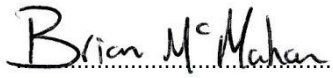
Grange Road Cycle Route – Stage 1 Road Safety Audit

Prepared by:  Checked by: 

Brian McMahon
Senior Engineer

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Rev No	Comments	Checked by	Approved by	Date
0	Draft Road Safety Audit	JB		21.10.15

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1 Introduction

1.1 Overview

AECOM has been commissioned by South Dublin County Council (SDCC) to undertake a Stage 1 Road Safety Audit of the proposed cycle/pedestrian scheme on Grange Road in Rathfarnham, Co. Dublin.

The scheme comprises of a cycle/pedestrian upgrades on Grange Road linking Taylor's Lane/Grange Road in the south to Nutgrove Avenue at the north of the scheme. This Stage 1 Audit will assess the safety implications of the scheme for all road users, with a particular emphasis on pedestrian and cyclists.

The Safety Audit Report indicates each of the problems identified, provides outline recommendations for solving the problems, presents the Audit Team Statement, and describes a schedule of documents reviewed. The members of the Audit Team were:

Audit Team Leader:

Brian McMahon, BE MSc CEng MIEI

Senior Engineer, AECOM

Audit Team Member:

Johanne Browne, BA BAI CEng MIEI

Senior Consultant, AECOM

The audit comprises of an examination of the scheme drawings. The site visit took place on the 15th October 2015. On the day of the visit the weather was dry. During the time of the site visit, there did not appear to be any circumstances that would suggest a deviation from normal traffic conditions. The traffic conditions on Grange Road were light. The site visit was undertaken between 09:30 and 11:00.

1.2 Road Safety Audit

This Safety Audit represents the response of an independent Audit Team on various aspects of the scheme. The recommendations contained therein are therefore the opinions of the Audit Team, and are intended as a guide to the designers on how the scheme as constructed can be improved to address issues of road safety.

The following documents were provided by the Design Team:

- Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3;
- Drg. No. 60302419_P_001, General Arrangement Sheet 2 of 3;
- Drg. No. 60302419_P_001, General Arrangement Sheet 3 of 3;

The terms of reference of the Audit are as described in HD 19/15. The team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

The Safety Audit guidelines do not provide a facility for the Audit Team to classify individual problems according to their severity, and hence the level of priority to be attached to each. It is instead the task of the design team and/or their representative to take a view on the validity of each of the recommendations, and decide on an appropriate course of action.

The response of the Design Team to the Safety Audit should be prepared in the form of a Safety Audit Feedback Form, accepting the changes proposed by the Audit Team or providing an alternative solution to the problem. The Feedback Form is then returned to the Audit Team for review and verification. A template for a Safety Audit Feedback Form is included as Appendix B.

The study area is shown in Figure 1.

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Figure 1 Extent of Study Area

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2 Site Description

2.1 Overview

The scheme comprises upgrades to the cycle and pedestrian facilities along Grange Road.

Location	Rathfarnham, Dublin 14
Classification	R822
Speed Limit	50 km/h
Local Authority Area	South Dublin County Council
Type of Road	Regional Road

2.2 Site Observations

Road Geometry

- Grange Road from Taylor's Lane to Nutgrove Avenue is 1.6km in length. It is a single carriageway urban road. The road width varies but narrows to approximately 6.0m north of Stonepark Abbey to Convent Lane.

Vehicular Traffic

- Traffic flows during the site visit appeared to be normal for the time of day, with a low volume of traffic noted.

Pedestrians & Cyclists

- Footpaths are provided on both sides of the road carriageway.
- A controlled crossing is provided between St. Enda's Drive and Bartons Drive. Controlled pedestrian crossing facilities are also provided at the signal controlled junction at Dispensary Lane.
- A short section of advisory cycle lane is provided on the approach to Taylor's Lane. There are no dedicated cycle facilities from Hermitage Avenue to Sarah Curran Avenue.
- A two-way cycle track is provided between Sarah Curran Avenue and Bartons Drive.
- Advisory cycle lanes are provided from Bartons Drive to Nutgrove Avenue.

Street Lighting

- Street lighting is provided over the length of the Grange Road.

