

Feasibility Stage



Road Safety Audit

North Cottesloe Primary School – Railway St KissnRide

Town of Cottesloe

May 2020

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1 Introduction

1.1 Scope of Audit

The Town of Cottesloe has commissioned this feasibility stage road safety audit of a proposed upgrade of the KissnRide facility on Railway Street at the North Cottesloe Primary School, including the examination of the existing KissnRide facility on Eric Street. The purpose of the audit is to identify any safety issues or deficiencies with the design and provide recommendations to address these deficiencies and safety issues.

Site plans annotated to indicate the locations of the audit findings have been provided at Appendix A.

1.2 Background Information

1.2.1 Documentation provided for audit

A summary of documents provided for audit is presented at Appendix B.

At the audit commencement meeting, the audit team noted that the two Cardno "North Cottesloe Primary School Concept" drawings (un-numbered but dated 24 June 2019, Revision A) showed a different configuration of pedestrian facilities at the proposed KissnRide;

- The Cardno drawings show wombat crossings across both through lanes of Railway Street as well as the KissnRide area.
- Sketches SK300 and SK301 show a wombat crossing at the KissnRide facility leading directly towards a guard-attended crossing for the through-lanes of Railway Street.

Note: A wombat crossing is a zebra crossing positioned on an elevated platform.

1.2.2 Description of the site

North Cottesloe Primary School is situated at the north east quadrant of the intersection of Eric Street and Railway Street, Cottesloe. It is adjacent to the Perth-Fremantle Railway line and with limited rail crossings in the area, Eric Street serves as the primary access for the school catchment to the west of the railway line.

Eric Street provides Distributor A access between Curtin Avenue and Stirling Highway, while Railway Street provides Local Distributor access along the eastern boundary of the Perth -Fremantle Rail line, between the nearest crossings of the rail line (grade separated crossing at Claremont Crescent approximately 1 km to the north of Eric Street, at-grade rail crossing at Jarrad Street approximately 1 km to the south of Eric Street).



In the vicinity of North Cottesloe Primary School, Eric Street is configured predominantly as a 2-lane road with painted centre median. Between the KissnRide entry and Stirling Highway, Eric Street has line marked sealed shoulders which are painted green and marked as cycle lanes at the median island immediately east of the KissnRide exit. However, segregated on-road cycling facilities do not extend through the Eric Street / Railway Street roundabout, where instead there are footpaths.

In the vicinity of North Cottesloe Primary School, Railway Street is configured as a 2-lane undivided road. There are footpaths along both verges of Railway Street.

1.2.3 Traffic

Information on existing road use was obtained from the Main Roads WA Trafficmap website. The following table summarises this information.

Location	Weekday traffic	Survey date	Linear growth rate (%)
Eric Street, immediately west of	9,353 vpd	2019/20	2.40/
Stirling Highway	8,537 vpd	2015/16	2.470
Bailway Street (at the interpretion with	3,482 vpd		
Mapp Street 24 hour video survey	including 150	1 June 2017	Single survey
Main Street - 24 nour video Survey)	bicycles		

The following traffic information was provided by the Town of Cottesloe.

Location	Weekday traffic	Survey date	Linear growth rate (%)
Railway Street – between Greenham Street and Grant Street	3,351 vpd	30 Oct 2019 – 13 Nov 2019	Single survey

It is noted that at the time of the audit site inspection, it is not known whether the pedestrian and vehicular traffic at school closing time was representative of normal activities. This is because of Covid-19 influences whereby caregivers had the option of schooling from home. Advice from the North Cottesloe Primary School prior to the audit was that they anticipated approximately 80% of normal attendance at the time the audit site inspection was undertaken.

1.2.4 Historic Crash data

Reported crashes for 2015 to 2019 inclusive were sourced for;

- the section of Railway Street from Greenham Street to the roundabout at Eric Street.
- The section of Eric Street from the roundabout at Railway Street up to the slow point near Gordon Street.

There were no reported crashes over the sections where the upgraded KissnRide facility is proposed.

On Eric Street, the following property damage crashes have been reported;



- Three RUM 11 right-angle crashes at the Railway Street / Eric Street roundabout, one involving a bicycle.
- Two RUM 17 Thru-left crashes at the Eric Street roundabout.
- One RUM 45 (Reversing rear-end) crash on the eastern Approach of Eric Street to the roundabout.
- One unallocated RUM 31 (Rear-end) crash at the roundabout, and another immediately west of the slow point island.

These crashes occurred predominantly outside school drop off and pick up hours (mostly late afternoon) and in dry weather conditions.

A collision diagram showing these crashes is presented at Appendix D.

1.3 Audit Process

1.3.1 Team organisation

The feasibility stage road safety audit team comprised:

Name	Organisation	Audit role
Adrian Bird	ADBird Engineering Pty Ltd	Team Leader
Andrew McDougall	GAF Traffic	Audit team member (accredited Senior Road Safety Auditor)

Table 2: Audit team

1.3.2 Audit methodology

Prior to the audit on Sunday 26 April 2020, the team leader captured daytime video of the site for reference purposes by the audit team.

