

Drainage for liveability

Australian Rainfall and Runoff

Purpose

This guidance note outlines the approach of the Water Corporation and the Department of Water and Environmental Regulation (the department) to implementing [Australian Rainfall and Runoff – A Guide to Flood Estimation](#) (ARR 2019)¹. It is a collaboration between the Water Corporation and the department and aims to provide guidance on the transition to ARR 2019.

Objectives

- Ensure the adoption of current industry best practice as outlined in ARR 2019.
- Provide guidance on the transition of numerical models and studies developed using the previous (1987) edition.

Background

Australian Rainfall and Runoff (ARR) is a nationally recognised suite of guidance documents and tools, for surface water quantity estimation and management. Its aim is to provide information relevant to design flood estimation in a form readily accessible to practitioners.

In recent times it was recognised that the 3rd edition, published in 1987², no longer reflected industry views and practice. A revised edition (2016-2019) was developed and published in a collaboration between the Commonwealth of Australia (Geoscience Australia 2019), Engineers Australia's National Committee on Water Engineering and private practitioners. This edition reflects currently accepted national industry views and practices, advances in computer technology and techniques, and better understanding of the rainfall runoff process. The previous version was also based on US data, while the current version is based on Australian data. The most recent edition is now publicly available free of charge in a variety of formats from the Australian Government [ARR webpage](#).

Updated approach to industry practice

A large part of the industry focus on the updates to ARR centred on the revised intensity frequency and duration curves and rainfall temporal pattern ensemble. The content, however, extends well beyond this. It covers a broad list of topics associated with surface water quantity estimation and management, land use planning and infrastructure design including, but not limited to:

- adoption of risk-based decision frameworks
- formal conceptualisation of modelling approaches
- minimum standards of documentation for numerical models
- analysis of uncertainty in estimation
- minimum standards for analysis, interpretation and presentation of numerical modelling results
- revised intensity-frequency-duration curves and rainfall temporal pattern ensembles



- updated information about technical parameters for numerical modelling.

The Water Corporation and the department recognise ARR 2019 as the guideline for best practice flood design estimation. We have adopted the guidelines for our own work and use it when assessing proposals. Both organisations agree practitioners should follow current best practices consistent with the ARR 2019 guidelines.

Transitioning numerical models

The Water Corporation and the department develop and use numerical models for surface water quantity estimation and decision-making. For the Water Corporation this will typically be documents such as capacity reviews and scheme reviews. The department uses modelling to inform flood and drainage studies, and water management plans. These studies and plans provide direction for land use planning at regional, catchment or precinct scale. This subsequently informs later stages of land use planning and infrastructure design.

Numerical models developed under the previous edition(s) of ARR will not be immediately discounted and remain valid tools. Both organisations may use any of the following transitional arrangements for existing modelling tools:

- Continue using numerical modelling developed using parameters or methods from the 1987 edition.
- Undertake an analysis of the model sensitivity to ARR 2019 parameters and determine a subsequent course of action.
- Partially transition a numerical model to ARR 2019 for certain important storm events.
- Fully transition a numerical model to ARR 2019 for all storm events.
- Replace the existing model with an entirely new numerical model incorporating revised parameters from ARR 2019.
- Instigate an alternative arrangement.

The Water Corporation and the department will jointly decide on the most appropriate course of action for models developed using previous editions of ARR. This is within the frameworks established by ARR 2019 (e.g. risk-based design, application of catchment modelling systems, etc). This decision will form the basis of assessments/approvals by the Water Corporation or advice from the department.

Interim arrangements

The Water Corporation and the department will ultimately make joint decisions as outlined above; however, each organisation has the individual expectations outlined below.

The Water Corporation requires anyone seeking approval or endorsement to adopt numerical modelling parameters consistent with Water Corporation numerical models.

The department advises that water planning documents should be consistent with the approved higher order water planning document, any current government-commissioned flood study,



drainage study or drainage and water management plan. In the absence of any of the aforementioned documents, parameterisation of numerical modelling should be based on ARR 2019.

We recommend consulting with both organisations as early as possible during the planning stages to confirm:

- if the general advice is applicable or an alternative approach is required
- how to proceed where there are multiple studies with conflicting parameters.

References

1. Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) *Australian Rainfall and Runoff: A Guide to Flood Estimation*, © Commonwealth of Australia (Geoscience Australia), 2019.
2. Pilgrim, DH (ed) (1987) *Australian Rainfall and Runoff – A Guide to Flood Estimation*, Institution of Engineers, Australia, Barton, ACT, 1987.

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