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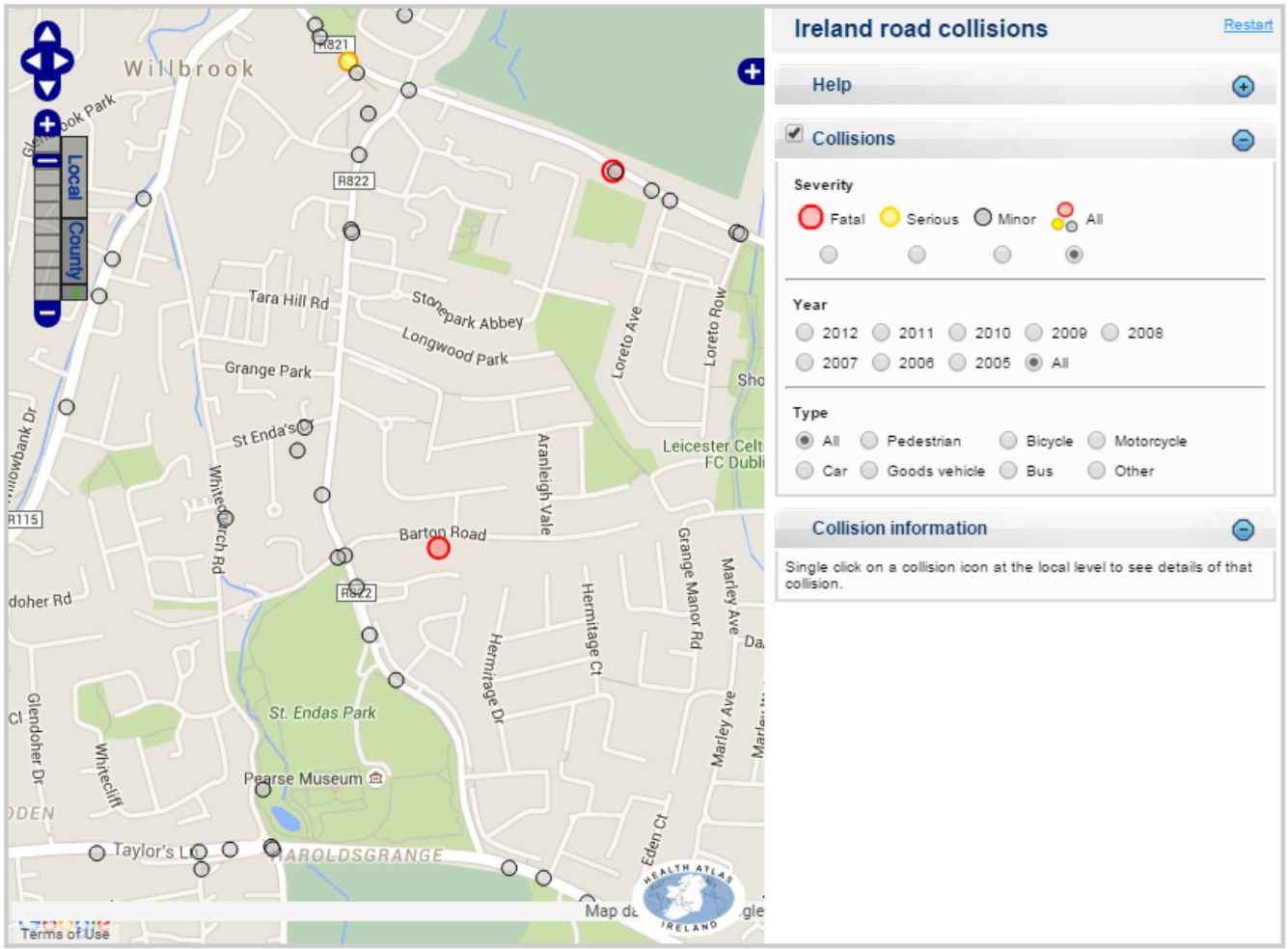
Collisions

- The RSA database of personal injury accidents was examined to establish if there are any existing cycle or pedestrian safety issues on the roads either end of the proposed cycle/pedestrian route.
- The database provides accident records for the period 2005 to 2012 with Figure 2.1 below outlining the recorded collisions over the eight year period.
- Ten collisions were recorded along Grange Road during this period. All were minor in severity. Six were vehicle collisions only, while there were four collisions which involved pedestrians.

