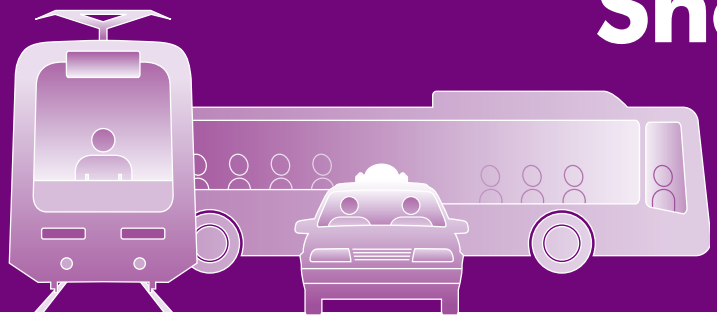

Shoulder Bus Stop Guidelines

March 2007

Introduction

Shoulder bus stops are mostly found in rural and outer urban areas. These bus stops have different requirements and constraints to those found in urban areas. Bus stops in rural and outer urban areas are often located on the road shoulder between the carriageway and table drain, with few or no passenger facilities. Many shoulder bus stops do not meet the needs and expectations of bus drivers, bus operators, passengers and motorists.

This guide is intended to provide information on the location, design and operation of shoulder bus stops (both passenger waiting areas and bus stopping areas).

These guidelines cover scheduled route bus stops. For guidelines for school bus stops refer to Department of Infrastructure publication *Rural School Bus Stops and School Located Interchanges: Safety Guidelines and Typical Treatments* (June 2006).

Bus Stop Location

The careful selection and assessment of locations for shoulder bus stops can assist in meeting the needs of various stakeholders cost effectively. When the opportunity arises to site a new stop or review the site of an existing bus stop the following should be considered:

- Bus stops and stopping areas should not be located near or on curves along a road. This may not provide sufficient sight distance for bus drivers to identify and stop at the bus stop, or adequate rear view of approaching vehicles when pulling out of the shoulder (Refer to figure 1). Further it may not provide sufficient sight distance to allow motorists to stop behind the stationary bus.
- Locating adjacent to a table drain should be avoided if possible as it becomes an obstacle for passengers boarding the bus, especially for disabled passengers.

Figure 1: When locating a bus stop bends and curves should be avoided.

- The bus stop should be located near an existing footpath to provide access to the bus stop and to minimise the cost of providing access (Refer to figure 2).
- Bus stops should not be located in narrow or restricted geometry areas where there is insufficient area for installation of hardstand for passengers to wait safely. The bus stop should be located with greater roadside width. Where there is no other option the bus stop should not be installed (Refer to figure 3).

Figure 2: Bus stops located or built without access footpath should be avoided.

Figure 3: Where the geometry or landscape is restrictive a bus stop should not be provided.

- Bus stopping areas should ideally be located on sealed road shoulders as this minimises the cost of maintenance.

Not all rural and outer urban bus stops require pull-off areas for buses. In some situations bus stop bays are not required. This is outlined in VicRoads' *Bus Stop Guidelines* (February 2006).

Bus Stop Waiting Area

Hardstand

The provision of a hardstand area is a basic requirement for all new or upgraded bus stops in accordance with with Disability Discrimination Act (1992) and the Disability Standards for Accessible Public Transport (2002). It provides passengers a stable and even surface to wait for and board a bus, especially for disabled passengers. It assists bus drivers maintain a clean bus interior and minimises the potential slip hazards in the bus for other passengers. The provision of hardstand area should be sufficient to allow all passengers adequate room to stand without overcrowding. This can be incorporated into a concreted area over the table drain. If the external ramp is deployed from the bus to assist passengers boarding and alighting, the hardstand area should allow for adequate vertical height in order to keep the ramp stable.

Shelters

Shoulder bus stops often do not have shelters. However, the provision of bus shelters should be considered at locations where there is a high level of passenger patronage. The initial selection of a location for a bus stop should include consideration for future provision of bus shelters. Bus stops should be reviewed as patronage grows so that shelters are provided in locations where level of use justifies.

For the design and layout of bus stop shelters refer to the VicRoads' *Bus Stop Guidelines* (February 2006).

Footpath

Passengers should be provided a footpath to access a bus stop hardstand area. When determining the location for a new shoulder bus stop this should be a pre-requisite. An unsealed footpath may be more difficult for passengers with disabilities to use and should be avoided where possible.

The provision of a sealed footpath enhances passenger comfort by avoiding travelling through muddy areas after rain and reduces mud tracked on to buses. Where there is no footpath and no other stop location can be found, the construction of a path should be considered during the installation of the bus stop. Where a bus stop is located a short distance away from an existing footpath the extension of the existing path should be provided. Footpaths need to be at least 1.2 metres wide to provide adequate access for wheelchairs.

Drainage & Vegetation

Drainage for rural roads is usually provided through table drains located on the outside of shoulders in cuttings or alongside shallow raised carriageways in flat areas. Due to the proximity of table drains to the road, passengers boarding and disembarking from buses often need to traverse table drains (Refer to figure 4). In this situation, and where no obvious alternative bus stop site exists, it is proposed that a 20 metre section of the table drain be replaced by kerb and channel or box culvert covered over with a concrete surface.

This provides clean and dry surface for pedestrians to board and disembark, and increases the accessibility for any passengers who would have difficulty crossing the table drain. This also reduces the cost of maintenance by eliminating possible damage to table drain from passenger traffic. Less mud and water is tracked on to the bus reducing the level and frequency of cleaning and a potential slip hazard for other passengers is eliminated.

