RFQ 2025.12
Volume 1 - Specification

FLOOD WARNING SYSTEM REVIEW - COOTAMUNDRA

Version 1.1

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Cootamundra Gundagai Regional Council

Flood Warning System Review- Cootamundra

Volume 1 – SPECIFICATION

1. INTRODUCTION

Cootamundra Gundagai Regional Council (the Council) has received financial support from the State Floodplain Management Program, managed by the Department of Climate Change, Energy, the Environment and Water (DCCEEW), to undertake a Flood warning system review for the township of Cootamundra.

The primary objective of the *Flood Prone Land Policy* outlined in the *Flood Risk Management Manual* is to reduce the impacts of flooding and flood liability on communities and individual owners and occupiers of flood prone property, and to reduce private and public losses resulting from floods, utilising ecologically positive methods wherever possible. In doing so, community resilience to flooding is improved.

Through DCCEEW and the NSW State Emergency Service (SES), the NSW Government provides specialist technical assistance to local government on all flooding, flood risk management, land-use planning matters and flood emergency management.

The NSW Government provides the Flood Risk Management Manual (NSW Government 2023) and its supporting toolkit to assist councils to meet their obligations through the preparation and implementation of floodplain risk management plans, through a staged process. Figure 1 below shows the FRM process which sits within the FRM Framework as outlined in the Manual. The Manual and toolkit documents the process for plan preparation, implementation and review.

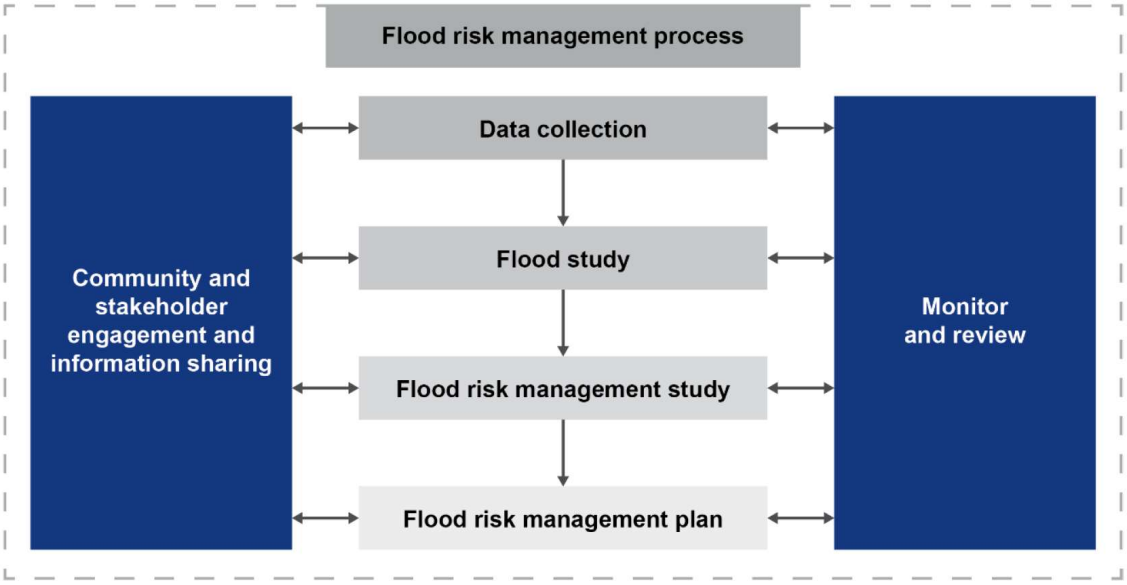

Figure 1 The flood risk management process in New South Wales

The NSW Flood Risk Management Manual acknowledges flood warning systems as an important strategic component of flood risk management in the state. The associated Flood Risk Management Guide – Support for Emergency Management Planning (DPE, 2023) recognises the need to '…coordinate and improve the effectiveness of Total Flood Warning Systems (TWFS)…' to service the NSW communities.

The current arrangements for flood warning in NSW are set out in The Provision and Requirements for Flood Warning in New South Wales (NSW SES, 2019).

