

Little Sahara Dunes Complex Access

Road Safety Audit



March 2017

RAA

Little Sahara Dunes Complex Access Road Safety Audit



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1 Introduction

1.1 Introduction

There have been repeated vehicle crashes at the entrance to the Little Sahara Dunes Complex, Kangaroo Island over the years. The crashes have predominantly involved vehicles departing the road at the chicane over the Eleanor River. Kangaroo Island Council has been approached by SAPOL, SA Ambulance Service and the community to review the existing conditions and provide recommendations for safety improvements.

The reported vehicle crashes have all occurred on the western side of the chicane with vehicles heading west where they are losing control of their vehicle on the bend, over correcting which results with the vehicle on the wrong side of the road crashing into the w-beam guard railing over the Eleanor River.

A joint Road Safety Audit was undertaken by RAA and Kangaroo Island Council as part of RAA's Tourism Region Assessment of Kangaroo Island in September 2016. This report outlines the findings of the Road Safety Audit and provides broad recommendations for infrastructure improvements.

1.2 About the Road Safety Audit

A road safety audit is a formal examination of an existing or proposed road or intersection, by an independent and qualified multidisciplinary team. The purpose of the audit is to identify risks and hazards that may result in a collision and provide broad recommendations that will reduce the probability and/or consequence of a collision occurring.

The audit is conducted in accordance with the *Austroads Guide to Road Safety, Part 6: Road Safety Audit*, which defines a multi-stage review process for the audit, and incorporates the following stages:

- Feasibility / Concept Design
- Preliminary Design
- Detailed Design
- Construction (Road Works)
- Pre-Opening to Traffic
- Existing Road Audits

The Road Safety Audit undertaken at Little Sahara Dunes Complex is classed as an existing road audit.

1.3 Road Safety Audit Team

The road safety audit team comprised of the following members of staff:



Anna Osman is the Asset Program Manager at Kangaroo Island Council. She has over 10 years' experience in local government in asset management and infrastructure planning. She has qualifications in business management and is a qualified road safety auditor.



Ian Bishop is a Traffic Engineer at RAA. He is an accredited road safety auditor and is also certified as a Vericom 4000 operator. He has over 10 years' experience in Civil & Traffic Engineering including highways, intersection design and modelling, road safety mass action treatments and the design and implementation of local area traffic management.



Richard Butler is an Analyst within RAA's Road Safety section. He has been an analyst, for over 10 years. Richard joined the RAA in 2012 and is responsible for the analysis of crash, road quality and survey data. He also conducts and analyses travel time runs across metropolitan Adelaide and has undertaken a number of highway assessments across the state.



Charles Mountain is the Senior Manager – Road Safety at RAA. He has extensive experience in transport, traffic and road safety. Prior to joining RAA he had over 25 years' experience in local government managing a wide variety of traffic, access and parking issues. He has qualifications in engineering, business management and is a qualified road safety auditor.

1.4 Background

The access to Little Sahara Dunes Complex on South Coast Road, the arterial link between Kingscote and the south coast of Kangaroo Island and is located some 6.8km east of Vivonne Bay. . The driveway to the complex is located on the east side of a bridge where the road passes over the Eleanor River on an S-curve.