Also prior to the audit commencement meeting, the team leader phone the North Cottesloe Primary School Principal, Doug Cook, to discuss operational observations of traffic and vulnerable road user interactions at the existing KissnRide facility on Railway Street.

The audit commencement meeting was held via Skype due to Coronavirus social distancing requirements, between 1.15 and 2.15pm on Thursday 30 April 2020. Participating in the audit commencement meeting was the audit team with David Lappan from the Town of Cottesloe.

A job safety analysis was prepared covering the site inspection activities, in recognition of the potential traffic hazards to audit team members in conducting the site inspections.



The daytime site inspection was conducted between 2.45pm and 3.45 pm on Thursday 30 April 2020, attended by both audit team members. During the afternoon site inspection, the audit team liaised briefly with the Traffic Warden manning the guard-attended crossing on Railway St to discuss any operational concerns. The night time site inspection was conducted on Thursday 30 April between 6.30pm and 7.00pm.

A draft audit report was prepared and audit team member comments were incorporated into the final report.

The audit team also completed the Road Safety Around Schools Audit Checklist.

1.3.3 Audit compliance

The audit has been conducted in accordance with Austroads Guide to Road Safety Part 6: Road Safety Audit (2009) and IPWEA (WA) audit requirements. It covers physical features of the site which may affect the road user safety and has sought to identify potential safety hazards based on the background information and site inspections. However, the auditors point out that no guarantee is made that every deficiency has been identified.

1.3.4 Safe System Findings

The aim of Safe System Findings is to focus the Road Safety Audit process on considering safe speeds and by providing forgiving roads and roadsides. This is to be delivered through the Road Safety Audit process by accepting that people will always make mistakes and by considering the known limits to crash forces the human body can tolerate. This is to be achieved by focusing the Road Safety Audit on particular crash types that are known to result in higher severity outcomes at relatively lower speed environments to reduce the risk of fatal and serious injury crashes.

Ratings of audit Findings or Recommendations are provided in the form (**KSI Severity Rating : Likelihood Rating**). A KSI Rating of "IMPORTANT" is used to provide emphasis to any road safety audit finding that has the potential to result in fatal or serious injury or findings that are likely to result in the following crash types above the related speed environment: head-on (>70 km/h), right angle (>50 km/h), run off road impact object (>40 km/h), and crashes involving vulnerable road users (>30 km/h), as these crash types are known to result in higher severity outcomes at relatively lower speed environments.

The Likelihood Rating (of crash occurrence) takes account of factors including exposure (traffic volumes and movements), speed environment, crash history and the road environment, and is subjective in that it requires the application of road safety engineering and crash investigation experience. The Likelihood Rating of crash occurrence is rated "VERY HIGH", "HIGH", "MODERATE" or "LOW".

1.3.5 Responding to the road safety audit

A Corrective Action Report to be completed by Main Roads WA is attached at Appendix E.



It is the responsibility of the Town of Cottesloe to seek additional advice, if necessary, before accepting any of the recommendations or proceeding with any solutions to address the recommendations made in this report.

1.3.6 Disclaimer

This report addresses physical features of the site (as described in section 1.1 Scope of Audit) which may affect the road user safety and has sought to identify potential safety hazards based on the available background information (refer to Appendix B) and site inspections.

The report is based on the conditions viewed at the times of inspection and is relevant at the time of production of the report. The times of site inspection may not be representative of all states of road use and therefore may not allow identification of all road safety hazards (eg wet weather performance).

The road safety audit team does not warrant, guarantee or represent that this report is free from errors or omissions or that the information is exhaustive. Information contained within this report may become inaccurate without notice, may be wholly or partly incomplete or incorrect, or may be superseded. Before relying on the information in this report, users should carefully evaluate the accuracy, completeness and relevance of the information and seek appropriate expert advice in the interpretation of this report. Furthermore, users should not solely rely on the contents of this report or draw inferences to other sites.

Subject to any responsibilities implied in law which cannot be excluded, the road safety audit team is not liable to any party for any losses, expenses, damages, liabilities or claims whatsoever, whether direct, indirect or consequential, arising out of or referable to the use of this report, howsoever caused whether in contract, tort, statute or otherwise.



2 Audit Findings and Recommendations

The audit findings and recommendations are presented in the Corrective Action Report in Appendix E.



3 Conclusions

This road safety audit has been carried out for the purpose of identifying any features that could be changed to improve the safety of the concept design of the proposed upgrade to the Railway Street KissnRide facility at the North Cottesloe Primary School.

All the identified problems have been noted in this report and the accompanying recommendations are forwarded to the Town of Cottesloe for consideration.

Revision	Date	Approved	Purpose	
А	3 May 2020	Adrian Bird	DRAFT for audit team review and comment	
0	11 May 2020	Adriande	Issued for Town of Cottesloe use	

Adrian Bird (Audit Team Leader)



APPENDIX A

Site plans indicating the audit finding locations





Figure A1: Site plan showing the audit finding locations along Railway Street



Figure A2: Site plan showing the audit finding locations along Eric Street (Map source: Nearmap)



APPENDIX B

Documents provided for audit

The following table provides a summary of the documents provided for the audit.