Council adopted the Cootamundra Floodplain Risk Management Plan and Study (FRMS&P) in August 2023 and is now progressively implementing the recommendations from the Plan.

One of the high priority actions recommended by the FRMS&P is for Improvement to Flood Warning (Option RM-05). The option is described within the FRMS&P as follows:

Undertake a review of the existing and identify improvements to the Flood Warning System for Cootamundra. Review current flood warning system in relation to trigger levels, maintenance requirements, messaging and recipients. Conduct a high level assessment of alternative flood warning systems.

2. BACKGROUND

The project is targeted towards identifying actions which can lead to improved flood warning arrangements for the Township of Cootamundra which is impacted by both riverine and major overland flow flooding.

Cootamundra (local area population 6782) is located on the western slopes of the Great Dividing Range. The catchment is generally rural in nature, with considerable clearing of the lower slopes and flat land immediately upstream of the town. The land use within the catchment consists primarily of rural agricultural land, supporting livestock (cattle and sheep) and dryland cereal crops (wheat and other grain) with low or medium density residential development in town. Elevations in the upper catchment are between 400 to 500 m AHD, reducing to 300 to 350 m AHD, closer to town. Slopes of between 1% and 3% are present in the upper catchment however this slope reduces to 0.5% and lower immediately upstream and through the town.

Cootamundra is located primarily on Muttama Creek but the confluence with major tributary Jindalee Creek is located within the airport precinct on the north-west side of Town (see Figure 2). Cootamundry Creek also flows around the periphery of the Town on the southern side. As such, flooding in Cootamundra can be as a result of any/all creeks flooding or from major overland flow flooding resulting from local intense storms.

Jindalee Creek has a catchment area of 54 km^2 to its confluence with Muttama Creek. Muttama Creek has a catchment area of 116 km^2 to this confluence. Cootamundry Creek joins Muttama Creek downstream of town with a catchment area of 62 km^2. Muttama Creek then flows south to join the Murrumbidgee River upstream of Gundagai.

Jindalee, Muttama and Cootamundry Creeks have well defined channels, particularly in the upper reaches. Muttama Creek becomes less well defined as the slope flattens through the township. The lower reaches of Jindalee Creek have also been modified to direct flooding around the airstrip.

With Muttama Creek effectively bisecting Cootamundra, there are a number of creek crossings through the town. Four main road bridges span Muttama Creek within the Town and there are also several low level causeways that are flooded in frequent events.

Cootamundra has a long history of flooding since its colonist settlement in 1847. The town was first gazetted as a municipality in 1884, and the earliest records available describe a catastrophic flood in 1885 and significant events thereafter in 1903, 1919, 1952, 1956, 1974, 1983 and 1984. A flood event occurred in September 2016 and more recently in October 2022.

The flooding event that occurred on the 31 October 2022 resulted in evacuation orders being issued for the properties and streets around Muttama Creek due to the possible flash flooding from 9pm that day. More than 400 properties were evacuated, and more than 100 properties and around 25 streets were reported to be impacted. The NSW SES (State Emergency Service) responded to 34 storm and flood rescues overnight including 1 for evacuation assistance.

Rainfall records indicate that the catchment was very wet prior to the October 2022 event and therefore losses due to infiltration were likely low. Recorded rainfalls for the critical duration (6 hrs) were equivalent to a 5% AEP in the Jindalee Creek catchment and a 20% AEP in the Muttama Creek

Catchment. This rainfall resulted in flood levels through the Town equating to slightly above the 5% AEP design event.

There are existing WaterNSW managed stream gauges within Muttama and Jindalee Creeks upstream of Cootamundra (see Figure 3):

- Muttama Creek at Berthong Road (GS# 41000207) is located approximately 5 kms upstream from Town and has been operating since July 2004. It collects level, flow and rainfall information.
- Jindalee Creek at Jindalee (GS#410112) is located approximately 8kms upstream from Town and has been operating since August 1975. It collects level, flow and rainfall information.

There are currently no stream gauges operating in the Cootamundry Creek catchment.

