Government of South Australia
Department of Planning, Transport and Infrastructure

How can we improve safety at South Australia's railway crossings?

Draft Railway Crossing Safety Strategy

Zero Harm

TOWARDS ZERO TOGETHER

Have your **say**

This draft Strategy outlines the various safety issues at railway crossings in South Australia and proposes a range of strategies and improvements to address them.

To have your say on these strategies and improvements and to highlight any safety concerns you may have at road or pedestrian train and tram crossings in the State, please complete the survey available on the website –

www.yoursay.sa.gov.au

The survey will take around 5 minutes to complete and your views will help to inform the shape and direction of the final strategies and improvements at railway crossings across the State.

Written feedback may also be submitted by email to dpti.roadsafety@sa.gov.au

The consultation period will stay open until 5:00pm Friday, 9 September 2016.

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Foreword

Trains and trams provide a critical network for the transport of passengers and freight across our State. Wherever these tracks meet a road or footpath—a unique set of safety hazards is present.

While they do not occur often, any incident at a railway crossing can cause service disruptions, motorist delays, property damage and, in the most serious cases, injury and death. The impacts on communities and the economy, as well as the loss of confidence in the rail transport system, can be significant and far-reaching.

The combination of speed, passengers and freight travelling on intersecting rail and road systems has the potential for high impact or catastrophic incidents. However, even a collision with a low speed train or tram can result in serious injury or death, particularly for pedestrians.

In South Australia, four people were killed and six people were seriously injured at railway crossings between 2011 and 2015. Each incident is a reminder of the risks present at crossings and the need for drivers, riders and pedestrians to obey the road rules and approach crossings with care. Near-hits also are a major concern. Rail operators have reported 660 near-hits at railway crossings during the same five-year period.

All incidents—whether fatal collisions or near-hits—have an immeasurable effect on train drivers, railway and emergency service employees and their families in particular.

As humans, we are all capable of making mistakes—and we do—every day. Recognising this helps us create a more forgiving road and rail network to minimize harm and ensure that those mistakes do not result in death or serious injury.

While State and Commonwealth governments have made significant safety improvements to railway crossings over the past decade, more work needs to be done.

Engineering and infrastructure improvements, installation of warning signals and automatic pedestrian gates, and education and enforcement continue to be necessary to improve safety at existing crossings.

However, in line with other Australian jurisdictions, we also need to consider reducing the number of railway crossings, by closing existing crossings and discouraging new crossings. This draft strategy has the greatest potential to achieve our objective of zero harm.

The fewer opportunities for people and vehicles to meet at an intersecting train or tram track, the safer and more reliable our network will be. Other benefits will include improved traffic flow and reduced travel times, allowing us to more efficiently move people, goods and services on our roads and public transport networks (as outlined in *Operation Moving Traffic, South Australia's Strategic Plan* and the *Integrated Transport and Land Use Plan*).

By working with and seeking feedback from the community, we will build a better and more integrated approach to managing our road and rail network and improving safety at railway crossings.

I look forward to hearing your thoughts.

Hon Stephen Mullighan MP
Minister for Transport and Infrastructure

South Australia's Railway Crossings

South Australia has an urban Adelaide Metro public transport train and tram network, and several regional and interstate rail lines that transport bulk primary products, other freight and passengers.

There are 710 public access railway crossings across the State, including 84 road level crossings and 364 pedestrian crossings on the Adelaide Metro network.

Trains can travel up to 110km/h and may require over a kilometre to stop, even longer for freight trains, once the brake is applied – that's six times the length of Adelaide Oval.

The safety risks vary depending on speed, vehicles, traffic and pedestrian volumes and crossing types. For example, with incidents involving pedestrians, the individual is most at risk of injury; in collisions involving large road vehicles such as B-doubles, significant damage to trains and/or derailment can result; in the case of passenger trains, the risk of multiple fatalities is high because of the potentially large number of people exposed.[1]

Many crossings are equipped with active controls such as flashing lights and boom gates, but some have only passive warning such as Stop or Give Way signs. Regardless of the type of warning device, railway crossings must be approached with care at all times.

