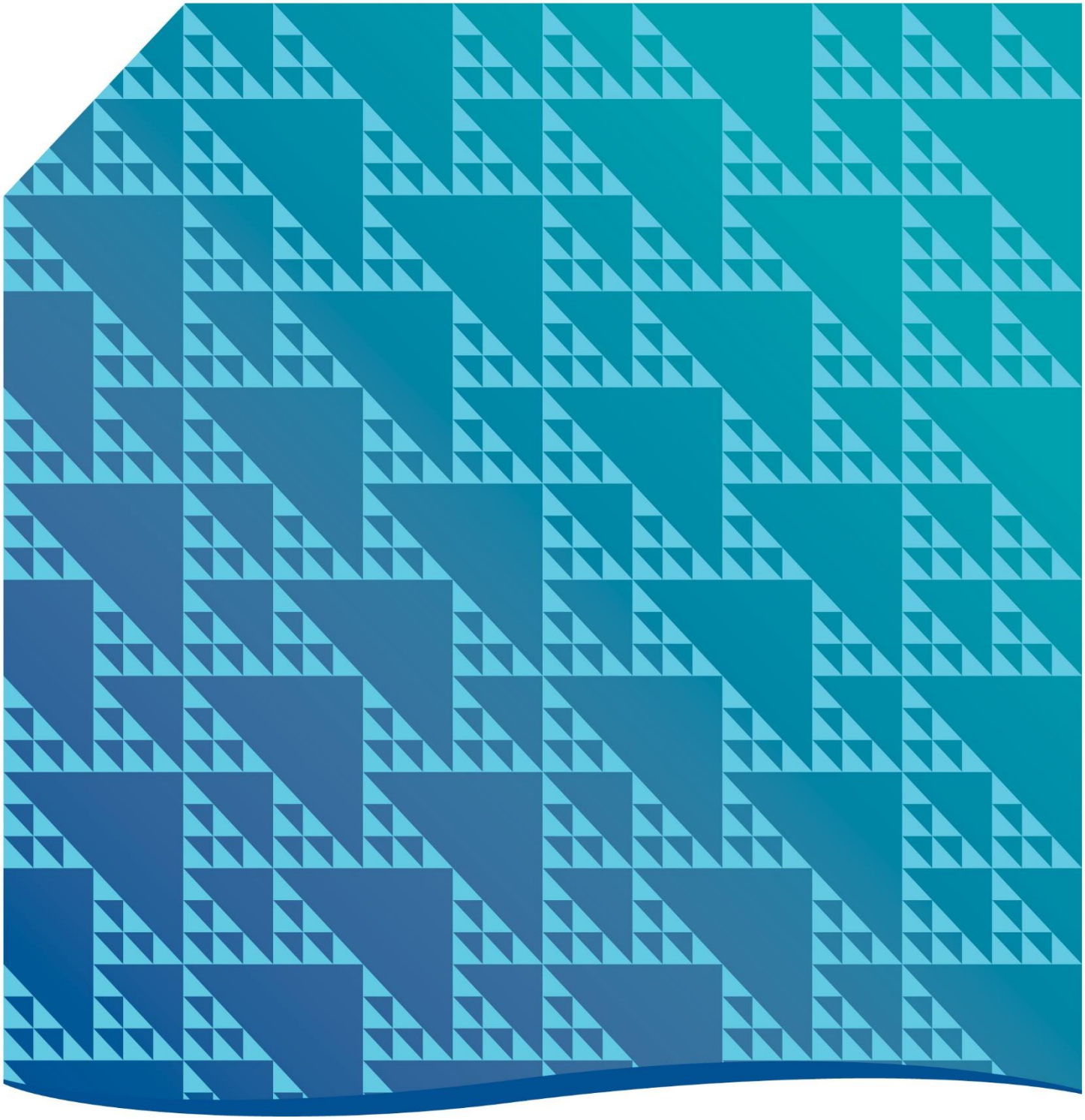
Professional Services
Specifications (PSS)

Last updated:
September 2020

# T3 – Road Design Guidelines & Standards ***INTERIM UPDATE***



Department of State Growth

Tasmanian Government

# Contents

## Revision History

| Version No. | Date | Description of changes |
|---|---|---|
| 2.0 | September 2020 | Interim version contains minor updates throughout and adds sections as placeholders prior to major review. The interim changes include:<br>• Addition of Pavement Design following withdrawal of PSS T15: Pavements at T3.6.4.<br>• Basis of Design renamed General Considerations.<br>• Design Considerations sections added to relate to items in GRD: Part 2, including *Functional Classifications* & *Design Speed and Operating Speed.*<br>• Update to Typical Cross Sections to include Rural and Urban roads,<br>• Additional information on other typical cross section elements, including crossfall & superelevation, verges, table drains, batter slopes, catch drains and property adjustments.<br>• Update to horizontal curve widening<br>• Updates to delineation regarding pavement marking and RRPM's for rural and urban roads.<br>• Additional details or place holder headings for:<br>Sight Distance, Plan Transitions, Vertical Alignment, Overtaking Lanes, Extended Design Domain, Intersections, Roundabouts, Interchanges, Signalised Intersections and Intelligent Transport Systems. |

## T3.1 Scope

***This Specification is in the process of being fully reviewed to identify and fully document and specific policies and guidelines for the design of roads for the Department of State Growth.***

***The review will cross reference Austroads Guides to Road Design, Traffic Management and Road Safety (as appropriate) to identify and document variations adopted for the design of roads for the Department of State Growth.***

***The review will cross reference Construction Specifications to eliminate discrepancies that might exist between the Construction Specifications and this specification.***

***This interim version of the Specification contains minor updates. Where additions have been made, text is highlighted in grey.***

This Specification sets out the technical requirements for road design, including the design of new roads and the upgrading or reinstatement of existing roads.

It defines requirements principally by reference to Austroads Guides, but also contains specific requirements. It deals primarily with the geometry of rural road alignments, cross-section widths, with safety components, Safety Audits and road reinstatement projects.

This Specification is part of the set of specifications comprising the Professional Services Specification (PSS).

## T3.2 Objective

The objective of this Specification is to ensure the Department's road design guidelines and standards are met in the design of roads for the Department. These guidelines and standards include Departmental policies and specific requirements and external guidelines and standards as referenced in this specification.

This Specification does not cover the specific requirements of other investigations to inform the road design but recognises that road design requires consideration of multiple factors.

## T3.3 References and Standards

Road Design shall be compatible to, and incorporate the requirements of all Professional Services, Construction and Maintenance Specifications, as well as Austroads Guidelines.

This Specification covers the issues specific to the following Austroads Guides to Road Design:

- Part 2 – Design Considerations
- Part 3 – Geometric Design
- Part 4 – Intersections & Crossings – General
- Part 4A – Unsignalised and Signalised Intersections
- Part 4B – Roundabouts
- Part 4C – Interchanges
- Part 6 – Roadside Design, Safety & Barriers

A more extensive list of the Austroads Guidelines and Australian Standards is listed in *Appendix T3A*.

In addition, the Department will continue to develop policies and standards that shall take precedence over external guidelines and standards.

## T3.4 Project Management Plan

Further to the requirements of *PSS PM2 - Project Management Plan and D1 Road Design*, the Project Management Plan shall have a complete description of the proposed design objectives, the project brief and a list of standards and guidelines to be applied to the design.

# T3.5 General Considerations

## T3.5.1 Design Standard

Road design shall generally be in accordance with the documents listed in *Clause T3.3 - References and Standards*.

## T3.5.2 Earthworks

In the design of earthworks for roads, the designer shall take account of special requirements such as the need for drainage blankets and local subsoil drains, the required depth of topsoil stripping, the need (or not) to strip topsoil under embankments and the requirements for batter treatments.