Currently the Bureau of Meteorology (BoM) issue flash flood warnings for Cootamundra based on local rainfall and stream gauge heights as warning times are relatively short. **There is a 1 hour lead time with rainfall >50mm over a 6 hour period.**

A flood study for Cootamundra was completed by Council in 2021 and the Cootamundra Floodplain Risk Management Study and Plan (FRMS&P) followed in 2023. The FRMS&P included a range of measures the address the flood risks at Cootamundra. This included the option of conducting a review of the Flood Warning System for Cootamundra (Option ID RM05) as a high priority. Council subsequently obtained NSW Floodplain Management Program grant funding to complete this project.

3. OBJECTIVE

The primary objective of the project is to review the current flood warning system for Cootamundra and recommend improvements for subsequent implementation. This is aimed at increasing the effectiveness of the flood warning system and reducing the risk to life and property within the Township.

4. SCOPE

Improvements to flood warning are discussed in Section 8.2.5 of the Cootamundra FRMS&P (2023) report.

Cootamundra is subject to inundation from two mechanisms, mainstream flooding from the Muttama, Jindalee and Cootamundry Creek catchments and overland flow flooding, resulting from local intense rainfall events in local catchments. The nature of overland flow inundation is such that the time between rain falling, and runoff is too short to provide meaningful flood warnings, even if gauges were installed within town. While the Muttama, Jindalee and Cootamundry Creek catchments provide a slightly longer period between rainfall and the flood wave arriving at town, recent events have shown the significant rainfall on the smaller Jindalee Creek catchment can result in a flood through town. Due to the complexities of flood deriving mechanisms in the study area, flood warnings may be difficult to prepare and disseminate. The quick catchment response time (within hours) may not allow time to interpret recorded rainfall data, construct and disseminate a flood warning, with enough time for the community to be able to take meaningful action to prepare.

The FRMS&P recommended that a review of the Flood Warning System for Cootamundra be undertaken. The review should include the following elements:

- A review of the existing system;
- Assessment of the trigger levels (rainfall and water levels) and warning times applicable using the existing hydrologic and hydraulic models;
- Assessment of the potential benefits of installing additional rain and/or stream level gauges and identification of suitable locations;
- A review of the maintenance requirements and costs, and messaging (alerts and recipients, including identifying vulnerable occupants);

- A review of how the existing and new information could be displayed and better communicated to the community; and
- Recommendation for an alternative system (if any), commensurate with the tangible and intangible benefits it would offer.

The above elements should be taken as representative of the Scope of the Review.

A key part of the Review will be for the Consultant to consult with the BoM and the NSW SES in regards to all aspects of the Review.

6. DELIVERABLES

The study shall produce the following products as a minimum:

- Flood Warning System Review Report.
- Study Materials as Detailed in Section 9.3.

7. AVAILABLE DATA AND INFORMATION

The Consultant is to collect, compile and assess all data and information relevant to this Review.

The following information will be made available to the consultant free of charge:

- The *Cootamundra Flood Study (2021)* report prepared by WMAwater obo Council. This includes all the handover data including the hydrologic and hydraulic modelling files.
- The *Cootamundra Floodplain Risk Management Study and Plan (2023)* report prepared by WMAwater obo Council. This includes all the handover data including updated hydrologic and hydraulic modelling files.
- The *Cootamundra Voluntary Purchase Feasibility Assessment (2023)* report prepared by WMAwater obo Council.
- The *Cootamundra-Gundagai Regional Flood Emergency Sub Plan (2023)* report prepared by the NSW SES.
- The historical Cootamundra Local Flood Plan (2007) report prepared by the NSW SES.
- The *Jindalee Levee Owners Manual (2019*) draft report prepared by Public Works Advisory.
- The *Jindalee Levee Audit (2019)* draft report prepared by Public Works Advisory.
- The *Cootamundra Flood Study (1986)* report prepared by the Water Resources Commission. PDF copy only.
- The *Cootamundra Floodplain Management Study (2001)* report prepared by Willing & Partners Consulting Group. PDF copy only.
- The *Cootamundra Floodplain Management Plan (2001)* report prepared by Willing & Partners Consulting Group. PDF copy only.

