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Logan Road and O'Keefe Street

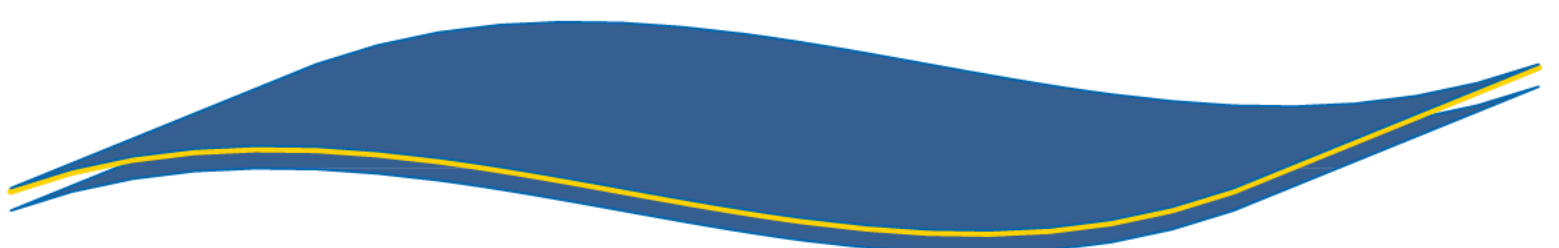
Existing Road Stage Road Safety Audit

Final

June 2018

Prepared for
City Projects Office
Brisbane Infrastructure

Prepared by
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1 INTRODUCTION

1.1 Background

Transport Engineering Studies has been commissioned by the City Projects Office to undertake an Existing Stage Road Safety Audit at the intersection of Logan Road and O'Keefe Street, Buranda. The purpose of this road safety audit is to provide an independent assessment of any road safety risks that may be present and to provide advice on options to mitigate identified risks.

1.2 Road Safety Risk Rating

The audit was completed in accordance with the requirements of Austroads, Guide to Road Safety: Part 6 Road Safety Audit, 2009. The audit report generally follows the format and topics outlined in the Austroads Checklist 6 for an existing road audit.

Risk rating of safety issues is defined as per Austroads Part 6 Table 4.4. Table 1.1 below outlines the severity and likelihood relationship consistently used to identify a risk rating. Actions required in response to these ratings are recommended as follows:

- **INTOLERABLE:** Must be corrected as quickly as possible.
- **HIGH:** Should be corrected or the risk significantly reduced, regardless of cost.
- **MEDIUM:** Should be corrected or the risk significantly reduced, if the treatment cost is moderate.
- **LOW:** Should be corrected or the risk reduced, if the treatment cost is low.
- **VERY LOW:** Deficiencies identified in the standard or the positioning of traffic control devices which, while unlikely to directly increase risk significantly have very low treatment cost and therefore should be mitigated with routine maintenance actions.

Table 1.1: Risk Rating Matrix

Severity		Frequency			
		Frequent (4)	Probable (3)	Occasional (2)	Improbable (1)
		Once/ week	Once/ year	5-10 years	<every 10 years
Catastrophic (4)	Likely multiple deaths	Intolerable (16)	Intolerable (13)	Intolerable (11)	High (7)
Serious (3)	Death or serious injury	Intolerable (15)	Intolerable (12)	High (8)	Medium (4)
Minor (2)	Minor injury	Intolerable (14)	High (9)	Medium (5)	Low (2)
Limited (1)	Trivial injury/property damaged	High (10)	Medium (6)	Low (3)	Very Low (1)

The above relies on professional engineering judgement of the audit team. Further information on determining risk ratings based on probability, severity and level of risk can be found in Austroads Part 6 Section 4.8 C.

1.3 Responding To Audit Findings

The Austroads Guide to Road Safety Part 6: Road Safety Audit clearly outlines that the client is not under any obligation to accept any or all of this road safety audit's recommendations. It should be noted that the recommendations outlined herein may not be the only option for mitigating the risk of a particular issue, or may not be the most cost effective option. It is good practice to document the reason(s) behind rejecting any findings from a road safety audit should such a decision be made. Refer to Austroads Part 6 Section 3.5 for further recommendations on rejecting audit findings.