Railway crossing incidents

In South Australia, over the five-year period 2011-2015, four people were killed and six people were seriously injured at railway crossings, and 660 near-hits were reported by rail operators at railway crossings (see Table 1). Anecdotal evidence suggests that near-hits are under-reported.

[1] Office of the National Rail Safety Regulator (ONRSR), Annual Safety Report 2013 to 2014

Table 1: Railway crossing incidents (including near-misses), South Australia 2011-2015

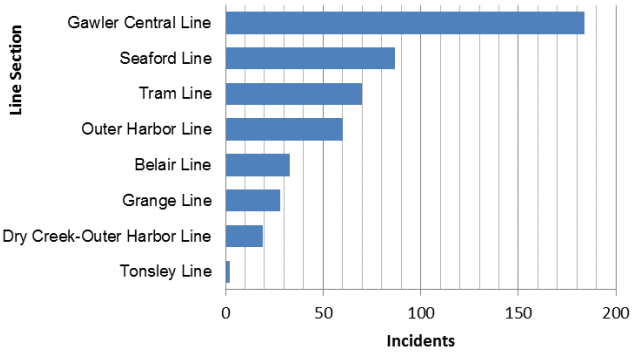
Incident Type	Road Level Crossing	Pedestrian Crossing	TOTAL
Near-miss	277	383	660
Collision (no injury)	10	1	11
Minor Injury	4	1	5
Serious Injury	2	4	6
Fatality	1	3	4

Railway crossing incidents by Line

Metropolitan Adelaide

Incidents (with both pedestrians and vehicles) most frequently occur at railway crossings along high-volume Adelaide Metro train lines, particularly the Gawler, Seaford and Outer Harbor lines (see Figure 1). A large number of vehicle incidents are also reported along the Tram line.

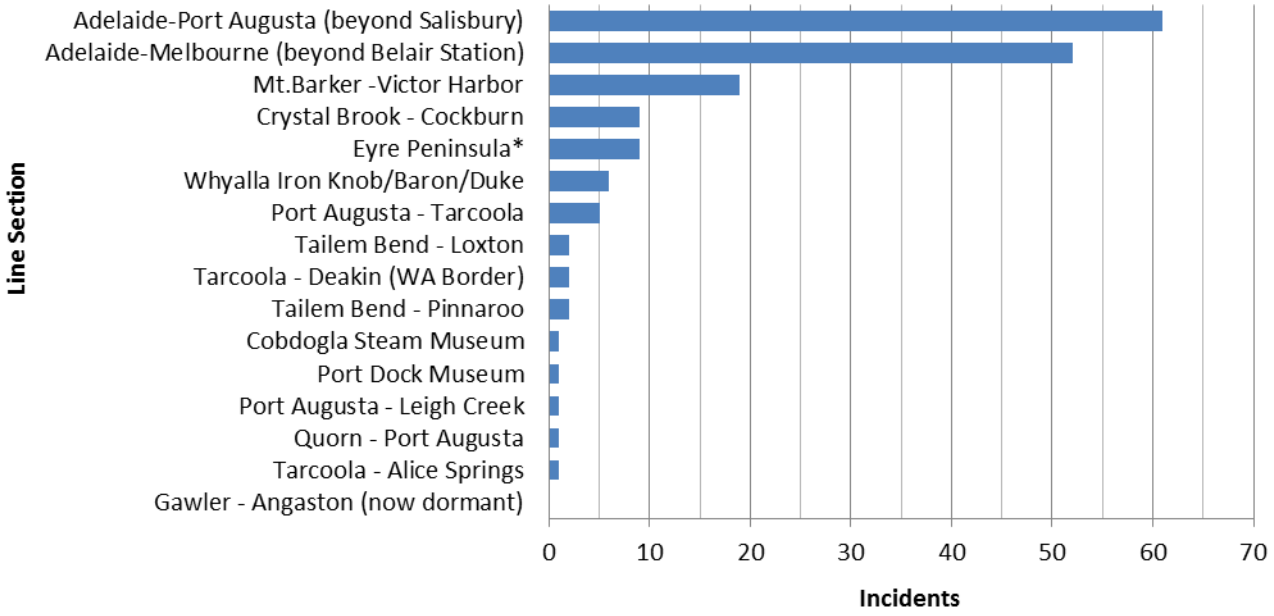
Figure 1: Metropolitan railway crossing incidents (including near misses) by Line Section, South Australia, 2011-2015



