



PLANNING PROPOSAL

WEST COWRA GROWTH AREA

PPA - COWRA SHIRE COUNCIL

DOCUMENT CONTROL

PROJECT REPORT DETAILS

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Principal Author	Janine Finlayson - Land-use Planner
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ACKNOWLEDGEMENT OF COUNTRY

In preparing this Planning Proposal, Cowra Shire Council acknowledge the traditional lands of the Wiradjuri people, and pays respect to elders both past, present and emerging.



Prepared by:
COWRA SHIRE COUNCIL
116 Kendal Street
COWRA NSW 2794



Executive Summary

This Planning Proposal has been initiated by Cowra Shire Council and aims to amend the existing provisions of Cowra Local Environmental Plan 2012 by removing a servicing restriction and changing the minimum lot size provisions for land in the West Cowra Growth Area.

The West Cowra Growth Area is zoned R5 Large Lot Residential and is defined generally by the Grenfell Road to the north, Airport Road to the west, Hartley Street to the East, and Boundary Road to the south. Maps of the West Cowra Growth Area are included in the relevant sections of this Planning Proposal.

The West Cowra Growth Area is an established residential location within the Cowra Township. The area is recognised by the Council's strategic planning framework as an area where residential growth is planned to occur over the short, medium and longer term. The growth is to be accommodated through new residential housing constructions on existing lots and through the further subdivision of existing property holdings to create new dwelling opportunities.

The West Cowra Growth Area has been zoned to allow residential development and subdivision since at least the commencement of the Cowra Local Environmental Plan 1990, which applied the I(c) Rural Small Holdings zone to the land and allowed for the subdivision of land into minimum 4,000m² lots. With the commencement of the Cowra Local Environmental Plan 2012, the following changes to the planning framework were introduced for the West Cowra Growth Area:

Rezoning of the land from I(c) Rural Small Holdings to R5 Large Lot Residential zone. This was an exercise to translate the zoning framework consistent with the requirements of the Standard Instrument – Principal Local Environmental Plan (LEP Template) and consistent with guidance provided to Council by the NSW Department of Planning and Environment.

- Retaining a minimum lot size of 4,000m² for new subdivision lots, but adding a clause framework to the Local Environmental Plan requiring reticulated sewer to be connected for lots at this size.
- Changing the minimum lot size from 4,000m² to 20,000m² (2 ha) where reticulated sewerage supply cannot be connected to the lots.

In March 2025, the Cowra Housing Strategy 2025 was adopted by Cowra Council. The Cowra Housing Strategy 2025 was funded by the NSW Government through the Regional Strategic Planning Fund in association with Cowra Council, and received the formal endorsement of NSW Department of Planning, Housing and Infrastructure in August 2025. One of the key objectives of the Cowra Housing Strategy 2025 was to review planning controls related to zoning, minimum lot size and permissible land-uses in residential zones and identify where changes may be necessary in order to ensure the sustainable use of land. One such change recommended

by the Cowra Housing Strategy 2025 is to amend Cowra Local Environmental Plan 2012 to allow subdivision in the R5 Large Lot Residential (West Cowra) into minimum 4,000m² lots by removing the restriction in Clause 4.1(3B) relating to the need for reticulated sewerage supply.

The endorsement of the Cowra Housing Strategy 2025 coincides with work that Cowra Council has been progressing since 2019 relating to the West Cowra Sewer Project which aims to investigate the likely requirements for augmenting Council's reticulated sewerage supply system to service the wider West Cowra Area. The West Cowra Sewer Project is an important strategic infrastructure project which aims to facilitate increased development outcomes within the wider West Cowra area, not just the R5 Large Lot Zone. The cost implications associated with the design, implementation, construction and maintenance of sewerage supply to this area of Cowra are significant and it is become increasingly evident that the project will be challenging to deliver as a short-term project. A longer-term financial commitment is likely to be required, as well as a staged implementation.

At the same time, The Cowra Housing Strategy 2025 has identified strong demand for large lot housing. Unlocking the development potential of the West Cowra Growth Area by refining minimum lot size controls will help Council meet housing targets and fill supply gaps in our local area, while prioritising reticulated sewerage to other parts of West Cowra.