Ireland Road Collisions



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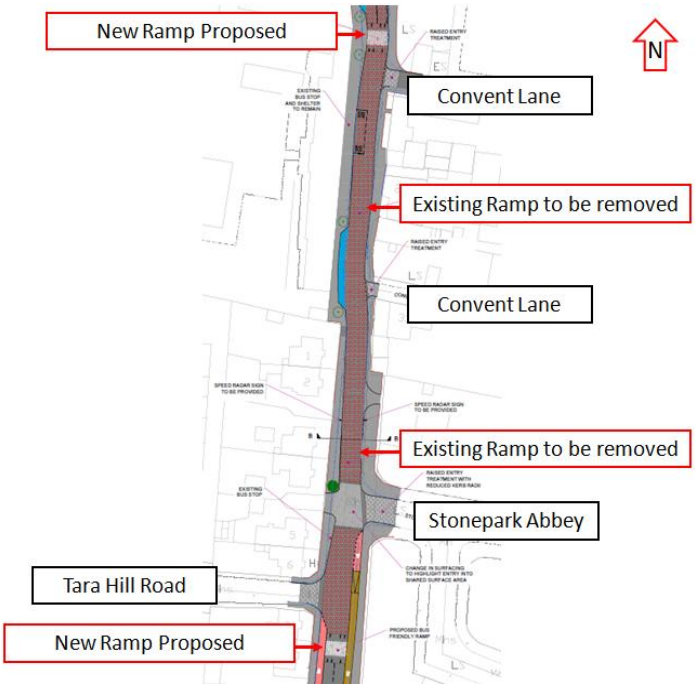
3 Departure from Standards

3.1 General

No departures from standards have been notified to the audit team

4 Items Resulting from this Stage 1 Road Safety Audit

4.1 Road Geometry

4.1.1 Problem	
Location:	Stonepark Abbey to Dispensary Lane
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1
Summary:	The potential speed of motorists through this part of the road carriageway.
Description:	 Figure: Existing and Proposed Ramps on Grange Road

Two shared spaces are proposed along this proposed scheme, the first from Park Avenue to Sarah Curran Avenue, and the second from Stonepark Abbey to Dispensary Lane. Where shared space is being provided the safety of cyclists needs to be supported by speed management for bus services and other vehicles.

Between Stonepark Abbey to Dispensary Lane it is proposed to remove two existing ramps on the road carriageway but replace these with two new bus friendly ramps. It is acknowledged that there are other speed reducing measures such as narrowing of the road carriageway proposed. However, the proposed ramps are located 160m apart. There is a risk that the speeds through the shared space area will be excessive, which could increase the risk of and severity of collisions with cyclists.

Recommendation:

Consideration should be given to providing additional speed reducing measures, such as additional ramps along this section of the road carriageway. Signage should be provided to indicate to motorists that they are entering a cycle friendly zone.

However, if the scheme should go ahead as currently proposed, the speed at which motorists drive through this section of the road should be monitored.

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4.1.2 Problem	
Location:	Park Avenue to Sarah Curran Avenue
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 2
Summary:	The potential speed of motorists through this part of the road carriageway.
Description:	 **Figure: Existing and Proposed Ramps on Grange Road**

Two shared spaces are proposed along this proposed scheme, the first from Park Avenue to Sarah Curran Avenue, and the second from Stonepark Abbey to Dispensary Lane. Where shared space is being provided the safety of cyclists needs to be supported by speed management for bus services and other vehicles.

Between Park Avenue to Sarah Curran Avenue it is proposed to provide a 150m long speed table. The speed reducing efficiency of the table will be reduced due to its overall length. There is a risk that the speeds through the shared space area will be excessive, which could increase the risk of, and severity of collisions with cyclists.

Recommendation:

Consideration should be given to providing alternative speed reducing measures at this location, such as two separate speed tables or speed ramps. Signage should be provided to indicate to motorists that they are entering a cycle friendly zone.

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4.1.3 Problem	
Location:	Grange Road / Nutgrove Avenue Approach
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3
Summary:	The left turn may be too tight for cyclists
Description:	

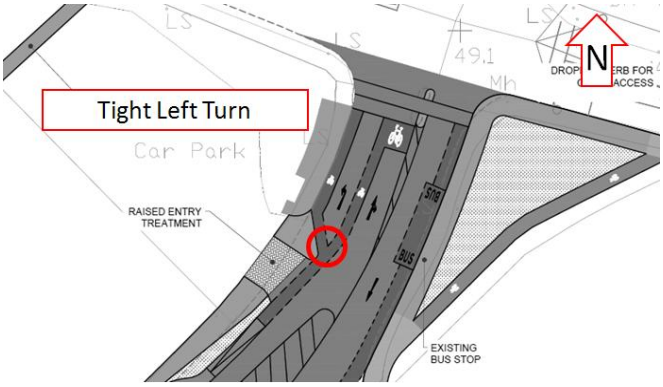

Figure: Tight Horizontal Transition Points at Northbound bus stop

The left turn radius proposed appears to be too tight and could result in cyclists crossing into the traffic lane, which could result in a collision with a vehicle.

