Examples of Control Data

The examples of Control Data provided in this document are **not** updated and as a result may not reflect the current information provided in the sources of the Control Data.

Auditors should **always** refer to the current source of Control Data to ensure the currency of the information referenced.

The first paragraph in all findings justification should **always** identify the potential crash risk associated with the finding.

Examples:

Justification of the finding: *[Inconsistent or inappropriate application of traffic signs]*

The inconsistent or inappropriate application of traffic signs can result in various crash types at various road layouts and locations.

Australian Standard AS 1742.2-2009: Traffic Control Devices for General Use indicates that traffic signs are provided to aid the safe and orderly movement of traffic. Uniformity in the design of signs facilitates identification by the road user. This assists the road user in promptly interpreting the message or instruction.

Australian Standard AS 1742.2-2009: Traffic Control Devices for General Use also indicates that as signs are an essential part of the road traffic system, their messages shall be consistent, their design and placement coordinated with the road geometric design, and their size selected so that they are both conspicuous and legible at required reading distances.

Justification of the finding: *[Insufficient Stopping Sight Distance]*

There is a risk vehicles could fail to anticipate a hazard or stationary vehicle in the road ahead following the curve which could result in rear end crashes.

Stopping Sight Distance is obscured by vegetation on the inside of the curve on North Road for eastbound vehicles, reducing available sight distance to 30 m.

Austroads Guide to Road Design Part 3: Geometric Design indicates that Stopping Sight Distance (SSD) is the distance to enable a normally alert driver, travelling at the design speed on wet pavement, to perceive, react and brake to a stop before reaching a hazard on the road ahead. Using an operating speed of 50 km/h and reaction time of 2.0 seconds, the required Stopping Sight Distance is 55 m.

Justification of the finding: *[Absence of Audio Tactile Line Marking]*

There is a risk of fatigue related off path crashes as the result of the absence of Audio Tactile Line Marking on North Highway.

Austroads Guide to Traffic Management Part 10: Traffic Control and Communication Devices indicates Audio Tactile Line Marking (ATLM) is used to provide noise (audio) and vibratory (tactile) warning to drivers starting to stray due to fatigue or fog.

Austroads also indicates that it is desirable that ATLM should not be installed within 500 m of a residential dwelling (where practicable) with a minimum of 200 m, unless appropriate noise barriers are installed or unless the frequency and severity of fatigue related crashes in the area are such that a continuous treatment is considered essential on safety grounds.

Australian Standard 1742.2-2009: Traffic Control Devices for General Use indicates clear and effective pavement marking is essential to provide guidance and may supplement other traffic devices to define the desired travel paths.

Justification of the finding: *[Insufficient Safe Intersection Sight Distance]*

There is a risk of vehicles failing to give way whilst exiting the intersection which could result in right angle crashes.

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections indicates that Safe Intersection Sight Distance is the minimum distance which should be provided on the major road at any intersection. Using an operating speed of 110 km/h and reaction time of 2.0 seconds the required Safe Intersection Sight Distance is 285 m measured 5 m back from the holding line on the side road.

Justification of the finding: *[Side road intersection located on the inside of a curve with an inappropriate speed limit and a crash history]*

There is a risk of vehicles failing to give way whilst turning right from South Highway to enter North Road or entering South Highway from North Road which could result in right angle crashes.

Monash University Accident Research Centre (MUARC) research indicates a curvilinear approach gives the appearance of high speed traffic vehicles slowing down and drivers on the side road incorrectly estimating actual travel speeds and selecting gaps based on inaccurate speed perceptions.

Austroads Guide to Road Safety Part 3: Speed Limits and Speed Management indicates that the most important consideration in the assessment or review of a speed zone should be the determination of the crash rate of the road. Extensive research has shown that even modest reductions in travel speed will result in substantial reductions in the incidence and severity of road crashes.

Austroads Guide to Road Safety Part 3: Speed Limits and Speed Management also indicates that the physical and operating environment of a road section is a major influencing factor on risk. Driver speed behaviour is also influenced by the road user activity and visual cues associated with differing road locations. Lower speed limits accompanied by appropriate design and enforcement will lead to lower speeds and hence lead to reduced road trauma.

Justification of the finding: *[Inappropriate filtering permitted at traffic signals]*

There is a risk of right angle crashes involving right turning filtering vehicles failing to give way to opposing vehicles.

Main Roads Policy and Application Guidelines for Control of Right-Turns at Traffic Signals indicate that full-time right-turn arrow control shall be applied if over the last 5 years the right-turn movement has been involved in more than 5 reported crashes and the times of day these crashes have occurred are generally spread across the full 24-hour period.

There have been 40 crashes, 1 of which resulted in hospitalisation and 6 resulting in medical treatment involving northbound through traffic and southbound right turning traffic which could be attributable to existing filter right turn movements exceeding the policy requirement.

Main Roads guidelines supplement to Austroads Guide to Traffic Management Part 9: Traffic Operations indicates that right turning traffic shall be prevented from filtering where the road is classified District Distributor A and above. North Street and South Street are District Distributor A roads meeting this requirement.