8. CONSULTATION

8.1 Technical Sub-Committee

The Consultant shall attend and present at meetings of Council's Project Technical Sub-Committee (TSC). These meetings will be held at Council's Cootamundra office. Consultants are to make allowance for attending three (3) TSC meetings, which would most likely be held at Cootamundra.

Consultants are to provide a preliminary consultation program. This program will be tabled for discussion at the first meeting of the TSC, held shortly after the project commences.

8.2 Other Consultation

Consultation by consultants should include (but not limited to) the following key stakeholders:

(i) Bureau of Meteorology (BoM)

(ii) NSW State Emergency Services (Local, Divisional and State)

(iii) Appropriate officers of the Engineering and Sustainable Development Departments of Council

(iv) Department of Climate Change, Energy, the Environment and Water (DCCEEW)

(v) Local Rural Fire Service staff

(vi) Local community

Consultants will need to demonstrate how they intend to consult with these bodies and in particular the types of issues that will need to be addressed.

9. PROGRAM AND REPORT

9.1 Program

The study is to be completed (including delivery of the final Flood Warning System Review report) within a period of nine (9) months from the date of the acceptance letter.

The nine (9) month duration includes a period of two (2) weeks for review of the draft Flood Warning System Review report by Council and the TSC and a requirement that the final report be delivered within two (2) weeks of Council's provision of consolidated comments to the Consultant on the draft report.

Consultancy proposals are to provide a 'time-line' of the key activities. The agreed 'timeline' will be confirmed as part of Council's acceptance of the Consultancy proposal. Once this 'timeline' has been agreed, the consultant shall notify Council as soon as any variation becomes apparent.

9.2 Reports

The following reports are to be presented as a minimum:

- Draft Flood Warning System Review Report
- Final Flood Warning System Review Report

The Consultant is to provide a brief progress update to Council on a fortnightly basis.

The format of the final report is not rigid, but it shall clearly indicate the stated recommendations, with supporting facts, figures and arguments.

The consultant shall be responsible for the preparation and printing of all documentation. Front covers of documents shall bear the logo of Council with appropriate acknowledgments inside the body of the report to the DCCEEW as the funding body.

Other documentation requirements are listed below:

- A4 sized paper (text), A4 or A3 minimum for accompanying plans
- All Reports and documents shall be produced in electronic formats in addition to hard copies using Microsoft Word, Spreadsheets (Excel) and /or pdf formats.
- Coloured graphics and maps, where available
- Electronic copies of all progress, draft and final reports
- 5 hard copies of the final report, plus one unbound reproducible copy and an electronic copy.

9.3 Hand-Over of Study Material

The consultant is to provide the following at hand-over:

- All relevant data and information in a format compatible with Council's GIS system, arranged in a suitable file structure.
- Copy of final reports including figures, inserts, maps, scanned documents and other graphics.

The consultant should provide all digital / electronic items requested on an appropriate electronic file storage medium.

The Consultant will also be required to upload the project handover data to the NSW Flood Data Portal (https://flooddata.ses.nsw.gov.au/) upon completion in compliance with DCCEEW requirements under a Creative Commons Attribution licence (see below).

The Consultancy Agreement must contain clauses including the following information or an equivalent which does not place any additional restriction on use by the State or use of specific information under creative commons. Table 14 column 4 identifies Intellectual Property Cases 1 and 2 which are defined as follows.
Case 1 - all clauses apply –which involves making information available under creative commons as outlined in Clause 1.7 and Schedule A below.
Case 2 – clauses 1.1 to 1.6 apply

1 *Intellectual property*

1.1 In this clause, Intellectual Property includes all statutory, legal, equitable and other proprietary rights and interests, including without limit, in copyright, patents, registered and unregistered trademarks, registered designs, circuit layouts, trade secrets, semiconductor or circuit layout rights, trade, business or company names, or other proprietary rights, or any rights to registration of such rights existing in Australia, whether created before or after this agreement.