Rural South Australia

Incidents involving vehicles are more common at railway crossings in rural areas of the State. Vehicle incidents are most frequently reported along the Adelaide–Melbourne and Adelaide–Port Augusta train lines. A large number are also reported along the Mount Barker–Victor Harbor Steam Ranger Heritage Railway (see Figure 2 on next page).

Figure 2: Rural railway crossing incidents (including near misses) by Line Section, South Australia, 2011-2015



**Eyre Peninsula includes Port Lincoln-Thevenard, Cummins-Kimba and Ceduna-Penong lines.*

Driver behaviour at Railway Crossings

Damage to railway crossing infrastructure caused by poor driver behaviour can also lead to further incidents (for example, where damaged signal posts or boom gates become stuck or drop onto vehicles).

The metropolitan and rural railway crossings with the highest number of incidents (damage to infrastructure, as well as a near-miss with a road vehicle or pedestrian) recorded in 2011-2015 are:

Metropolitan railway crossings

- Tapleys Hill Road/Trimmer Parade intersection, Seaton (46 incidents)
- South/Cross Road intersection, Emerson (23 incidents)
- Cormack Road, Dry Creek (22 incidents)
- Torrens Road, Ovingham (18 incidents)
- Park Terrace, Salisbury (15 incidents)
- Jetty Road, Brighton (15 incidents)
- Morphett/Diagonal Road, Oaklands Park (13 incidents)
- Eastern Parade, Port Adelaide (13 Incidents)

