Appendix M2
Road Safety Audit

Roughan & O'Donovan

BusConnects Core Bus Corridors

Kimmage to City Centre Core Bus Corridor

Stage 1 Road Safety Audit

P·M·C·E

January 2022

Roughan & O'Donovan

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Kimmage to City Centre Core Bus Corridor

Stage 1 Road Safety Audit

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P·M·C·E

T +353 (1) 464 3041
F +353 (1) 459 1836
info@pmceconsultants.com
www. pmceconsultants.com

Mona Villa
Lower Commons Road
Brownsbarn
Dublin 22

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1 Introduction

1.1 General

This report results from a Stage 1 Road Safety Audit on the proposed Kimmage to City Centre Core Bus Corridor Scheme, carried out at the request of Mr Eoin O'Catháin of Roughan & O'Donovan.

The members of the Road Safety Audit Team are independent of the design team, and include: -

Mr. Aly Gleeson
(BSc MEng MBA CEng FIEI RSACert)
Road Safety Audit Team Leader

Mr. Peter Monahan
(BE MSc CEng FIEI RSACert)
Road Safety Audit Team Member

The Road Safety Audit took place during April and May 2021 and comprised an examination of the documents provided by the designers (see Appendix B). In addition to examining the documents supplied, the Road Safety Audit Team visited the site of the proposed measures on the 29th April 2021. Weather conditions during the site visit were dry and the road surface was dry. Traffic volumes during the site visit were moderate, pedestrian and cyclist volumes were moderate and traffic speeds were considered to be generally within the posted speed limit.

Where problems are relevant to specific locations these are shown on drawing extracts within the main body of the report and their locations are shown in Appendix D. Where problems are general to the proposals sample drawing extracts are within the main body of the report, where considered necessary.

This Stage 1 Road Safety Audit has been carried out in accordance with the requirements of GE-STY-01024 - Road Safety Audit (December 2017), contained on the Transport Infrastructure Ireland (TII) Publication's website.

The scheme has been examined and this report compiled in respect of the consideration of those matters that have an adverse effect on road safety and considers the perspective of all road users. It has not been examined or verified for compliance with any other standards or criteria. The problems identified in this report are considered to require action in order to improve the safety of the scheme and minimise collision occurrence.

If any of the recommendations within this road safety audit report are not accepted, a written response is required, stating reasons for non-acceptance. Comments made within the report under the heading of Observations are intended to be for information only. Written responses to Observations are not required.

1.2 Items Not Submitted for Auditing

Details of the following items were not submitted for audit; therefore no specific problems have been identified at this stage relating to these design elements, however where the absence of this information has given rise to a safety concern it has been commented upon in Section 3: -

- Vehicle swept paths
- Visibility splays
- Traffic Signal Layout and Phasing
- Traffic Impact Assessment
- Collision Data

2 Project Description

2.1 General

BusConnects is the National Transport Authority's (NTA) programme to improve bus and sustainable transport services. It is a key part of the Government's policies to improve public transport and address climate change in Dublin and other cities. The aim of BusConnects is to deliver an enhanced bus system that is better for the city, its people and the environment. BusConnects is included in the Programme for Government "Our Shared Future" 2020, as well as within the following Government strategies:

- The National Development Plan 2018 - 2027
- Transport Strategy for the Greater Dublin Area 2016 – 2035
- The Climate Action Plan 2019

Part of the overall BusConnects Programme is to create 16 radial core bus corridors (CBC), as illustrated in Figure 2-1. A CBC is an existing road with bus priority so that buses can operate efficiently, reliably and punctually. This generally means full length dedicated bus lanes on both sides of the road from start to finish of each corridor or other measures to ensure that buses are not delayed in general traffic congestion. The bus lanes are typically alongside segregated cycle lanes/tracks where feasible and general traffic.

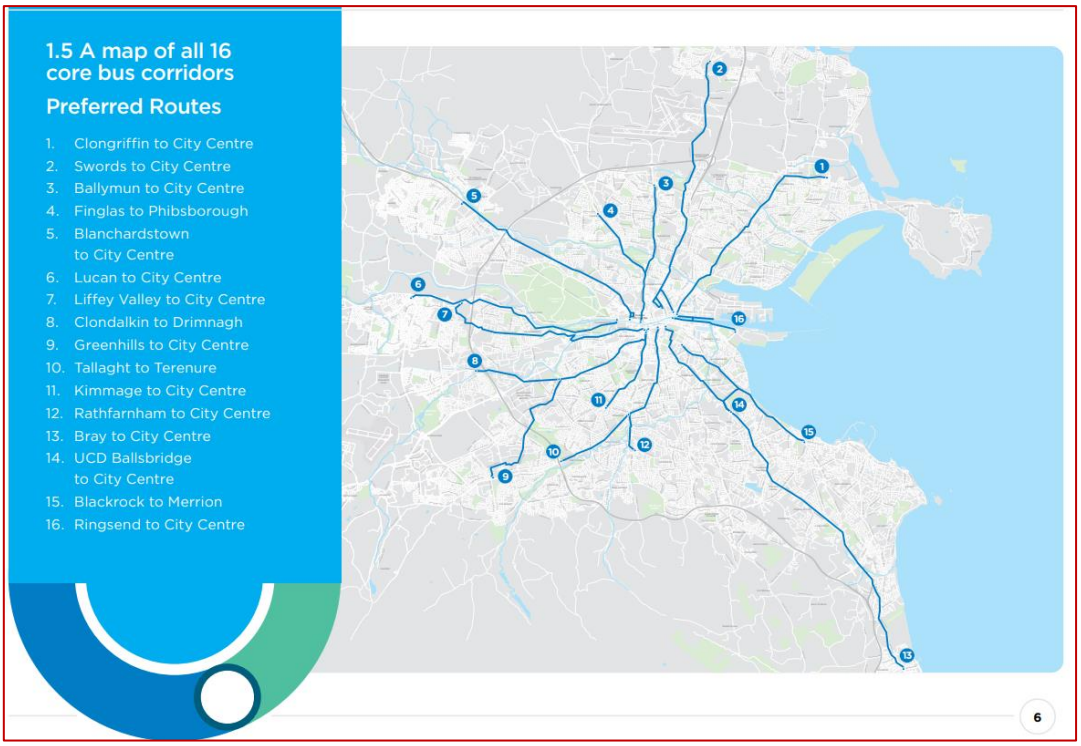


FIGURE 2-1 BUSCONNECTS RADIAL MAP (SOURCE: BUSCONNECTS.IE)

The Kimmage to City Centre corridor (Route 11 in Figure 2-1) travels in a southerly direction from the city centre. The route can be summarised as follows, and is illustrated in Figure 2-2: -

Kimmage to City Centre (Route 11): The Kimmage to City Centre Core Bus Corridor (CBC) commences on Kimmage Road Lower at the junction with Terenure Road West and Fortfield Road. It is routed via Kimmage Road Lower to Harold's Cross Road, and then along Harold's Cross Road, Clanbrassil Street Upper & Lower and New Street South, where it will join the Greenhills CBC at the Kevin Street Upper junction. Priority for buses is provided along the entire route, consisting primarily of dedicated bus lanes in both directions, with alternative measures proposed at particularly constrained locations along Kimmage Road Lower