1.4 Audit Trigger

Transport Engineering Studies understands that the trigger to undertake this Road Safety Audit has been at the discretion of the City Projects Office. Undertaking independent road safety auditing at various stages throughout the engineering design process ensures that safety is considered as an integral part of the design and planning process.

2 PROJECT DESCRIPTION

2.1 Study Area

The road extents considered in the Road Safety Audit are shown in Figure 2.1.

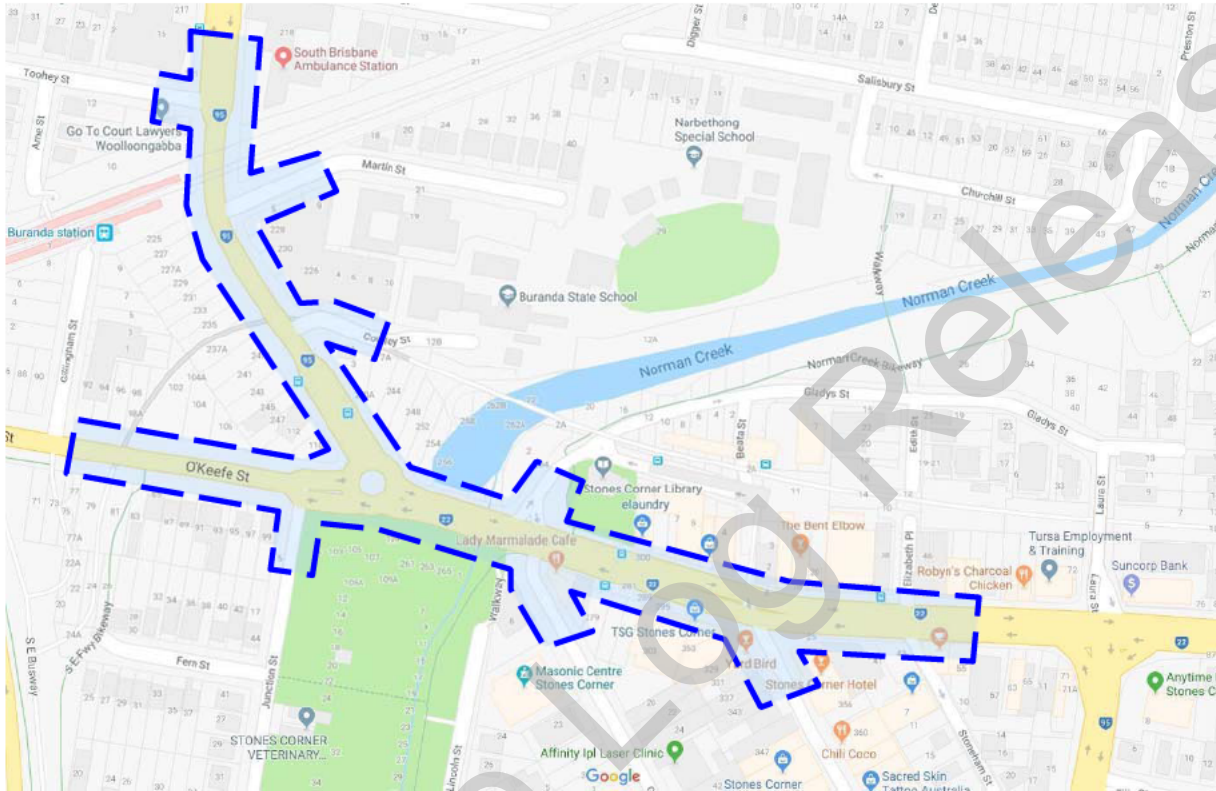


Figure 2.1: Road Safety Audit Extents

2.2 Inception Meeting

An inception meeting was held with staff from the City Projects Office on Tuesday, 20 March 2018. At the meeting it was noted that Council will be investigating upgrade options for the Logan Road/O'Keefe Street intersection, the primary drivers for which are capacity and active transport provisions.