Title	Detail	Date
Road Safety Audit Brief	email	22 April 2020
Reported crashes	Railway Street – Greenham Street to Eric Street Eric Street – Railway Street to the slow point immediately west of Gordon Street	2015 to 2019 inclusive
Town of Cottesloe resolution	Item 2i	25 February 2020
Traffic Engineering, Safety Review and Travel Management Plan V5	Move Consultants	September 2019
Previous Road Safety Audits	None identified	-

Table B1 Documents provided for audit



APPENDIX C

Site Photos



Photo	Photo content	
1	Vehicles were observed driving contra-flow to get past illegally standing vehicles on Eric Street shortly before and after school closing time.	
2	2 The driver of the vehicle at the left of this photo is trying to turning left from Railway Street onto Eric Street. Vehicles were observed mounting the roundabout splitter island to get past the illegally standing vehicles shown in the eastbound lane of Eric Street.	
3	Sight distance to the west along Eric Street from the KissnRide exit is restricted by the Banksia trees.	9
4	Footpath running along the east verge of Railway St. Note the path width and also the foliage encroaching over the footpath.	11
5	Multiple tow ball strikes evident and wide lane width at the Eric Street KissnRide exit.	13
6	6 Soft, uneven surface of the informal parking area on the west verge of Railwa Street, north of the proposed KissnRide facility.	
7	View from the roundabout northwards showing the poor delineation at the NW quadrant of the Eric St / Railway St roundabout due to the faulty street light (indicated in the red circle).	15

Table C1 Photo index





Photo 1: Vehicles were observed driving contra-flow to get past illegally standing vehicles on Eric Street shortly before and after school closing time.



Photo 2: The driver of the vehicle at the left of this photo is trying to turning left from Railway Street onto Eric Street. Vehicles were observed mounting the roundabout splitter island to get past the illegally standing vehicles shown in the eastbound lane of Eric Street.





Photo 3: Sight distance to the west along Eric Street from the KissnRide exit is restricted by the Banksia trees.



Photo 4: Footpath running along the east verge of Railway St. Note the path width and also the foliage encroaching over the footpath.





Photo 5: Multiple tow ball strikes evident and wide lane width at the Eric Street KissnRide exit.



Photo 6: Soft, uneven surface of the informal parking area on the west verge of Railway Street, north of the proposed KissnRide facility.





Photo 7: View from the roundabout northwards showing the poor delineation at the NW quadrant of the Eric St / Railway St roundabout due to the faulty street light (indicated in the red circle).



APPENDIX D

2015 to 2019 crash information



APPENDIX D1

Road User Movement (RUM) codes



Crash Factor Matrix

ROAD USE MOVEMENT (RUM) CODES

	0	1	2	3	4	5	6	7
	PEDESTRIAN on foot, in toy/pram	INTERSECTION vehicles from adjacent approaches	VEHICLES FROM OPPOSING DIRECTIONS	VEHICLES FROM ONE DIRECTION	MANOEUVRING	overtaking	ON PATH	OFF STRAIGHT, ON STRAIGHT
-		2	1 2	Vehicles in same lanes				0-0-0-1
I	1	тняч-тняч]	1 SIDE SWIPE HEAD ON 21	REAR END 31		HEAD ON 51	PARKED 61	OFF CARRIAGEWAY TO LEFT
2				2 1				
		right-thru 12	2 тнячняснт 22	LEFT REAR 32	LEAVING PARKING 42	OUT OF CONTROL 52	DOUBLE PARKED 62	INTO OBJECT/VEHICLE
3				2 1		2 1		
	FAR SIDE 3		B RIGHT LEFT 23	RIGHT REAR 33	parking 43	ришив сит 53	BROKEN DOWN 63	TO RIGHT
4				2				RIGHT
	Lying, standing on Carriageway 4		4 RIGHT RIGHT 224	UTURN 34	PARKING VEHICLES ONLY 44	слліка ім 54	CAR DOOR 64	OFF CARRIAGEWAY INTO OBJECT/VEHICLE 7
5	1	2	2 1	Vehicles in parallel kanes	1 2	2		222.
	WALKING WITH TRAFFIC 5	RIGHT-RIGHT] {	5 THRU LEFT 25	LANE SIDE SWIPE 35	reversing 45	PULLING OUT REAR END 55	OBSTRUCTION 65	OUT OF CONTROL ON CARRIAGEWAY
6				2	۶ <u></u>			g (
	FACING TRAFFIC 6			LANE CHANGE RIGHT 36	REVERSING INTO FIXED OBJECT 46	0.1rt 56	TEMPORARY ROADWORKS 66	LEFT TURN 7
7		2					-	
	DRIVEWAY 7	тнки-церт 1	7 UTURN ¹ 27	LANE CHANGE LEFT 37	LEAVING DRIVEWAY 47		TEMPORARY OBJECT ON CARRIAGEWAY 67	RIGHT TURN 7
8		2		$\frac{2}{1}$				
	ON FOOTWAY 8	RIGHT-LEFT] {	3	RIGHT TURN S/S 38	LOADING BAY 48			
9	STRUCK WHILE BOARDING OR ALIGHTING O							
	OTHER 98	OTHER 10	OTHER 20	OTHER 30	OTHER 40	Other 50	OTHER 60 (MISSILE/ FLYING OBJECT)	Other 70