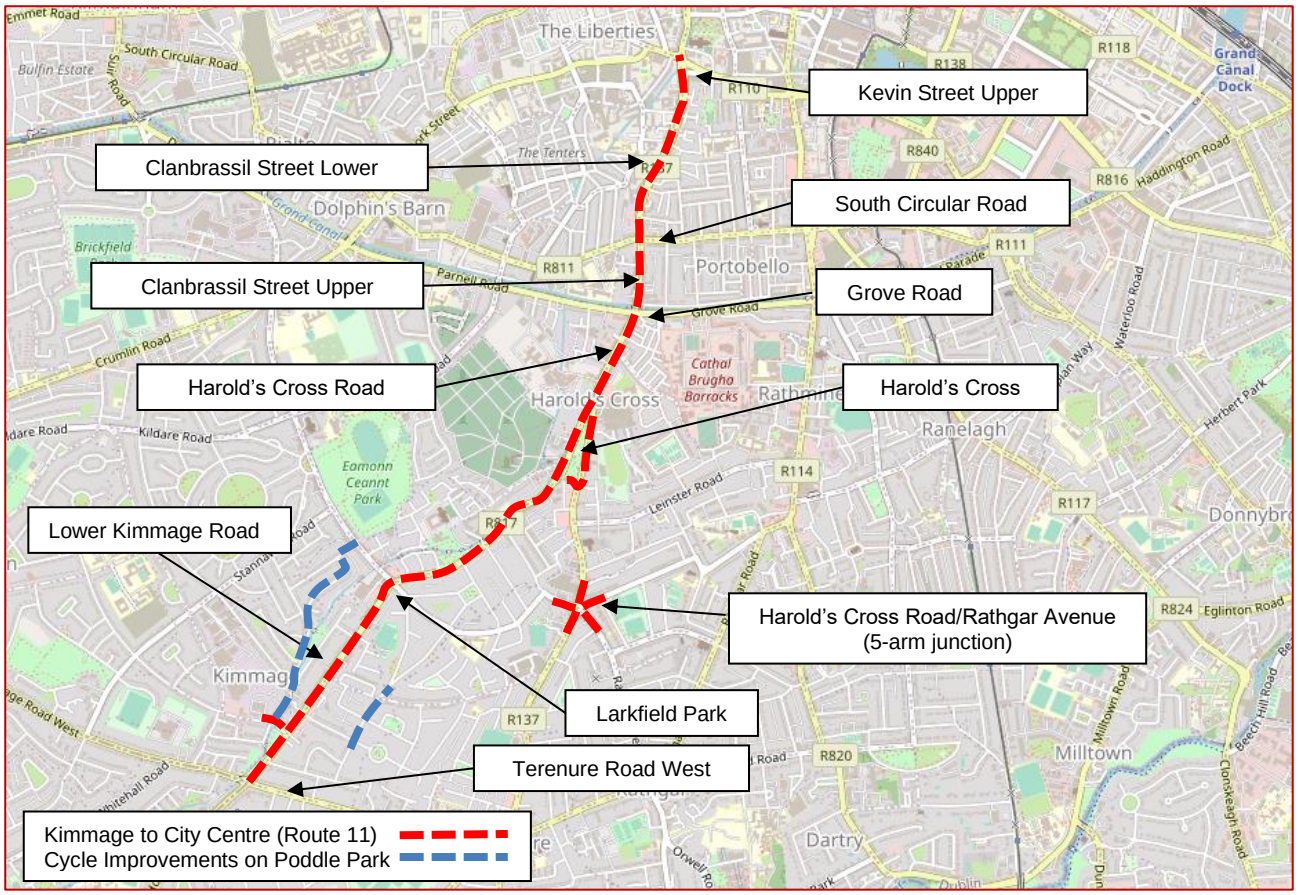


FIGURE 2-2: LOCATION PLAN

The key roads on the route are highlighted in Figure 2-2, and comprise urban streets with 50kph speed limits, high pedestrian and cyclist volumes, existing bus stops and bus lanes, signalised junctions, pedestrian crossings, public lighting and a mix of public amenities (shops, parks, carparks etc.).

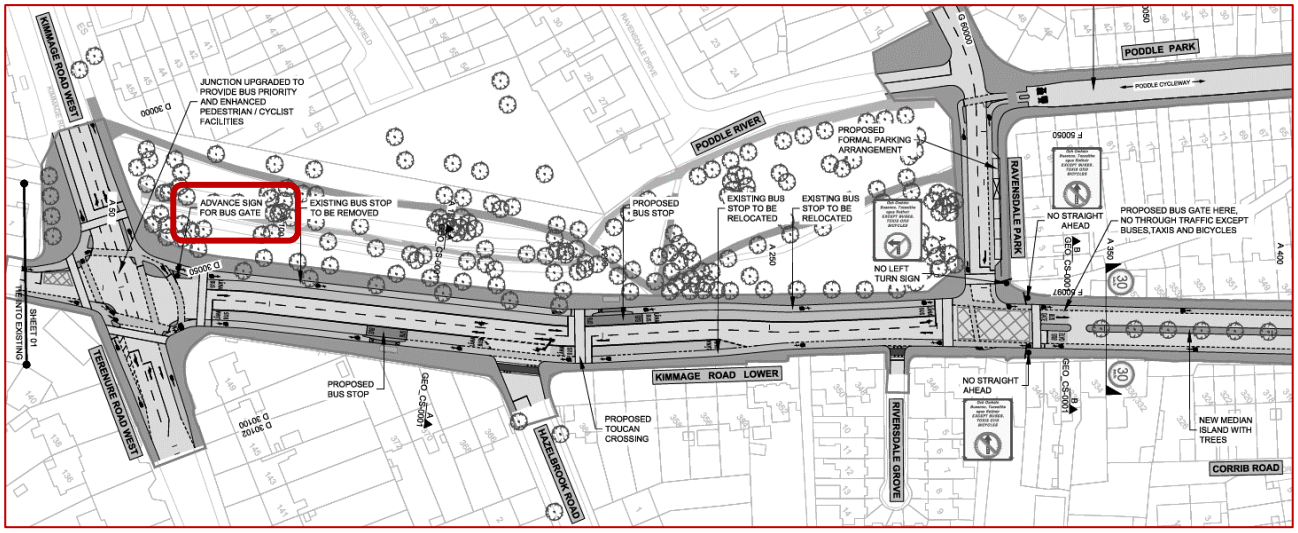
As well as improvements to Route 11, additional bus priority and cycle improvements are proposed at the Harold's Cross Road/Rathgar Junction, with further cycle improvements on Poddle Park and Derravaragh Road (Figure 2-2).

3 Main Report

3.1 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02)*

Summary: *Northbound drivers may be insufficiently aware of the upcoming bus gate when entering Kimmage Road Lower, resulting in driver confusion, hesitation, and possibly unsafe U-Turn manoeuvres at the junction between Kimmage Road Lower and Ravensdale Park.*



An advance sign advising drivers of the upcoming bus gate has been indicated at the junction of Kimmage Road West, Kimmage Road Lower and Terenure Road West. Additional signage has not been indicated.

The provision of a single sign in advance of the bus gate may offer limited guidance for drivers needing to choose a more appropriate alternate route, resulting in higher traffic volumes entering Kimmage Road Lower and neighbouring residential streets. This may lead to driver confusion, hesitation, and possibly unsafe U-Turn manoeuvres.

Recommendation

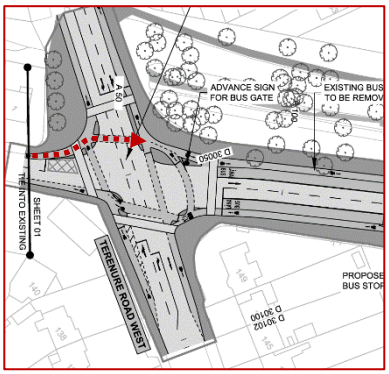
Additional advance signage should be provided on Kimmage Road West, Terenure Road West and Kimmage Road advising drivers of the bus gate & associated restrictions, and providing directions for alternate routes for intended/likely destinations.