If planning provisions in Cowra Local Environmental Plan 2012 remain unchanged, the challenges of delivering a sewerage supply to the R5 Large Lot Residential zone in West Cowra will inhibit subdivision potential and dwelling growth within this important housing location of Cowra Township. Consistent with the recommendations of the Cowra Housing Strategy 2025, Cowra Council is now committing to a Planning Proposal that seeks to amend Cowra Local Environmental Plan 2012 as follows:

- Amending the provisions contained in Clause 4.1(3B) by removing the requirement for reticulated sewerage supply to be connected to new subdivision lots within "Area B" (to which the West Cowra Growth Area relates).
- Amending Map Sheet LSZ_002C by changing the minimum lot size applying to the West Cowra Growth Area from "Z1 – 2ha" to "W-4,000m²".

To be clear, the Planning Proposal seeks only to change the minimum lot size applying to the subdivision of land within the R5 Large Lot Residential zone in West Cowra. There will be no changes to:

- The primary land-use for West Cowra, which will remain for large lot residential purposes.
- The permissibility of residential development types in the zone.
- The permissibility of a dwelling in the zone, which is currently allowed on a lot of any size, regardless of whether sewer is or will be connected to the land.

This Planning Proposal is prepared in a form that is consistent with the recommendations of the NSW Department of Planning and Environment's Local Environmental Plan Making Guidelines. It

provides the necessary reporting basis for Cowra Shire Council to progress an amendment to Cowra Local Environmental Plan 2012.

A summary of the primary assessment findings is included as follows:

- The Planning Proposal is prepared as a result of Action 2.1 of the adopted Cowra Housing Strategy 2025.
- The proposal is consistent with the Central West and Orana Regional Plan 2041.
- The proposal is consistent with any provisions of an applicable State Environmental Planning Policy.
- The proposal is consistent with the Cowra Local Strategic Planning Statement.
- The proposal is consistent with the requirements of other relevant strategies and planning documents of the Council including the Cowra Shire Land use Strategy 2009.
- The proposal is consistent with relevant Section 9.1 Ministerial Directions.
- The likely environmental, social and economic impacts of the proposals are acceptable, and positive in the majority. The Planning Proposal is supported by a Land Capability Assessment prepared by a suitably qualified environmental consultancy which confirms that the proposed amendments to Cowra LEP 2012 are not likely to result in significant environmental impacts.
- The Planning Proposal is not determined to be of significance to State and Federal governments.
- The Planning Proposal is supported by a suite of maps that demonstrate the proposed scope of changes to Cowra Local Environmental Plan 2012.



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PROJECT INTRODUCTION

I.1 Project Overview

This Planning Proposal has been initiated by Cowra Shire Council and aims to amend the existing provisions of Cowra Local Environmental Plan 2012 by changing the minimum lot size provisions for land in West Cowra that is currently zoned R5 Large Lot Residential.

The West Cowra Growth Area is an established residential location within the Cowra Township. The area is recognised by the planning framework in Cowra Township as an area where residential growth is planned to occur over the short, medium and longer term. The growth is to be accommodated through new residential housing constructions on existing lots and through the further subdivision of existing property holdings to create new dwelling opportunities.

The Planning Proposal seeks to amend Cowra Local Environmental Plan 2012 as follows:

- Amending the provisions contained in Clause 4.1(3B) by removing the requirement for reticulated sewerage supply to be connected to new subdivision lots within “Area B” (to which the West Cowra Growth Area relates).
- Amending Map Sheet LSZ_002C by changing the minimum lot size applying to the West Cowra Growth Area from “Z1 – 2ha” to “W-4,000m²”.

The preparation of this Planning Proposal is a key recommendation of the Cowra Housing Strategy 2025 which was adopted by Cowra Council in March 2025 and formally endorsed by NSW Department of Planning, Housing and Infrastructure in August 2025. Specifically, Action 2.1 of the Cowra Housing Strategy 2025 seeks to:

Amend Cowra LEP 2012 to allow subdivision in the R5 Large Lot Residential zone (West Cowra) and remove the restriction relating to the need for reticulated sewerage supply in Clause 4.1(3B).

The Planning Proposal has been prepared in accordance with the NSW Planning and Environment’s Local Environmental Plan Guideline dated August 2023.