APPENDIX D2

Collision diagram



RAILWAY ST, ERIC ST TO GREENHAM ST AND ERIC ST, RAILWAY ST TO SLOW POINT NEAR GORDON ST, COTTELSOE COLLISION DIAGRAM 205 TO 2019 REPORTED CRASHES



APPENDIX E

Corrective Action Report



Road Safety Audit: Feasibility audit for concept design of North Cottesloe Primary School KissnRide facility on Railway Street

Audit Stage:	Feasibility Stage
Documents Reviewed:	Refer to Appendix B of the Road Safety Audit report
Audit Team:	Adrian Bird (Team Leader), Andrew McDougall
Audit Date:	30 April 2020

ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
1	Form of pedestrian facility at the proposed KissnRide on Railway Street	 The Cardno concept plans provided for audit show collinear wombat crossings on both lanes of Railway Street as well as the KissnRide facility. Sketches SK300 and SK301 show a wombat crossing at the KissnRide facility collinear with a guard attended crossing across both lanes of Railway Street. Operational details indicating how each form of pedestrian facility would operate were not provided to the audit team. The adoption of a wombat crossing instead of a guard-attended crossing across the through-lanes of Railway Street is likely to result in; Periods of traffic congestion at peak pedestrian times where the crossing is continuous in use by pedestrians, possibly leading to driver frustration and inappropriate, unsafe driver behaviour. 	actions and comments)
		 Greater reliance on young children (where unsupervised) cognitively assessing whether an approaching vehicle will yield and if it is safe to cross the road. Errors of judgement can result in high severity crashes in a 40km/hr speed environment. Possibly lower levels of driver compliance in yielding to pedestrians due to the absence of a traffic warden at the crossing. In addition, the layout of the proposed KissnRide facility on Railway Street includes; Children having to cross the KissnRide car park in order to get to the pedestrian crossing across Railway Street, and 	



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
		 Children crossing the KissnRide lane in close proximity to angle parking bays in which vehicles in the closest bays will be reversing towards the crossing. Visibility of small children in this instance is likely to be restricted. 	
		Each of these safety issues can result in high severity crash outcomes. (IMPORTANT: LOW)	
		Justification	
		Although in most instances, children using the crossings will be supervised, this cannot be guaranteed. Unsupervised children may not be able to cognitively process either;	
		 A change in priority between a wombat crossing and a crossing where a guard has not implemented pedestrian priority, or 	
		• The need for caution at a wombat crossing at which the pedestrian has priority but the vehicle driver has failed to yield.	
		It is not clear from the information provided for audit;	
		 Whether a wombat crossing across Railway Street will meet Main Roads WA warrants. Whether the proposed configuration of the guard attended crossing option across Railway Street can be managed by a single guard (given the median width). How three separate lanes of traffic will be effectively managed. NOTE: Advice from the WAPOL children's crossing and road safety committee is that a traffic warden would only provide supervision to the warranted area (the crossing of through-lanes on Railway Street) and would be restricted from providing any supervision on the adjacent wombat crossing within the KissnRide car park area. There are legal implications for anyone supervising pedestrians on the KissnRide wombat crossing. 	
		The audit team consider the safety of pedestrian facilities at which intermittent pedestrian priority over vehicles is established by a competent person or by a signal device is a better overall safety option compared with the wombat crossings option, in particular considering;	
		a) The likelihood of compliance by drivers with pedestrian priority facilities.	



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
		b) The risks of creating congestion on (Local Distributor) Railway Street prompting driver frustration and associated inappropriate driver behaviour.	
		Recommendations	
		1. Review the form of the proposed pedestrian priority facility across Railway Street.	* Wombat crossing within the carpark and a self regulating crossing on Railway
		2. Review the location of the wombat crossing at the proposed KissnRide facility as well as the interface arrangements of this facility with the proposed pedestrian priority facility across Railway Street.	Street managed by a warden. * Having a wombat crossing on Railway
		3. Develop a management plan for the proposed form of pedestrian facility at the proposed KissnRide and the adjacent crossing of the realigned section of Railway Street. This should address issues including;	Street may cause confusion between regulated crossing and warden controlled crossing. * Include 8km/hr posted sign in carpark.
		 Formalising the responsibilities for supervision of children leaving school grounds in relation to the pedestrian facilities across the KissnRide trafficable lane and also across Railway Street. Whether the KissnRide pedestrian facility will be supervised and if so, how. Whether one or two guards will be required to manage pedestrian movements the through-lanes of Railway Street (guard-attended option). 	
		4. If it is proposed to use different pedestrian treatments for the KissnRide and the lanes of Railway Street, then ensure that the possibility of pedestrians continuing unhindered across both types of facility is mitigated. This could be achieved by either;	
		 Ensuring that the different facility types are not collinear, or Installing a gating structure to ensure that the two facility types are physically segregated (eg using offset grab rails). Ensuring supervision of children at the interface between the two types of pedestrian facility. 	
		5. Liaise with the WAPOL children's crossing and road safety committee and Main Roads WA to confirm whether;	
		 a wombat crossing on either the KissnRide or across Railway Street through lanes meets warrants. 	