3.2 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02)*

Summary: *Left turning drivers may turn across straight-ahead cyclists, leading to side-swipe and side-on collisions.*

The northbound cycle lane which crosses the Kimmage Road West arm of its junction with Terenure Road West, is offset from the northbound through traffic route. There is a danger that left turning drivers onto Kimmage Road West at this junction may misinterpret the cycle crossing as a separate, downstream, non-motorised road user (NMU) crossing and that they have priority over cyclists wishing to proceed northbound, resulting in possible vehicular/cyclist collisions.



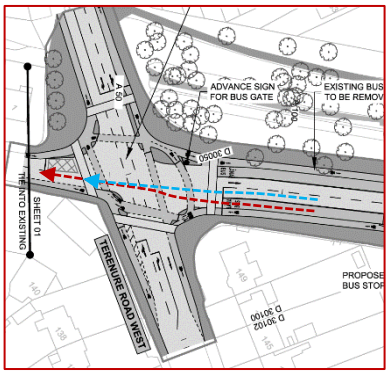
Recommendation

During the design development the alignment of the northbound cycle lane should be amended to reduce the lateral displacement from the northbound traffic lane, in order to reduce the impression that this is a separate crossing. In addition, left turning drivers should be presented with a flashing left-arrow amber signal to ensure they enter Kimmage Road West with caution.

3.3 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02)*

Summary: *The merging of two straight-ahead traffic lanes within the junction may lead to side-swipe collisions if both movements proceed on the same phase.*



No information has been provided about the proposed signal phasing at the Kimmage Road West, Terenure Road West and Kimmage Road Lower junction. Two southbound lanes are indicated at the junction, one of which is a bus lane. Should both the general traffic lane and the bus lane receive a green signal at the same time there is insufficient room on the downstream exit from the junction to accommodate two traffic lanes, possibly resulting in sideswipe collisions.

Recommendation

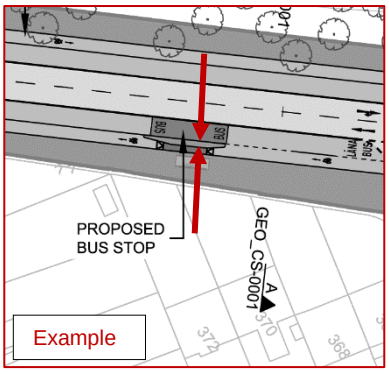
It is recommended that the bus lane and the general traffic lane operate on a separate phase, and that both lanes do not receive a green signal at the same time.

3.4 Problem

Location: *General Problem*

Example: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02)*

Summary: *Insufficient island width may increase the risk of pedestrians, waiting for a bus, blocking the cycle track and pedestrian/cyclist collisions.*



The width of the floating island is not indicated on the drawings provided, however, it appears to be narrow.

Should pedestrians waiting for a bus choose to wait within the island, there is a risk that they could impede cyclists and increase the likelihood/ possibility of pedestrian/cyclist collisions.

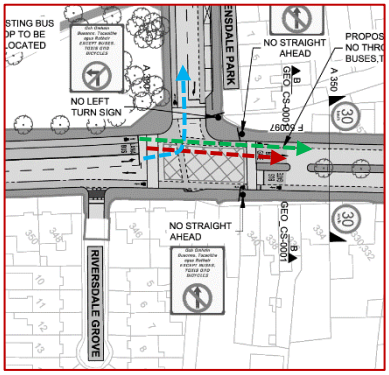
Recommendation

Ensure the floating islands at bus stops along the route can safely accommodate pedestrians.

3.5 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02)*

Summary: *Risk of general traffic turning left across straight-ahead bus movements, resulting in side-on collisions.*



No information has been provided in relation to the proposed signal phasing at the Kimmage Road Lower/Ravensdale Park junction. The junction provides northbound access for buses and cyclists through the bus gate, whilst directing general traffic to turn left into Ravensdale Park.

Should all traffic proceed on the same signal phase, there is an increased risk of side-on collisions between left turning traffic and straight-ahead buses/cyclists, resulting in side-on and vehicle/cyclist collisions.

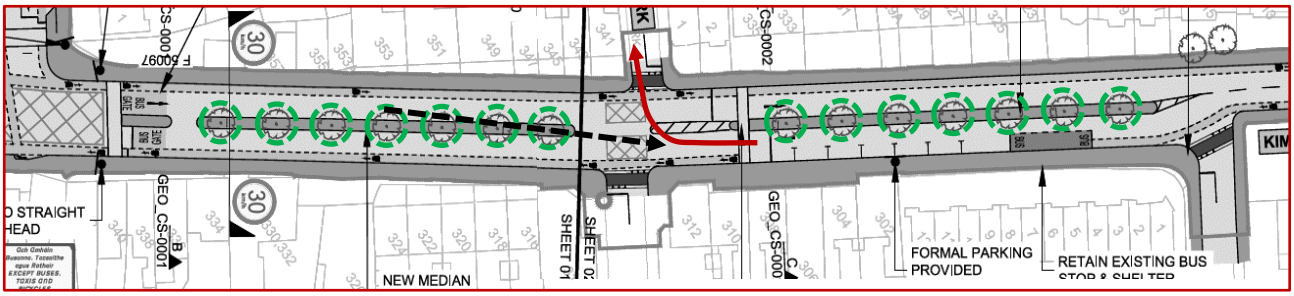
Recommendation

Ensure that the general traffic lane operates on a separate signal phase to the bus and cycle lane(s).

3.6 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02) & BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0002 (Rev S3 L02)*

Summary: *Tree planting, and associated canopies, may increase the risk of bus strikes and reduced visibility, leading to material damage and side-on collisions.*



Tree planting is indicated on a new central island on Kimmage Road Lower, between Ravensdale Park and Kimmage Court. The tree canopies may, as they mature, overhang the bus corridor, increasing the risk of bus strikes and material damage collisions.

Additionally, the line of trees may reduce visibility between straight-ahead bus movement and turning traffic, leading to side-on collisions.

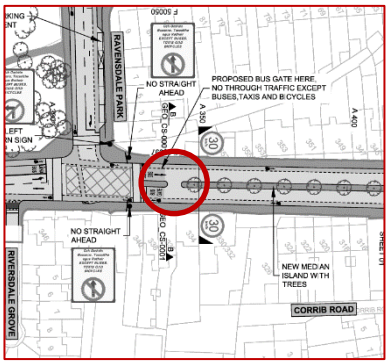
Recommendation

Care will be required during the subsequent Design Development phases to ensure that the tree species chosen have canopies, when mature, that will not present a hazard to vehicles travelling in the adjacent traffic lane and that adequate clearance is available so that forward visibility for all road users is not impeded.

3.7 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02)*

Summary: *Large vehicles may be unable to safely turn at the Kimmage Road Lower U-Turn facility, increasing the risk of vehicle/pedestrian and vehicle/cyclist collisions.*



A gap has been indicated in the proposed median north of the Ravensdale Park junction. This is presumably intended to facilitate vehicles that are not permitted to pass through the southbound bus gate and must therefore undertake a U-turn manoeuvre.

It is unclear if the indicated gap can accommodate the swept path of all vehicles likely to need to undertake this U-turn manoeuvre. Should insufficient space be provided, this could result in large vehicles reversing within the carriageway, and possibly overhanging the adjacent footpath, and presenting a hazard to other road users, in particular cyclists & pedestrians. This could increase the risk of vehicle/pedestrian and vehicle/cyclist collisions.