1.2 The consultant indemnifies Council, the Department of Planning, Industry and Environment (NSW Government) and their employees and agents against any action, costs, expenses, losses or damages suffered or incurred by all, or any more of them, arising out of, or in any way in connection with:

(a) any breach by the consultant or its employees or its agents of the consultant's obligations under clause 1.2, and

(b) any infringement by council or NSW Government of third party Intellectual Property rights in its use of the Project Materials.

1.3 The consultant warrants that:

(a) in carrying out the Project, it will not infringe any Intellectual Property rights, and

(b) any report by the Recipient will not contain anything that, to its knowledge, is libellous or defamatory.

1.4 Subject to clause 1.5:

(a) The consultant grants to the council and the State, at no cost, a perpetual, irrevocable, worldwide, royalty-free non-exclusive licence, including the right to sub-license, to use, reproduce, modify, adapt, publish and communicate to the public, the Project Materials (to avoid doubt, including for the purpose of making the Project Materials freely available to the public or any section of it, whether in hard copy or on-line and including use and modification of any models and copying photographs), and

(b) To ensure compliance by the consultant with clause 1.4(a), if the consultant engages a third party to create the Project Materials the consultant must ensure that the terms of its engagement provide that the third party:

(i) assigns Intellectual Property in such materials to the council immediately on creation of the materials; and

warrants that it has the legal authority to comply with the obligation referred to in clause 0(b)(i).

1.5 To the extent that the consultant cannot take ownership of Intellectual Property in any Incorporated Existing Materials:

(a) the consultant must ensure that relevant third parties grant to the council and State, at no cost, a perpetual, irrevocable, worldwide,

royalty-free, non-exclusive licence, including the right to sub-licence, to use, reproduce, modify, adapt, publish and communicate to the public, the Incorporated Existing Materials for any Non-Commercial Purpose (to avoid doubt, including for the purpose of making the Incorporated Existing Materials freely available to the public or to any section of it, whether in hard copy or on-line and including use and modification of any models and copying of photographs); and

(b) if any of the Incorporated Existing Materials are included in the materials referred to in clause 1.7, the Recipient must ensure that relevant third parties make those Incorporated Existing Materials available to the public under a Creative Commons Attribution 4.0 licence.

1.6 This clause 1 survives termination or expiry of this agreement.

1.7 To make the required information available under a Creative Commons Attribution 4.0 licence the Consultant must insert a copyright notice into the deliverables indicated below in accordance with the form and instructions in Schedule A. The Consultant must particularise New Contract Material and Existing Contract Material, as specified in the instructions in Schedule A. The deliverables this refers to are as follows:

(i) project report(s) and associated figures (excluding any sections highlighted as confidential by the council);

(ii) spatial flood extent layers for key events; and

(iii) any other data and tools noted as IP Case 1 in Column 4 of Table 14 or otherwise advised by council to the consultant

SCHEDULE A

This copyright notice is to be incorporated into the Deliverable Services. It can be downloaded MS Word format from: https://goo.gl/dsuQD5. It should replace any other copyright notice in the document(s), which are generally located inside the front cover.

Instructions

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10. GENERAL

10.1 Council's Authorised Representatives

The study will be administered by Council. Personnel authorised to issue instructions in regard to this study are:

Name: Mike Brearley, Councils External Project Manager, Telephone: 0407 953 249.
E-mail: mike@mbaconsult.com.au

Name: Bimal Shah, Interim Manager Engineering, CGR Council, Telephone: 1300 459 689.
E-mail: bimal.shah@cgrc.nsw.gov.au

DCCEEW is a member of Council's TSC. DCCEEW's representative on this project is Steve Manwaring (steve.manwaring@environment.nsw.gov.au; 02 6229 7170; 0475 835 886). DCCEEW's role on the committee is to provide technical and policy advice. Council may request, at any time, the advice and support of DCCEEW in any aspect of the study.

NSW SES is also member of Council's TSC. NSW SES's representative on this project is Joshua Stanbury (joshua.stanbury@ses.nsw.gov.au; 02 4226 0275; 0478 281 649).