Item Descriptio	n Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
	 A guard attended pedestrian facility across the Railway Street through lanes can be managed by a single guard and if the location requires 2 traffic wardens. Alternative treatments such as a Pelican crossing covering the two through-lanes of Railway Street as well as the KissnRide facility would be an acceptable alternative pedestrian priority facility. Note: This option is likely to generate relatively greater delays for pedestrians and for vehicles compared with the guard-attended option. Modify the design as appropriate based on the advice received from recommendation 5 above. 	



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
2	KissnRide parking bays near the proposed pedestrian priority crossing on Railway Street	 The Cardno concept plan shows KissnRide parking bays immediately abutting the wombat crossing. A vehicle occupying the bay immediately upstream of the wombat crossing will obstruct sight lines between pedestrians and approaching vehicles, possibly resulting in a high severity crash. (IMPORTANT: LOW) Justification Drivers approaching a wombat crossing must have unobstructed views of pedestrians on the wombat crossing. Main Roads WA's standard drawing for zebra crossings (Drawing 200331-164-3) indicates minimum distances for the restriction of Stopping as being 20m upstream and 10m downstream of the closest edge of a zebra crossing. The audit team were not provided information on the proposed speed limit to be applied within the proposed KissnRide facility. However, it is expected that a speed limit no greater than 10km/hr would be applied. Australian Standard AS1158.4 at Figure 3.1 describes the 'surround zone' comprising the area 3m back from each approach to the zebra crossing as the area in which driver visibility of persons approaching the crossing needs to be provided. Recommendation Modify the design to ensure that Crossing Sight Distance is achieved at the wombat crossing, and that Stopping Sight Distance is achieved for the surround zones 3m adjacent to the wombat crossing, and that Main Roads WA's no stopping distances are provided. This may be achieved by; Providing a nib for the east verge of the wombat crossing (this reduces the crossing distance of the wombat crossing, provides additional pedestrian storage and reduces the likelihood of congestion on the footpath running along the eastern verge of Railway Street) Modifying the KissnRide parking bay arrangement to provide the necessary sight lines and no stopping distances. 	* Agree with nib that is within carpark adjacent to school fenceline. * 2 bays before and after wombat crossing within carpark to be removed. Agree with recommendation.



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
3	Signs and line marking at the proposed pedestrian priority facility on Railway Street	The Cardno concept plans provided for audit show indicatively some of the signs and line marking required for the proposed pedestrian priority facilities on Railway Street including the proposed KissnRide. Main Roads WA have developed guideline drawings for both zebra crossings and Traffic Warden controlled children's crossings that mitigate the potential for drivers to fail to react appropriately when the pedestrian facilities are in use and also to provide consistency in pedestrian priority facilities at schools throughout Western Australia. This is necessary to avoid potential high severity crashes between vehicles and pedestrians (IMPORTANT: LOW) Justification Main Roads WA provide a guideline and drawings on their website for; Traffic Warden Controlled Children's Crossings. Zebra Crossings. Recommendation Ensure that the appropriate Main Roads WA guidelines and drawings are complied with in developing the design for the KissnRide facility on Railway Street.	* Wombat crossing going over Railway Street to be removed as per recommendation in item 1. There needs to be a compliance check to ensure compliance with these standards. * Agree with recommendation.



Item	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
4	Restricted sight lines at the proposed pedestrian priority facilities	The Cardno concept plans show an existing power pole surrounded by what appears to be w-beam safety barrier, immediately adjacent to the proposed wombat crossing on the realigned section of Railway Street. Persons located in the median of Railway Street could be concealed from an approaching southbound driver on Railway Street by either the power pole or the safety barrier. Failure of the driver to detect a person in this situation could result in a high severity crash (IMPORTANT: HIGH) Justification It is essential for the safe operation of a pedestrian priority facility that approaching drivers can see persons approaching the crossing as well as those already on it. Recommendation Modify the design so that persons within 3m of the wombat crossing can be seen by drivers approaching from the north on Railway Street.	



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
5	Restricted sight lines at the proposed pedestrian facility to the north of the KissnRide facility on Railway Street	The Cardno concept plans show an existing power pole surrounded by what appears to be w-beam safety barrier, located in the median at the north end of the proposed realignment section of Railway Street. Persons located in the median of Railway Street could be concealed from an approaching northbound driver on Railway Street by either the power pole or the safety barrier. Failure of the driver to detect a person in this situation could result in a high severity crash. (IMPORTANT: HIGH) Justification It is essential for the safe operation of a pedestrian priority facility that approaching drivers can see persons approaching the crossing as well as those already on it. Recommendation Modify the design so that persons within 3m of the pedestrian facility can be seen by drivers approaching from the south on Railway Street.	* Guardrail to be replaced by traffic rated bollard and barrier kerb to provide the equivalent protection for power pole whilst providing the required sight lines for pedestrians. * Agree with recommendation.