I.2 Project Background

I.2.1 Planning Framework – West Cowra Growth Area

The West Cowra Growth Area has been zoned to allow residential development and subdivision since at least the commencement of the Cowra Local Environmental Plan 1990, which applied the I(c) Rural Small Holdings zone to the land and allowed for the subdivision of land into minimum 4,000m² lots. With the commencement of the Cowra Local Environmental Plan 2012, the following changes to the planning framework were introduced for the West Cowra Growth Area:

- Rezoning of the land from I(c) Rural Small Holdings to R5 Large Lot Residential zone. This was an exercise to translate the zoning framework consistent with the requirements of the Standard Instrument – Principal Local Environmental Plan (LEP Template) and guidance provided to Council by the NSW Department of Planning, Housing and Infrastructure.
- Retaining a minimum lot size of 4000m² for new subdivision lots, but adding a clause framework to the Local Environmental Plan requiring reticulated sewer to be connected.
- Changing the minimum lot size from 4000m² to 20,000m² (2 ha) where reticulated sewerage supply cannot be connected to the lots.

The planning justification to require provision of reticulated sewerage to minimum 4000m² lots was related to the preparation of a series of mapping by the (then) NSW Department of Water and Energy, Environment and Climate Change and the NSW Department of Primary Industries which included an Environmentally Sensitive Areas – Water Overlay Map. The map identified areas of the Cowra Shire where groundwater resources were identified to be either moderately or highly vulnerable. The map also identified areas where sensitive waterways are located which generally included the major freshwater habitats and connected riparian areas. This mapping was translated into the 'Map Sheet Series – Wetlands, Groundwater Vulnerability, Riparian Lands and Watercourses Map' in Cowra Local Environmental Plan 2012.

It was generally the view of those Government Agencies (referred to above) that:

- The Environmentally Sensitive Area Overlay was to be used by Council as a land-use decision making tool. The mapped data was high-level, broad and strategic based data designed to give general direction to land-use planning decisions that were to be implemented through the preparation of the Cowra Local Environmental Plan 2012.
- In relation to the vulnerable groundwater mapping, the likely impacts of residential settlement occurring within mapped locations (including the West Cowra Growth Area) can be mitigated by planning strategies that minimise settlement density. Larger lot forms in unsewered areas provide a more sustainable approach to on-site effluent management, particularly in locations that are known to have underlying vulnerable groundwater resources, and smaller lot forms should only be considered where reticulated sewerage supply is available for connection.

Cowra Local Environmental Plan 2012 was subsequently adopted with the following minimum lot size controls for the West Cowra Growth Area.

- Minimum lot size of 2 hectares (20,000m²) for subdivision lots to be created without connection to a reticulated sewerage supply.
- Minimum lot size of 4,000m² or subdivision lots to be created with connection to a reticulated sewerage supply.

1.2.2 Unlocking existing housing potential

Council plays a key leadership role in determining how and where housing supply will be delivered across the Cowra Shire to meet identified community needs and priorities.

A key finding of the Cowra Housing Strategy 2025 is the ongoing importance of large lot lifestyle living, both now and into the future. Forty-eight per cent of Cowra Housing Strategy 2026 community feedback survey respondents identified lifestyle and community values as key reasons why Cowra is an attractive location for housing and population growth.

Low-density living aligns strongly with the rural character and appeal of the Shire. It is also typical of regional areas, where residents often prefer larger properties with greater space for dwellings, outbuildings, and private open space, rather than higher-density, apartment-style development commonly found in metropolitan centres. Community consultation further indicates that many working-age residents—an important demographic Cowra is seeking to attract—prefer large lot housing.

While there may be pressure to release additional land on the urban fringe, this approach can require significant investment in infrastructure, including roads, utilities, and public services.

These costs are often substantial, may not be immediately recovered through development contributions or other revenue streams, and can create barriers to timely development.

A more sustainable approach to housing growth is to maximise opportunities within existing zoned land through infill development. This involves utilising vacant or underdeveloped land within established residential areas, rather than expanding into previously undeveloped land.

As the impacts of climate change become more pronounced, it is increasingly important to deliver housing in a sustainable manner. Key drivers for sustainable housing include:

- **Environmental impact:** Energy-efficient design and environmentally responsible materials reduce the overall ecological footprint of development.
- **Economic benefit:** Sustainable housing can deliver long-term savings through reduced energy consumption and lower maintenance costs, while also enhancing property values.
- **Community resilience:** Well-planned housing supports resilient communities by strengthening infrastructure and promoting shared spaces and local connections.