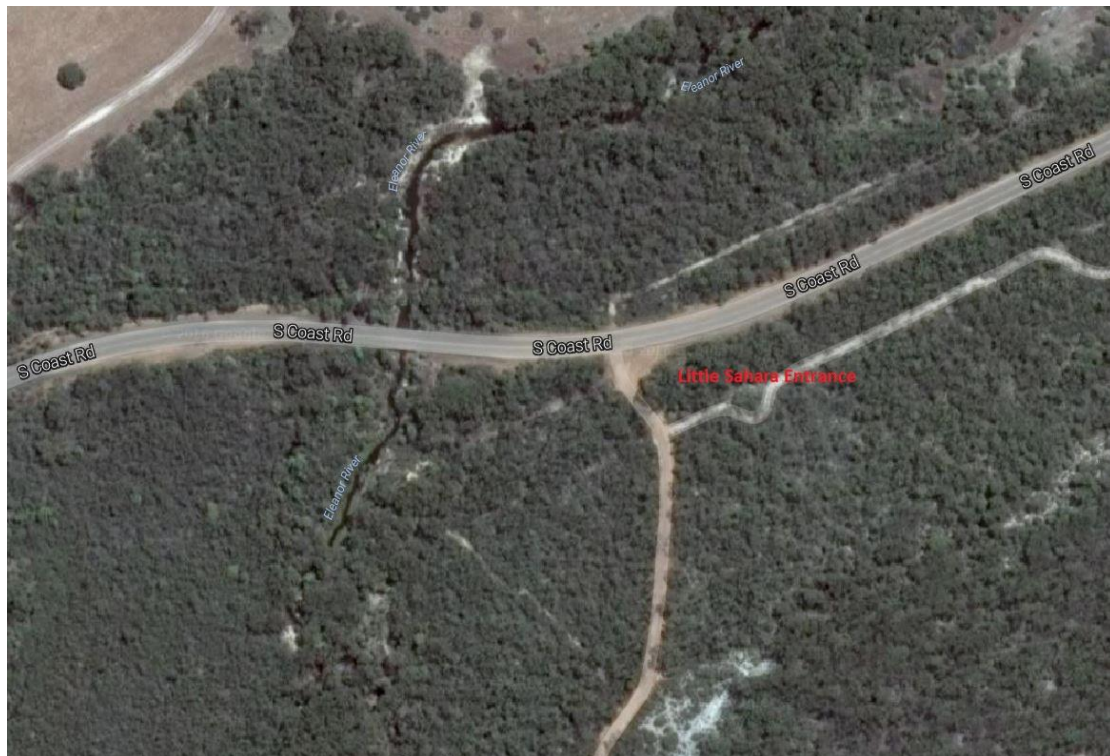


Figure 1 – Site

Since 2010 there have been seven (7) reported crashes at this location, all attributed to driver inattention. All crashes incurred property damage to both the vehicles involved and the guardrail. In one instance, the crash was so severe, the vehicle hit the guardrail twice. There were a total of 7 crashes at the site, 4 of which were serious injury crashes.

Within the locality of the Little Sahara, South Coast Road has an average of 241 vehicles per day during the spring months which can more than double over the peak tourist season in Summer. The posted speed limit along this section of South Coast Road is 110km/h. The average recorded speed of vehicles at this location was 80 km/hr with a maximum speed of 159 km/hr observed.

There is a speed advisory sign of 85km/hr on approach to the curve and temporary 'Reduce Speed' signs have also been installed by Council since August 2015. The lane widths are narrow, ranging from 2.9m at the last chevron alignment marker (CAM) before the bridge to 3.4m at the first CAM before the turn off into Little Sahara. Edge breaks are apparent against the unsealed shoulder and two Raised Reflective Pavement Markers (RRPMs) have been damaged and are no longer effective.

2 Site Investigation

The audit was conducted Friday 16 September 2016 between 10.00am and 11.30am. The weather at the time of the investigation was cloudy but fine. The investigation was carried out on foot and several drive throughs undertaken in a Nissan Navara utility vehicle and a Subaru Forrester sports utility vehicle. A night audit has not been undertaken but may be performed as a separate exercise, if required.

3 Audit Findings

3.1 Signs

- a) The speed advisory and side road intersection on outside of curve sign is some 300m back from the curve, as a result, there is a risk that motorists may not adopt the recommended speed for the curve. It is therefore recommended that the sign is relocated closer to the curve, in accordance with the requirements outlined in AS 1742.2.
- b) No advanced warning for the Little Sahara tourist attraction has been provided, so there is potential for motorists to brake hard and without warning prior to the bend. This increases the risk of rear end crashes and any vehicle that turns into the complex at too high a speed may lose control on the unsealed access. It is recommended that the access is sealed and advanced tourist information signs are installed.



Figure 2 – Speed advisory sign back too far from the corner and should be relocated. No advance warning of major tourist attraction so vehicles have adequate time to slow down and passing traffic aware of the driveway and possible traffic movements.

- c) On approach to the S-curve, the radius of the corner is unclear with a temporary 'Reduce Speed', a 'Little Sahara Dunes Complex' sign and a CAM located within close proximity. The configuration of this signage could result in the approaching driver interpreting the 'Reduce Speed' sign pertains to 'Little Sahara Dunes Complex' rather than the approaching corner and not slow down. It is recommended the temporary "Reduce Speed" sign is removed to avoid confusion and focus the motorists' attention on safely negotiating the curve.
- d) The first CAM is positioned after the start of the curve and does not provide the approaching driver with adequate warning prior to the start of the curve. There is an increased risk of run-off crashes if drivers are not made aware of the substandard curve. It is recommended that additional CAMs are installed in accordance with AS1742.2.
- e) There is no advance warning of the Little Sahara Attraction. The existing sign is small and unreadable until the motorists arrive at the intersection. As a consequence, there is a risk of motorists en route to little Sahara braking hard when they become aware of the access, or turning into the access at high speed. This increases the risk of rear end crashes or loss of control when turning. It is recommended that advanced tourist attraction direction signs are installed to provide adequate warning of the turn off.



Figure 3 – Sequencing of signage could result in the driver not realising the radius of the approaching curve and that 'Reduce Speed' pertains to the Little Sahara Dunes Complex access driveway rather than the curve.



Figure 4 – CAMs do not adequately inform the approaching driver of the radius of the curve. Distinctive arrow on ‘Little Sahara Dunes Complex’ entrance sign should be incorporated to provide further clarification to approaching drivers.

3.2 Line Marking & Delineation

- a) Edge line marking has faded to non-existent and should be reinstated to provide further visual cue as to the radius of the approaching corner.
- b) If a driver takes this corner too fast and goes wide, a lack of a sealed shoulder with loose stone material (ironstone) encroaching onto the carriageway could cause the vehicle to skid, particularly if brakes are applied or if the driver oversteers.



Figure 5 - Faded edge line marking to be reinstated.