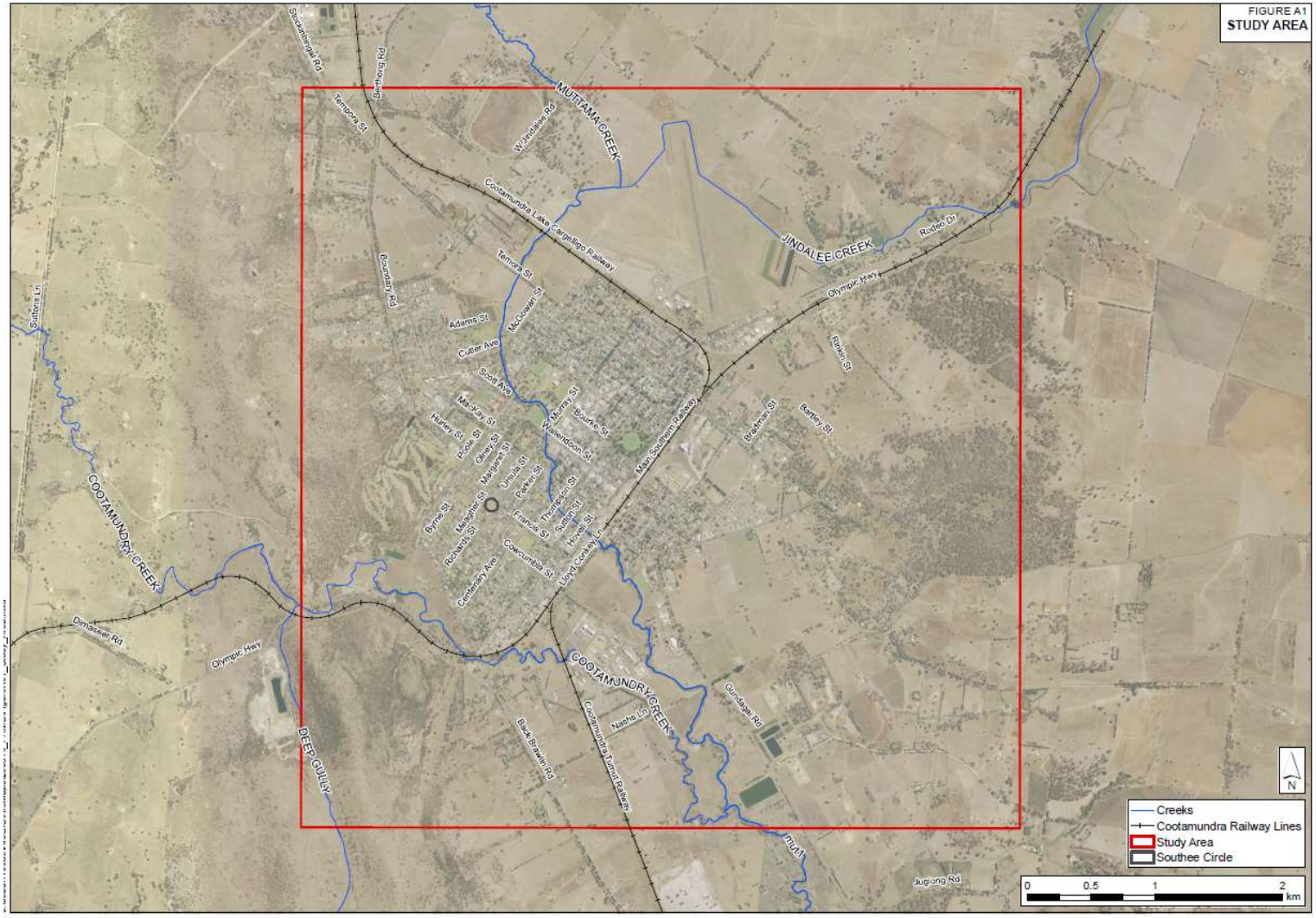

FIGURE 2 COOTAMUNDRA – STUDY AREA

Source: *Cootamundra FRMS&P (2023) report.*