Recommendation:

Use reverse curves on footpath kerbs, reflecting more closely traffic movement to provide a smoother radius for cyclists.

4.1.4 Problem	
Location:	Grange Road / Nutgrove Avenue Approach
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3
Summary:	The horizontal transition may be too tight for cyclists
Description:	

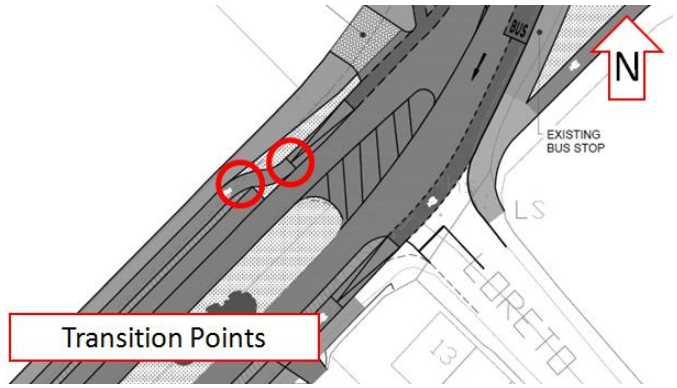

Figure: Tight Horizontal Transition Points at Northbound bus stop

Transitions should be designed and constructed to provide continuity, comfort and safety to cyclists. The curve radius of a transition should permit cyclists to preserve momentum and maintain their balance. The curve radius proposed appears to be too tight and could result in cyclists losing control of their bikes, resulting in injury.

Recommendation:

The proposed transition should be increased in length with a larger radius used. For cycle routes in an urban area, a curve radius of 20.0m is recommended in the National Cycle Manual to accommodate cyclists travelling at 30km/h.

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4.1.5 Problem	
Location:	Grange Road / Nutgrove Avenue Approach
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3
Summary:	Impeded Exit Visibility.
Description:	

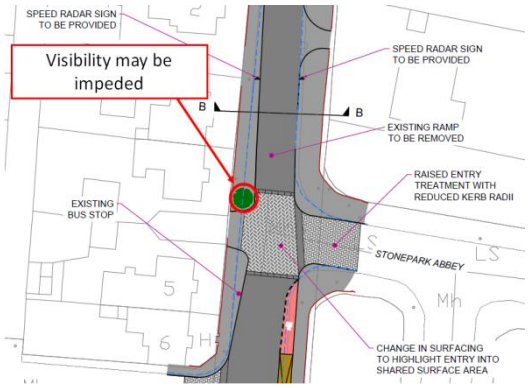

Figure: Visibility May be Impeded by Proposed Tree

A tree is proposed outside a residential access. However, visibility to the left on exit (to the north) may become impeded due to the growth of the tree. It is unclear if this vegetation is to be cut back and maintained. This may lead to inappropriate exiting manoeuvres resulting in collisions with through traffic.

Recommendation:

Visibility of, and from, the junction should be clear and unobstructed, in accordance with traffic speeds and the requirements of the relevant design guidance. All vegetation should be cut back sufficiently, and adequately maintained, to ensure adequate visibility splays are provided.

Capabilities on project:
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4.2 Signing & Lining

4.2.1 Problem	
Location:	Throughout the scheme
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheets 1 to 3
Summary:	Motorist failing to stop at the stop line.
Description:	 *Figure: Control road markings not provided on minor arms throughout the scheme*
The lack of the STOP worded road marking (M 114) increases the possibility that drivers on the minor approach will fail to take account of other road users, particularly pedestrians and cyclists at the junction which may lead to collisions with these vulnerable road users.	
Recommendation:	
Consideration should be given to providing STOP worded road markings to increase conspicuity of the junction.	