The design should, as far as practicable, balance the cut and fill quantities to ensure that import of fill material to the site can be avoided or minimised. In this calculation allowance shall be made for loss of volume (from excavated materials) due to topsoil stripping, rock, unsuitable material, wastage, the compacted density of the fill and other such factors. Some contingency amount should also be allowed. In the estimation of fill quantities allowance shall be made for the volume of topsoil stripped in areas to be filled.

## T3.5.3 Erosion Control

The design shall address the outcomes of all reports generated under *PSS T5 - Environmental Investigations and Reporting*.

The design shall provide the most appropriate form of erosion control commensurate with public safety, aesthetics, environmental impact, performance and a low maintenance level.

Erosion control measures shall be developed for all surfaces including but not limited to embankments, cut batters, shoulders, verges, medians, drains and watercourses, and land downstream of road reserve discharges.

## T3.5.4 Pedestrian and Bicycle Facilities

The need for pedestrian and bicycle facilities shall be assessed and incorporated into the design if warranted by the Austroads Guidelines and Australian Standards, unless they are specifically excluded by the Project Brief, or by the approval of a non-compliant design, in accordance with *Clause T3.14 Acceptance of Non-Compliant Design Elements* of this specification.

## T3.5.5 Rural Bus Bays

***Department Policy***

***General***

*The scope of activity is the provision of School Bus Stops and General Bus Stops and associated amenities, including kerbing and pavement strengthening, lay-by and hardstand areas, road line marking and delineating the extent of the bus stop (Ground Level Infrastructure); and the provision of tactile ground surface indicators, lighting, shelters, seating, rubbish bins, poles, signs and timetables (Above Ground Infrastructure).*

*The Commonwealth Disability Standards for Accessible Public Transport 2002 (the Standards) are applicable to General Bus Stops, regardless of whether or not pedestrian facilities are located around that bus stop.*

***Ownership and Responsibility***

*Except where stated otherwise in this policy, the provision, maintenance and eventual removal of Above Ground Infrastructure is the responsibility of the public transport operator or the provider of the Above Ground Infrastructure. This includes removal of rubbish, removal of graffiti and repairs arising from vandalism of the Above Ground Infrastructure.*

*In the case of School Bus Stops, the Department may assist the school bus operation by providing hardstand areas (generally in gravel) at selected locations.*

***School Bus Stops***

*School Bus Stops are exempt from compliance with the Standards. However, where notice is given to the Department of students who may require additional assistance when boarding/disembarking a bus, the Department will consult with the operator, the student's family and the school to make an assessment of the most appropriate way of assisting the child. The Department will not accept responsibility for the cost of any modification to Above Ground Infrastructure or Ground Level Infrastructure required to provide specific assistance to a child.*

***General Bus Stops - Existing infrastructure***

*As a provider of bus services consistent with its obligations under the Standards, the Department will seek to progressively upgrade existing Ground Level Infrastructure, subject to available resources. The public transport operator, or the provider of the facilities, remains responsible for the maintenance of all Above Ground facilities in existence at the date of this policy.*

*Where road works occur, it is the responsibility of the road authority to ensure that Ground-Level Infrastructure meets the Standards if the road surface around the bus stop is repaired or replaced.*

*Where it is not possible to undertake remedial works consistent with the Standards (e.g. where there is insufficient space), consideration must be given to the extent to which the Standards can be met at that location, or whether the Standards could be met through relocation of the bus stop to an alternative location.*

***General Bus Stops - New infrastructure***

*Where the Department agrees to install Ground Level Infrastructure as part of a new construction project on a State road, it will accept responsibility for on-going maintenance of the roadworks associated with the facilities, except where such responsibility rests with a Local Government Authority, under the provisions of Section 11 of the Roads and Jetties Act 1935.*

*Any proposed installation of a new bus stop is always subject to the availability of road funds and competing priorities of other works. Redundancy of existing bus stops due to demographic changes and changes in travel patterns may also be a consideration.*

*When required, location, installation and maintenance of advance warning signs for bus stops are the responsibility of the Department.*

### T3.5.6 Railway Level Crossings

Notwithstanding the provisions of Austroads' *Guide to Road Design Part 4: Intersections and Crossings - General*, the road alignment at a railway level crossing motorcyclists and cyclists to safely negotiate the railway crossing without catching a wheel or slipping on the rails. Any project which has the potential to alter infrastructure at, or increase traffic movements across a rail level crossing must be discussed with TasRail.

### T3.5.7 Climate Change

In the design of roads that may be affected by the impacts of sea level rise, the design shall take into account the projected sea level rise induced by climate change during the life of the road, as well as available historic sea level data for the site.

# T3.6 Design Considerations

## T3.6.1 Functional Classification of Road Network

The Department of State Growth uses a road hierarchy road classification system for its entire road network. The categories in the road hierarchy are:

- Category 1: Trunk Roads – *The primary freight and passenger roads connecting Tasmania*
- Category 2: Regional Freight Roads – *Tasmania's major regional roads for carrying freight*
- Category 3: Regional Access Roads – *The main access roads to Tasmania's regions, carrying less heavy freight*
- Category 4: Feeder Roads – *Allowing safe travel between towns, major tourist destinations and industrial areas*
- Category 5: Other Roads – *The remainder of the State Roads*

## T3.6.2 Performance Based Standards Vehicle Types and Network

The national Performance Based Standards (PBS) are designed to allow innovation in the development of road freight vehicles that will operate within specified safety, geometric and pavement loading parameters.

PBS classifications adopted in Tasmania are listed in *Table T3.7.1 – PBS Classifications*.

*Table 3.6.1. – PBS Classifications*

| PBS Level | Vehicle Configuration | Example Vehicle |
|---|---|---|
| 1 | Length ≤ 20m (General Access) | 19m semi-trailer |
| 2A | Length ≤ 26m | 26m B-double |
| 3A | 26m < Length ≤ 3.65m | 36.2m A-double |

Access Maps of Tasmania's PBS Networks, and the limitations on those networks, are available on the Department of State Growth website at:

www.transport.tas.gov.au/vehicles_and_vehicle_inspections/heavy_vehicles/Heavy_vehicle_access

The typical design vehicle for each road category is nominated in Section T3.8, however the typical design vehicle should be checked against the Access Maps.

### T3.6.3 Design Speed and Operating Speed

Austroads *Guide to Road Design: Part 3 Section 2.2.5* states in part:

- *"…the design speed is fixed to geometric features of a carriageway that affect vehicle operation..."*
- *"is related to either the intended operating speed or the posted speed limit of a road or section of road… "*
- *"If the operating speed varies along the road, the design speed must vary accordingly. Identification of the operating speed is fundamental to the development of any roadway facility."*

In general for new roads (Greenfield), the Design Speed, should aim to be 10km/h above the posted speed limit. Variations to the design speed, with appropriate transitions of design speed between each geometric element, may be required to provide a cost effective solution, due to several factors.

For projects on existing roads (Brownfield sites), the approach of adopting a single design speed of 10km/h above the posted speed limit should only be used in the total absence of other data.

In accordance with *Part 3: Geometric Design Section 3: Speed Parameters* the design speed should not be less than the measured or estimated operating speed & designers should obtain rigorous estimates for each element of the road. This could involve speed surveys, checks of v85 speeds at traffic count sites or undertaking an Operating Speed Analysis.

A minimum requirement is that an Operating Speed Analysis is performed, using available information (for example road centreline GIS data from State Growth).

Queensland Transport Main Roads publish tools to assist performing various speed analyses. The use of these tools (OSROAD and VEHSIM) is encouraged for Department of State Growth projects.

### T3.6.4 Pavement Design

**Professional Service Specification T15: Pavements has been withdrawn.**

Pavement and bituminous surfacings selection and design shall be in accordance with

1. VicRoads Code of Practice RC500.22 Selection and Design of Pavement and Surfacings, and
2. VicRoads Codes of Practice State Growth Supplement (Pavements and Surfacings) June 2017.

