Supplement

Traffic and Road Use Management
Volume 2 – Guide to Road Safety

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P4-A Convex mirrors

1 Introduction

This supplement provides guidance on the use and installation of convex mirrors functioning as a traffic safety device on Queensland roads. This supplement is not relevant to convex mirrors when utilised for parking stations and parking areas.

The purpose of the convex mirror is to indicate to the road user, the presence or absence of a moving or stationary vehicle and/or pedestrian.

The convex shape of the mirror results in distortion of the image, speed and distance of any object. The degree of distortion depends on the radius of curvature and size of the convex mirror – the larger the radius of curvature, the less the distortion and vice versa.

2 Considerations

Consideration of mirror shape is essential to ensure the road user has adequate time in a particular situation to understand and interpret the information provided by the convex mirror.

The image appears to be smaller, further away and travelling at a slower speed in a mirror with a smaller radius of curvature. A convex mirror with a small radius of curvature could potentially provide too much detail in a small area, which will hamper road user’s driver’s ability to discriminate detail.

The larger the radius of curvature, the less the distortion of the oncoming vehicle. Larger diameter mirrors are more easily seen by road users. These large diameter mirrors also provide a larger field of view, enabling the oncoming traffic to be more clearly seen than would be the case if smaller mirrors were used.

In addition to distortion effects, the image of a vehicle in a convex mirror appears to be on the wrong side of the road due to the ‘mirror image’ effect, where left appears to be right and vice versa. This ‘mirror image’ effect can result in road users misinterpreting the images. This can be potentially dangerous, especially in the case of vehicles approaching the intersection from a one-way street. This is seen as a serious limitation.

Consideration should also be given to potential problems resulting from headlight glare at night and the effect of glare from the sun, particularly at dawn and dusk.

Dark blue, black and other dark colours are difficult to detect in these mirrors in the early morning or late afternoon as these colours appear to be absorbed by the road surface.

3 Road safety inspection

A road safety inspection should be conducted prior to a decision to install a convex mirror on a Queensland road. Considering the problems inherent in the design and use of convex mirrors, the road safety inspection must indicate that the solution provides both safety and traffic management benefits.

The road safety inspection outcomes and consequent decision to install the convex mirror must be fully documented in accordance with relevant Australian Standards for risk assessment.
4 Limitations on Queensland roads

Convex mirrors should not be installed:

- on Queensland roads where alternative traffic management measures or engineering measures, such as improvements to sight distance and road re-alignment, are available in the short term
- within the carriageway, including shoulders, islands and medians
- to enhance pedestrian crossing movements (in this instance, other solutions should be considered, such as relocation of the crossing point or the provision of strategically-located pedestrian refuges), and
- without appropriate signs.

Convex mirrors may be used on Queensland roads as an interim measure until appropriate traffic management/engineering solutions are implemented.

5 Legal issues

When considering the installation of convex mirrors, a risk assessment shall be carried out in accordance with the relevant Australian Standard. The purpose of which is to document the benefits of installing a convex mirror will provide a safer solution than doing nothing. To ensure the department is not compromised in the event of a crash, the following three-step process shall be adopted:

1. use and documentation of road safety inspection procedure to assess the road safety benefits relative to the risk of crash(es) in installing a convex mirror at a particular location

2. make a decision based on the assessment of the road safety benefits and the risk of crash(es) arising from the installation, and

3. take all necessary steps to ensure safe and proper installation, operation and use of the mirror. For example, if the installing road authority is aware of some potential danger arising from a road user’s reliance on a convex mirror at a particular location, failure to provide adequate warning of the deficiency of the mirror could increase the level of risk carried by the road authority at that location.

Where property owners or developers believe that a convex mirror on the Queensland road will assist safe access from concealed private driveways or private roads, they should approach the road authority for approval.

Convex mirrors should be installed and maintained by the road authority responsible for the care and control of the particular road. See Clause 7 Funding.

To ensure safe installation and community acceptance, each convex mirror proposal on a state-controlled road should be in accordance with this supplement. Local and regional councils should seek advice from the local Traffic Advisory Committee prior to considering installation.

Road authorities are advised that all necessary precautions should be taken to securely install a convex mirror at the appropriate location and height to ensure safety of all road users, including pedestrians, and to prevent vandalism. See Clause 6.4 Mounting details.
Convex mirrors shall be regularly inspected by the road authority to ensure that the mirror is adequately maintained, in a serviceable condition, and that the mirror is correctly aligned and not damaged. Adequate records of these inspections are required.

6 Installation

6.1 Criteria for use

Convex mirrors are not for general use. They should only be installed as a traffic safety device in situations where lateral visibility/sight distance is critical, but considered severely limited and there are no other immediate viable options available.

Convex mirrors should only be used in low-volume and low-speed road environments. The following conditions should generally apply:

- 85th percentile speed on the road(s) is 60 km/h or less, and
- traffic volume on the road(s) is less than 300 vehicles/peak three hour period.

6.2 Typical uses

Convex mirrors may be installed at the following locations where the lateral visibility/sight distance is critical, but considered to be limited:

- obscured T-junctions
- concealed driveways
- acute bends of a narrow road, such as hairpin bends in mountain passes
- parking areas with acute exit driveways, and/or
- approaches to skewed railway level crossings.

6.3 Types and selection of convex mirrors

Convex mirrors must be suitable for outdoor use. They should be very durable, vandal-resistant, require nil or low minimal maintenance, and be of weather-proof material and construction.