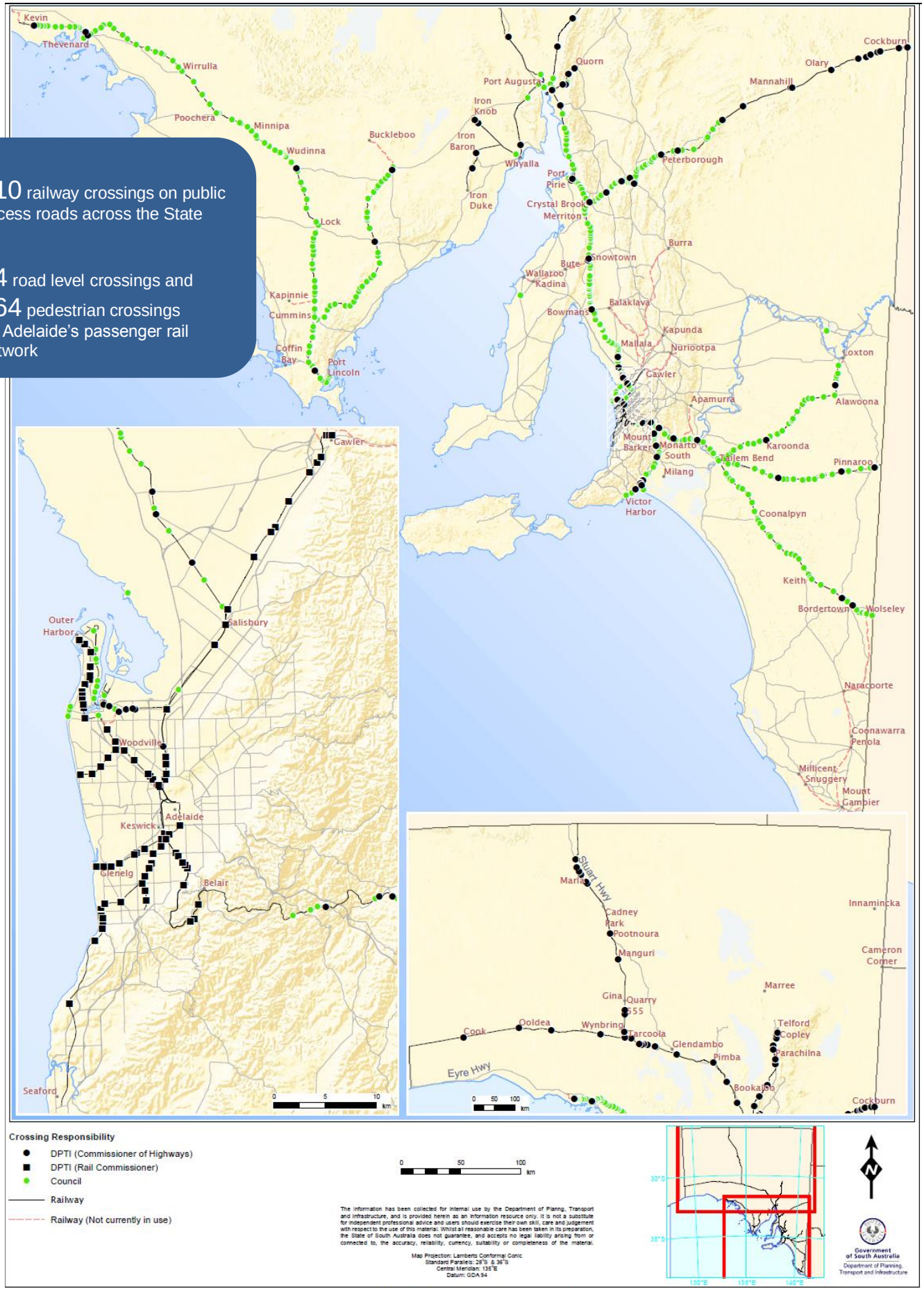
Rural railway crossings

- Mannum Road, Murray Bridge (15 incidents)
- Eyre Highway, Ceduna (7 incidents)
- Warnertown Road, Coonamia (5 incidents)
- Racecourse Road, Stirling North (5 incidents)
- Cypress Terrace, Murray Bridge (5 incidents)
- Footner Road, Port Augusta (4 incidents)
- Wauchopes Road, Coonamia (4 incidents)
- Mount Laura, Whyalla (4 incidents)
- North Terrace, Tailem Bend (4 incidents)

Locations of railway crossings in South Australia

710 railway crossings on public access roads across the State

84 road level crossings and
364 pedestrian crossings
on Adelaide's passenger rail network



Crossing Responsibility

- DPTI (Commissioner of Highways)
- DPTI (Rail Commissioner)
- Council
- Railway
- Railway (Not currently in use)

0 50 100 km

Map Projection: Lamberts Conformal Conic
Standard Parallels: 29°S & 36°S
Central Meridian: 135°E
Datum: GDA 94

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Managing Railway Crossing Safety

While there are risks at all railway crossings, some crossings in particular are subject to critical safety issues. Road level crossings on busy main roads, for example, can involve long waits at crossing signals, leading to traffic delays and frustrated motorists taking risks.

In addition, a large number of road level crossings and pedestrian crossings (particularly in rural areas) have only passive safety controls that rely on individuals seeing a train approaching and making a decision to stop or proceed through the crossing.

Responsibility for managing railway crossing safety is shared by many organisations, including State and local governments and rail infrastructure owners. Interface Agreements between road and rail managers set out the responsibilities of each party and how they will identify and manage risks at railway crossings on their networks to improve safety.

How do we know where the issues are?

The Australian Level Crossing Assessment Model (ALCAM) is used to assess potential risks at railway crossings and help prioritise safety improvements according to their comparative safety risks. ALCAM is used in conjunction with stakeholder consultation, including on-site railway crossing assessments, traffic surveys, standards and other risk mitigation strategies, as well as consideration of the crash/incident history of the site.