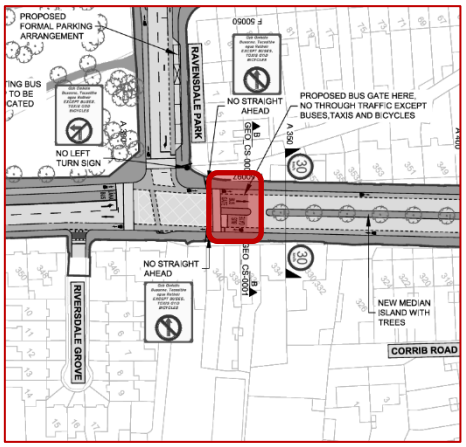
Recommendation

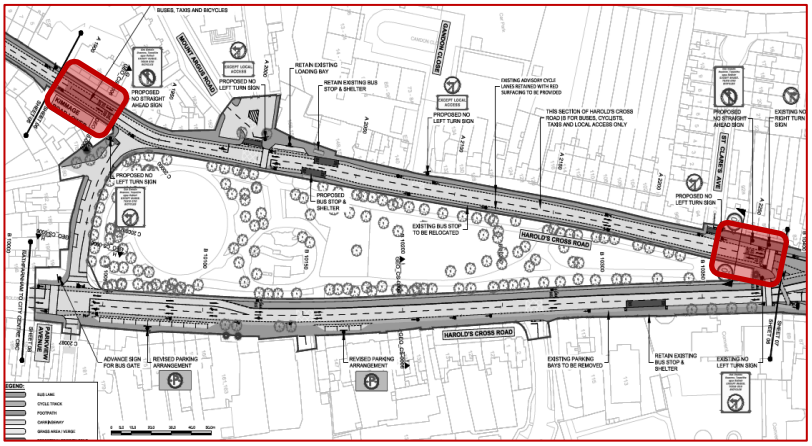
Undertake analysis to confirm the swept path of large vehicles using the U-Turn facility, and amend the arrangement if necessary.

3.8 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02) & BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0006 (S3 L02)*

Summary: *Bus gate restrictions may displace existing traffic onto the adjacent road network, giving rise to potential safety issues outside of the scheme extents.*





The proposed bus gate immediately north of Ravensdale Park could result in significant volumes of traffic being displaced onto the adjacent road network, in particular to the west of Kimmage Road Lower. This displaced traffic could give rise to potential safety issues outside of the scheme extents, particularly as the adjacent road network consists primarily of residential streets.

A similar problem may exist for the bus gate indicated at Harold's Cross.

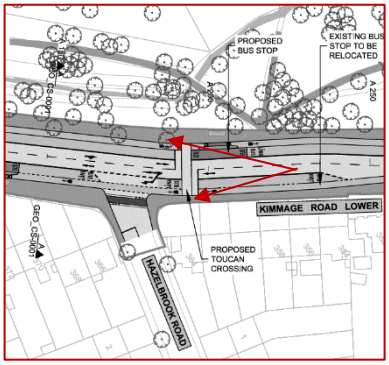
Recommendation

An assessment of the effect of displaced traffic on the adjacent road network should be undertaken, and measures should be implemented to address any safety issues that may arise.

3.9 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02)*

Summary: *Southbound drivers may have restricted visibility to the primary and secondary signals at the Toucan Crossing on Kimmage Road Lower, leading to an increased risk of overshoot and vehicle/pedestrian collisions.*



A northbound bus stop is indicated directly upstream of the Toucan crossing on Kimmage Road Lower. Stationary buses at this stop may block a southbound driver's visibility to the signal heads on approach to the Toucan crossing. Should a southbound bus also stop at the Toucan crossing, during a red signal, general traffic travelling south on Kimmage Road Lower may have no clear visibility to the primary or secondary signals, increasing the risk of overshoot and vehicle/pedestrian collisions.

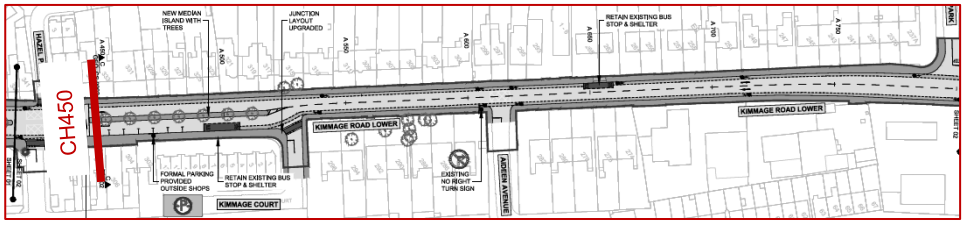
Recommendation

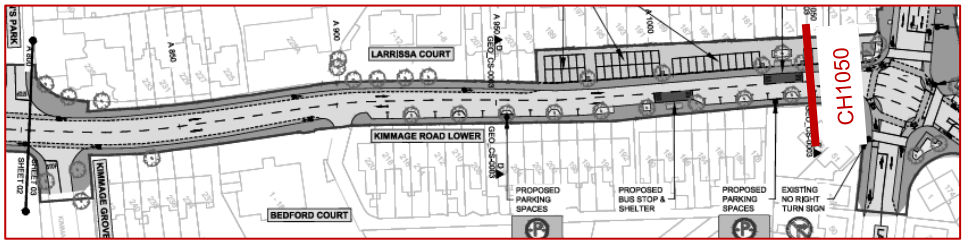
The northbound bus stop should be relocated further north on Kimmage Road Lower, and appropriate signal supports chosen (e.g. high-mast or cantilever-type signals) which ensure that approaching drivers have adequate visibility to the upcoming signals.

3.10 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0002 (Rev S3 L02) & Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0003 (Rev S3 L02)*

Summary: *The absence of pedestrian crossing facilities on Kimmage Road Lower may lead to unsafe crossing manoeuvres and present difficulties for mobility impaired non-motorised road users.*





No pedestrian crossing has been indicated along Kimmage Road Lower between the crossing at Chainage 450 and the junction with Sundrive Road at Chainage 1050. The absence of pedestrian facilities within this 600m section of Kimmage Road Lower may result in pedestrians crossing at unsafe locations, and presents difficulties for mobility impaired pedestrians undertaking return journeys by public transport.

This is a particular concern for mobility and visually impaired pedestrians, as well as bus passengers accessing opposing bus stops.

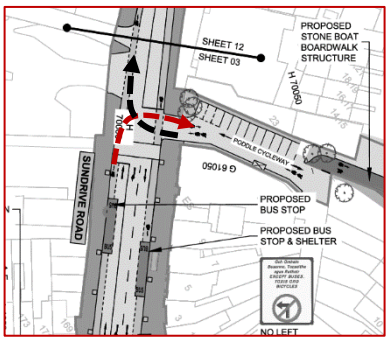
Recommendation

Identify pedestrian desire lines across Kimmage Road Lower and provide pedestrian facilities to support safe pedestrian movement.

3.11 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0003 (Rev S3 L02)*

Summary: *Risk of vehicle/cyclist collisions where right turning cyclists' cross traffic on Sundrive Road to access/exit the Poddle cycleway.*



It is unclear if it is intended to signalise the intersection between Sundrive Road and the Poddle cycleway. A failure to signalise this junction could result in difficulties for cyclists entering/exiting the Poddle cycleway, particularly for those undertaking right turns into/out of the cycleway.