Pavement investigations shall be undertaken in accordance with *Professional Services Specification T6: Geotechnical and Site Investigations and Reporting*.

# T3.7 Specific Standards and Guidelines: Geometric Design

## T3.7.1 Cross Section: Rural Roads

| Design | | | | Cross Section Width (m) [7][8] | | | |
|---|---|---|---|---|---|---|---|
| **Road Category** | **AADT (vpd)** | **Carriageway** | **Vehicle** | **Seal** | **Lane** | **Shoulder [9]** | **Median** |
| 1 | ≥ 12,000 | 2+2 Divided | PBS-L3A | 20.1 | 3.5 | 2.0 | 2.1 [13] (FSB) |
| | < 12,000 [1] | 2+1 Divided | PBS-L3A | 16.6 | 3.5 | 2.0 [10] | 2.1 [14] (FSB) |
| | All | Ramps | Function dependant | 7.0 | 4.0 | 2.0 (LHS) 1.0 (RHS) | Required where two opposing ramps |
| 2 | ≥ 3,000 | Single Undivided [2] | PBS-L2A | 10.0 | 3.5 | 1.5 | None [15] |
| | < 3,000 [1] | Single Undivided [3] | PBS-L2A | 9.0 | 3.5 | 1.0 [11] | None [15] |
| 3 | ≥ 5,000 | Single Undivided [4] | PBS-L2A | 9.0 | 3.5 | 1.0 [11] | None [15] |
| | < 5,000 [1] | Single Undivided [5] | PBS-L2A | 8.2 | 3.1 | 1.0 [11] | None [15] |
| 4 & 5 Typical | All | Single Undivided [6] | PBS-L2A | 7.2 | 3.1 | 0.5 [11][12] | None |
| 4 & 5 Constrained Alignments | All | Single Undivided [6] | GA | 6.2 | 3.1 | None [12] | None |
| 4 & 5 Unsealed | All | Single Undivided | GA | 6.2 Pavement | N/A | None | None |

- The width of auxiliary lanes (overtaking / turn lanes) are to match specified lane widths
- The full width of shoulders is to be sealed.

1. Projected traffic volumes to be taken into account (i.e. if volumes are expected to exceed vpd limit within 20 years, a higher level of service should be considered).
2. Overtaking lanes may be required at regular selected locations. Divided multi-lane carriageways may be required where volumes are nearing or exceeding 12,000 vpd.
3. Overtaking lanes may be required at isolated selected locations.
4. Overtaking lanes may be required at regular selected locations. Divided multi-lane carriageways may be required where volumes are nearing or exceeding 12,000 vpd.
5. Overtaking lanes, slow vehicle turn outs or stopping bays may be required at isolated selected locations.

6. Slow vehicle turn outs and/or stopping bays may be required at isolated selected locations
7. Typical verge width of 0.5m to be applied.
8. Minimum width between safety barriers on two way single carriageway roads to be 8.0m.
9. Where kerb and channel is provided, the shoulder width may be reduced by the width between the lip line and line of kerb.
10. 2.5m where barrier required on single lane sections.
11. Wider shoulders may be considered on sections where there is a high volume of cyclist activity.
12. When determining the typical cross section on Category 4 and 5 Roads, the PBS Approval Status must be considered.
13. 2.1m minimum to facilitate FSB provision. 3.0m may be considered where AADT >15,000. Isolate sections of wider median may be required for stopping sight distance on curves.
14. 2.1m minimum to facilitate FSB provision. Isolated sections of wider median may be required for stopping sight distance on curves.
15. Median and FSB or Wide Centre Line Treatment may be considered on isolated sections where justified by crash history.

## T3.7.2 Cross Section: Urban Roads

| Design | | | | Cross Section Width (m) | | | |
|---|---|---|---|---|---|---|---|
| **Road Category** | **AADT (vpd)** | **Carriageway** | **Vehicle** | **Seal** | **Lane** | **Sealed Shoulder** (3) | **Median** |
| 1 | All | To suit situation (1) | PBS-L3A | Varies | 3.5 (2) | 2.5 (4)(5) | To suit situation (6) |
| | All | Ramps | Function dependant | 7.0 | 4.0 | 2.0 (LHS)<br>1.0 (RHS) | Required where two opposing ramps |
| 2 | All | Single Undivided (1) | PBS-L2A | Varies | 3.5 (2) | To suit situation (5) | None (7) |
| 3 | All | Single Undivided (1) | PBS-L2A | Varies | 3.5 (2) | To suit situation (5) | None (7) |
| 4 & 5 | All | Single Undivided | Location dependant | Varies | 3.0 (2) | To suit situation (5) | None |

- The width of auxiliary lanes (overtaking / turn lanes) are to match specified lane widths

1. Configuration will vary in context with volumes (i.e. multi lane city arterial vs single lane through rural township)
2. 4.2m min. where through lane is directly adjacent to kerb without should provision (measured to line of kerb)
3. Where kerb and channel is provided, the shoulder width may be reduced by the width between the lip line and line of kerb.
4. Wider shoulders may be considered on sections where there is a high volume of cyclist activity
5. Shoulder width will vary dependant on PSC Approval Status (if appropriate), roadside usage, parking, cycle lanes etc.
6. Median provision and width will vary dependant on location and volumes. Median barrier may be required in certain locations
7. Median provision will likely be required on high volume city arterial situations

### T3.7.3 Cross Section: Bridges

For the purposes of the interim review, the typical cross section on bridges will be assessed on a project by project basis.

### T3.7.4 Cross Section: Crossfall and Superelevation

**Traffic Lanes**

- The typical crossfall on a traffic lane for sealed roads is 3%.
- The typical crossfall may be increased to 4% for roads prone to snow or high intensity rainfall.
- The typical traffic lane crossfall for unsealed roads 4%.
- Superelevation of traffic lanes is as per Austroads Guide to Road Design: Part 3.

**Shoulders**

- The crossfall (and superelevation) of road shoulders should match traffic lanes

### T3.7.5 Widening on Horizontal Curves

Horizontal Curve Widening for the relevant design vehicle for the road category should be applied as *Austroads Guide to Road Design Part 3: Geometric Design*.

Where the design vehicle relates to PBS requirements, the following design vehicle shall be adopted:

- General Access – Prime mover and semi-trailer (19m)
- PBS 2A – B-double (25m)
- PBS 3A – B-triple (35.4m)

Normal practice is to apply curve widening to each lane, including where plan transitions are not used. Curve widening may be applied to the inside of a curve, however it is preferable to consider adjusting the horizontal alignment and re-assessing curve widening requirements.

It may be necessary to omit curve widening in constrained locations, and this will be considered a Departure from Standard or Guidelines or a Design Exception.

### T3.7.6 Cross Section: Other

#### *T3.8.6.1. Verge*

- The minimum width of verges is 0.5m which a 10% cross fall away from the road in both cut and fill.
- Where Safety Barrier is required:
  - Verge width is typically 1.0m but should consider the specification of the safety barrier type.
  - Verge widths to taper in line with design guidelines and specifications of safety barrier type.
- Where kerb and gutter is required:
  - The minimum width of verge required behind the kerb and gutter is 0.5m to prevent damage to kerbs, with 1.0m preferable to allow the use of side entry pits.
  - The verge slope is typically 10% towards the kerb and gutter but may be reduced to 4%, or slope away from the gutter if required.
  - The installation of fencing may be required in cut to prevent material from falling on to the roadway.