2.3 Audit Details



A day and night time audit was conducted on Wednesday, 21 March 2018. Weather conditions were overcast and wet at the time of inspection. The audit was undertaken on foot and in a passenger vehicle.

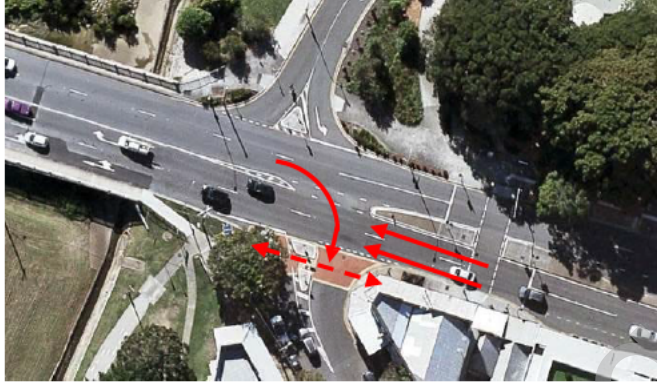
3 ROAD SAFETY AUDIT FINDINGS

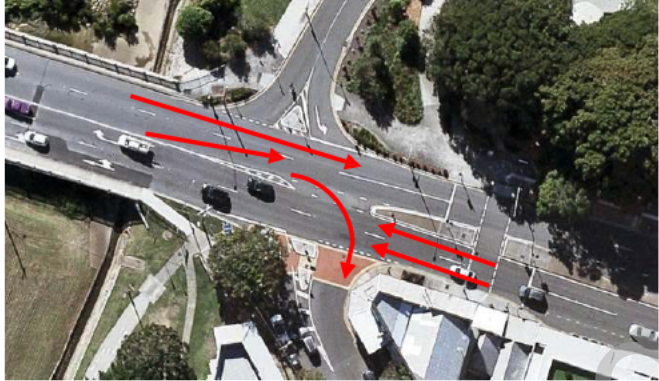
The following summarises the road safety issues, hazards and opportunities identified as part of the audit undertaken. The audit was completed in accordance with the requirements of Austroads, Guide to Road Safety: Part 6 Road Safety Audit, 2009. Issue locations are presented on attached Figures A2 to A6.



Table 3.1: General Road Safety Audit Findings


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
1.	WPT 1	 <p>Signs of pavement failure are present on Logan Road, immediately prior to the Old Cleveland Road intersection. If left untreated, this condition is expected to worsen.</p> <p>Potholes, cracking and level differences in the pavement can introduce control issues for motorcyclists and bicycle riders and increase the risk for falling incidents.</p> <p>It is also a pedestrian trip hazard due to the uneven walking surface for pedestrians crossing Logan Road. There is risk of injury to motorcyclists, cyclists and pedestrians.</p>	LOW (2)	Consider undertaking pavement works.	



Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
2.	WPT 2	 <p>The entry plaza to the Busway station may give the appearance of a roadway to northbound drivers on Logan Road approaching Old Cleveland Road. A left turn pavement arrow is provided but partially removed by service trenching. A Left Turn Only sign is installed in Old Cleveland Road but is positioned to the left of the intersection (i.e. not directly in the field of view of drivers looking towards the plaza). A driver may not realise that they cannot continue through to the plaza until they have proceeded part way across the intersection. Increased risk of angle collisions.</p>	LOW (2)	Consider relocating the left only sign more centrally in the field of view of approaching drivers. Consider repainting the left turn pavement arrow.	
3.	WPT 3, WPT 4, WPT 42, WPT 43, WPT 44	 <p>There are numerous kerb ramps not aligned with the receiving kerb ramps throughout the corridor. Visually impaired pedestrians may rely on the alignment to identify where the receiving kerb ramp is located, and could be directed onto the carriageway. Increased risk of pedestrian and vehicle conflict.</p>	LOW (2)	Consider realigning the kerb ramps.	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
4.	WPT 5	 <p>Vehicles turning right from Logan Road into Cleveland Street experience moderate levels of delay in peak periods. The footpath on the southern side of Logan Road caters for significant use. No dedicated right turn lane is provided, and vehicles propped to turn right partially block the right-hand through lane.</p> <p>Due to a combination of delays and wanting to avoid blocking traffic, drivers are more likely to fail to yield to pedestrians or cyclists crossing Cleveland Street.</p> <p>Risk of vehicle collisions with vulnerable road users.</p>	MEDIUM (5)	<p>Consider installing dedicated right turn lane.</p> <p>Consider signalling the intersection.</p> <p>Consider banning the right turn into Cleveland Street (during peak periods).</p>	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
5.	WPT 6	 <p>The widened 'median' allows right turning vehicles to partially move out of the through lane but not completely. Passing drivers may misjudge the available width for passing in the right-hand lane. Risk of side swipe and offset rear end collisions.</p>	MEDIUM (5)	<p>Consider providing a right turn lane. Consider banning the right turn. Consider reconfiguring arrangements to remove ambiguity. i.e. so that any propped vehicles are positioned wholly within the through lane.</p>	