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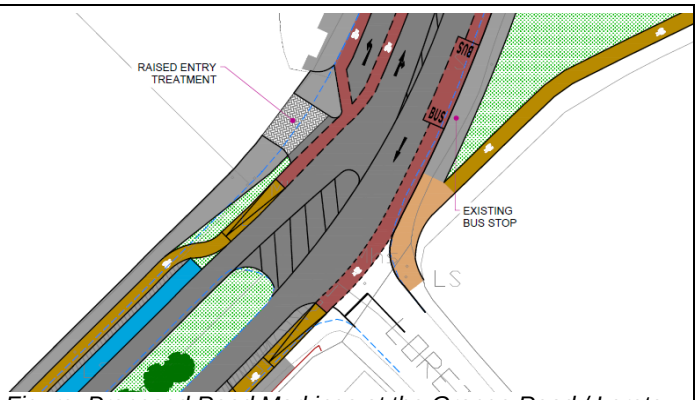
4.2.2 Problem	 *Figure: Proposed Road Markings at the Grange Road / Loreto Terrace junction*
Location:	Grange Road / Loreto Terrace / Car Park
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3
Summary:	Potential side impact collisions
Description:	
There is an existing yellow box provided throughout the junction to allow exit from both Loreto Terrace and Car Park. Motorists may take a risk in edging out onto the road carriageway hoping to get through a gap in the traffic. If a gap is not available they may be at risk of side impact collisions.	
Recommendation:	
Consideration should be given to providing a smaller yellow box in front of Loreto Terrace and the car park, to provide a space where motorists can exit from the minor arms.	

4.2.3 Problem	 *Photo: Existing 'No Entry' Road Markings*
Location:	Grange Road
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3
Summary:	Potential head-on vehicle collision
Description:	
The existing 'No Entry' road markings are not proposed in the schemes drawings, which could result in some driving in the incorrect direction on Grange Road. Driving in the incorrect direction could lead to a collision with southbound vehicles.	
Recommendation:	
The existing 'No Entry' road markings should be replaced.	

Capabilities on project:
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4.2.4 Problem	
Location:	Grange Road, throughout the length of the scheme
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 to 3
Summary:	Illegal parking on the cycle lane / tracks


Photo: Parking noted south of St. Enda's Drive on Grange Road


Photo: Parking noted at Convent Lane

Description:

Parking has been noted on the along the Grange Road. Parking is not permitted on cycle lanes/tracks, but motorists may park on the proposed cycle facilities. Parking in the cycle facilities will result in cyclists moving either onto the road carriageway or the footpath, putting them into conflict with either motorists or pedestrians respectively.

Recommendation:

Measures should be provided to discourage motorists from parking on the cycle facilities along Grange Road.

Capabilities on project:
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4.2.5 Problem	
Location:	Grange Road, throughout the length of the scheme
Drawing:	Drg. No. 60302419_P_103, General Arrangement Sheet 3 of 3
Summary:	Potential pedestrian / Cyclist collisions
Description:	

Figure: Tramline and Ladder Tactile Paving is not provided

Tactile paving is not provided on the transition from footpath/cycletrack to shared surface meaning that visually impaired pedestrians will be unsure as to which is the correct side for pedestrians. Tactile paving not provided on the cycle lane side of the shared surface means that visually impaired pedestrians may walk down this ramp and onto the cycle track. This would put pedestrians at risk to collisions with cyclists.

Recommendation:

Tramline and ladder tactile paving should be provided at the change to and from the shared surface area.

4.2.6 Problem	
Location:	Downhill Sections of the Cycle Track
Drawing:	Drg. No. 60302419_P_103, General Arrangement Sheet 3 of 3
Summary:	Cyclists colliding with pedestrians
Description:	

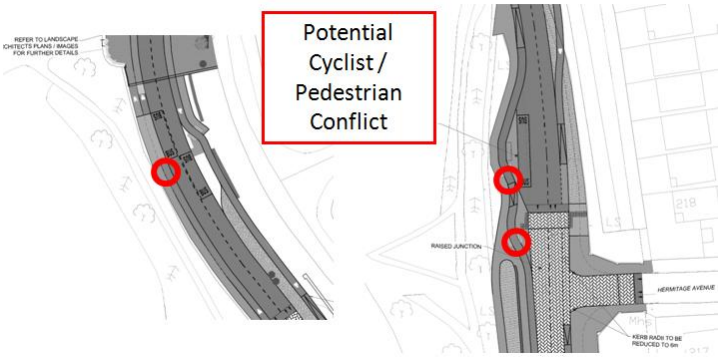

Figure: Potential locations where conflicts could occur between pedestrians and cyclists travelling at speed downhill

High cycle speeds are likely on the approaches to the pedestrian crossings at Hermitage Avenue and the bus stop to the south of the Pearse Museum Entrance. Cyclists who fail to slow down may cause a serious collision with pedestrians in these areas.