Acrylic, highly polished stainless steel or polycarbonate convex mirrors should be used.

The acceptable sizes are 600, 800, 1000 and 1200 mm diameter or rectangular size 600 mm x 450 mm.

While field trials may be necessary to determine the preferred range of curvature and size for a particular use, generally convex mirrors with diameters of 800 mm and 1000 mm are appropriate for installation on Queensland roads.

6.4 Mounting details

Convex mirrors must be securely mounted to a pole, wall or other suitable high point to deter vandalism. Appropriate signs shall be used in conjunction.

The convex mirror shall be fitted with a visor at its top. This will reduce the accumulation of dust on the mirror surface. The fitting of a brightly-coloured protective outer band (target board) will assist in improving the conspicuity of the mirror, which could be of assistance to road users who do not use this area regularly.
The convex mirror should be installed at a location that provides the best view of the road and the oncoming vehicles concerned. It may be necessary to use two mirrors when one mirror does not give a complete view of the road scene.

7 **Funding**

The road authority undertaking the installation and maintenance of convex mirrors is responsible for funding.

Where the installation of a convex mirror on a Queensland road is requested by the property owner or developer, the road authority may require the property owner or developer to contribute to the installation and ongoing maintenance of the mirror.

**P4-B Guideline on domestic waste collection on state-controlled roads**

1 **Introduction**

The purpose of this supplement is to provide guidance to local governments for implementation of domestic waste collection schemes using wheelie bins on state-controlled rural roads in Queensland.

Throughout Queensland, local governments have introduced domestic waste collection services using wheelie bins. This has resulted in wheelie bins being placed on, or adjacent to, state-controlled and local government roads.

The major concern in relation to these collection services is the potential conflict in high speed environments between the constantly stopping collection vehicles and other road users.

Waste collection, particularly on roads with a high speed limit and high traffic volume, can have adverse effects on road safety due to the speed differential between road users and collection vehicles – this can also have the following flow on effects:

- Inadequate pull over width on road shoulders for waste collection vehicles, resulting in roads being partially blocked. This is especially hazardous where the road alignment is poor or in adverse weather conditions. There is a potential hazard when a collection vehicle stops in a no overtaking zone and the lane is not wide enough for following vehicles to pass without crossing the barrier lines.
- Waste collection vehicles constantly stopping and starting and obscuring vision of other drivers.
- The presence of wheelie bins as potential roadside obstructions/hazards, and
- Unsealed shoulders that may become unstable in wet conditions for waste collection vehicles to travel.

2 **Considerations**

2.1 **Role of local government**

Local government has a duty of care to road users to manage associated risks. Any third party employed to provide the domestic waste collection service has the same duty of care.

To ensure the collection system is not introducing any unnecessary risks, local government should conduct a risk assessment, in accordance with AS/NZS ISO 31000:2009, of the waste collection method and route (new or existing), taking into consideration the type/size of waste collection vehicles.
to be used and factors affecting the route e.g., road width and local environmental conditions, and
nominate mitigation factors to reduce these risks.

2.2 Wheelie bin placement

Driveways are likely to provide a relatively flat and stable area for waste collection vehicles to pull off
the carriageway, either completely or by straddling the carriageway. Driveways are also less likely to
be susceptible to instability in poor weather conditions. Areas where vehicles can pull over may need
to be provided where there is insufficient hard shoulder and poor visibility. As such, information
provided to residents for wheelie bin placement, issued by local government, should include that
wheelie bins be placed on driveways on collection days only.

Where possible, the wheelie bin should be placed on the departure side of the driveway with adjacent
property wheelie bins grouped together (Figure 2.2) to give waste collection vehicles space to
manoeuvre and possibly pull off the carriageway. Therefore, the driveway effectively becomes the
pick-up area.

*Figure 2.2 – Wheelie bin placement on residential driveway*

2.3 Waste collection vehicle operation

During waste collection activity, waste collection vehicles are to be manoeuvred out of the traffic flow,
i.e., on the hard shoulder or as far away from the through traffic lane as practicable (Figure 2.3-A).
During the collection activity, the wheelie bin should be replaced on the ground in an upright position (Figure 2.3-B) or at least off the carriageway with the lid closed so that the wheelie bin does not become a hazard for other road users.

**Figure 2.3-A – Waste collection activity**

**Figure 2.3-B – Wheelie bin following collection**
2.4 Time of collection

To minimise conflict with other road users, early morning daylight collections or a time that avoids the heaviest traffic flows on a route should be considered when scheduling domestic waste collection services.

2.5 Road rule exemptions

Transport Operations (Road Use Management – Road Rules) Regulation 2009 made, under the TORUM Act (‘the Road Rules Regulation’), contains a provision that specifically deals with the operation of waste collection vehicles on roads. Section 313A exempts the driver of a waste collection vehicle from a number of listed provisions of the Road Rules Regulation on certain conditions.

2.6 Signing of waste collection vehicles

In addition to the requirement for vehicles with a GMV of 12 tonnes or more to have Rear Marker Plates (National Heavy Vehicle Regulator, National Heavy Vehicle Inspection Manual, refer to www.nhvr.gov.au), waste collection vehicles should display a sign both on the front and rear of the vehicle stating ‘Vehicle Frequently Stopping’ (Figure 2.6 (example only)). Refer to TC Signs register.

Figure 2.6 – Signing of waste collection vehicle (example only)