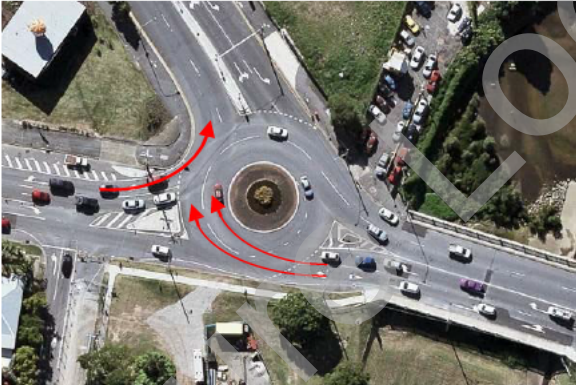
Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
6.	WPT 7	 <p>The timber fence on the southern side of Logan Road has horizontal rails that can be a spearing hazard if struck by passing cyclists. It is also a snag hazard as the ends of the rails project beyond the end post. Risk of higher injury if struck by cyclists.</p>	MEDIUM (5)	Consider replacing with conventional pedestrian fencing.	
7.	WPT 9, WPT 18, WPT 29, WPT 33, WPT 34, WPT 37, WPT 40	 <p>Non-frangible timber poles are located within the clear zone (including on the departure sides of the roundabout). Risk of higher severity injury if struck by errant vehicles.</p>	HIGH (8)	<p>SHORT TERM: Consider installing a hazard marker to delineate the power poles (where not already present).</p> <p>LONG TERM: Any plans to upgrade this corridor should consider relocation or undergrounding of power poles.</p>	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
8.	WPT 8	 <p>A directional sign is defaced and obscured by signs in the foreground. This may reduce awareness of directional movements for motorists unfamiliar with the area. Risk of late breaking/lane change manoeuvres leading to sideswipe and rear end collisions.</p>	LOW (2)	<p>Consider replacing the sign. Consider relocation of sign to a location where it is more visible to approaching traffic.</p>	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
9.	WPT 10	 <p>The barriers on the sides of the Norman Creek bridge do not have appropriate end treatments, and are a potential blunt impact hazard. Risk of higher severity injury to occupants of errant vehicles.</p>	HIGH (8)	Consider providing end treatments for all bridge barriers.	
10.	WPT 11	 <p>The timber guardrail is insufficient to prevent a vehicle from entering Norman Creek upon impact. Risk of higher severity injury to occupants of errant vehicles.</p>	HIGH (7)	Consider providing a road safety barrier system that has an appropriate beginning length of need on both bridge approaches.	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
11.	WPT 12	 <p>Delineation of the central island is limited to white paint on the kerb. Risk of vehicles mounting the island, particularly in poor visibility conditions on the O'Keefe Street approach.</p>	VERY LOW (1)	Consider installing hazard markers in the central island.	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
12.	WPT 13	 <p>Existing footpaths naturally channelise pedestrians on Logan Road and O'Keefe Street towards the roundabout, but no crossing facilities exist at the roundabout itself (which is multi-lane and carries significant traffic volumes). Pedestrian demands in the area are high as a result of the surrounding land uses and public transport nodes. These demands will grow given planned high density residential development in the vicinity of the intersection.</p> <p>Pedestrians were observed crossing the road at non-signalised areas close to the roundabout.</p> <p>Increased risk of pedestrian and vehicle conflict.</p>	MEDIUM (4)	<p>Consider signalling the intersection.</p> <p>Consider installing pedestrian fencing behind the kerbs to channelise pedestrians towards existing crossings.</p> <p>Consider installing pedestrian wayfinding signage.</p>	
13.	WPT 14	<p>Multi-lane roundabouts may be difficult for non-confident cyclists to navigate, particularly when carrying high vehicular volumes.</p> <p>The existing roundabout design does not include any specific provisions for cyclists, though the BCC <i>Bicycle Network Overlay Map</i> classifies all three legs of the intersection as primary cycle routes.</p> <p>Increased risk of cyclist and vehicle collisions.</p>	HIGH (8)	<p>Consider providing measures to improve safety and amenity for less confident cyclists (such as providing transition ramps, to and from paths to allow cyclists to easily bypass the roundabout).</p>	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
14.	WPT 15	<p>Vehicles at the Logan Road/O'Keefe Street roundabout experience high levels of delay in peak periods. This may increase risk-taking behaviour by drivers. Increased risk of angle collisions.</p>	MEDIUM (5)	<p>Consider increasing the capacity of the intersection (e.g. through the provision of bypass lanes) or increasing the acceptable performance threshold of the intersection by replacing the roundabout with traffic signals.</p>	
15.	WPT 16	 <p>Right turns are permitted from both lanes on the westbound approach to the roundabout. Visibility of vehicles turning right from the left-hand lane may be obscured by vehicle in the inside circulating lane to drivers turning left at the eastbound approach (who do not need to give way to traffic on the inside lane). Risk of crashes involving left turning and right turning vehicles.</p>	MEDIUM (4)	<p>Consider signalling the roundabout. Consider restricting right turns on the westbound approach to the right-hand lane only.</p>	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
16.	WPT 17	 <p>There is overgrown vegetation hanging over the footpath at a height of less than 1.5m. This is a clipping hazard for path users. Risk of injury to pedestrians cyclists.</p>	LOW (2)	Consider undertaking vegetation maintenance works.	
17.	WPT 19	<p>Vehicles attempting to turn right from Junction Street into O'Keefe Street in the peak periods experience high levels of delay. Traffic volumes in both directions on O'Keefe Street are significant, and queuing from the Logan Road roundabout extends back through the Junction Road intersection. Turning drivers only have a short (30m) distance over which to observe vehicles approaching from the right due to the proximity of the roundabout.</p> <p>The resultant delays may increase risk-taking behaviour by drivers (such as selecting inappropriate gaps in opposing traffic streams). Increased risk of angle collisions.</p>	HIGH (8)	Consider signalling the intersection. Consider restricting right turns out of Junction Street to O'Keefe Street (at all times or during peak periods).	

Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
18.	WPT 20	 <p>There are no Tactile Ground Surface Indicators to distinguish the holding point at the kerb ramps for path users crossing the Junction Street leg of the O'Keefe Street intersection. This intersection leg carries substantial traffic volumes in the peak periods. Increased risk of pedestrian and vehicle conflict.</p>	LOW (2)	Consider installing Tactile Ground Surface Indicators (TGSI) at the holding point.	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
19.	WPT 22, WPT 25, WPT 26, WPT 27	 <p>There are a number of instances of uneven level surfaces, gaps, drop-offs and cracks in the footpath throughout the corridor that are a hazard to pedestrians and cyclists and may result in slips, trips and falls. Risk of pedestrian and cyclist injury.</p>	LOW (3)	Consider undertaking footpath maintenance.	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
20.	WPT 23	 <p>Signs of pavement failure are present on Junction Street, immediately prior to the O'Keefe Street intersection. If left untreated, this condition is expected to worsen.</p> <p>Potholes, cracking and level differences in the pavement can introduce control issues for motorcyclists and bicycle riders and increase the risk for falling incidents.</p> <p>It is also a pedestrian trip hazard due to the uneven walking surface for pedestrians crossing Junction Street.</p> <p>There is risk of injury to motorcyclists and cyclists.</p> <p>Risk of pedestrian injury.</p>	LOW (2)	Consider undertaking pavement works.	


Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
21.	WPT 28	 <p>The left-hand side 60 km/h speed limit sign (for northbound motorists on Logan Road) is blocked by vegetation. This can potentially reduce motorist awareness of the change in speed restrictions. Increased variance in vehicle speeds may increase vehicle conflict.</p>	LOW (2)	Consider undertaking vegetation maintenance works.	

Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
22.	WPT 31	 <p>The tubular steel fencing in the western verge of Logan Road underneath the rail overbridge is a spear hazard in crashes involving errant vehicles. Risk of higher crash severity.</p>	MEDIUM (4)	Consider replacing the fencing with an alternative that does not have horizontal structural elements.	

Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
23.	WPT 32	 <p>The kerb ramps on Martin Street are not aligned. Visually impaired pedestrians may rely on the alignment to identify where the receiving kerb ramp is located and could be directed onto the Logan Road carriageway. Additionally, there are no Tactile Ground Surface Indicators to distinguish the holding point. Increased risk of pedestrian and vehicle conflict.</p>	LOW (2)	<p>Consider realigning the kerb ramps. Consider installing Tactile Ground Surface Indicators (TGSIs) at the holding point.</p>	

Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
24.	WPT 36	 <p>A directional sign on Logan Road southbound is obscured by vegetation in the foreground. This may reduce awareness of directional movements for motorists unfamiliar with the area. Risk of rear end and sideswipe crashes due to late braking or lane change manoeuvres.</p>	LOW (2)	Consider undertaking vegetation maintenance works.	

Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
25.	WPT 38	 <p>There is a 14.5m crossing distance between the northern and southern sides of Cowley Street at the Logan Road intersection. Pedestrians crossing at this this location are exposed to turning traffic for a long period, particularly during busy school peak periods. Increased risk of pedestrian and vehicle conflict.</p>	MEDIUM (4)	Consider installing a median refuge so that pedestrians can stage crossing manoeuvres.	

Item	Location	Issue/Risk Description	Risk	Possible Solution	Client Response
26.	WPT 41	 <p>Significant ponding began to form at the northern side of the mid-block signalised crossing outside the Stones Corner Library during a rain event. It was observed that pedestrians navigated around the ponding outside of the pedestrian crossing to avoid the slip hazard, increasing the likelihood of conflict with vehicles. Increased risk of pedestrian and vehicle conflict.</p>	MEDIUM (4)	Consider undertaking works to improve drainage at this location.	
27.	WPT 30	<p>There is evidence of previous collisions with underside of the rail overpass across Logan Road. Static advance warning signs are provided on both approaches, but may not be conspicuous enough for a high volume, multi-lane corridor. Risk of vehicle and property damage.</p>	LOW (3)	Consider providing non-static warning devices (e.g. flashing lights that operate when triggered by Overheight Vehicle Detectors).	

4 CRASH ANALYSIS

Intersection crash records (2013-2017) have been assessed to determine if any safety deficiencies can be identified from crash type trends or clusters at specific locations. Table 4.1 below summarises the number of crashes and crash types recorded in each year.

