiple route choices between destination points. Cyclists unfamiliar with an area will need to familiarise themselves with these options particularly when considering a large complicated junction such as this, and subsequently choose the most appropriate route. It is felt, however, that the implemented design is fit for purpose and well signed and we will review the cycle routes and their uptake as part of the ongoing benefits realisation work in the coming months and years.	

4.2 ISSUE

Location: General – throughout scheme area

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

As part of the scheme it is proposed to replace the existing illuminated bollards with hoop frames and keep left signs. The Audit Team are aware of a motorcyclist fatality in the City of Westminster that involved a collision with a hooped traffic bollard. Whilst it is understood that the underlying issues regarding that incident are broader than the use of hooped bollards, it may be beneficial to consider whether their use is the most appropriate method of highlighting the central islands to road users at this location.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ note the comments regarding the road traffic collision. Hooped bollard proposed by RJ as a continuity of measure used in southern roundabout regeneration scheme, which was implemented in 2011. TfL approved design proposal.	
Client Organisation Comments	
Agree with the designer's comments.	

4.3 ISSUE

Location: Various – throughout scheme area

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

Various problems were raised in previous Road Safety Audits which do not appear to represent a problem in the constructed scheme, based on the observations undertaken by the Audit Team.

It is understood that the operational scheme will be closely monitored and it is considered worthwhile that this will also include previous items raised in the Stage 1 Road Safety Audit referenced 3.1.2, 3.1.7, 3.1.8, 3.3.2 and the Stage 2 Road Safety Audit referenced 3.2.3, 3.2.5, 3.2.6, 3.2.7, 3.3.1, 3.4.1, 3.4.2, 3.4.4, 3.5.1, 3.6.1, 3.6.2 and 3.7.1.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ agree that all relevant issues/concerns of the Safety Audit Team to be included in the continued monitoring of this scheme.	
Client Organisation Comments	
It is positive that these potential problems have not materialised. However, the collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risks for the above items materialise as a pattern, further investigation will be undertaken.	

4.4 ISSUE

Location: 1 – Cycle crossing towards London Road from Elephant and Castle

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

The Audit Team have previously raised concerns regarding:

- Cyclists given a green signal to use the designated cycle crossing across the clockwise lanes of the peninsular may not anticipate a bus crossing their path.
- As buses are located almost alongside but slightly in front of the cycle stop line they may not notice a cyclist setting away from the stop line.
- Cyclists can become positioned alongside a bus as both users attempt to utilise the right turn facility to enter London Road.

Whilst regular bus drivers may be aware of the arrangement and take suitable care, concerns have also been raised that coaches may also attempt to use the right turn facility and these drivers may not be aware of the potential presence of cyclists. It is understood that the signalisation of the right turn facility into London Road is not deemed feasible and that the traffic signal phasing generally mitigates these issues. However, it may be beneficial to monitor with a view to making alterations to:

- Emphasise the priority between cyclists on the cycle crossing and buses using the bus right turn facility,
- Increase the conspicuousness of cyclists leaving the cycle crossing for buses using the bus right turn facility,
- Reduce the potential for cyclists to be squeezed alongside a bus. As it is understood that widening of this lane is not considered feasible, this may involve provision of cycle logos to promote a primary riding position.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the concerns highlighted by the Safety Audit Team and would agree with the recommendation for continued monitoring.	
Client Organisation Comments	
The collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risk materialises as a pattern, further investigation will be undertaken.	

4.5 ISSUE

Location: 2 – Pedestrian crossing across London Road

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

The Audit Team have previously raised concerns regarding buses or cyclists entering London Road whilst pedestrians are given a green signal to cross.

On site observations indicate that this is mitigated by the traffic signal staging and issues were only observed whilst pedestrians cross out of phase. Therefore in order to encourage pedestrians to wait for and cross during the green man phase it may be beneficial to reduce the wait time for pedestrians at this crossing. It is appreciated that this needs to be balanced against other network demands.

Design Organisation Response	Accepted / Part Accepted / Rejected
<p>OM Comments - Pedestrian wait times will be fully reviewed during the SCOOT enabling process. (19/08/16)</p> <p>TI Comments - Scoot designs currently being finalised and issued to signal contractor for installation. (30/08/16)</p>	

Client Organisation Comments
<p>The mitigation of SCOOT implementation is accepted as an appropriate response to this issue. The collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risk materialises as a pattern, further investigation will be undertaken.</p>

4.6 ISSUE

Location: 3 – London Road junction with Elephant & Castle

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

The kerbs on the south facing radius leading from London Road to Elephant and Castle and the southwest facing side of the traffic islands between opposing flows in London Road both show signs of being scrubbed against (rubber marks). Vehicles regularly running immediately adjacent to the kerb edge could result in damaged or displaced kerbs or for an increased potential for users of the footway to be clipped by a passing vehicle.