Recommendation

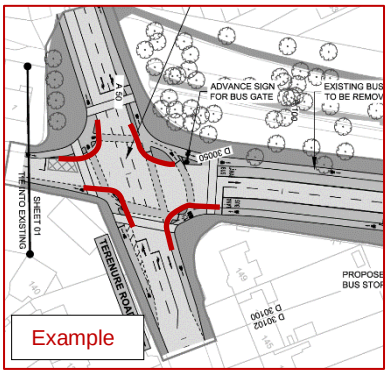
The Poddle access at Mount Argus Way should be incorporated within the signal arrangement indicated on Sundrive Road.

3.12 Problem

Location: *General Problem*

Example: *Junction of Kimmage Road West, Kimmage Road Lower and Terenure Road West*

Summary: *Modifications to junction radii may increase the risk of large vehicles mounting the kerb, leading to vehicle/pedestrian, vehicle/cyclist and material damage collisions.*



Junctions within the Scheme extents are being modified to incorporate protected cycleway lanes/tracks. This shall result in junctions having tighter radii, which may complicate the swept path of a large vehicle turning through the junction, and increase the risk of kerb strikes, vehicle/pedestrian, vehicle/cyclist, and material damage collisions.

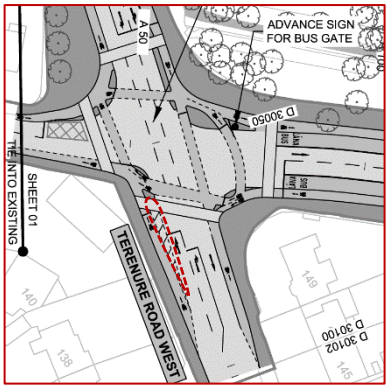
Recommendation

A swept-path analysis should be undertaken at each junction to confirm that large vehicle movements can be accommodated safely.

3.13 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02)*

Summary: *Ghost island may fail to direct drivers around the kerb island at the junction, leading to vehicles mounting the kerb, vehicle/pedestrian, vehicle/cyclist and material damage collisions.*



A ghost island has been indicated on Terenure Road West, upstream of a physical island at the junction. Drivers may fail to see the road markings during the hours of darkness, in poor weather, or if the markings become worn over time. This may increase the risk of westbound drivers proceeding through the junction without being fully aware of the physical island, leading to vehicles mounting the kerb and vehicle/pedestrian, vehicle/cyclist or material damage collisions.

Recommendation

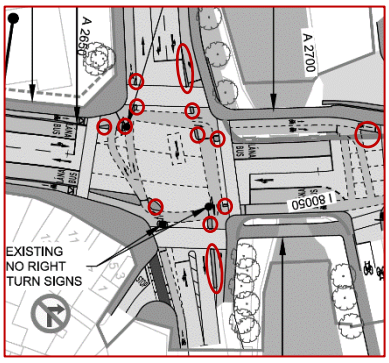
The ghost island should be replaced by a physical island with an appropriate sign/bollard within the 'nosing'.

3.14 Problem

Location: *General Problem*

Example: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0008 (Rev S3 L02)*

Summary: *Small islands proposed at signalised junctions may be impractical to sign, and lead to these islands being struck.*



Small islands have been indicated within signalised junctions to separate vehicle, cycle and pedestrian movements. The relatively small size of the islands, and their number within a junction, may be impractical to sign, and lead to these signs being struck by vehicles and cyclists, leading to material damage and loss of control collisions.

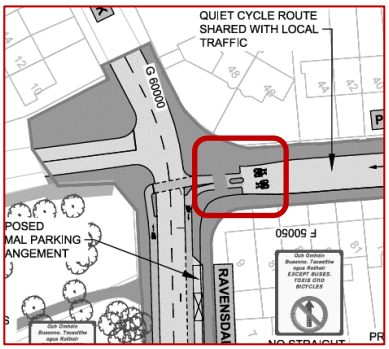
Recommendation

Ensure physical islands can accommodate traffic signs and provide at least 450mm between the kerb and sign edge.

3.15 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001 (Rev S3 L02)*

Summary: *Large vehicles (such as Refuse Vehicles) may reverse over a lengthy distance on Poddle Park, increasing the risk of material damage collisions.*



The Poddle Park junction with Ravensdale Park is indicated as being closed. Southbound drivers on Poddle Park will need to undertake a U-turn at the closure, before returning north.

No turning head facility has been indicated at this location, which may require large vehicles (e.g. refuse vehicles) to reverse long distances to a turning point. This may increase the risk of material damage collisions.

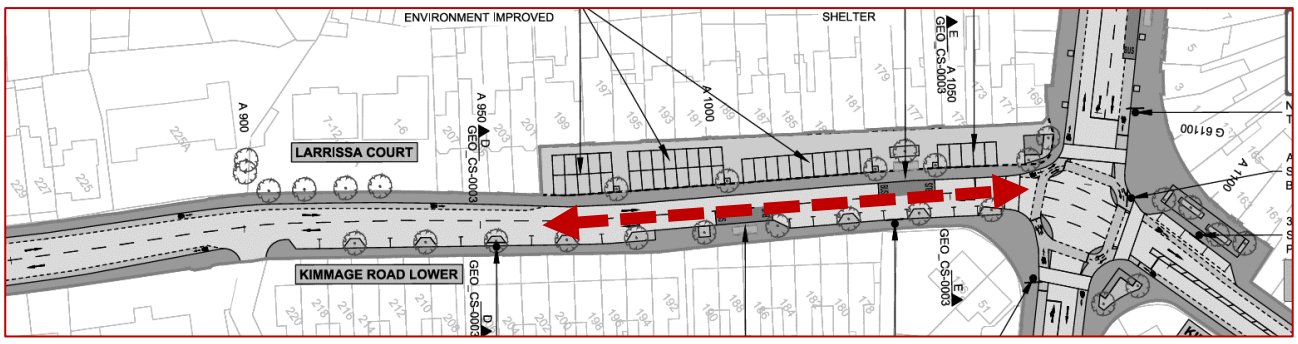
Recommendation

Provide a turning head facility at the Poddle Park/Ravensdale Park junction and undertake analysis to confirm the swept path of a turning vehicle can be safely accommodated.

3.16 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0003 (Rev S3 L02)*

Summary: *The removal of approximately 100m of advisory cycle lanes on Kimmage Road Lower may increase the risk of a vehicle/cyclist collision.*



it is proposed to remove a section of an existing advisory cycle track on either side of Kimmage Road Lower between Sundrive Road and a point 100m to the south. The removal of cycle infrastructure in this area, particularly where significant on and off-street parking exists, may complicate the interaction between drivers and cyclists, and increase the risk of vehicle/cyclist collisions.

Recommendation

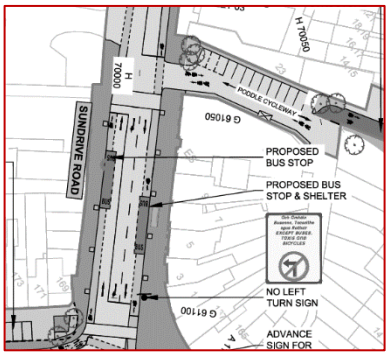
Either: -

- Remove the on-street parking and retain the existing advisory cycle lanes; or
- Provide a shared-surface with traffic calming (e.g. raised tables), surface treatment, signage and road markings to ensure that cyclists and vehicles can safely use the same carriageway.

3.17 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0003 (Rev S3 L02)*

Summary: *Stationary buses at the bus stop on Sundrive Road may block visibility to the primary signal head, leading to unsafe overtaking and vehicle/pedestrian collisions.*



The bus stop on Sundrive Road is located upstream of a signalised pedestrian crossing. Drivers may wish to overtake buses at the bus stop, and accelerate to move past the stationary bus with limited visibility to the traffic signal head. This may increase the risk of a driver failing to observe a red signal, and continue through the crossing on a pedestrian phase, leading to vehicle/pedestrian collisions.