Recommendation:

Cyclists should be made aware that they need to reduce speed at these locations. Consideration should be given to providing cyclist rumble strips and yield road markings adjacent to the bus stop.

Capabilities on project:
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4.3 Pedestrians & Cyclists

4.3.1 Problem

Location:	Grange Road / Nutgrove Avenue Approach
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3
Summary:	Existing Desire Line should also provide for Pedestrians

Photo: Existing Footpath on Nutgrove Avenue

Photo: Existing Track through the Green

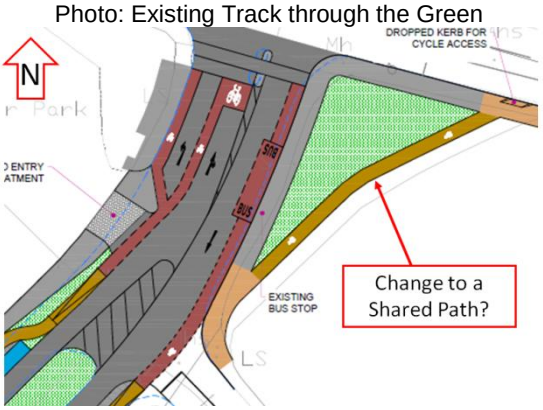

Figure: Proposed Cycle Lane

Description:

It is proposed to provide a cycle lane through the green area at the edge of the junction. This is already a desire line for pedestrians, evidenced by the existing worn path through the grass. Therefore, it is likely that pedestrians will walk on the cycle path proposed in this location. The proposed facility appears narrow and will result in a reduced quality of service for both modes. The footpath on Nutgrove Avenue is shown as a shared footpath but it is currently a pedestrian's only footpath. The transition location from footpath to shared surface has not been specified.

Recommendation:

The cycle track should be changed to a shared facility with a minimum width of 3.0m. Tactile paving should be provided on the transition from the footpath to shared surface to ensure that pedestrians, in particular, the visually impaired are aware of the presence of cyclists.

Capabilities on project:
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4.3.2 Problem	 Photo: Existing Tactile Paving on Grange Road / Nutgrove Avenue Junction
Location:	Grange Road / Nutgrove Avenue Junction
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3
Summary:	Old Tactile Shape Provided
Description:	
The existing tactile paving on the Nutgrove Avenue / Grange Road junction is incorrect, with the stem of the tactile not provide on the right side of the crossing, which may make it difficult for visually impaired pedestrians to find the pedestrians push button, with the risk that they walk onto the road carriageway in conflict with vehicles.	
Recommendation:	
Dropped kerbs and tactile paving should be provided in accordance with the 'Guidance on the Use of Tactile Paving', and should be provided at all appropriate locations and orientation to direct pedestrians in the correct direction.	

4.3.3 Problem	 Figure: Tactile Paving Not Indicated on the Drawings
Location:	Throughout Scheme
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheets 1, 2 and 3
Summary:	Tactile Paving not shown at any of the proposed crossing locations.
Description:	
Tactile paving has not been indicated at some of the proposed crossings in the scheme. Tactile paving is used to warn of crossing locations and used as a guide across the road carriageway. The lack of tactile paving may result in pedestrians crossing the road carriageway unaware that they may be in conflict with vehicles, resulting in a collision.	
Recommendation:	
Dropped kerbs and tactile paving should be provided in accordance with the 'Guidance on the Use of Tactile Paving', and should be provided at all appropriate locations and orientation to direct pedestrians in the correct direction.	

Capabilities on project:
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4.3.4 Comment	
Location:	Grange Road at Section A-A
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3
Summary:	Reduced Pedestrian Footpath
Description:	

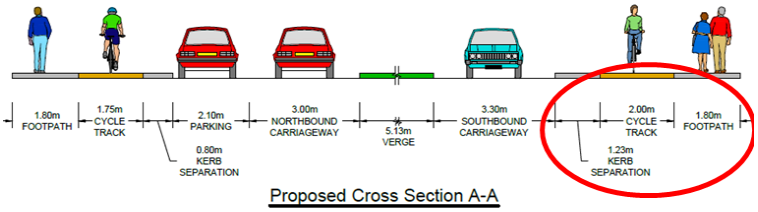

Figure: Proposed Cross Section on Grange Road

It is proposed to slightly reduce the existing pedestrian footpath on this section of the route. However, it is proposed to provide a kerb separation of 1.23m wide on the eastern side of the road, which is not required. The proposed footpath width should be maximised to wide as possible.