It may therefore be beneficial to monitor vehicle movements at these locations to determine if the actual vehicle paths are different from the swept path analysis and to incorporate alterations if deemed necessary.

Design Organisation Response	Accepted / Part Accepted / Rejected
<p>RJ acknowledge the issue highlighted by the Safety Audit Team and would agree with the recommendation for continued monitoring.</p> <p>RJ path analysis showed that the left turn out of London Road should be fine but the left turn into London for buses is very tight and potential for overrunning. Design issue previously raised with TfL.</p>	

Client Organisation Comments

As noted by the designer, the turning movement was tracked at design stage to ensure that sufficient space is available for a large vehicle turning. The junction is being used correctly by the majority of road users. It is accepted that there could be a circumstance that drivers do not keep correct lane discipline resulting in clipping the kerb. However, it is felt that the junction is operating within the safely designed parameters and any collision occurring at this location would not be as a result of the road layout, rather is down to poor driving behaviours, which is extremely difficult to mitigate with engineering.

The collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risk materialises as a pattern, further investigation will be undertaken.

4.7 ISSUE

Location: 4 – St Georges Road junction with Elephant & Castle

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

The building overhang on the section of shared use cycle footway between St Georges Road and London Road is below 2.3m, as are the signs mounted on the island between the cycle track and the westbound traffic lanes on St Georges Road. It is considered that these features are unlikely to result in injury as they are both away from the main desire lines and therefore unlikely to be impacted with.

It may however be beneficial to raise the mounting height of the signs and provide features to highlight the building overhang or provide features to physically deter the route under this for cyclists.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the issue highlighted by the Safety Audit Team and would recommend that this issue is incorporated within the complete signing review recommended in Issue 4.10.	

Client Organisation Comments
It is possible that at the time of the audit, these areas had not been completed. The areas described are not within areas of shared space and bollards have been installed to define the shared space extents. Therefore, any cyclist ignoring this clear signage is doing so at their own risk and is breaking the law.

4.8 ISSUE

Location: 5 – Cycle crossing south of St Georges Road

Reason considered to be outside the Terms of Reference: Incomplete element / traffic signal issue undergoing post opening tweaks / alterations rather than a defined road safety concern.

During the latest site visit the higher cycle specific traffic signal aspect relating to the westbound cycle stop line, within the central reservation area, had been 'bagged over'. Therefore only the low level smaller cycle specific aspect was visible. It is understood that this measure will be in place until permanent louvres can be fitted to this traffic signal aspect to deter cyclists on the eastern side of this crossing potentially miss-interpreting the incorrect traffic signal as an invite to cross.

The Audit Team consider that this should be completed as a priority as the cycle specific signal is not particularly conspicuous due to its location and orientation. Furthermore, as the traffic signals for cyclists on this signal pole are not in the regular line of sight for cyclists it may be beneficial to consider altering the traffic signal layout for cyclists. This may include but is not limited to providing an additional offside lower level cycle specific signal aspect.

Design Organisation Response	Accepted / Part Accepted / Rejected
TI Comment – Issue resolved by adding louvres and realigning both high level and low level signal heads to reduce see-through problems. (30/08/16)	

Client Organisation Comments

The suggested mitigation and action by the TI team has been implemented.

4.9 ISSUE

Location: 6 – St Georges Road junction with Elephant & Castle

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

Traffic was observed to block back from St Georges Road and obstruct the progress of northbound / clockwise vehicles on this section of the peninsular. It is understood that this may have been in part due to obstructions further west within St Georges Road. It may also be as a result of the traffic signal phasing as the red phase for vehicles entering St Georges Road was observed to extend beyond the green phase for vehicles leaving Elephant and Castle Link.

It is understood that the traffic signal timing is undergoing fine tuning / tweak post opening. If the alterations to traffic signal timing cannot ensure that vehicles can clear this area prior to the next traffic signal stage being released, it may be worthwhile providing a yellow box to deter users from obstructing the junction.

