VicRoads Supplement to the Austroads Guide to Road Design

Part 5 – Drainage: General & Hydrology Considerations

Part 5A – Drainage: Road Surface, Networks, Basins & Subsurface

Part 5B – Drainage: Open Channels, Culverts & Floodways

Note 1: Superseded documents & New Supplement
VicRoads RDG Part 7 and the Austroads GRD Part 5: Drainage Design have now been superseded by AGRD Part 5: Drainage (Parts 5, Part 5A & Part 5B) released in May 2013. VicRoads has developed this single Supplement for all three parts.

Note 2: Important Preliminary Information
VicRoads did not adopt the Austroads Guide to Road Design (AGRD) – Part 5: Drainage Design (2010). The VicRoads Road Design Guidelines (RDG) – Part 7: Drainage was retained and supported by additional information provided in VicRoads Supplement to AGRD Part 5: Drainage Design.

Note 3: Use of VicRoads Supplement to AGRD
This VicRoads Supplement must be read in conjunction with the Austroads Guide to Road Design. Reference to any VicRoads or other documentation refers to the latest version as publicly available on the VicRoads website or other external source.
VicRoads Supplement to the Austroads Guide to Road Design Updates Record

Part 5 – Drainage: General & Hydrology Considerations
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Part 5B – Drainage: Open Channels, Culverts & Floodways

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<th>Rev. No. Date Released</th>
<th>Section/s Update</th>
<th>Description of Revision</th>
<th>Authorised By</th>
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<td>Rev. 1.0 July 2013</td>
<td>First Edition</td>
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This VicRoads Supplement has been developed by VicRoads Technical Consulting and authorised by the Executive Director – Network and Asset Planning.

The VicRoads Supplement to the Austroads Guide to Road Design provides additional information, clarification or jurisdiction specific design information and procedures which may be used on works financed wholly or in part by funds from VicRoads beyond that outlined in the Austroads Guide to Road Design guides.

Although this publication is believed to be correct at the time of printing, VicRoads does not accept responsibility for any consequences arising from the information contained in it. People using the information should apply, and rely upon, their own skill and judgement to the particular issue which they are considering. The procedures set out will be amended from time to time as found necessary.
References

AGRD – Austroads Guide to Road Design
AGTM – Austroads Guide to Traffic Management


VicRoads Standard Specification Section 701
VicRoads Standard Specification Section 619
Part 5 – Drainage: General & Hydrology Considerations

Note:

Multiple references in AGRD
Where multiple references are provided, the primary reference consulted shall be the Victorian source (if available). Otherwise the reference most relevant to the conditions shall be used.

1.0 Introduction
VicRoads has no supplementary comments for this section.

2.0 Safety in Design
2.5 On-road Safety
2.5.2 Floodways
Additional Information (p10)
Any proposal for adoption of a floodway on a VicRoads controlled asset shall be subject to approval of the relevant Regional Director.

3.0 Environment
3.6 Erosion and Sediment
3.6.3 Erosion Estimates
Additional Information
The Revised Universal Soil Loss Equation (RUSLE) calculates annual erosion rates (Aₜonne/ha/year) based on:

\[ A_s = R \times K \times LS \times C \times P \]

4.0 Drainage Considerations
4.10 Waterway Structures
4.10.1 Factors Affecting Selection of Waterway Structures
Additional Information
Culvert/Bridge structures with a minimum span or diameter of 1.8m, or a minimum waterway area of 3m² per cell (for multi cell culverts), shall be classified as a structure subject to VicRoads’ requirements for structural design and proof engineering by appropriate prequalified structural engineers.

5.0 Operations & Maintenance
VicRoads has no supplementary comments for this section.

6.0 Hydrology
VicRoads has no supplementary comments for this section.

References
VicRoads has no supplementary comments for this section.

Tables and Figures
VicRoads has no supplementary comments for this section.

Appendices
Appendix B – Table B1: Drainage Construction Material Considerations
Fibre Reinforced Concrete (FRC) Pipes
Additional Information
Refer to VicRoads Specification Standard Section 701 for further details.