Figure 6 – The shoulders are unsealed and present a risk of vehicles skidding should the vehicle drift out of the traffic lane.

- c) Crash barriers commence too late into the curve. The photo below shows the skids marks of a vehicle that has overcorrected. In the over correction occurred sooner, the vehicle would have crashed into the vegetation behind the barrier on the right hand side. Similarly, vehicles may run-off road and pass behind the barrier on the left. This increases the severity of a crash. It is recommended that the barriers are extended on both sides of the road.



Figure 7 – The crash barrier commences late into the curve and provides limited protection to vehicles that drift off the road at the curve transition.

4 Summary & Recommendations

The road safety audit at Little Sahara Dunes Complex has identified a number of recommendations, a summary of which is provided in Table 1 below. Suggested priorities have also been included, where 1 is high priority and 3 is low priority. A further table is provided in Appendix A to enable the responsible authorities to respond to the audit.

Table 1 – Summary of Recommendations

Item No.	Risk / Hazard Description	Recommendation	Priority
3.1 – Signs			
a	Speed advisory sign too far from the corner and driveway access point	<ul style="list-style-type: none"> Relocate speed advisory sign closer to the curve and driveway access to comply with the requirements of AS1742.2 	2
b	No advance warning of major tourist attraction, so vehicles do not have adequate time to slow down and turn. Vehicles may not be aware of traffic turning out of the complex.	<ul style="list-style-type: none"> Install advance destination signs "Little Sahara Dunes Complex 500m" 	1
c	Sequencing of signage could result in driver not realising the radius of the approaching corner and that 'Reduce Speed' pertains to the Little Sahara Dunes Complex access driveway rather than approaching corner	<ul style="list-style-type: none"> Remove temporary 'reduce speed' sign 	5
d	CAMS do not adequately inform the approaching driver of the radius of the corner.	<ul style="list-style-type: none"> Install additional CAMS to comply with AS 1742.2. 	3
e	The Little Sahara entrance sign is small and difficult to read by approaching drivers.	<ul style="list-style-type: none"> Upgrade Little Sahara entry sign to include a distinctive arrow in accordance with AS1742.15 for directions signs. 	4
3.2 – Line Marking & Delineation			
a	Edge line marking has faded and is not visible so does not provide a visual cue for the radius of the approaching curve.	<ul style="list-style-type: none"> Reinstate edge line marking and raised retroreflective pavement markers. 	2
b	Vehicles that drift onto the shoulder are likely to lose control since the surface has very loose material.	<ul style="list-style-type: none"> Seal shoulders in both directions 	1

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Item No.	Risk / Hazard Description	Recommendation	Priority
c	Barriers are of insufficient length and there is a risk a vehicle may crash into vegetation before the barrier commences.	<ul style="list-style-type: none">▪ Extend w-beam barriers to protect roadside hazards.	3

5 Concluding Statement

This road safety audit has been conducted by the audit team through an on-site inspection for the purposes of identifying infrastructure and/or environmental issues that may present safety risks for road users.

The identified issues have been noted in this report and the accompanying recommendations have been submitted for the consideration of the road authority.



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16/03/17



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17/03/17



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Traffic & Road Safety Analyst
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17/3/17



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Senior Manager – Road Safety
Reviewer

17/03/17

Appendix A – Response to Road Safety Audit



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Table A1 – Summary of Recommendations and Response to Audit

Item No.	Risk / Hazard Description	Recommendation	Priority	Authority Response
3.1 – Signs				
a	Speed Advisory sign too far away from the corner and driveway access point	Move Speed Advisory Sign 50m closer to the curve and driveway access	2	
b	No advance warning of major tourist attraction so vehicles have adequate time to slow down and passing traffic aware of the driveway and possible traffic movements.	Install Advance Notice signage “Little Sahara Dunes Complex 500m”	1	
c	Sequencing of signage could result in driver not realising the radius of the approaching corner and that ‘Reduce Speed’ pertains to the Little Sahara Dunes Complex access driveway rather than approaching corner	Remove temporary ‘reduce speed’ sign	5	
d	Chevron signs do not adequately inform the approaching driver of the radius of the corner.	Install additional chevron signs to meet DPTI Guidelines	3	
e	Little Sahara Entrance sign small and difficult to read by approaching drivers.	Little Sahara Entrance notice board to include distinctive arrow	4	

3.2 – Line Marking & Delineation				
a	Edge line marking has faded to non-existent and should be reinstated to provide further visual cues as to the radius of the approaching corner	Reinstate edge line marking and reflective cat eyes	2	
b	If a driver takes this corner too fast and goes wide a lack of a sealed shoulder with loose stone material (ironstone) encroaching onto the carriageway could cause the vehicle skid, particularly if breaks are applied and or if the driver corrects the angle and oversteers careering the vehicle into the crash barrier on the opposite side of the road.	Seal shoulders in both directions	1	
c	Should a driver over correct or miss judge the corner, there is a likelihood that the vehicle could go behind the crash barrier.	Extend w-beam to mitigate the risk of a car getting behind the existing	3	