Table 4.1: Study Area Crash History (2013-2017)

DCA Code	Description	2013	2014	2015	2016	2017	TOTAL
001	PEDESTRIAN: NEAR SIDE VEHICLE HIT FROM RIGHT	1	1				2
002	PEDESTRIAN: HIT EMERGING BEHIND VEHICLE			1			1
003	PEDESTRIAN: FAR SIDE VEHICLE HIT FROM LEFT		1	1	1		3
104	VEHICLES ADJACENT APPROACH: THRU-RIGHT	1				1	2
105	VEHICLES ADJACENT APPROACH: RIGHT-RIGHT	1					1
107	VEHICLES ADJACENT APPROACH: THRU-LEFT	1	1	1			3
202	VEHICLES OPPOSITE APPROACH: THRU-RIGHT	2	2				4
203	VEHICLES OPPOSITE APPROACH: RIGHT-LEFT				1		1
207	VEHICLES OPPOSITE APPROACH: U-TURN		1				1
301	VEHICLES SAME DIRECTION: REAR END	3		3	2	1	9
302	VEHICLES SAME DIRECTION: LEFT REAR				1		1
305	VEHICLES SAME DIRECTION: LANE SIDE SWIPE	1					1
307	VEHICLES SAME DIRECTION: LANE CHANGE LEFT	1					1
308	VEHICLES SAME DIRECTION: RIGHT TURN S/SWIPE	1					1
309	VEHICLES SAME DIRECTION: LEFT TURN S/SWIPE	1					1
408	VEHICLES MANOEUVRING: ENTERING FROM FOOTWAY					2	2
604	VEHICLES ON PATH: CAR DOOR			1			1
605	VEHICLES ON PATH: PERMANENT OBSTRUCTION		2	1			3
607	VEHICLES ON PATH: TEMPORARY OBJECT ON CARRIAGEWAY			1			1
703	OFF PATH-STRAIGHT: LEFT OFF CARRIAGEWAY HIT OBJECT		1				1
705	OFF PATH-STRAIGHT: OUT OF CONTROL ON CARRIAGEWAY					1	1

DCA Code	Description	2013	2014	2015	2016	2017	TOTAL
803	OFF PATH-CURVE: OFF CARRIAGEWAY RT BEND HIT OBJECT					1	1
805	OFF PATH-CURVE: OUT OF CONTROL ON CARRIAGEWAY			1			1
TOTAL		13	9	10	5	6	43

The following observations have been made regarding this data:

- Three rear end crashes at the O'Keefe Street/Gillingham Street intersection, though the crash circumstances vary substantially (one involved a driver taking their foot off the brake pedal after initially coming to a stop, another involved a driver claiming that the sun obscured their vision).
- Two through/right crashes and one through/left crash at the O'Keefe Street/Junction Street intersection (refer to Issue 17).
- Four cyclist-involved crashes at the O'Keefe Street/Junction Street intersection (refer to Issue 13).
- Five angle crashes and three rear end crashes at the Logan Road/O'Keefe Street intersection (refer to Issue 14).
- Three crashes involving pedestrians in the immediate vicinity of the Logan Road/Old Cleveland Road intersection, though the crash circumstances vary substantially (one involved an eastbound vehicle running a red light, one involved a pedestrian crossing the road away from the crossing, another involved a cyclist merging from a parking lane into a vehicle).
- Three strikes on the rail overbridge (refer to Issue 27).

The locations of the recorded crashes are shown on Figure A1 at Appendix A.

5 STATEMENT BY AUDIT TEAM

The findings and recommendations in this report are the opinions of the auditors listed below. The auditors have made every effort to identify all relevant safety issues applicable to the purpose of this audit.

The Austroads' Guide to Road Safety Part 6: Road Safety Audit clearly outlines that the client is not under any obligation to accept any or all of this road safety audit's recommendations.

Where client responses are documented in this report, they have been recorded after the completion of the audit and have not been considered by the Auditors at the time of preparing the report.

Michael Pickerill – Accredited Senior Road Safety Auditor


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Alex Thompson – Road Safety Team Member


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