Design Organisation Response	Accepted / Part Accepted / Rejected
<p>OM Comment – Agreed, as previously mentioned, during the SCOOT enabling process this blocking will be reviewed and timings altered. (19/08/16)</p> <p>TI Comment – Scoot designs currently being finalised and issued to signal contractor for installation. (30/08/16)</p>	
Client Organisation Comments	
<p>It is unclear what the safety issue here is. From an operational perspective, SCOOT will be implemented to provide the best balance to traffic flow across all areas of the junction.</p>	

4.10 ISSUE

Location: 7 – Elephant & Castle Link

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

The Audit Team noted that cycle prohibition signs are present beside the western side of the combined crossing south of St Georges Road and the eastern side of the toucan crossing north of Walworth Road. These crossings are orientated and located in a way that they have no clear meaning. Furthermore the extent of the shared use areas are not clearly defined throughout the scheme area.

It is recommended that a complete signing review is completed.

Design Organisation Response	Accepted / Part Accepted / Rejected
<p>RJ acknowledge the issue highlighted by the Safety Audit Team and would agree with the recommendation for a complete signing review.</p>	
Client Organisation Comments	
<p>It is not clear who installed these signs as they were not installed by the contractor. The signs have been removed.</p>	

4.11 ISSUE

Location: 8 – Southern Roundabout / Elephant & Castle Link junction with Walworth Road.

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

The Audit Team noted during the night visit that the uplighter to the bollard on the north-western corner of the splitter island between opposing flows on Walworth Road was not illuminated. Additionally lighting column EC36 was not illuminated.

These should be addressed to ensure that sufficient illumination is provided.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the issue highlighted by the Safety Audit Team and would concur that this is a maintenance issue for TfL.	
Client Organisation Comments	
The issue is rectified.	

4.12 ISSUE

Location: 9 – Elephant & Castle Link junction with Walworth Road

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

The Audit Team observed that pedestrians cross into and walk along the central reservation and then cross at the southern end of the pedestrian guardrail. Whilst there is a crossing provided in relatively close proximity to the south, it is considered that rather than having to walk further south to the crossing and wait for either pedestrian phase, some users continuing north instead choose to risk crossing the three/four lanes of traffic in either direction. In order to minimise the potential for conflicts with pedestrians it may be beneficial to provide additional pedestrian deterrent to encourage use of the pedestrian crossing.

Design Organisation Response	Accepted / Part Accepted / Rejected
The extent of PGR within the central island is the same as previous. RJ recommend for this issue to be monitored.	
Client Organisation Comments	
The extent of the PGR could be extended, however, the issue described will still remain as extending the PGR does not resolve the issue. It appears that despite the existing central PGR being in place to mitigate this issue, some pedestrians still decide to take this risk and any additional pedestrian deterrent is unlikely to be effective.	
The collision statistics will be kept under review for the standard three year period (and regular checks during this period) post implementation and if the described risk materialises as a pattern, further investigation will be undertaken.	

4.13 ISSUE

Location: 10 – Inner area of Elephant & Castle Peninsular

Reason considered to be outside the Terms of Reference: Incomplete element rather than a defined road safety concern resulting from the scheme implemented.

During the night visit the street lighting within the centre of the Peninsular was not illuminated and this resulted in this whole area and the inner / anti-clockwise peninsular lanes being noticeably darker than you would typically find in a built up area.

Temporary lighting is present at the eastern extent of the crossings to the south of St Georges Road which suggest that the issue may not be a quick fix. It is therefore considered important that the implications elsewhere are carefully considered to ensure that lighting levels provided are adequate both in the interim and permanent lighting arrangements. This may require a survey of the levels of illumination and additional temporary and / or permanent lighting units.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the issue highlighted by the Safety Audit Team and agree that any interim lighting currently in place is meeting the requirements of TfL Street Lighting Technical Approvals Team.	
Client Organisation Comments	
The final lighting scheme has now been implemented and is functioning as expected.	

4.14 ISSUE

Location: 11 – Cycle crossing over St Georges Road

Reason considered to be outside the Terms of Reference: Issue relating to continued fine tuning of traffic signal operations rather than a defined road safety concern.

Cath Linney from the Metropolitan Police commented during the site visit that waiting times generally at the crossings seemed pro-longed and that this may contribute to pedestrians crossing out of phase and resultant collisions. Specifically, Cath Linney had waited for a prolonged period at the southern side of the cycle crossing on St Georges Road for a green signal to proceed.

Further observations indicated that the detector did not appear to be registering the presence of cyclists at this stop line. This resulted in cyclists being unclear and reaching over to press the push button for the adjacent pedestrian crossing or crossing out of phase when gaps in vehicle flows permitted.

Design Organisation Response	Accepted / Part Accepted / Rejected
TI Comment – Functionality of detector to be checked but it has been detecting cyclists – issue more likely to be down to long waiting times. (30/08/16)	
Client Organisation Comments	
The signal timings have been revised to allow cycle movements to flow better.	