Recommendation:

A clear width of 2000mm is recommended in the National Disability Authority's "*Building for Everyone*" to enable people to walk alongside each other and for two wheelchair users or parents with strollers to pass comfortably.

4.3.5 Problem	
Location:	Grange Road / Sarah Curran Avenue
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 2 of 3
Summary:	Proposed Pedestrian Crossing off the Desire Line
Description:	

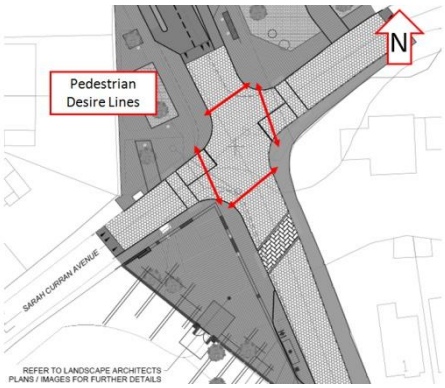

Figure: Proposed Cross Section on Grange Road

The crossings at this junction are located off the pedestrian desire lines. Significant proportions of pedestrians and cyclists will not inconvenience themselves by travelling the extra distance to formal facilities and may be prepared to take the risk of crossing away from the formal crossing point. With pedestrians crossing at numerous locations it will increase the risk of a collision with vehicles.

An uncontrolled crossing has not be provided on the northern side of the junction.

Recommendation:

It is important that crossings are sited where the maximum number of people are likely to use them. The uncontrolled crossings should be sited closer to the pedestrian desire line.

An uncontrolled crossing should be provided on the northern side of the junction.

Capabilities on project:
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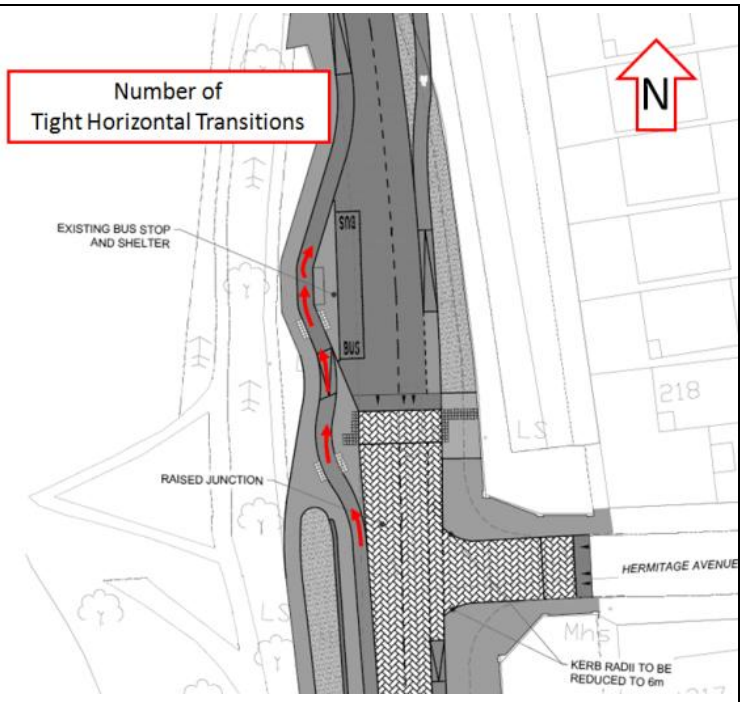
4.3.6 Problem	
Location:	Cycle track at the back of the bus stop
Drawing:	Drg. No. 60302419_P_103, General Arrangement Sheet 3 of 3
Summary:	The horizontal transition may be too tight for cyclists
Description:	 Figure: Tight Horizontal Transition Points at pedestrian crossing and southbound bus stop

Transitions should be designed and constructed to provide continuity, comfort and safety to cyclists. The curve radius of a transition should permit cyclists to preserve momentum and maintain their balance. There are five separate turns for cyclists travelling on the cycle track behind the pedestrian crossing and bus stop. These turns combined with the tight curve radius proposed, and the steep vertical gradient could result in cyclists losing control of their bikes, resulting in injury.