#### *T3.8.6.2. Table Drain*

- Table drains are normally provided in cut situations and are generally a v-drain cross section.
- For Category 1 Roads, the desirable foreslope is 6:1 (typical width 4.2m) with a maximum of foreslope 4:1 (typical width 2.8m).
- For Category 2 Roads, the typical foreslope is 3:1 (typical width 1.8m to 2.1m); however the adoption of table drains as per Category 1 Roads should be considered.
- For other road categories, the typical foreslope is 3:1 (typical width 1.5m to 1.8m), however flatter slopes should be considered where topography allows and other constraints are limited.
- The invert of a table drain is intended to be 100mm below the formation level of pavement, therefore the width of the table drain may vary to suit the design depth of the pavement.
- The provision of subsoil drains need to be considered in conjunction with table drains.
- Erosion control measures for table drains are shown on Standard Drawings.

#### *T3.8.6.3. Cut embankments*

- The nominal cut batter slope is 3:1. This flatter slope reduces the risk of erosion and increases the likelihood of successful revegetation.
    - Steeper batter slopes may be adopted but must consider slope stability and erodibility and rehabilitation requirements.
    - The general maximum of an earth cut batter slope is 1.5:1.
    - The general maximum of a rock cut batter is 1:4. The use of this slope must consider the exposed batter slope as a road safety hazard and provide mitigation against material falling on to the trafficable width of road.

#### *T3.8.6.4. Fill embankments*

- Batter slopes of 6:1 or 4:1 are to be adopted on Category 1 and Category 2 Roads, where viable or where safety barrier is not required.
- Batter slopes of 6:1 or 4:1 are preferred on for all other Road Categories, where topography permits and there are no limited constraints. *It is acknowledged that it is likely that maximum slopes will normally be required.*
- The nominal maximum fill batter slope is 2:1.
    - Where safety barrier is likely to be required, fill embankments of 2:1 are preferable.
    - Steeper fill batters may be possible where safety barrier is required, subject to geotechnical testing and confirmation.

#### *T3.8.6.5. Catch and Open Drains*

- Catch drains typical are as per State Growth Standard Drawings.
- The provision of catch and open drains at the top of cut and toe of fill embankments must be considered when determining a project typical cross sections.
- The provision of catch and open drains must be assessed / considered prior to the establishment of any new property acquisition boundaries.

#### *T3.8.6.6. Property Adjustments*

- In rural areas:
  - A new property boundary should be located a minimum of 5m clear of a new earthworks batter, or 6m where catch drains are required.
  - The existing boundary may be retained if it is a minimum of 3m clear of an earthworks batter.
  - It is acknowledged that these offsets are not always possible due to a range of factors. Design Reports must note where offsets are unable to be achieved.

## T3.7.7 Safety Barriers

***Department of State Growth Policy – Road Safety Barrier Systems on the State Road Network***

All Road Safety Barrier Systems shall be in accordance with Standard Specifications 708 and 711 and VicRoads RDN 06-04.

- The default preference is for flexible barrier systems to be used, noting;
  - Wire rope barriers are typically more appropriate for central median installations and as side barriers on high speed roads where the alignment is consistently straight or has large radius curves (e.g. as is the case for most Category 1 roads).
  - For most other situations, flexible steel beam barriers will be more suitable given they can be readily applied to both open and constrained road geometry, require minimal ongoing surveillance (i.e. no checking of tension) and allow provision of motorcycle attenuation where necessary.
- The minimum barrier standard is to be MASH Test Level 3 (TL3)
- Design including risk assessment shall be in accordance with Austroads' Guide to Road Design Part 6: Roadside Design, Safety and Barriers
- There shall be no encroachment of woody vegetation through the barrier
- Designers should consider the need for motorcycle attenuation systems and discuss this aspect with the Department on a project by project basis.

***Design Requirements***

Designers are to undertake an errant-vehicle risk assessment for the site and traffic conditions (present and projected), and determine the most appropriate compliant traffic barrier type and configuration, in accordance with Austroads' *Guide to Road Design Part 6: Roadside Design, Safety and Barriers* and VicRoads RDN 06-04.

Where safety barriers are retrofitted to existing heavy vehicle routes, the width of the shoulder and traffic lane must comply with the width requirements in *Clause T3.8.1 Cross Section: Rural Roads and T3.8.2 Cross Section: Urban Roads*.

### T3.7.8 Guide Posts and Delineation

The placement of guide posts should be in accordance with AS 1742.2 and must consider locations that are subject to snow and fog. Locations of snow and fog and other requirements for guide posts are as per Standard Specification Section 709 – Guide Posts.

Guidance on the requirements for delineation on safety barrier is found in Standard Specifications Section 708 – Steel Beam Guard Fence and Section 711 – Wire Rope Safety Barrier.

The typical application of pavement line marking and RRPM's by Road Category is as per the following tables.

**Rural Roads**

| Road Category | AADT (vpd) | Carriageway | Material | Long Lines | RRPM's |
|---|---|---|---|---|---|
| 1 | ≥ 12,000 | 2+2 Divided | Long Life | Audible Centre & Edge lines | All |
| | < 12,000 | 2+1 Divided | Long Life | Audible Centre\| & Edge lines | All |
| | All | Ramps | Long Life | Standard edge lines | Non terminating ramps only |
| 2 | ≥ 3,000 | Single Undivided | Long Life | Standard Centre & Edge lines (2) | All |
| | < 3,000 | Single Undivided | Paint | Centre line & Edge lines | All |
| 3 | ≥ 5,000 | Single Undivided | Paint (1) | Centre line (1) & Edge lines | All |
| | < 5,000 | Single Undivided | Paint (1) | Centre line (1) & Edge lines | Centre only |
| 4 & 5 Typical | All | Single Undivided | Paint | Centre line & Edge lines | Not required (3) |
| 4 & 5 Constrained alignments | All | Single Undivided | Paint | Centre line only | Not required |
| 4 & 5 Unsealed | All | Single Undivided | N/A | N/A | N/A |

1. Long life material may be considered where volumes are higher or to facilitate audible markings at locations where justified by crash history.
2. Audible markings may be considered at locations where justified by crash history.
3. RRPM's may be considered at locations where justified by crash history or on specific 'tourist routes'

**Urban Roads**

| Road Category | AADT (vpd) | Carriageway | Material | Long Lines | RRPM's |
|---|---|---|---|---|---|
| 1 | All | Multi-lane Divided | Long Life | Standard Centre & Edge lines | All |
| | All | Ramps | Long Life | Standard edge lines | Non terminating ramps only |
| 2 | All | Single Undivided | Long Life | Standard Centre & Edge lines | Not required(2) |
| 3 | All | Single Undivided | Paint (1) | Centre line & Edge lines | Not required(2) |
| 4 & 5 | All | Single Undivided | Paint | To suit situation | Not required |

1. Long life material may be considered where volumes are higher.
2. Lane line RRPM's may be considered on divided multi-lane carriageways.

### T3.7.9 Sight Distance

***Specific sight distance considerations / directions to be confirmed following full review.***

### T3.7.10 Horizontal Alignment: Plan Transitions (Spirals)

- Normal practice is to round plan transitions up to the nearest interval of 10m.
- Normal practice is to adopt superelevation extension i.e. rotation of the inside lane does not commence until the outside lane crossfall matches the inside lane.

### T3.7.11 Horizontal and Vertical Alignment: Clearances

***Note that the clearances nominated in this section are under review and need to be confirmed on a project by project basis, or with TasNetworks and TasRail as required.***

Vertical clearances are shown in diagrams in Appendix 3B: Cross Sections and Clearances.

- The vertical clearance for bridges needs to consider whether the project is on a high vehicle route. *Vertical clearances for major structures will be specified in the Guide for design of Major Structures.*
- The vertical clearances to overhead powerlines must be confirmed in consultation with TasNetworks.
- The horizontal clearance to power poles must be considered in conjunction with other road side hazards.
- All clearances associated with rail infrastructure must be confirmed with TasRail.