4.15 ISSUE

Location: 12 – Exit from Elephant & Castle Link to Walworth Road

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

Cath Linney from the Metropolitan Police commented that the extent of buses waiting to access the eastbound bus stop restricted access from the shared use area back on to the carriageway for eastbound cyclists, Furthermore, vehicles navigating around the end of buses waiting beyond the extent of the bus cage were witnessed to overhang / over-run the southern tactile paving area.

It does not appear that this layout altered significantly as part of this scheme but as the above issues could result in collisions and / or a reduced level of service within the scheme area it may be beneficial to address these issues.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the issue highlighted by the Safety Audit Team and the Met Police. A relocation of the bus stop further eastward may address this issue. RJ recommend continued monitoring.	
Client Organisation Comments	
The issue will be monitored as part of the ongoing operational monitoring and if this issue persists or causes a safety issue, further investigation will take place on appropriate mitigation.	

4.16 ISSUE

Location: 13 – Access to cycle track opposite Walworth Road

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

During the site visit it was noted that very few cyclists entered the second entry point to the off carriageway cycle track from Walworth Road.

It is considered that this may be as a result of:

- The alignment of the right turn entry into the track appears tight from the carriageway approach which is exacerbated by the close proximity of the lighting column / signal aspect located immediately to the right.
- The buff surface applied to this area seems to have loose material which is unappealing for a cyclist particularly on what may look like a tight radius.
- The traffic signal staging appears to result in pedestrians crossing the cycle track just as cyclists are at the decision point as to whether continue on carriageway or enter the cycle track.

It is recommended that the cycle track is brushed to ensure loose materials are removed. It may be beneficial to consider relocating the lighting unit and monitoring usage to determine if further measures may be required to encourage uptake of this section of cycle track.

Design Organisation Response	Accepted / Part Accepted / Rejected
RJ acknowledge the issues highlighted by the Safety Audit Team and would agree that any loose material should be cleared and would be expected to be during routine maintenance. RJ do not consider alignment or location of the lighting column to be an issue for cyclist entry onto the footway track.	
Client Organisation Comments	
Loose material has been cleared from the location. Otherwise, the entry point for the cycle track is operating as designed. It is possible that during the time of the visit, these facilities were new and cyclists were unaware that they were available. No further action is required	

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.

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 3 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: Ringway Jacobs

Signed:

5.3 TRAFFIC SIGNAL DESIGN TEAM STATEMENT

I have given due consideration to each relevant issue raised and have stated my proposed course of action for each relevant issue in this report.

Name:

Position:

Organisation: Transport For London

Signed:

5.4 CLIENT ORGANISATION STATEMENT

I accept these proposals by the Design Organisation.

Name:

**Position: Organisation: Transport
for London**

Signed:

5.5 SECONDARY CLIENT ORGANISATION STATEMENT (where appropriate)

I accept these proposals by the Design Organisation.

Name:

Position:

Organisation:

Signed:

APPENDIX A

Documents Forming the Audit Brief

DRAWING NUMBER

TFL-NE2014-373D Rev 06 GA - Overall
TFL-NE2014-373D Rev 06 GA-001
TFL-NE2014-373D Rev 06 GA-002
TFL-NE2014-373D Rev 06 GA-003
TFL-NE2014-373D Rev 06 GA-004
TFL-NE2014-373D Rev 06 GA-005
TFL-NE2014-373D Rev 06 GA-006
TFL-NE2014-373D Rev 06 GA-007
TFL-NE2014-373D Rev 06 GA-008

DRAWING TITLE

General Arrangement – Overall Plan
General Arrangement – sheet 1 of 8
General Arrangement – sheet 2 of 8
General Arrangement – sheet 3 of 8
General Arrangement – sheet 4 of 8
General Arrangement – sheet 5 of 8
General Arrangement – sheet 6 of 8
General Arrangement – sheet 7 of 8
General Arrangement – sheet 8 of 8

DOCUMENTS

- Safety Audit Brief
- Site Location Plan
- Traffic signal details

- TfL signal safety checklist
- Departures from standard
- Previous Road Safety Audits
- Previous Designer Responses
- Collision data
- Collision plot
- Traffic flow / modelling data
- Pedestrian flow / modelling data
- Speed survey data
- Other documents

DETAILS (where appropriate)

PRO/08/000377&000378/01A DATED 06/07/15
PRO/08/000094/07A

1915/008/A3/TLRN/2013 & 2209/008/A3/TLRN/2015
1915/008/A3/TLRN/2013 & 2209/008/A3/TLRN/2015

APPENDIX B

Problem Locations