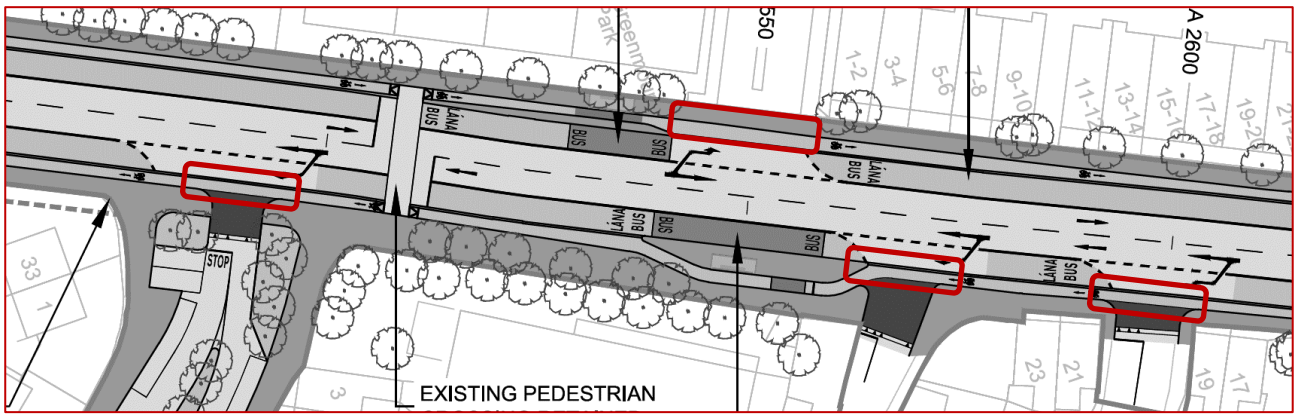
Recommendation

Ensure drivers have sufficient visibility to the pedestrian signals when a bus is at the bus stop, or amend the layout at this location to prevent vehicles from passing stationary buses at the bus stop.

3.18 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0007 (Rev S3 L02)*

Summary: *Unclear priority between straight-ahead cyclists and vehicles turning into/out of side roads could lead to side-on collisions.*



The off-road cycle track is indicated as continuing through side road junctions. Drivers may believe cyclists are on the footway, so would need to yield to turning drivers on the road. Similarly, cyclists may believe they have priority as the cycle track is continuous across the side road junction.

As a result, both cyclists and drivers may be confused as to who has priority at the side road, increasing the risk of side-on collisions between vehicles and cyclists.

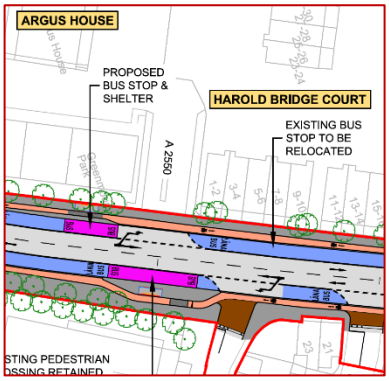
Recommendation

The off-road cycle track should be ramped back to the carriageway level upstream of a side road junction, thereby providing clarity that straight-ahead cyclists have priority at side road junctions.

3.19 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0007 (Rev S3 L02)*

Summary: *Left-turning drivers into Argus House may have view of cyclists obscured by a stationary bus, leading to side-on collisions.*



Drivers turning left into Argus House may not have clear visibility to cyclists on the cycle track due to a bus at the bus stop, and may unintentionally turn across the path of a cyclist, leading to side-on collisions.

Additionally, drivers exiting Argus House will have limited visibility to northbound traffic, and may enter Harold's Cross Road when it is unsafe to do so, leading to side-on collisions.

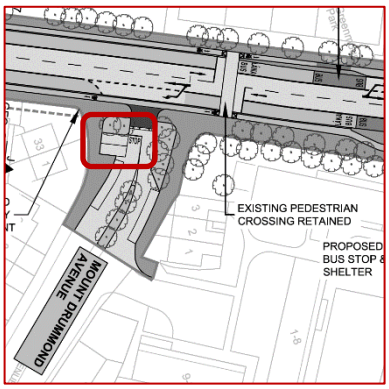
Recommendation

The bus stop should be relocated further north, downstream of the Argus House access.

3.20 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0007 (Rev S3 L02)*

Summary: *Vehicles using the perpendicular parking spaces on Mount Drummond Avenue may exit in front of a vehicle or cyclist using the junction, leading to side-on collisions.*



Two perpendicular parking spaces have been indicated at the junction between Harold's Cross Road and Mount Drummond Avenue. Given the close proximity of the perpendicular parking spaces to the side road junction, there is an increased risk of drivers exiting the parking spaces with limited visibility to vehicles or cyclists using the junction.

This may lead to side-on collisions where a driver exits the parking spaces in front of a cyclist or vehicle.

Recommendation

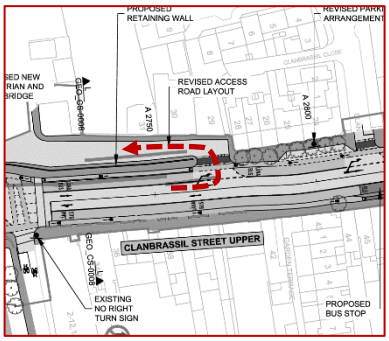
The perpendicular parking spaces should be removed.

3.21 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0008 (Rev S3 L02)*

Summary: *Acute angle of side road at CH2750 may lead to complex entry/exit manoeuvres, and poor visibility.*

The side road at Ch. 2750 meets Clanbrassil Street Upper at an acute angle. This may complicate manoeuvres for vehicles entering/exiting the access, and restrict visibility for exiting drivers, increasing the risk of side-on and material damage collisions.



Additionally, the retaining wall indicated at the side road access may also block inter-visibility between exiting drivers and pedestrians/cyclists, increasing the risk of vehicle/pedestrian and vehicle/cyclist collisions.

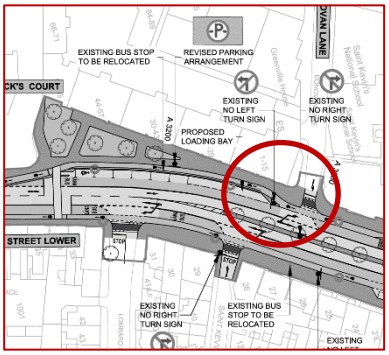
Recommendation

Undertake swept path analysis to confirm that vehicles can safely enter/exit the side road, and ensure sufficient inter-visibility is available between all road users at this junction.

3.22 Problem

Location: *Drawing No BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0009 (Rev S3 L02)*

Summary: *The cycle track may be used for loading/unloading, forcing cyclists into the path of pedestrians, leading to personal injury collisions.*



The cycle track is directed behind parking bays and a loading bay at Ch. 3200. Loading/unloading operations could result in the cycle track being impeded, leading to cyclists entering the footway where they may conflict with pedestrians, resulting in personal injury collisions.

Additionally, the parking/loading bays may reduce visibility for drivers exiting Donovan Lane, increasing the risk of side-on collisions.

Recommendation

The cycle track should relocated in front of the parking bays, which is consistent with other cycle track/parking arrangements within the scheme extents.