Treatment options

A range of treatment options are available to improve safety at railway crossings. Their implementation requires integrated, tailored solutions involving both road and rail authorities, as well as consultation with local governments and the community.

Treatment options can include:

- **advance warning signs**
- **queuing treatments (eg cross hatching)**
- **traffic signal coordination**
- **road re-alignment**
- **upgraded control mechanism (eg flashing lights and boom gates)**
- **high intensity lights (eg LEDs)**
- **sight line improvements**
- **reduced speed limits on the approach to road level crossings**
- **closure of the crossing**

Given the inherent risks and serious incidents associated with railway crossings in South Australia and interstate, the introduction of new crossings is discouraged. This position is supported at a national level; the Australian Transport Safety Bureau recommends that “every State ensure unnecessary railway crossings are eliminated and those that remain are as safe as possible”.

All Australian jurisdictions have railway crossing improvement programs in place. Most recently, the Victorian Government announced that “it will remove 50 of the worst railway crossings in Melbourne over the next decade”.

The following pages outline the risks present at metropolitan, rural and pedestrian railway crossings across South Australia, and highlight the strategies proposed to improve safety.

As a community we must recognise that closing railway crossings is a key strategy to improve safety and needs serious consideration. Closing road level crossings and pedestrian crossings will require extensive consultation with local government and the community to assess the need for access across the train lines for both vehicles and pedestrians. Maintaining connectivity is crucial to the life of all communities.

Metropolitan Railway Crossings

Metropolitan railway crossings, which are used by high numbers of vehicles and trains each and every day, can severely affect the efficiency and safety of road and rail users and have major financial impacts on businesses and the State's economy.

The road network in Greater Adelaide intersects the interstate and metropolitan rail network 'at grade' (on the same level at the point of crossing) at 128 locations. Of these, 84 at-grade crossings are on the Adelaide Metro rail network. Many are on arterial roads and affect through traffic, bus services and freight movements.

Separating the road and rail network ('grade separation') with underpasses or overpasses, upgrading with safety improvements or by closing some crossings can improve public transport and road network efficiency, as well as safety for motorists, pedestrians, cyclists and public transport users.

Some 42,000 vehicles, 1800 pedestrians, 130 trains and 15,000 rail passengers pass through the railway crossing on Morphett Road, Oaklands Park each day. Total crossing closure time is around 1.5 hours per day – a significant delay on a major road.

Risks at metropolitan railway crossings

Vehicles queuing over the tracks

Queuing presents the greatest safety risk at metropolitan road level crossings. It occurs when vehicles stop on the tracks at a crossing because of other vehicles stopped ahead, possibly due to nearby traffic signals or drivers turning right.

Driver compliance

Lack of awareness of the risks, complacency, impatience and inattention contribute to drivers failing to obey road rules at road level crossings. Unsafe behaviour typically involves not waiting for boom gates to open completely, queuing over the tracks, running red-lights or weaving around boom gates.

Improvements and strategies to reduce risks

Many metropolitan road level crossings have already been treated to manage the risk of queuing. Broader strategies to manage the safety risks at metropolitan level crossings are described here:

STRATEGIES

- **Grade separate any new railway crossings on urban arterial roads**
- **Grade separate key railway crossings between Brighton and Elizabeth**
- **Identify high risk railway crossings based on incident data, ALCAM surveys, traffic volumes and congestion**
- **Target crossings for infrastructure safety improvements such as traffic light coordination at sites with queuing risks**
- **Identify crossings for possible closure where other alternatives may exist**
- **Identify railway crossings for installation of safety cameras**
- **Use CCTV cameras to monitor potential sites for short-stacking**
- **Manage risks through Interface Agreements**
- **Work collaboratively with councils and rail operators on road level crossings in their area**

Railway crossings on the Outer Harbor Line that will be grade separated as a result of the Torrens to Torrens project include:

- South Road, Croydon

Railway crossings that will be grade separated under the Torrens Junction project include:

- Park Terrace, Bowden
- Gibson Street, Bowden

Metropolitan Pedestrian Crossings

Most pedestrian crossings on the metropolitan rail network have passive controls such as 'maze ways' that rely on individuals seeing an oncoming train. Those adjacent to a road level crossing may also have bells to warn pedestrians.