### T3.7.12 Vertical Alignment

### T3.7.13 Overtaking Lanes

The following points relate to the provision of overtaking lanes specifically:

- Overtaking lengths in Table 9.2 of Part 3: Geometric design nominate lengths of overtaking lanes based on the operating speed of the road, not the posted speed limit. The Department's default position is to adopt the desirable minimum lengths specified. The Department will consider reduced lengths where it can be demonstrated there are site specific limitations such as locations where the topography and other factors do not allow the maximum length of an overtaking lane for a posted speed limit to be applied.
- The minimum overtaking lane length on Category One Roads is in the order of 1,200m (excluding tapers).
- Widening of the shoulder through merge tapers is the preferred treatment (ref Figure 9.4 Part 3: Geometric Design). *This was not formerly State Roads practice.*
- Merge tapers should be kept clear of safety barrier and other physical obstructions.
- Widening of the shoulder in the counter direction of an overtaking lane through diverge and merge tapers is not normally provided.
- Where traffic lane widths are less than 3.5m, the length of diverge and merge tapers may be reduced to suit the width of the traffic lane using the formulae in Section 9.9.2 of Part 3: Geometric Design.

## T3.7 Extended Design Domain (EDD)

***Guidance on the adoption of Extended Design Domain (EDD) criteria to be advised as part of the full review of this Specification.***

# T3.8 Specific Standards and Guidelines: Intersections

***Guidance on specific elements to the design of unsignalised intersections, junctions, property accesses and other components will be considered and confirmed as part of the full review of this Specification.***

***A number of sections are listed with little or no supplementary information, however it is anticipated that specific information will be provided or the section deleted as appropriate.***

## T3.8.1 Design and Checking Vehicle

## T3.8.2 Swept Path

- The preference is for the use of turning templates of for 5-15km/ as a minimum.
- Generally a minimum clearance from the vehicle body to any traffic islands or other physical obstructions of 300 mm is to be adopted.
- The use of turning templates for 0-5km/h should be limited to turns on to the main roadway.

## T3.8.3 Property Accesses

The following point relates to Category One Roads only:

- For road accesses that are located within single lane sections, the provision of a taper and / or length of widened parallel shoulder is to be considered to minimise deceleration to the turning speed in the traffic lanes.

## T3.8.4 G-Turn and P-Turn Facilities

## T3.8.5 Sight Distance

The following point relates to Category One Roads only:

- Safe Intersection Sight Distance must consider the effect on any flexible safety barrier installed in the median, particularly for right turning vehicles from the highway to a side road or access.

## T3.8.6 Types of Turn Treatments

- New installations of Auxiliary Right Turn lanes (AUR) on the main road are not an acceptable treatment. The type of treatment, Basic Right Turn (BAR), Channelised Short Right Turn (CHRs) or Channelised Right Turn (CHR) is to be informed by relevant through traffic and side road traffic volumes.
- The use of short Channelised Right Turn lanes (CHRs) on the main road can be used to retrofit existing AUR facilities; however may be nominated in a project brief as a preferred treatment in specific circumstances.
- There is an emerging issue with the use of full length auxiliary left turn treatments in terms of dynamic sight line restrictions. Where warrants are met for the provision of these facilities, specific discussion with the Department will be required as alternatives such as a reduced level of treatment (i.e. a BAL) or other design options such as an offset left turn lane may need to be explored.

### T3.8.7 Deceleration Lengths

### T3.8.8 Acceleration Lanes at junctions

- Acceleration lanes at junctions are not normally provided.
- The installation of an acceleration lane at a junction may be nominated in a project brief in specific circumstances (i.e. significant heavy vehicle volumes). Approval from State Roads must be provided prior to including acceleration lanes in the scope of new work.

### T3.8.9 Pavement Edge Rounding and Tapers and Junction

### T3.8.10 Traffic Islands and Medians

## T3.9 Specific Standards and Guidelines: Roundabouts

***Guidance on specific elements to the design of roundabouts will be considered and confirmed as part of the full review of this Specification.***

***A number of sections are listed with little or no supplementary information, however it is anticipated that specific information will be provided or the section deleted as appropriate.***

The design of roundabouts must include heavy freight industry consultation.

### T3.9.1 Sight Distance Criteria

### T3.9.2 Geometric Design

- The adoption of reverse curve horizontal alignments on the approach to roundabouts in high speed (>80km/h) environments has not been adopted by State Roads.

### T3.9.3 Crossfall on Circulating Width

### T3.9.4 Central Island and Swept Path

### T3.9.5 Cyclists and Other Considerations

## T3.10 Interchanges

***Guidance on specific elements to the design of interchanges will be considered and confirmed as part of the full review of this Specification.***

## T3.11 Signalised Intersections

***Guidance for Signalised Intersections to be provided as Professional Services Specification T17: Traffic Signals (Under Development).***

## T3.12 Intelligent Transport Systems (ITS)

***Guidance for Intelligent Transport Systems (ITS) to be provided as Professional Services Specification T18: Intelligent Transport Systems (Under Development).***

# T3.13 Acceptance of Non-Compliant Design Elements

***It is noted that this section is repeated across several pieces of documentation. The review of this Specification intends to consolidate the process and components on Departure of Standards and Guidelines to a single location. For the interim, this section has been retained and 'greyed out'.***

## T3.13.1 Non compliance

*Further to PSS PM1 - General Provisions Clause PM1.3.6 Departure from Minimum Design Criteria* all road design projects which contain elements that do not comply with the criteria of Austroads Guides, Australian Standards and the relevant Planning Scheme must be referred to the Department as early as possible in the design process, ideally at the initiation or concept stage.

When a proposed departure outside the normal range for any criteria has been identified, the Consultant must prepare an application for Departure from a Guideline, Standard or Planning Scheme. This application is be forwarded to the Department for approval.

## T3.13.2 Application

The application shall provide as a minimum the following information:

- description of the project including total budget allocation and road category
- current and projected traffic volumes
- recent accident history if it is for an existing road (if known)
- reference to the particular guideline, standard or planning scheme criteria from which the design element would depart
- any impact on safety, environment, cultural heritage, community, access and the adjoining road network
- justification for departing from the normal standard / guideline, including the implications and additional cost of meeting the normal standard / guideline and demonstrating that adoption of different value for the criteria is in the overall community interest, particularly with respect to cost and safety
- proposed mitigation measures
- an assessment of risk, where the departure has safety implications
- any other relevant information.

A form for Application for Departure from Guideline, Standard or Planning Scheme is attached as *Appendix T3.C*.

## T3.13.3 Justification

Reasons for adopting any particular design criteria and/or parameters must be robust, defensible and fully documented. Depending on the complexity of the project, the Consultant may be required to attend a meeting with the Department to provide further information.

Adopting multiple minimum, or below minimum, criteria simultaneously may produce an unsafe or unsatisfactory result. Where a minimum or below minimum criteria is adopted for one geometric element it may be desirable to adopt above minimum criteria for other elements. However, a critical aspect may be that drivers anticipate the

sub-standard element at a sufficient distance to adjust their driving safely. This may necessitate multiple substandard elements to provide appropriate cues to drivers.

Departures from minimum Australian Standards will only be considered in the most exceptional circumstances and all reasonable efforts to eliminate the need for the departure must be explored before making an application for departure. Works on Category 1 and Category 2 roads should be designed to contemporary design guidelines; departures will only be accepted in exceptional circumstances.

### T3.13.4 Approval or Rejection

The Department will consider the application and may decide to:

- refuse the design as presented
- request further information before a recommendation can be made
- approve the application with some modification
- approve the design as presented.

On the acceptance or rejection of the application, the Department will advise the Consultant of the decision, outlining reasons if the application has been rejected.

An acceptance of an Application for Departure from a Guideline or Standard shall be project specific. It shall not set a precedent for any other project.

## T3.14 Hold Points

Hold points for road design shall be as listed in specification *D1 Road Design* of the PSS.