4 Observations

4.1 While tactile paving has not been indicated at this early stage in the design process, it will be required at all controlled & uncontrolled pedestrian crossings, and also at the interface between segregated pedestrian/cyclist facilities and shared surfaces, for example the shared surface which extends out to the “floating island” bus stop arrangements.

In addition, measures will be required at the proposed “floating island” bus stop arrangements to ensure that visually impaired public transport users are guided safely to/from the bus stop and the adjacent footpath.

4.2 It is unclear if it is proposed that the junction between Kimmage Road Lower and Hazelbrook Road is to be signalised. Should it not be proposed to signalise this junction, then the location of the stop line would provide insufficient inter-visibility for drivers exiting from the side roads towards approaching traffic & cyclists on Kimmage Road Lower possibly resulting in unsafe exiting manoeuvres and side-on collisions.

4.3 It is unclear where drivers entering Kimmage Road Lower at the Sundrive Road junction, or from any of the intervening side road junctions between the Sundrive Road & Ravensdale Park, are advised that they cannot proceed through the bus gate at Ravensdale Park.

Insufficient information for drivers on which directions they can proceed in could result in a significant number of U-turn manoeuvres, which are inherently hazardous manoeuvres, occurring at the bus gate.

4.4 It is unclear where drivers entering Kimmage Road Lower from any of the intervening side road junctions between the Sundrive Road & Harold’s Cross Road, are advised that they cannot proceed through the bus gate at Harold’s Cross Road.

Insufficient information for drivers on which directions they can proceed in could result in a significant number of U-turn manoeuvres, which are inherently hazardous manoeuvres, occurring at the bus gate.

4.5 Northbound cyclists on Fortfield Road may enter the cycle track at the junction of Kimmage Road West, Kimmage Road Lower and Terenure Road West, and fail to stop ahead of the signalised crossing during a pedestrian phase, as no stop line has been provided on the cycle track. A stop line should be provided on the cycle track upstream of the pedestrian crossing.

4.6 Southbound drivers on Harold’s Cross Road may believe the central ghost island for the bus gate toward Kimmage Road Lower is a right-turn pocket, and enter it inadvertently. Additional road markings and coloured surfacing should be used to clearly define this route as Bus Only. The straight-ahead arrow in the general traffic lane should be revised to a left turn arrow, clearly advising drivers of the direction they must travel through the signals.

4.7 Left turn arrow provided for general traffic at Ch. 3250, despite left turns being prohibited. Omit left turn arrow.

5 Road Safety Audit Team Statement

We certify that we have examined the drawings referred to in this report. The examination has been carried out with the sole purpose of identifying any features of the design that could be removed or modified in order to improve the safety of the scheme.

The problems identified have been noted in this report together with associated safety improvement suggestions, which we would recommend should be studied for implementation.

No one on the Road Safety Audit Team has been involved with the design of the scheme.

ROAD SAFETY AUDIT TEAM LEADER

Aly Gleeson Signed: 

Dated: 18th January 2022

ROAD SAFETY AUDIT TEAM MEMBER

Peter Monahan Signed: 

Dated: 18th January 2022

Appendix A – Road Safety Audit Brief Checklist

Have the following been included in the audit brief?: (*if 'No', reasons should be given below)*

		Yes	No
1.	The Design Brief	☐	☑
2.	Departures from Standard	☐	☑
3.	Scheme Drawings	☑	☐
4.	Scheme Details such as signs schedules, traffic signal staging	☐	☑
5.	Collision data for existing roads affected by scheme	☐	☑
6.	Traffic surveys	☐	☑
7.	Previous Road Safety Audit Reports and Designer's Responses/Feedback Form	☐	☑
8.	Previous Exception Reports	☐	☑
9.	Start date for construction and expected opening date	☐	☑
10.	Any elements to be excluded from audit	☐	☑

Any other information?

(if 'Yes', describe below)

☐ ☑

Appendix B – Documents Submitted to the Road Safety Audit Team

DOCUMENT/DRAWING TITLE	DOCUMENT/DRAWING NO.	REV
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0001	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0002	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0003	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0004	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0005	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0006	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0007	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0008	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0009	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0010	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0011	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0012	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0013	L02
CBC 11 Kimmage to City Centre GA	BCIDD-ROT-GEO_GA-0011_XX_00-DR-CR-0014	L02

Appendix C – Feedback Form

Road Safety Audit Feedback Form

Scheme: Kimmage to City Centre Core Bus Corridor Scheme

Route No.: R817, R137, and local urban roads

Audit Stage: Stage 1 Road Safety Audit **Date Audit Completed:** 17th May 2021

	To Be Completed by Designer			To Be Completed by Audit Team Leader
Paragraph No. in Safety Audit Report	**Problem Accepted (Yes/No)**	**Recommended Measure(s) Accepted (Yes/No)**	**Describe Alternative Measure(s). Give reasons for not accepting recommended measure**	**Alternative Measures or Reasons Accepted by Auditors (Yes/No)**
3.1	No	No	Road signs will form part of the next design stage, so the type, number and location of signs is to be developed at a later stage. However, it is anticipated that existing Advance Directional Signs (ADS), developed as part of the detailed design process, would be modified to identify Kimmage Road Lower as "Local Access Only". No other additional/dedicated Bus Gate signage is anticipated at this stage.	Yes
3.2	Yes	Yes		
3.3	Yes	Yes		
3.4	Yes	No	The bus shelter will be located on the footpath rather than the island to encourage pedestrians to wait here. The floating island function here is to allow a mobility impaired person a chance to board without risk of a cyclist following behind or the bus ramp to be laid without creating a hazard to cyclists. It is not intended to accommodate waiting patrons since there is insufficient space to provide such an island.	Yes
3.5	Yes	Yes		
3.6	Yes	Yes		

Road Safety Audit Feedback Form

Scheme: Kimmage to City Centre Core Bus Corridor Scheme

Route No.: R817, R137, and local urban roads

Audit Stage: Stage 1 Road Safety Audit **Date Audit Completed:** 17th May 2021

	To Be Completed by Designer			To Be Completed by Audit Team Leader
Paragraph No. in Safety Audit Report	**Problem Accepted (Yes/No)**	**Recommended Measure(s) Accepted (Yes/No)**	**Describe Alternative Measure(s). Give reasons for not accepting recommended measure**	**Alternative Measures or Reasons Accepted by Auditors (Yes/No)**
3.7	No	No	The gap in the median is wide enough for normal delivery vehicles to U-turn. Any larger vehicles can do a 3-point turn at the nearby junction at Corrib Road. Also, the number of loading vehicles in this area will be limited, as loading for businesses to the north of Corrib Road use a service lane behind the businesses, so park off Kimmage Road Lower; and loading to the south of Kimmage Road Lower is limited to two businesses. Additionally, the volume of traffic using this road will be reduced following the works. Therefore, the risk of unsafe turning manoeuvres will be low.	Yes
3.8	Yes	Yes		
3.9	Yes	Yes		
3.10	Yes	No	All existing pedestrian crossings will be maintained as part of the scheme. Minimal additional works are proposed along KRL on the basis that there will be a significant reduction in traffic along the road following the implementation of the bus gates. It will be brought to the NTA and DCC's attention that a demand for additional pedestrian crossing points should be monitored and provided in future if required.	Yes
3.11	Yes	Yes		
3.12	Yes	Yes		
3.13	Yes	No	A physical island cannot be placed along the full extent highlighted since access is required to the petrol station forecourt across this hatch. It may be possible to provide pencil	Yes