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
6	Road user non- compliance with existing parking controls on Eric Street	During the afternoon site inspection, the audit team identified several vehicles illegally standing on the eastbound lane of Eric Street, between the Eric Street / Railway Street roundabout and the entry to the existing KissnRide facility on Eric Street. This included vehicles standing within the roundabout and appeared to contribute to queues of vehicles extending to the western side of the Curtin Avenue intersection. This issue effectively gridlocked traffic on Eric Street as well as Railway Street in the vicinity of both existing KissnRide facilities, resulting in some drivers proceeding contraflow as well as mounting roundabout splitter island and central annulus areas to try to pass the standing vehicles. This increases the risk of driver frustration resulting in a range of crash types including rear end, side swipe, head-on and high severity crashes between pedestrians and vehicles at the roundabout. (IMPORTANT: MODERATE) Justification Refer to Photos 1 & 2 at Appendix D of the audit report. The effect of vehicles illegally standing on Eric Street was to exacerbate significant congestion approximately 15 minutes prior to, and for 15 minutes following, the close time siren for the North Cottesloe Primary School. The restriction of traffic flows eastbound on Eric Street also severely restricted the opportunity for other drivers to complete an anticlockwise circulatory movement around the school when access into either KissnRide facilities, now and following the implementation of any upgrades. Anticlockwise circulatory traffic movements around the school are already possible by utilising Eric Street, Mann Street, Grant Street and Railway Street.	



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
		The audit team were briefed that the ongoing use of the Eric Street KissnRide had not been determined at the time of audit.	
		Recommendations	
		1. The proposed provision of a new KissnRide facility on Railway Street is supported in principle by the audit team as a means of improving the safety of all road users, by utilising Railway Street which carries significantly less through traffic than Eric Street.	
		2. For as long as the Eric Street KissnRide facility remains in service;	* Agree with recommendation 2.
		 the existing parking restrictions on Eric Street need to be enforced to deter drivers from standing illegally. Drivers seeking to utilise a KissnRide facility need to be educated in the need to circulate anti-clockwise around the school if access into a KissnRide facility is unavailable, instead of blocking traffic by queuing at a KissnRide entry point. Improve the conspicuity of parking controls in place along Eric Street by repainting the yellow edge line and placing addition No Standing signs at the start and finish of the restricted section. 	* Point 2 in relation to the anti-clockwise circulation will need to be clarified to specify going around the block.
		3. If the Eric Street KissnRide facility is to be closed following the implementation of the new KissnRide facility on Railway Street, then means of stopping it's use as a pick up point need to be determined. (The documentation provided for audit does not clarify what is intended for the existing Eric Street KissnRide facility). For example, the Eric Street KissnRide might be re-purposed as a segregated staff car park (possibly using a permit system) with a small separate allocation of parking bays for school visitors. This would require removal of the existing KissnRide pavement markings and reconfiguration of sealed and unsealed (limestone surfaced) parking areas.	* Existing kiss and ride will be staff parking and for kindy mainly drop offs and refresh yellow line on Eric Street and location of "No Stopping" sign and surveillance for compliance.



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
7	Parking controls for the proposed KissnRide facility on Railway Street	The concept designs provided to the audit team do not indicate parking controls that will be required to appropriately manage traffic at and near the facility. Failure to provide adequate parking controls will result in traffic congestion which in turn may escalate driver frustration leading to inappropriate, unsafe driver behaviour. Such behaviour could result in a vehicle versus pedestrian crash with high severity outcomes. (IMPORTANT:LOW) Justification The audit team observed highly undesirable manoeuvres by drivers trying to get past illegally standing	*Increase enforcement in the interim and install centre median on Eric Street as the worst case to prevent queuing should the problem persist.
		vehicles at the Eric Street KissnRide facility. Associate congestion also gave rise to driver frustration which included several prolonged soundings of vehicle horns. Main Roads WA's Traffic Warden Controlled Children Crossing guideline provides details on preferred minimum No Stopping distances as well as signs and line marking requirements at guard-attended	
		Recommendation As an integral part of the KissnRide design, include parking controls to limit the possibility of excessive traffic congestion or unsafe manoeuvres around parked or standing vehicles on through-lanes.	



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
8	All movement exit from the proposed KissnRide	The concept designs for the proposed KissnRide facility show both right and left turn movements being accommodated at the KissnRide exit. This arrangement creates the potential for vehicles positioned side by side at the exit to mask one another from approaching traffic in either direction on Railway Street. This could result in right-angle or side swipe crashes at the exit. (MODERATE) In addition, a vehicle trying to turn right from the KissnRide at the exit could block other vehicles from exiting to the left, significantly reducing the effectiveness of the KissnRide as a short term pick up facility, leading to driver frustration. This in turn can result in errant driver behaviour which could result in a vehicle / pedestrian crash of high severity (IMPORTANT: LOW). Justification The potential exists for the establishment of an anti-clockwise circulatory mindset and operational guideline that requires drivers to continue to circulate around the school if they cannot enter the KissnRide facility / facilities. The streets that can accommodate this circulatory traffic are Railway Street, Eric Street, Mann Street and Grant Street. Recommendations 1. As part of the management plan for the KissnRide facility / facilities, include an anti-clockwise circulatory guideline for drivers to adopt when they cannot access a KissnRide facility. 2. Modify the design to exclude the possibility of a right turn movement out of the proposed KissnRide facility on Railway Street.	* Agree with recommendations. * Point 1. would need to be reinforced by the school.