Justification of the finding: *[Insufficient Safe Intersection Sight Distance, Stop signs and crash history]*

There is a risk of westbound vehicles failing to give way whilst exiting the intersection of North Street which could result in right angle crashes. There have been 10 right angle crashes at this intersection, 1 of which resulted in hospitalisation. The restricted sight lines may have been a contributory factor in these crashes.

The tree located in the median to the south of the intersection reduces Safe Intersection Sight Distance for right turning vehicles exiting North Street to northbound through traffic or northbound right turning vehicles on South Street from 27.5 m south of the intersection for a distance of 18.5 m.

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersection indicates that Safe Intersection Sight Distance is the minimum distance which should be provided on the major road at any intersection. Using an operating speed of 90 km/h and reaction time of 2.0 seconds the required Safe Intersection Sight Distance is 214 m measured 3 m back from the holding line on the side road.

Australian Standard 1742.2-2009 Traffic Control Devices for General Use indicates that the use of Stop signs where poor sight distance is not a factor can lead to driver disobedience, and lack of credibility of Stop signs. For these reasons no crash warrant is given for the use of Stop signs.

Justification of the finding: *[Bus stop location and layout]*

There is a risk of rear end or sideswipe crashes involving stationary buses at the stop or buses exiting the stop colliding with vehicles entering the nearby left turn pocket. There is also a risk that bicycle riders may be forced into the adjacent traffic lane to overtake stationary buses risking collision with traffic in the adjacent traffic lane.

Cycling Aspects of Austroads Guides indicates that consideration should be given to the treatment of indented bus stops to provide a safe facility for cyclists and bus patrons.

The bus stop embayment to the rear of the bus stop has a width of 1.8 m and the front of the bus stop is located 29.3 m from the commencement of the left turning pocket accessing South Street and a service station on a road with an 80 km/h posted speed limit. The cycle lane provided on South Street southbound also leads into the rear of the bus embayment.

The *Public Transport Authority, Public Transport Bus Stop Site Layout Guidelines* indicates that bus embayments are recommended for stops on high speed roads (80 km/h and above) and the desired minimum width of a bus embayment is 3.0 m.

Public Transport Authority, Public Transport Bus Stop Site Layout Guidelines also indicates that the desirable distance a bus embayment should be sited on the approach to the tangent point of an intersection is 100 m with a minimum distance of 40 m.

Justification of the finding: *[Poorly located intersection warning sign]*

There is a risk vehicles could enter the right turn pocket in the vicinity of the Side Road Intersection warning sign and collide with right turning vehicles already in the right turn pocket resulting in sideswipe crashes.

The Side Road Intersection W2-4(R) warning sign is located approximately 100 m following the commencement of the right turning pocket on the left verge. The arrow pavement markings at the commencement of the right turning pocket were also observed to be in poor condition requiring essential maintenance.

Main Roads Guidelines indicates that a Side Road intersection warning sign located on a dual carriageway road should be located on the same side of the road as the side road junction and located prior to the commencement of the turning pocket.

Australian Standard 1742.2-2009 Traffic Control Devices for General Use indicates that a system of clear and effective pavement markings is essential for the proper guidance and control of vehicles and pedestrians.

Justification of the finding: *[Visibility of signs]*

There is a risk of vehicles stopping abruptly on South Street on the approach to North Street as a result of the partially obscured Give Way sign that may result in rear end crashes.

Australian Standard 1742.2-2009 Traffic Control Devices for General Use indicates that the longitudinal placement of certain signs is fixed by the nature of their message or their characteristic use. Special care is required in the siting of such signs to ensure that they are prominently displayed to approaching drivers.

Justification of the finding: *[Roadside hazards located within the clear zone]*

There are trees, culverts and power poles located in the median that pose a risk to vehicle occupants in the event an errant vehicle leaves the road.

Hazards within the clear zone should be removed or suitably protected or be frangible to the impact of a vehicle. Effective clear zones are determined using the method described in *Austroads Guide to Road Design Part 6: Roadside Design, Safety and Barriers*. Using an estimated 85th percentile speed of 90 km/h, straight alignment, flat batter slopes and > 6000 vehicles per day, the required clear zone is 7.5 m.

Austroads Guide to Road Design Part 6: Roadside Design, Safety and Barriers indicates removal of roadside hazards is rated very high as an effective treatment to prevent an off path incident.

Justification of the finding: *[Inadequate street lighting provision at pedestrian crossings]*

There is a risk of night-time crashes on South Street involving pedestrians at crossing locations in the vicinity of South Street College.

Australian Standard 1158.0 Lighting of Roads and Public Spaces indicates that the primary aim of the provision of road lighting is the safe movement of people.

Australian Standard 1158.0 Lighting of Roads and Public Spaces also indicates that Category P lighting should be provided to roads and outdoor public spaces on which the visual requirements of pedestrians are dominant, e.g. local roads, outdoor shopping precincts and outdoor carparks.