- **Safety and risk reduction:** Locating housing outside high-risk areas reduces the likelihood of damage or loss from natural hazards. Recent flood and bushfire events in Cowra and across NSW reinforce the importance of avoiding hazard-prone land when planning for growth.

Removing servicing restrictions within the West Cowra Growth Area is intended to increase the utilisation of existing large lot residential land, unlock subdivision potential, and support housing supply in response to market demand.

Current planning controls already permit dwellings within the R5 Large Lot Residential zone on lots of any size without requiring connection to reticulated services. Allowing subdivision to a minimum of 4,000 sq metres without reticulated sewer connection would not compromise Council's objectives for density or character. Instead, it would increase housing opportunities within existing residential zones without imposing a significant financial burden on ratepayers.

This approach is consistent with the historical planning framework for the West Cowra Growth Area. Previous controls permitted subdivision down to 4,000 sq m, resulting in the established development pattern and residential densities currently observed across much of the R5 zone, where development capacity has largely been realised.

It is also aligned with the Department of Planning, Housing and Infrastructure's Planning Reforms by facilitating and fast-tracking residential development.

Accelerating the delivery of residential lots represents a significant opportunity to stimulate Cowra's regional economy. The initiative will inject short-term economic activity through civil works and housing construction, creating employment for local contractors, trades, and suppliers. Beyond the construction phase, the release will enable population growth by attracting new residents and retaining local workers, increasing demand across retail, health, education, and service sectors.

1.2.3 Planning controls supporting appropriate servicing and development outcomes

Council has proactively planned for potential changes to the MLS in the West Cowra Growth Area by updating its Development Control Plan and Contributions Plans in advance of any amendments to the Cowra Local Environmental Plan 2012.

Specifically, Part D.9 - West Cowra Growth Area - has been bookmarked as its own chapter for future planning controls in the area.

In addition, the recently adopted Cowra Council 2026 Contributions Plans have been structured to encourage development and remove barriers to subdivision. This includes the removal of residential areas from Section 7.11 contribution requirements, helping to improve development feasibility and support housing delivery.

1.2.4 Geotechnical capability and environmental suitability

A Land Capability Assessment by McMahon Earth Science in 2024 evaluated the environmental suitability of the R5 West Cowra Growth Area for subdivision growth using on site effluent management practices.

It found the area capable of supporting 4,000 sq m lots without the need for a reticulated sewerage supply and able to rely on On Site Sewage Management Systems.

Further, the geotechnical analysis also found groundwater - cited as a reason for the servicing restriction - is at deep depths in the West Cowra Growth Area and typically, there is a low level of connectivity to groundwater in the underlying geology.

Risk to soil was assessed as minimal when Council's guidelines and industry best practices are adhered to, especially when an application such as aerated (irrigated) wastewater system can be set as a planning control for any future subdivision and importantly, any new OSSM system installation, such as the replacement of any existing old and failing systems.

It is clear that sustainable and effective on site wastewater management is achievable for the West Cowra Growth Area, that not only protects public health, but also the environment.

1.2.5 West Cowra Sewer Project

The provision of reticulated sewerage to service the wider West Cowra area is an infrastructure project that has been the subject of continued investment and investigation from Cowra Shire Council over a number of years.

Project work to date has considered a number of options for achieving connection of the wider West Cowra area to a sewerage scheme including:

- Modified Gravity Scheme;
- Pressure Sewer System;
- Hybrid Gravity/Pressure Sewer System;
- Vacuum System.

At present, the key issues posing primary constraints to the provision of a sewerage scheme to the wider West Cowra area is cost-benefit and funding allocation. The augmentation of a reticulated sewerage supply to service residential, commercial and industrial development in West Cowra is an expensive infrastructure project, with cost estimates indicating a total capital investment value in the order of \$60M. Funding of the project is heavily dependent on State Government subsidy. The financial implications for existing landowners and developers (of new subdivisions) is also an important cost implication for Council and the local community and requires further investigation.