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
9	Sight lines at the Eric Street KissnRide exit	 Safe Intersection Sight Distance is not achieved at the Eric Street KissnRide exit. Sight lines to the west are restricted by the Banksia trees located a short distance to the west of the exit. This can result in drivers; Encroaching into the cycle lane on Eric Street to improve their sight lines to approaching eastbound traffic on Eric Street and Possibly accelerating rapidly from the exit to avoid approaching eastbound traffic, potentially conflicting with pedestrians at the facility immediate east of the exit, or even coming into direct contact with the median island (including the grab rail). The lack of sight distance at the exit can result in a variety of crash types including right angle, side swipe, rear-end, loss of control hit object and pedestrian versus vehicle crashes with potentially high severity outcomes. (IMPORTANT: LOW) Justification Refer to Photo 3 at Appendix D of the audit report. Austroads Guide to Road Design Part 4 A (Unsignalised and signalised intersections) Table 3.2 indicates that for a design speed of 60km/hr (maximum posted speed limit of 50km/hr), 123m is the required Safe Intersection Sight distance assuming a reaction time of 2.0 seconds. Currently available sight distance is approximately 65m. Recommendations If the exit is to remain, prune the Banksia trees from the north verge of Eric Street in order to provide and maintain Safe Intersection Sight Distance at the exit. 	



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
10	Pedestrian desire lines to and from North Cottesloe Primary School	 The proposed KissnRide facility on Railway Street provides two pedestrian facilities – one near the school entry and one near the pre-primary access. The concept design features a narrow section near the Eric Street roundabout where pedestrians may find it more direct to try to cross Railway Street than to utilise the nearest pedestrian facility. This could result in conflict between pedestrians and vehicles, particularly vehicles entering Railway Street from the west on Eric Street, possibly resulting in high severity injuries. (IMPORTANT: LOW) Justification Foliage in the north west quadrant of the Eric Street / Railway Street roundabout currently restricts stopping sight distance for vehicles entering Railway Street northwards from the west on Eric Street and also for crossing sight distance for pedestrians trying to cross at this location. This situation will be exacerbated by the proposed realignment of Railway Street immediately to the north of the roundabout, where the realignment consists of a left curve, right curve combination. It is possible that queues of vehicles could extend from the KissnRide close to the Eric Street roundabout. The audit team evaluated the potential exit speed for the movement from the west on Eric Street to the north on Railway Street. It was determined that it is possible to drive this manoeuvre at in excess of 40km/hr, which confirms verbal advice that the audit team received from the Railway Street traffic warden, who estimated some vehicles making the turn at speeds approaching 60km/hr. Recommendation 1. Ensure that the design accommodates stopping sight distance for the design speed for vehicles entering Railway Street. This may require the pruning or clearing of some foliage, or modification of the design if this is not possible. 2. Deter pedestrians from attempting to cross Railway Street near the roundabout where the realigned section of Railway Street connects with existing Railway Street, using pedestrian	* Recommendation one is the preferred option as the second approach of installing fence is costly and may not be equitable to those that wish to head toward Eric Street. i.e - a non-school destination.



Item	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
11	Footpath along the eastern verge of Railway Street	The concrete footpath along the eastern verge of Railway Street (between the Eric Street roundabout and Greenham Street) is approximately 1.2m wide. Between the path and the school boundary fence is sand (approximately 0.5m) and the section between the path and the trafficable lane is grassed (width varies). Numerous shrubs and tree branches overhang the footpath in this section. The audit team noted a significant number of pedestrians and cyclists utilising this footpath immediately after school closing time. Path users were observed encroaching onto the areas adjacent to the footpath on several occasions to make room for other path users. Encroaching onto uneven or soft ground, particularly for young cyclists or pram users, can result in falls or collisions. (IMPORTANT: LOW) Justification Refer to Photo 4 at Appendix D of the audit report. Recommendations 1. Pave either side of the footpath (between the Railway Street kerbline and the school property boundary) to reduce the risk falls or collisions involving path users. 2. Under prune the foliage along the footpath to establish and maintain a minimum clearance of 2.5m for allow path users to proceed without having to avoid foliage.	* Agree with recommendation



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
12	Roadside	 The concept design appears to introduce some additional roadside hazards including; Existing power poles which will be located in the median and within the clear zone of the realigned section of Railway Street. The concept plans show what appears to be w-beam safety barriers installed in a diamond shape around these poles. A possible embankment as natural surface levels are lower to the west where the realigned section of Railway Street and adjacent new footpath are proposed. These hazards can increase the risk of injury in the event of a loss of control crash where a vehicle departs the trafficable lane, or a path user deviates from the path alignment. (LOW) Justification There have been no reported crashes on the section of Railway Street, between Greenham Street and Eric Street, involving a vehicle running off the road and hitting an object. However, it is noted that the existing alignment is straight and the proposed design comprises two reverse curves. It is noted that the configuration of safety barriers presented in the Cardno concept plans are unlikely to be a crashworthy treatment, due to the sub-standard length and configuration of barrier sections. It is further noted that installing a safety barrier closer to a trafficable lane than the hazard being shielded increases the likelihood of hits. Recommendations 1. Undertake a risk assessment to determine whether the introduced roadside hazards require removal, relocation, shielding using safety barriers or no mitigation. 2. If it is determined that safety barriers are required, consider the use of energy absorbing bollards rated to 50km/hr as an alternative to w-beam safety barriers. 	* The roadside barriers are a requirement of Western Power. * The guardrail will be replaced by the protection in recommendation two and barrier kerb.