# Appendix T3.A – Schedule of References

| | **Austroads Guidelines** |
|---|---|
| | **Guide to Road Design** |
| Part 2 | *Design Considerations* |
| Part 3 | *Geometric Design* |
| Part 4 | *Intersections and Crossings - General* |
| Part 4A | *Unsignalised and Signalised Intersections* |
| Part 4B | *Roundabouts* |
| Part 4C | *Interchanges* |
| Part 5 | *Drainage design* |
| Part 6 | *Roadside Design, Safety and Barriers* |
| Part 6A | *Pedestrian and Cyclists Paths* |
| Part 6B | *Roadside Environment* |
| | **Guide to Road Safety** |
| Part 3 | *Speed Limits and Speed Management* |
| Part 4 | *Local Government and Community Road Safety* |
| Part 5 | *Road Safety for Rural and Remote Areas* |
| Part 6 | *Road Safety Audit* |
| Part 7 | *Road Network Crash Assessment and Management* |
| Part 8 | *Treatment of Crash Locations* |
| Part 9 | *Roadside Hazard Management* |

| **Code** | **Australian Standards** |
|---|---|
| AS/NZS 1158 (set) | *Lighting for roads and public spaces set* |
| AS/NZS 1158.4 | *Lighting for roads and public spaces – Lighting of Pedestrian Crossings* |
| AS 1348 | *Road and traffic engineering – glossary of terms* |
| AS 1428.1 | *Design for access and mobility - general requirements for access – new building work* |

| | |
|---|---|
| AS 1428.2 | *Design for access and mobility: enhanced and additional requirements - buildings and facilities* |
| AS 1742.2 | *Manual of uniform traffic control devices - traffic control devices for general use* |
| AS 1742.3 | *Manual of uniform traffic control devices - traffic control for works on roads* |
| AS 1742.7 | *Manual of uniform traffic control devices - railway crossings* |
| AS 1742.9 | *Manual of uniform traffic control devices - bicycle facilities* |
| AS 1742.10 | *Manual of uniform traffic control devices - pedestrian control and protection* |
| AS 1742.11 | *Manual of uniform traffic control devices - parking controls* |
| AS 1742.12 | *Manual of uniform traffic control devices - bus, transit, tram and truck lane* |
| AS 1742.13 | *Manual of uniform traffic control devices - local area traffic management* |
| AS 1742/15 | *Manual of uniform traffic control devices - direction signs, information signs and route numbering* |
| AS 1798 | *Lighting poles and bracket arms: preferred dimensions* |

| | |
|---|---|
| AS 2876 | *Concrete kerbs and channels (gutters)- manually or machine placed* |
| AS/NZS 2890 (set) | *Parking facilities set* |
| AS/NZS 3000 | *Electrical installations (known as the Australian/New Zealand wiring rules)* |
| AS/NZS 3008.1.1 | *Electrical installations -selection of cables – cables for alternating voltages up to and including 0.6/1 kV – typical Australian installation conditions* |
| AS/NZS 3008.1.2 | *Electrical installations - selection of cables – cables for alternating voltages up to and including 0.6/1 kV – typical New Zealand installation conditions* |
| AS/NZS 3725 | *Design for installation of buried concrete pipes* |
| AS/NZS 3845 | *Road Safety barrier systems* |
| AS 3996 | *Access covers and grates* |
| AS/NZS 4058 | *Precast concrete pipes (pressure and non-pressure)* |
| AS 4282 | *Control of the obtrusive effects of outdoor lighting* |
| AS/NZS ISO 31000 | *Risk Management – Principles & Guidelines* |
| AS/NZS 4586 | *Slip resistance classification of new pedestrian surface materials* |
| AS 4799 | *Installation of underground utility services and pipelines within railway boundaries* |
| AS 5100 (set) | *Bridge design set* |

| Codes | International Standards |
|---|---|
| ISO 11819-1 | *Acoustics - measurement of the influence of road surfaces on traffic noise - statistical pass-by method* |

# Appendix T3.B – Cross Sections and Clearances

***The following information previously formed the typical cross section classifications. It has been retained in this interim version for reference only. The intent is to adopt the typical cross section details in the body of this Specification.***

***NOTE:***
*The Department will provide direction on the cross section to be used. For roads within urban and township areas further details are provided in Austroads Guide to Road Design Part 3 Geometric Design.*

***Road Design Cross Section Selection***

| | | AADT | | | | |
|---|---|---|---|---|---|---|
| **Road Category** | **Type** | **>5,000** | **2500-5000** | **1000-2500** | **<1,000** | **<300** |
| 1 | Trunk | A1 | A1 | A1 | B1 | |
| 2 | Freight | A1 | B1 | C1 | C1 | |
| 3 | Access | C1 | D1 | D1 | D2 | |
| 4 | Feeder | D1 | D1 | D2 | E1 | |
| 5 | Other | | D2 | E1 | E1 | |
| 5 | Unsealed | | | | F1 | F2 |

***Road Design Cross Sections (Sealed)***

| Cross Section Widths | | | | | |
|---|---|---|---|---|---|
| **Road** | | | **Bridge** | | |
| **Section Reference** | **Traffic Lane Width** | **Road Shoulders** | **Long Bridge Shoulder** | **Short Bridge Shoulder** | **Maximum Length For Short Bridge** |
| A1 | 3.50m | 2.0m | 1.0m | 2.0m | 75m |
| B1 | 3.50m | 1.5m | 1.0m | 1.5m | 30m |
| C1 | 3.50m | 1.0m | 1.0m | 1.0m | N/A |
| D1 | 3.00m | 1.0m | 1.0m | 1.0m | N/A |
| D2 | 3.00m | 0.5m | 0.5m | 0.5m | N/A |
| E1 | 2.75m | 0.5m | 0.5m | 0.5m | N/A |
| Interchange Ramps | 4.0m | 1.0m Left<br>0.5m Right | 1.0m Left<br>0.5m Right | 1.0m Left<br>0.5m Right | N/A |

***Road Design Cross Sections (Unsealed)***

| Cross Section Widths | | | | | |
|---|---|---|---|---|---|
| **Road** | | | **Bridge** | | |
| **Section Reference** | **Trafficable Width** | **Road Shoulders** | **Long Bridge Shoulder** | **Short Bridge Shoulder** | **Max Length For Short Bridge** |
| F1 Single Lane | 6.50m | 1.0m | 0m | 0m | 9m |
| F2 Single Lane | 5.50m | 0.6m | 0m | 0m | N/A |

# Performance Based Standards (PBS) Geometric Requirements

The national PBS are designed to allow innovation in the development of road freight vehicles that will operate within specified safety, geometric and pavement loading parameters.

The PBS classification for Tasmania is listed in *Table T3.7.1 – PBS Classifications*.

***PBS Classifications***

| PBS Level | Vehicle Description |
|---|---|
| 1 | Passenger Vehicle to 21m Combination |
| 2A | B-Double 21m to 26m |
| 3A | A-Double or B-Triple combination 30.1m to 36.5m |

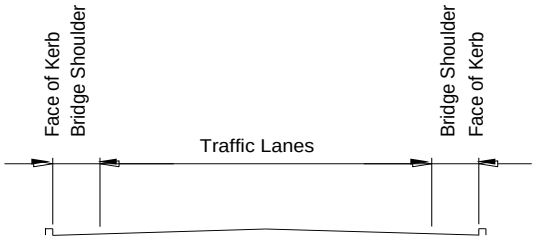
The relationship between the road design cross section classification to PBS classifications are shown in *Table T3.7.2 – PBS Level 2A Design Cross Section Classification* and *Table T3.7.3 – PBS Level 3A Design Cross Section Classification*.