Road Safety Audit Feedback Form

Scheme: Kimmage to City Centre Core Bus Corridor Scheme

Route No.: R817, R137, and local urban roads

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Paragraph No. in Safety Audit Report	**Problem Accepted (Yes/No)**	**Recommended Measure(s) Accepted (Yes/No)**	**Describe Alternative Measure(s). Give reasons for not accepting recommended measure**	**Alternative Measures or Reasons Accepted by Auditors (Yes/No)**
			bollards on approach to the pedestrian crossing where such bollards will not impede the exit turning manoeuvres of vehicles.	
3.14	Yes	Yes		
3.15	No	No	Refuse trucks regularly reverse along residential roads where provisions for turning are constrained. There is a wide commercial access approximately 70m north of the proposed traffic plug which can act as a turning point for vehicles and requires a short reversing distance.	Yes
3.16	No	No	The proposed bus gate just north of Ravensdale Park will act as traffic management along KRL, reducing the traffic volumes to appropriate levels in line with NCM guidelines for allowing cyclists to share with general traffic. The vehicular parking is required to formalise the residential parking activities in the area which currently occur within the existing cycle lanes. Removing the parking will encourage such parking activities to continue, forcing cyclists to weave in and out of the cycle lane creating a more hazardous situation than is proposed. Raised tables are not desirable from a bus operation point of view and there are no statutory signs for shared areas.	Yes
3.17	Yes	No	The pedestrian crossing will be relocated across the northern arm and the southern stop line extended further from the bus stop.	Yes

Road Safety Audit Feedback Form

Scheme: Kimmage to City Centre Core Bus Corridor Scheme

Route No.: R817, R137, and local urban roads

Audit Stage: Stage 1 Road Safety Audit **Date Audit Completed:** 17th May 2021

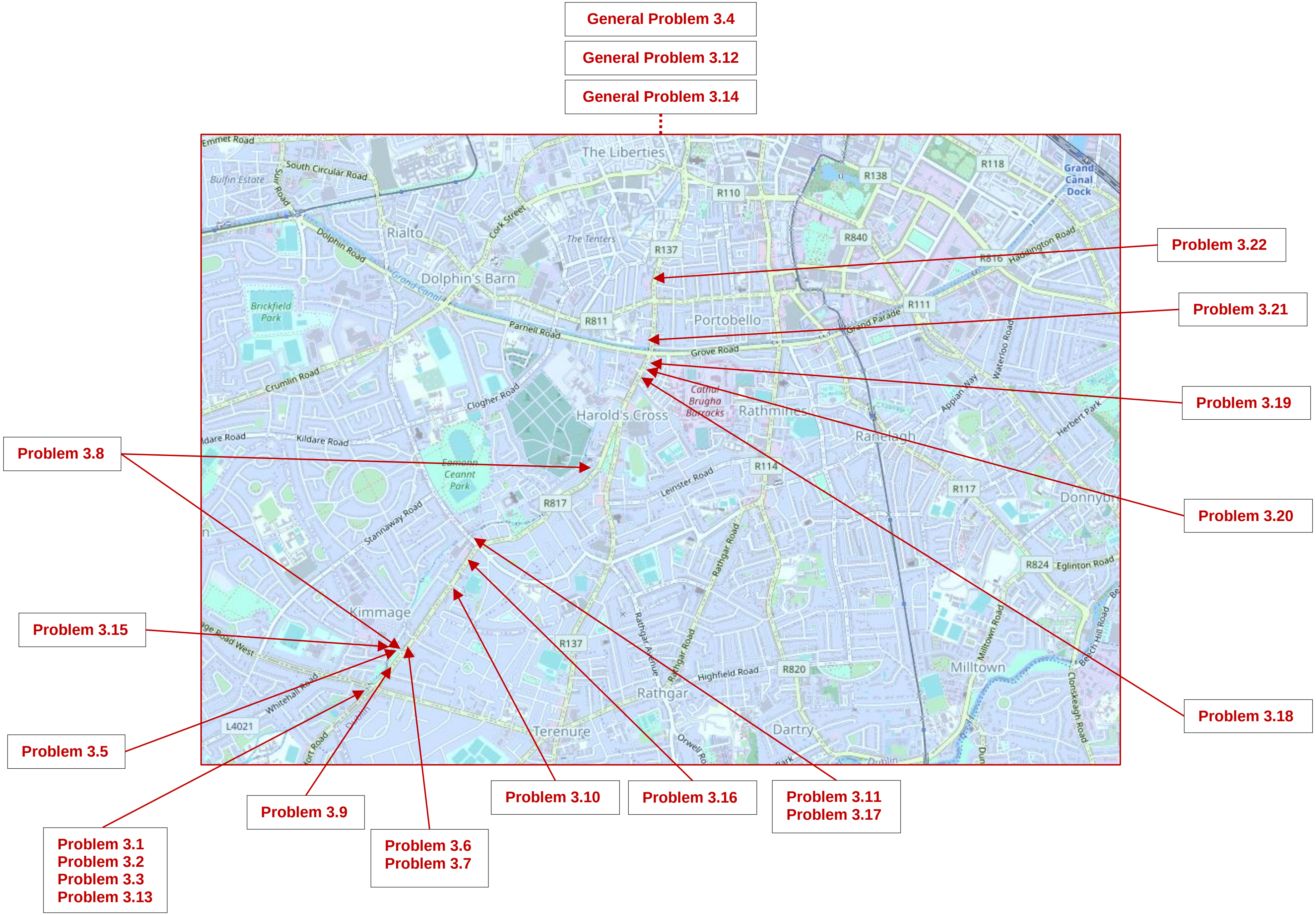
	To Be Completed by Designer			To Be Completed by Audit Team Leader
Paragraph No. in Safety Audit Report	**Problem Accepted (Yes/No)**	**Recommended Measure(s) Accepted (Yes/No)**	**Describe Alternative Measure(s). Give reasons for not accepting recommended measure**	**Alternative Measures or Reasons Accepted by Auditors (Yes/No)**
3.18	No	No	Drivers will need to mount over a 60mm high splayed kerb at junctions indicating the priority for cyclists across these junctions.	Yes
3.19	Yes	No	There is in sufficient road cross-section available to provide a floating island north of the access. The bus cage will be moved further south of the access to improve the visibility for exiting drivers and for bus drivers of right turning vehicles into the access.	Yes
3.20	No	No	The parking spaces are located at the required set back from a junction location. The parking provision is as per DMURS recommendation to narrow the excessively wide existing street.	Yes
3.21	Yes	Yes		
3.22	Yes	No	The designer shall investigate opportunities to create a wider buffer zone between the parking bay and the cycle track to accommodate loading activity, which should reduce the risk of loading crates and/or trollies obstructing the path of cyclists. The exact width will be developed further at the detail design stage, ahead of a Stage 2 RSA.	Yes

Signed: _____ Designer **Date** 19/01/2022

Signed: _____ Audit Team Leader **Date** 18th Jan '22

Signed: _____ Employer **Date** 02/03/2023

Appendix D – Problem Locations


General Problem 3.4
General Problem 3.12
General Problem 3.14
Problem 3.22
Problem 3.21
Problem 3.19
Problem 3.20
Problem 3.18
Problem 3.8
Problem 3.15
Problem 3.5
Problem 3.1
Problem 3.2
Problem 3.3
Problem 3.13
Problem 3.9
Problem 3.6
Problem 3.7
Problem 3.10
Problem 3.16
Problem 3.11
Problem 3.17
The Liberties
Rialto
Dolphin's Barn
Portobello
Harold's Cross
Rathmines
Ranelagh
Kimmage
Rathgar
Terenure
Dartry
Milltown
Grand Canal Dock
Brickfield Park
Cathal Brugha Barracks
Eamonn Ceannt Park