Item	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
13	Geometry of the Eric Street KissnRide exit	The vertical geometry of this exit is poor, with evidence of multiple vehicles having their tow ball grind against the trafficable surface. This may reduce traction or destabilise a vehicle accelerating onto Eric Street from the exit, resulting in a variety of crash types. (LOW) Justification Refer to Photo 5 at Appendix D of the audit report. Recommendation If the exit is to remain, safety can be improved by re-grading the exit vertical geometry and narrowing the exit lane width while maintaining a minimum angle of intersection with Eric Street of 70 degrees. Note: This may require some retaining structures or the loss of one parking bay.	



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
14	Verge parking to the north of the proposed KissnRide facility on Railway Street	The west verge of Railway Street immediately to the north of the angle parking area is utilised as an informal 90-degree parking area. It appears that this is being utilised by some caregivers of the Pre- primary school. The surface of the area where this informal parking is occurring is undulating soft sand and grass. The variability of surface texture and profile could result in a driver skidding or moving abruptly, possibly causing a crash with other vehicles or pedestrians, resulting in a high severity injury. (IMPORTANT: LOW) Justification	
		 Refer to Photo 6 at Appendix D of the audit report. There is mountable kerbing at this location and it is expected that informal parking will continue following the implementation of a KissnRide facility on Railway Street, unless measures are taken to prohibit this parking. It was noted that the action of vehicles driving on the soft sand is pushing sand onto the adjacent footpath, also creating the risk of instability for cyclist using the path, and an ongoing maintenance issue for the Town of Cottesloe. Recommendation 1. Determine whether parking will continue to be permitted on the west verge of Railway Street, to the north of the proposed KissnRide facility. 	* Agree with recommendation.
		 If parking will be permitted at this location, provide formal parking bays with a competent surface in order to avoid collisions arising from an uneven surface or from variable surface traction. 	



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
15	Street light not working	The street light located at the north west quadrant of the Eric Street / Railway Street roundabout was not working at the time of the audit night inspection. The departure leg from the roundabout heading northwards on Railway Street approaching the proposed KissnRide upgrade was poorly delineated as a result, increasing the possibility of loss of control crashes and pedestrian versus vehicle crashes. (IMPORTANT: LOW) Justification Refer to Photo 7 at Appendix D of the audit report. Recommendation Repair the faulty luminaire.	* Agree with recommendation.



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
16	Road lighting for the proposed KissnRide on Railway Street	Lighting is currently installed along the eastern verge of Railway Street, between Greenham Street and Eric Street. The proposed KissnRide facility realigns Railway Street and the adjacent footpath a significant distance to the west of the existing lighting. The proposed footpath runs close to existing trees in the west verge of Railway Street. Failure to provide adequate lighting for the realigned section of Railway Street and the adjacent footpath could result in pedestrian /vehicle conflict and also reduce the security of pedestrians using the proposed path in hours of darkness. (IMPORTANT: LOW) Justification Although there have been no reported crashes involving pedestrians along the west verge of Railway Street, the existing lighting provides good delineation for pedestrians between Greenham Street and Eric Street. The proposed layout of Railway Street and the adjacent footpath will not be as well lit by the existing lighting due to the increased distance from the road lighting and the increased proximity of trees. Recommendation Review pedestrian lighting requirements for the proposed KissnRide facility on Railway Street and incorporate additional lighting into the design as appropriate.	* Agree with recommendation. Lighting review and design to be undertaken.



ltem	Description	Audit Finding and Recommendation	Response (Project Manager to agree / disagree, provide reason for disagreeing, and detail proposed actions and comments)
17	Supplementary lighting for Zebra Crossings	The proposed KissnRide concept plans show at least one wombat crossing. Failure of a driver to detect a pedestrian on, or approaching, a zebra crossing (a key element of a wombat crossing) can result in a high severity crash. (IMPORTANT: LOW) Justification Australian Standard AS1158.4 requires the provision of supplementary lighting to provide vertical illumination of object on or approaching a zebra crossing. Figure 1.3 from that standard provides an indication of the lighting requirement. Recommendation Provide supplementary lighting in accordance with AS1158.4 as an integral part of any zebra / wombat crossing.	* Agree with recommendation and lighting design will be done as per action for item 16.



Corrective Action Report – [North Cottesloe Primary School KissnRide upgrade on Railway Street] Feasibility Stage Road Safety Audit

NOTE:

- This Corrective Action Report is to be read in conjunction with the full Road Safety Inspection Report.
- The asset owners (Main Roads WA and/or the relevant local government authorities) <u>must</u> be informed of these findings, recommendations and proposed actions.
- Items not under the responsibility of this project representative must be forwarded to the persons / agencies who are responsible.

These findings and recommendations have been considered, and the actions listed will be taken accordingly.

Responsible Project Representative	Company / Agency / Division	Position	Date

Asset Owner Representative	Company / Agency / Division	Position	Date