***PBS Level 2A Design Cross Section Classification***

| Design Cross Section | AADT | Road Surface |
|---|---|---|
| F2 | Industry Only | Unsealed |
| F1 | <2000 | Unsealed |
| D1 | 150 - 2000 | Sealed |
| C1 | 2000 - 6000 | Sealed |
| B1 | >6000 | Sealed |

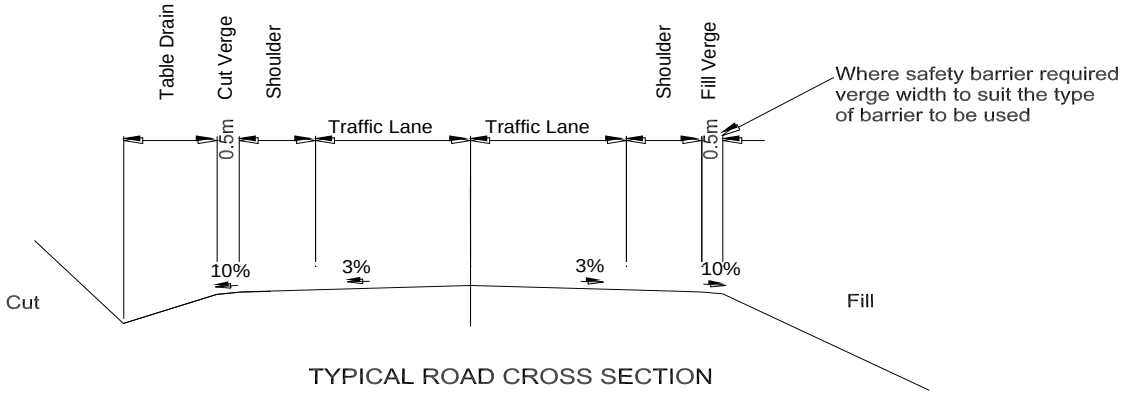
***PBS Level 3A Design Cross Section Classification***

| Design Cross Section | AADT | Road Surface |
|---|---|---|
| B1 | 150 - 2000 | Sealed |
| B1 | 2000 - 5000 | Sealed |
| A1 | >5000 | Sealed |




TYPICAL BRIDGE CROSS SECTION

This diagram to be updated or replaced in full review.




TYPICAL ROAD CROSS SECTION

| Section | Traffic Lane Width (m) | Road Shoulders (m) | Long Bridge Shoulder (m) | Short Bridge Shoulder (m) | Max Length for Short Bridge (m) |
|---|---|---|---|---|---|
| Sealed | | | | | |
| A1 | 3.5 | 2 | 1 | 2 | 75 |
| B1 | 3.5 | 1.5 | 1 | 1.5 | 30 |
| C1 | 3.5 | 1 | 1 | 1 | N/A |
| D1 | 3 | 1 | 1 | 1 | N/A |
| D2 | 3 | 0.5 | 0.5 | 0.5 | N/A |
| E1 | 2.75 | 0.5 | 0.5 | 0.5 | N/A |
| Interchange Ramps | 4 | 1 | 1 | 1 | N/A |
| Unsealed | | | | | |
| F1 | 3.25 | 0.5 | 0 | 0 | 9 |
| F2 | 3.25 | 0 | 0 | 0 | 9 |

NOTES:-

1. KERB AND GUTTER
Face of kerb and gutter to be located at back of shoulder.

2. CROSSFALLS
In areas subject to snow and high intensity rainfall ,and for unsealed pavements, typical crossfalls shall be 4%.

3. TABLE DRAIN
Table drain width shall be sufficient to ensure invert of table drain is 0.1m below sub base. Table drain slope shall not be steeper than 3:1, (desirable in flat terrain is 6:1).

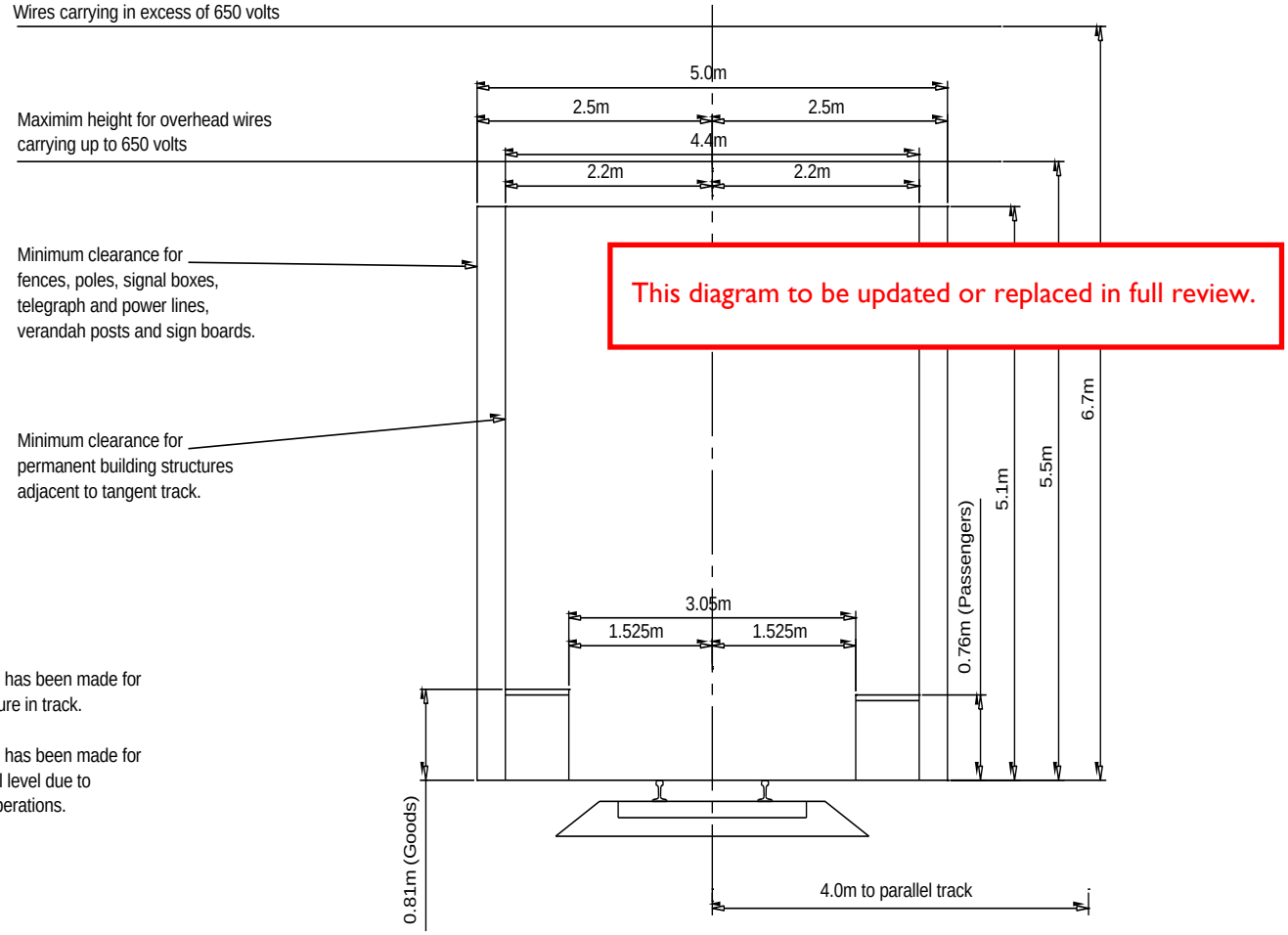
4. BRIDGES
For single lane bridges, lane width = 4.5m

5. Curve widening shall be applied to horizontal curves.

6. Right shoulder width for interchange ramps shall be 0.5m..

7. Dual carriageway median shoulder and verge widths shall be 1.0m and 0.5m. respectively.

8. EARTHWORKS
Nominal cut slopes shall be 1.5:1
Nominal fill slopes shall be 2:1

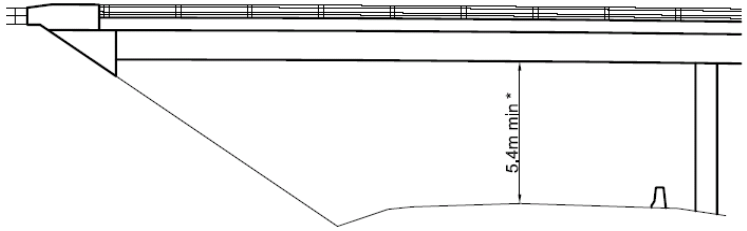



Copied from A.N.R.C. drawing R-97

NOTES:-

1. No allowance has been made for cant or curvature in track.

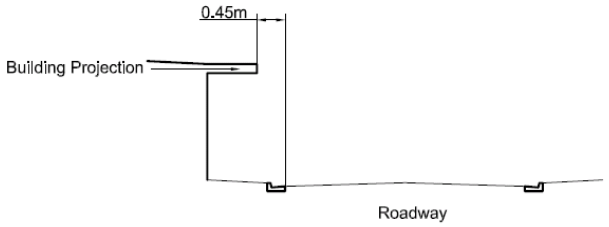
2. No allowance has been made for changes in rail level due to reballasting operations.