Nominal Sizes for Culverts
Additional information
Box culverts should comply with the requirements of AS1597.1 (2010) - Table 2.5, as follows:

Preferred Internal Dimensions – Culvert Units
(from Table 2.5: AS1597.1 (2010))

<table>
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<tr>
<th>Size class mm</th>
<th>Nominal Span mm</th>
<th>Nominal height mm</th>
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<tr>
<td>300 x 225</td>
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<tr>
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<td>1200 x 1200</td>
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</tr>
</tbody>
</table>

Notes:
1. The size class is designated as ‘the nominal span’ x ‘the nominal height’ in millimetres, for example ‘450 x 200’.
2. Other size culverts may be made to a specific order.

3. Actual size should be checked with the manufacturer.

Refer to VicRoads Specification Standard Section 619 for further details.
Part 5A – Drainage: Road Surface, Networks, Basins & Subsurface

Note:

Multiple references in AGRD
Where multiple references are provided, the primary reference consulted shall be the Victorian source (if available). Otherwise the reference most relevant to the conditions shall be used.

1.0 Introduction
VicRoads has no supplementary comments for this section.

2.0 Major/Minor Drainage Concept
VicRoads has no supplementary comments for this section.

3.0 Road Surface Drainage
VicRoads has no supplementary comments for this section.

4.0 Aquaplaning
VicRoads has no supplementary comments for this section.

5.0 Kerbed Drainage
5.3 Kerbed Drainage Elements
5.3.4 Inlet Locations
Additional Information (p64)
For VicRoads project an extra pit near the lowest point with a separate pipeline to an alternative outlet shall be provided at land locked sags.

For freeways and ramps an additional pit near the low point with a separate pipeline to an alternative outlet capable of carrying the entire 50 ARI storm event shall be provided.

5.4 Design Criteria
5.4.2 Pavement Spread and Gutter Flow Limits
Additional Information (p66)
For freeways and ramps where reduced or narrow shoulders are proposed the following additional surface flow criteria is appropriate at 10 year ARI.

- Where no shoulders on freeway ramps provided – 1.5m maximum flow width.
- Where 1.0m to 3.0m shoulder width provided and posted speed limit is greater than 80km/h – flow width within shoulder width.
- Where shoulder width 1.0m or less provided and posted speed limit is 80km/h or less – 1.5m maximum flow width.

6.0 Underground Piped Networks
VicRoads has no supplementary comments for this section.

7.0 Basins
VicRoads has no supplementary comments for this section.

8.0 Subsurface Drainage
8.6 Location of Subsurface Drainage
8.6.5 Locations of Subsurface Drains on Rural Roads
Clarification (p166)
Subsurface drains shall be provided on all VicRoads class M, A, B and C roads unless approved otherwise by the relevant VicRoads Regional Director.

References
VicRoads has no supplementary comments for this section.

Tables and Figures
VicRoads has no supplementary comments for this section.

Appendices
VicRoads has no supplementary comments for this section.
Part 5B – Drainage: Open Channels, Culverts & Floodways

Note:

Multiple references in AGRD
Where multiple references are provided, the primary reference consulted shall be the Victorian source (if available). Otherwise the reference most relevant to the conditions shall be used.

1.0 Introduction
VicRoads has no supplementary comments for this section.

2.0 Open Drains and Channels
VicRoads has no supplementary comments for this section.

2.14 Batter Drains and Chutes
Additional Information (p53)
Stormwater drainage network culvert outlets on batters shall discharge at the base of the batter, in preference to the use of batter drains and chutes, where batters are steeper than 6:1 or where excessive scour is likely to occur in the batter.

3.0 Culverts

3.4 Culvert Type

3.4.2 Materials
Clarification (p166)
Materials used for major culverts shall provide for a minimum design life of 100 years.

4.0 Floodways
VicRoads has no supplementary comments for this section.

References
VicRoads has no supplementary comments for this section.

Tables and Figures
VicRoads has no supplementary comments for this section.

Appendices
VicRoads has no supplementary comments for this section.