Of the 364 pedestrian crossings on the Adelaide Metropolitan passenger transport network, 21 have active gated controls.

Risks at pedestrian crossings

More than one train

Crossings with multiple tracks and a high frequency of trains present serious risks for pedestrians because of the likelihood of trains approaching from both directions at the same time. The risks are particularly high where there are no gates or signals. Pedestrians may not see an approaching train obscured by another train, particularly if they are distracted by a phone, using headphones or in a rush.

'Caution – More than one Train' warning signs and automatic pedestrian gates have been installed at some of Adelaide's metropolitan pedestrian crossings.

Further improvements to safety can be made by installing more warning signs, activating more crossings with gates, grade separating pedestrian crossings as well as educating pedestrians about the risks.

In some cases, closing pedestrian crossings enables the overall risk to be better managed, especially if there are safer crossings nearby, as well as improves rail performance in metropolitan areas.

Consultation with local government and the community is important to maintain safe connectivity for pedestrians and cyclists.

STRATEGIES

- **Grade separate any new pedestrian crossings**
- **Identify pedestrian crossings for infrastructure safety improvements**
- **Install automatic pedestrian gates on high volume pedestrian crossings**
- **Ensure appropriate signage at all pedestrian crossings**
- **Identify crossings for possible closure where safer alternatives exist**
- **Continue to improve accessibility for people with disabilities as part of upgrades at pedestrian crossings in line with the *Disability Discrimination Act 1992* and relevant accessibility standards**
- **Consider and address the safety risks of existing pedestrian crossings that may arise due to increased development**
- **Prioritise activation of pedestrian crossings where train line speed is above 90km/h**

Pedestrian crossings on the Outer Harbor Line that will be grade separated as a result of the Torrens to Torrens project include:

- South Road, Croydon

Pedestrian crossings planned for grade separation under the Torrens Junction project include:

- Park Terrace, Bowden

This project will also provide automatic gates at the footpath at War Memorial Drive, Bonython Park in North Adelaide.

Rural Railway Crossings

Rural crossings generally carry fewer road vehicles and trains than those in metropolitan areas; however, the trains are often longer, heavier and travel at higher speeds and the vehicles are often longer and heavier freight-carrying vehicles and in each case will take longer to stop.

The risks at road level crossings in rural areas differ from those in the metropolitan area.

Of the 710 public access road level crossings across the State, 271 have active controls with boom gates and/or flashing lights.

Risks at rural railway crossings

Sighting

Road level crossings in rural areas typically have passive controls (Stop or Give Way signs) that rely on the motorist seeing an approaching train and taking the appropriate action.

On high-speed road and rail networks, safe sighting distances can be quite long and difficult to achieve. On low-volume train lines, motorists may not expect or look for a train. Removing obstructions such as vegetation may improve sighting. In some situations, road realignment or installing active controls may be necessary.

Short-stacking

Short-stacking occurs when a long vehicle such as a semi-trailer does not have enough space to completely clear the crossing and stops while part of the vehicle is still within the crossing. Installation of left-turn acceleration lanes, short-stacking warning signs or restrictions based on vehicle length may be considered to improve safety. Other options include closing the crossing or considering alternative routes.

Complacency on seasonal/low volume rail lines

When motorists in rural areas are used to *not* seeing a train on a particular line they may ignore or not pay attention to the warning signs. Trains can run at any time, particularly during grain harvest periods.