Justification of the finding: *[Service cover locations, motorcyclists and bicycle riders]*

There is a risk that motorcyclists and bicycle riders could become unstable negotiating the road surface around the service cover located in the merge area into the left turn pocket which could result in loss of control.

Austroads Research Report AP-R515-16 Infrastructure Improvements to Reduce Motorcycle Casualties indicates that when considering the road surface, the crash likelihood is increased when surface objects such as service covers are present in the riding path particularly when higher or lower than the surrounding road surface.

Cycling Aspects of Austroads Guides indicates that designers should ensure that service covers and drainage assets do not reduce the road width available for safe use by cyclists.

Justification of the finding: *[Flat road surface, drainage and loose aggregate]*

There is a risk of rear end crashes resulting from vehicles skidding whilst braking approaching the intersection in the left pocket, particularly during wet conditions.

Austroads Guide to Traffic Management Part 13: Road Environment Safety indicates that pavement friction can be significantly reduced by the presence of loose aggregate. If the friction supply drops to a low level in such situations, drivers can inadvertently demand more friction than the pavement can supply, leading to loss of control.

Austroads Guide to Road Design Part 5A: Drainage – Road Surface, Networks, Basins and Subsurface indicates that the safety of road users is most at risk from run-off that either falls directly upon the road surface or flows onto the road surface from the adjacent road reservation. The main risk to road users encountering road surface run-off is a loss of control.

Justification of the finding: *[Inadequate sealed shoulder width]*

There is a risk of run off road crashes as the result of inadequate sealed shoulder width.

The crash history along this route shows that 59 % of the casualty crashes had an off-path crash nature. Furthermore 24 % of the casualty crashes that had a head-on crash nature involved vehicles that were out of control resulting in a collision with opposing vehicles.

Austroads Guide to Road Design Part 3: Geometric Design indicates that a traffic function of the shoulder is to provide an initial recovery area for any errant vehicle and the most important benefit of sealed shoulders is that they reduce crash rates, particularly with respect to run-off-road crashes, with most of the benefit being achieved by shoulder seal width of 0.5 to 1.5 m.

Austroads Guide to Road Design Part 3: Geometric Design indicate 7.0 m sealed traffic lanes with 2.5 m shoulders of which 1.5 m is sealed shoulder should be provided on routes where traffic volumes are > 3000 AADT.

Traffic volumes on this route range 3901 - 3963 AADT comprising 12.5 – 13.9 % heavy vehicles, thereby meeting this requirement.

Justification of the finding: *[Absence of lateral separation between opposing vehicles with a crash history]*

There is the risk of head-on crashes as the result of no lateral separation provided between opposing vehicles.

The casualty crash history along this route shows that head-on crashes are significantly over-represented when compared to the network average. 24 % of all casualty crashes had a head on crash nature compared to a network average of 2 %. The majority of the head on casualty crashes involved vehicles that were out of control.

The results of a Ball Bank assessment conducted using an Electronic Digital Inclinometer of the curves along this route found that the majority of curves were within standard. However 58 % of the unsigned curves along the route were found to be rated to a safe speed ranging between 100 – 105 km/h placing a continual demand on drivers on this unsigned curvilinear route.

Austroads Guide to Road Design Part 3: Geometric Design indicates that a Wide Centre Line Treatment (WCLT) is the widening of the centre line markings to provide increased lateral separation between opposing directions of travel. This increases separation and improves safety by reducing head on crash risk. The use of WCLT together with Audio Tactile Line Marking (ATLM) has demonstrated a substantial reduction in the numbers of crashes and reduces the crash potential for a wide range of traffic volumes.

Justification of the finding: *[Inconsistent road environment]*

There is the risk of off-path, head-on or fatigue related crashes as the result of the inconsistent application of traffic control devices.

There was no consistency found to the application of Audio Tactile Line Marking (ATLM) and Retroreflective Raised Pavement Markers (RRPM) along South Highway.

Austroads Guide to Traffic Management Part 13: Road Environment Safety indicates that a fundamental objective in road safety engineering is to ensure the road network presents a consistent environment to road users to elicit safe responses. A consistent road environment, in terms of appearance and control features (road design and traffic management), assists road users in their decision-making and behavioural responses.

Austroads Guide to Traffic Management Part 13: Road Environment Safety also indicates that the road environment should provide information in a consistent manner to ensure similar situations are treated in a similar manner, as road users would expect, based on their expectations built up from previous experiences.

Justification of the finding: *[Unsealed road cross-section]*

There is the risk of off-path or loss of control crashes as the result of inadequate unsealed road crossfall.

The majority of the unsealed sections of South Road has inadequate crossfall with the majority of the route ranging from 0.2 % to 1.4 % resulting in poor drainage of the road surface.

Worn and deformed surface can lead to loss of traction, poor drainage and reduced skid resistance, thereby may affect braking performance and lead to loss of steering control.

ARRB Unsealed Roads Manual 2009 indicates crossfall in the range 4 – 6 % are adequate to shed surface water off the road reducing development of potholes and corrugations in straight sections. To minimise scouring and erosion, maximum superelevation to match crossfall in straight sections should also be used on curves.