Recommendation:

The proposed transitions should be increased in length with a larger radius used. For cycle routes in an urban area, a curve radius of 20.0m is recommended in the National Cycle Manual to accommodate cyclists travelling at 30km/h. Two transitions around the combined pedestrian crossing and bus stop pedestrian area should be considered.

Capabilities on project:
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4.3.7 Problem	
Location:	Grange Road / Nutgrove Avenue Approach
Drawing:	Drg. No. 60302419_P_001, General Arrangement Sheet 1 of 3
Summary:	Existing Desire Line should also provide for Pedestrians

Photo: Pedestrian after crossing the road to the north of the existing bus stop

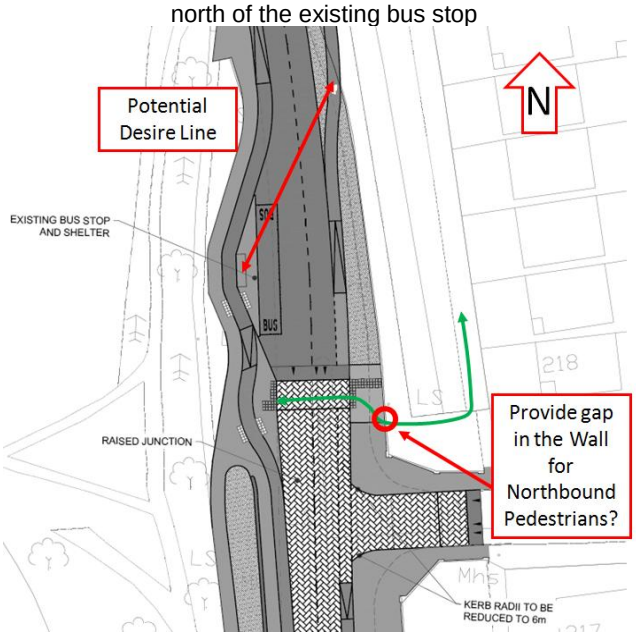

Figure: Proposed Cycle Lane

Description:

It is proposed to provide a controlled crossing to the north of the Hermitage Avenue junction. However, some pedestrians were noted to cross the Grange Road further north. The proposed crossing won't provide a direct route for northbound pedestrians. Therefore, many pedestrians will continue to cross to the north of the bus stop were they will be at risk of collision with vehicles.

Recommendation:

To reduce the distance northbound pedestrians must walk, and to reduce the number of pedestrian who do not use the controlled crossing, consideration should be given to providing a gap through the existing wall into the residential estate.

4.4 Street Lighting

No issues with the street lighting were noted.

4.5 Drainage & Maintenance

No drainage issues were noted on site.

Capabilities on project:
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5 Audit Team Statement

I certify that the site was visited and that this audit has been carried out in accordance with the National Roads Authority Road Safety Audit Standard HD 19/15.

The Road Safety Audit 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.

No one on the audit team has been involved with scheme design.

AUDIT TEAM LEADER: SENIOR ROAD SAFETY AUDITOR

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Signed ..... Brian McMahon

Date 21.10.15

AUDIT TEAM MEMBER: ROAD SAFETY AUDITOR

Name:	Johanne Browne, BA BAI CEng MIEI
Position:	Senior Consultant
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OTHERS INVOLVED:

There were no other persons involved in this audit than previously stated above.

Appendix A – Documents Submitted to the Audit Team

The following documents were submitted as part of the Road Safety Audit:

Document No.	Description	Date
Drg. No. 60302419_P_101	General Arrangement Sheet 1 of 3	September 2015
Drg. No. 60302419_P_102	General Arrangement Sheet 2 of 3	August 2015
Drg. No. 60302419_P_103	General Arrangement Sheet 3 of 3	August 2015
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Appendix B – Safety Audit Feedback Form

NOTE: THE TEXT BELOW REPRESENTS AN EXAMPLE OF A SAFETY ADUIT FEEDBACK FORM. THE SAFETY AUDIT FEEDBACK FORM SHOULD BE COMPLETED BY THE DESIGN TEAM IN RESPONSE TO THE ISSUES RAISED IN THIS AUDIT AND SUBMITTED TO THE OVERSEEING ORGANISATION AS A SUPPLEMENT TO THE SAFETY AUDIT REPORT.

	To be Completed by Designer			**To be Completed by Audit Team Leader**
Paragraph No. in Safety Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure	Alternative measures or reason accepted by auditors (yes/no)
			-	
			-	