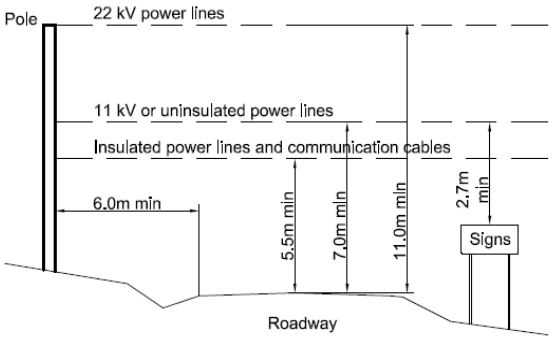

CLEARANCE TO STRUCTURES

* +0.2m for pedestrian bridges

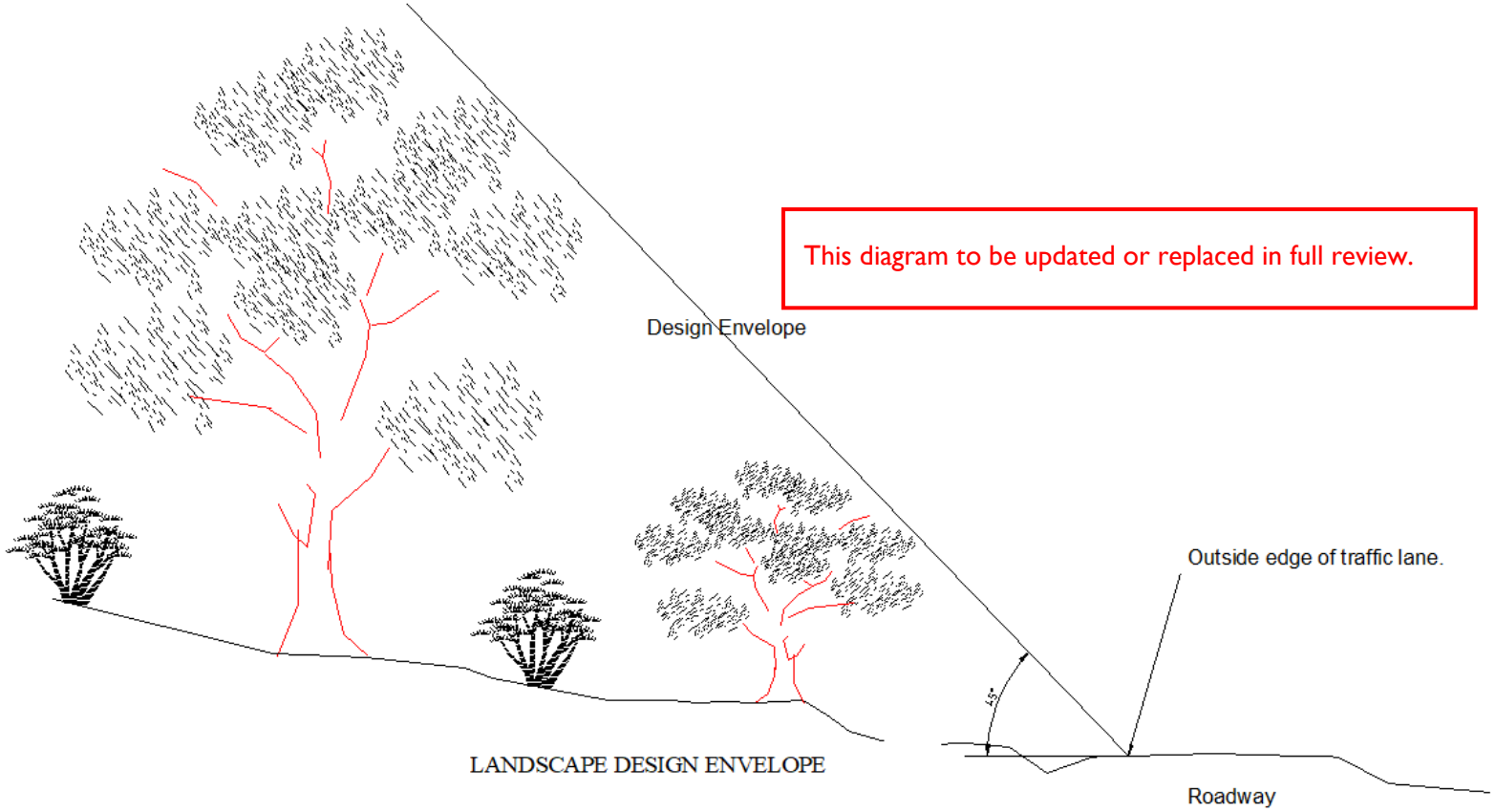
These diagrams to be updated or replaced in full review.




CLEARANCE TO BUILDINGS




CLEARANCE TO OVERHEAD SERVICES


This diagram to be updated or replaced in full review.
Design Envelope
Outside edge of traffic lane.
45°
LANDSCAPE DESIGN ENVELOPE
Roadway

# Appendix T3.B – Application for Departure from Guideline, Standard or Planning Scheme

***It is noted that this section is repeated across several pieces of documentation. The review of this Specification intends to consolidate the process and components on Departure of Standards and Guidelines to a single location. For the interim, this section has been retained and 'greyed out'.***

**Application for Departure from a Guideline, Standard or Planning Scheme**

State Roads Project Manager: Contact Tel No:

Design Organisation:

Contact name: Contact Tel No:

Project Title Project Estimated Cost:

Road category:

Traffic Volume (AADT) Current Projected

**Relevant Guideline or Standard** (reference must be made to specific clauses)

*Proposed Departure(s) and Justification*

Include: - demonstrating that adoption is in the overall community interest particularly with respect to safety and cost, the additional cost of conforming (if known and relevant), consequences of not conforming, alternatives considered, other project design criteria at or below minimum, any impact on safety, environment, cultural heritage, community, access and the adjoining road network.

*Proposed Mitigation*

| |
|---|
| |

*Safety Risk Analysis*

| *Safety Risk* | *Consequence Level** | *Likelihood Level** | *Risk Level** |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

* Refer to Appendix A of Procedure Number PDB-XX-TPXX

**Accident History** - For an existing road attach a recent accident history if available.
Accident history attached: Yes/No

Signed:_____ Date:_____

Print Name: _____
Title: Project Manager

For Processing Purposes only

| |
|---|
| Application for Departure from Standard Accepted<br><br>Comment:<br><br>Signed:_____ Date:_____<br><br>Title: |

| |
|---|
| Approved – General Manager, State Roads<br><br>Signed:_____ Date:_____ |


Department of State Growth

Salamanca Building Parliament Square
4 Salamanca Place
HOBART TAS 7001 Australia

Email: info@stategrowth.tas.gov.au

Web: www.transport.tas.gov.au