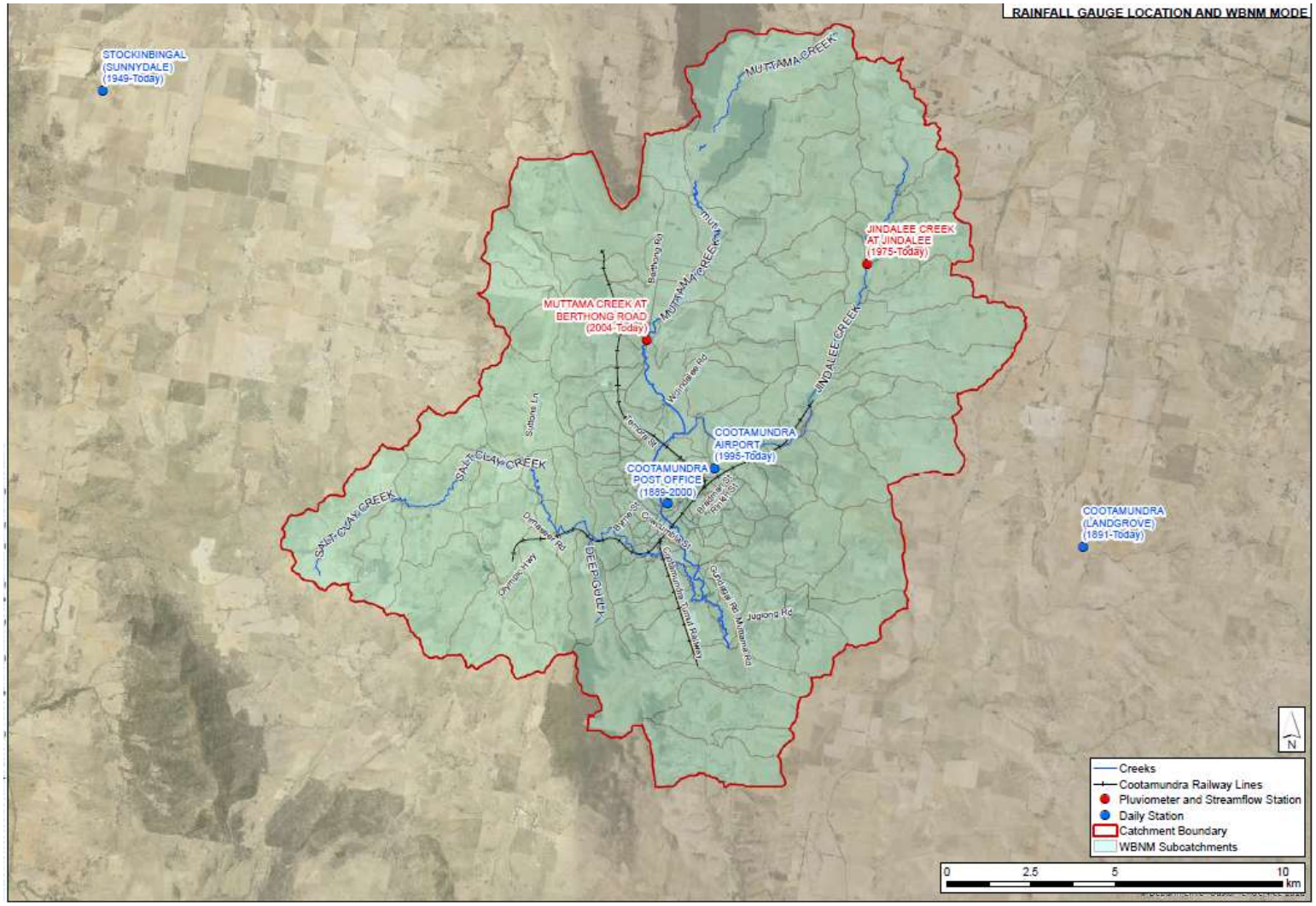

FIGURE 3 COOTAMUNDRA LOCAL CATCHMENTS AND GAUGE LOCATIONS

Source: *Cootamundra FRMS&P (2023) report.*