Inactive rail lines

Road level crossings on dormant, disused or closed railway lines (such as the Gawler to Angaston and Mount Gambier to Millicent lines) also present a hazard to motorists, particularly when "*Stop*" or "*Give Way*" signs remain in place as this can cause confusion to motorists. Those local or familiar to the area may not slow down, knowing that there are no trains running, whilst others may slow down or stop, with a risk of a rear end collision by a following vehicle. In these circumstances a "Railway Crossing Not in Use" sign should replace any Stop or Give Way signs. Old non-frangible posts and other infrastructure can also create a hazard to drivers.

In some cases alternative signage needs to remain at the crossing, such as where rail remains in the road causing a hump, dip or rough surface, to alert drivers to the change in conditions.

Railway crossings on high speed rural roads

Reducing travel speeds on the approach to road level crossings has several advantages including: it alerts motorists to a change in conditions or hazard ahead, increases attention to warning signage, provides the motorist with more time to observe the control at the crossing or an approaching train; significantly reduces the braking/stopping distance of the road vehicle and lessens the impact of a collision with a train.

Both Western Australia and Victoria have reduced speed limits to 80km/h on the approach to selected road level crossings on high speed roads with positive results.

South Australia could consider a similar approach on major arterial roads with an existing speed limit of 100km/h or more to improve safety at rural level crossings.

As railway crossings on National Highways already have active controls in place, these roads would be excluded. Rather, Active Advance Warning Signals (AAWS) could be considered on advance of these crossings.

STRATEGIES

- **Grade separate any new railway crossings on major traffic/freight routes**
- **Identify rural crossings for safety improvement works**
- **Trial vehicle-activated signs on passive rural crossings**
- **Engage with industry about pursuing low cost technology solutions at rural railway crossings**
- **Identify crossings for closure where other alternatives may exist**
- **Reduce speed limits on the approach to railway crossings on roads with a speed limit of 100km/h or greater**
- **Work with Councils and rail operators to reduce risks**
- **Manage risks through Interface Agreements**
- **Continue to undertake ALCAM and other safety surveys**

Education and Enforcement

Motorists and pedestrians have a low perception of the danger at railway crossings. Research in South Australia indicates that 69% of pedestrians, 47% of cyclists and 44% of motorists engage in unsafe behaviours at railway crossings.

Raising awareness and understanding of the risks and road rules related to railway crossings is critical to improving safety and compliance. Education is most effective when coinciding with visible police presence and enforcement efforts.

STRATEGIES

- **Promote the road rules to raise awareness of the laws and penalties that apply to road users at railway crossings**
- **Educate drivers in the Adelaide metropolitan area about the danger of queuing over tracks**
- **Educate pedestrians and cyclists about the danger of trains approaching from both directions**
- **Raise awareness within the heavy vehicle industry about short-stacking risks**
- **Contribute towards and promote national railway crossing education programs and campaigns**
- **Improve compliance at high-risk railway crossings and align with education campaigns**
- **Raise awareness of risks at infrequently used lines in rural areas**

Definitions

Activated Crossing – Vehicle and pedestrian traffic controlled at railway level crossing by devices such as flashing light signals, bells or other audible warning devices, gates or barriers, or a combination of these. The device is activated prior to and during the passage of a train or tram.

ALCAM – The Australian Level Crossing Assessment Model used to assess and identify potential risks at Level Crossings.

Interface Agreement – An agreement about managing risk to safety identified and assessed under the Rail Safety National Law.

Level crossing – An area where a road and a railway meet at substantially the same level, whether or not there is a level crossing sign on the road at all or any of the entrances to the area.

Near miss – Where the driver of a moving train takes emergency action, or would have if there was sufficient time, to avoid impact with a person, vehicle or other obstruction and no collision occurred. Emergency action includes continuous audible warning and/or brake application.

Passive Crossing – Vehicle and pedestrian traffic controlled at railway level crossing by signs or devices, which rely on the user detecting the approach or presence of a train by direct observation.

Private Crossing – A Level Crossing provided to permit access to private property or to extend access between parts of private property.

Railway Crossing – A level crossing or any area where a footpath or shared path crosses a railway at substantially the same level.

Department of Planning, Transport and Infrastructure

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