Figure 4: Where possible the bus stops should not be located near table drains

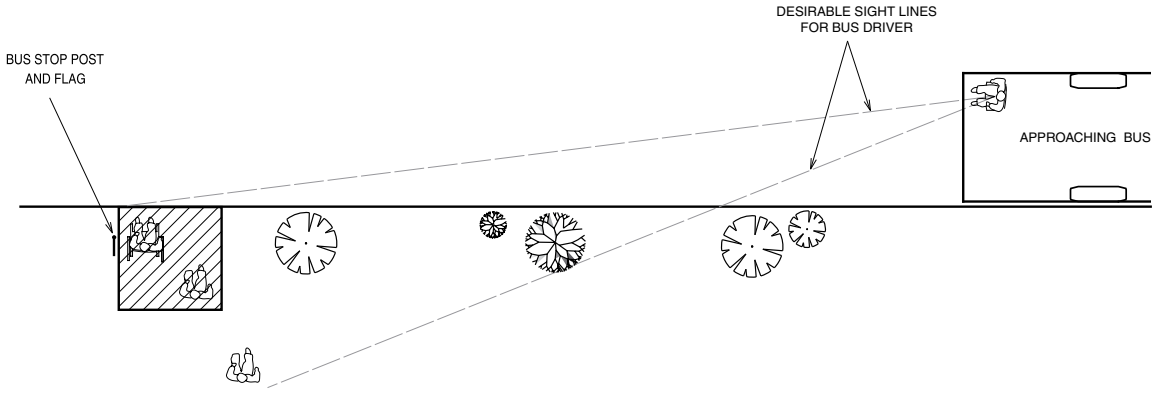

Figure 5: Line of sight of bus stop and passengers should not be obstructed by vegetation

Vegetation leading up to a bus stop should be avoided as it reduces the visibility of the stop and passengers to bus drivers. Any vegetation in place needs careful management (Refer to figure 5).

Bus Stopping Area

There are three main issues that affect rural bus stopping areas:

- insufficient width for bus to stop safely;
- lack of length for acceleration of bus re-entering traffic; and
- issues associated with gravel stopping areas.

Width of Bus Stopping Areas

Generally, most rural and outer urban roads have shoulder widths between a range of 1.5 to 2.0 metres and 2.5 to 3.0 metres for high volume roads. For further information on road shoulders refer to Austroads *Rural Road Design: A Guide to the Geometric Design of Rural Roads*. The minimum shoulder width required for a bus stopping area is 3 metres which allows the bus to stop without delaying traffic. (Refer to figure 6.)

Figure 6: Narrow shoulder needs widening and sealing.

Often due to the narrow shoulders buses cannot fully pull into a bus stopping area without infringing on the traffic lanes, the table drain or verge adjoining the shoulder. This manoeuvre increases the risk of accidents with other motorists and damage to the table drain and verge. The risk increases on rural roads with single carriageways with other motorists attempting to overtake a stationary bus.

Where insufficient shoulder width is available there are two acceptable solutions:

1. Extend the width of the shoulder to allow the bus to fully pull into the bus stopping area without infringing on the traffic lane. This may also involve drainage works for any table drain present.
2. Consider a different location for the bus stop.

Length of Bus Stopping Areas

The length of a bus stopping area should be sufficient to allow the bus to start moving before re-entering traffic lanes. Compared to a standing start, providing a short length for acceleration reduces bus driver and motorist frustration, with less disruption to the flow of traffic. It also reduces crash risk and increases safety and comfort for occupants of the bus (Refer to figure 7).

The minimum length recommended is 15 metres, consistent with a taper on a bus bay. However, where possible, a longer sealed distance should be provided, especially in higher speed zones.

Unsealed Shoulders

Ideally, bus stops should not be located on unsealed shoulders. Unsealed road shoulders are generally designed to allow the occasional stopping of light motor vehicles in emergency situations. The location of a bus stopping area on an unsealed shoulder creates frequent repeated heavy vehicle loading and braking causing greater wear. The result of this wear is identifiable with the presence of rutting and pot holes which require frequent maintenance intervention.

During dry periods, these defects are a potential obstacle/hazard for bus drivers and create an uncomfortable journey for passengers due to rough terrain. Further in dry conditions, buses pulling in and out of gravel shoulders can create clouds dust which can reduce the line of sight for other motorists, create discomfort for waiting passengers and make buses dirty. In wet weather conditions, mud and pools of water form in these defects, which become splashed onto waiting passengers. Furthermore, these become a hazard for bus drivers to avoid and are distractions reducing safety. Maintenance requirements for buses are also greater using unsealed shoulders.

Where a bus stopping area is placed on a road shoulder, the shoulder may be sealed with a similar surface treatment as the rest of the road. In some situations merely sealing the road shoulder may not be sufficient, it will need to be upgraded and a pavement design developed. Similar treatments should be applied to the acceleration and deceleration tapers of the bus stopping area.

Figure 7: Bus stop does not have sufficient length after stop to allow bus to accelerate and shoulder sealing is needed.

Further Reading

AUSTROADS (2003) Rural Road Design: A Guide to the Geometric Design of Rural Roads.

COMMONWEALTH OF AUSTRALIA (2002) Disability Standards for Accessible Public Transport.

DEPARTMENT OF INFRASTRUCTURE (2006) Rural School Bus Stop and School Located Interchanges: Safety Guidelines and Typical Treatment.

VICROADS (2006) Bus Stop Guidelines. February 2006.

Further information

For further information on bus stop infrastructure, responsibilities or standards and guidelines, contact:

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These guidelines are also available on VicRoads website, www.vicroads.vic.gov.au/rbptguidelines. Future updates will also be placed on the website.