The time-frame for delivery of the overall project is likely to mean that the objectives and intended outcomes of this Planning Proposal to deliver timely additional R5 Large Lot residential Housing possibilities in the West Cowra Growth Area will not be achieved in the short to medium term. A change to existing minimum lot size provisions is proposed in order to ensure that growth and development within the West Cowra Growth Area is not compromised by long-term infrastructure provisioning, to the overall area.

I.3 Structure and Form

The Planning Proposal has been prepared in accordance with the NSW Planning and Environment's Local Environmental Plan Guideline dated August 2023, hereafter referred to as the Guideline.

Section 2 of the Guideline includes detailed guidance on what content needs to be included in a Planning Proposal. Table 1 includes a checklist of all of the information required by the Guideline and a reference on where the information can be found within this Planning Proposal.

The Guideline requires that the Planning Proposal must be prepared to a high standard and complying generally with the requirements detailed below.

Section 1 - Project Introduction

Section 1 includes introductory information relating to the project including a project overview and relevant background information.

Section 2 - The Existing Environment

Section 2 includes a detailed description of the project including location and title, land-use descriptions, and an assessment of the existing environmental conditions applying to the land.

Section 3 - Existing Planning Framework

Section 4 includes a description of the existing planning framework applying to the subject land including provisions under Cowra Local Environmental Plan 2013.

Section 4 - Description of the Proposal

Section 4 includes a detailed description of the proposed changes to Cowra Local Environmental Plan 201.

Section 5 - Strategic Alignment

Section 5 includes detailed information describing how the proposed development aligns with the strategic planning framework applying to the subject land.

Section 6 - Planning Proposal Part 1

Section 6 addresses the Part 1 matters for consideration under the NSW DPE Local Environmental Plan Making Guidelines.

Section 7 - Planning Proposal Part 2

Section 7 addresses the Part 2 matters for consideration under the NSW DPE Local Environmental Plan Making Guidelines.

Section 8 - Planning Proposal Part 3

Section 8 addresses the Part 3 matters for consideration under the NSW DPE Local Environmental Plan Making Guidelines.

Section 9 - Planning Proposal Part 4

Section 9 addresses the Part 4 matters for consideration under the NSW DPE Local Environmental Plan Making Guidelines.

Section 10 - Planning Proposal Part 5

Section 10 addresses the Part 5 matters for consideration under the NSW DPE Local Environmental Plan Making Guidelines.

Section 11 - Planning Proposal Part 6

Section 10 addresses the Part 6 matters for consideration under the NSW DPE Local Environmental Plan Making Guidelines.

Supporting Documentation

1.3.1 Land Capability Assessment - West Cowra Growth Area

In order to properly understand the likely environmental impacts of allowing intensification of residential growth and development in West Cowra in unsewered locations, Cowra Shire Council has commissioned a Land Capability Assessment from McMahon Earth Science.

The Land Capability Assessment prepared by McMahon Earth Science is included as Appendix A to this Planning Proposal. The key findings of the Land Capability Assessment have been discussed in a later section of this Planning Proposal.



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THE EXISTING ENVIRONMENT

2.1 Baseline Environmental Analysis

A base line environmental analysis is required to be completed in order to understand the relevant issues affecting land-use within the West Cowra Growth Area.

The analysis has been completed using a combination of desktop and site investigative exercises as necessary. The analysis aims to provide strategic context for the Planning Proposal and focuses on the following key issues:

- **Site Location.** A description of the geographical location of the West Cowra Growth Area and its spatial relationship to the wider Cowra Township and surrounding agricultural areas. Refer Section 2.1.
- **Land-use.** A description of the various land-use activities that are occurring within the West Cowra Growth Area. Refer Section 2.2
- **Surrounding Environment.** A description of the various land-use activities that are occurring on land surrounding the West Cowra Growth Area. Refer Section 2.3
- **Topography, Slope and Land-form.** A description of the key characteristics of the West Cowra Growth area which influence urban land-use in terms of elevation, aspect and drainage. Refer Section 2.4
- **Water Resources.** A description of the key water resource features of the West Cowra Growth Area including permanent surface waters, surface water collection dams, bores, domestic water supply infrastructure and groundwater aquifer systems. Refer Section 2.5
- **Heritage.** A description of the European and Aboriginal Cultural Heritage feature of the landscape relating to the West Cowra Growth Area. Refer Section 2.6
- **Access, Roads and Transport.** A description of the road network that services the West Cowra Growth Area. The active transport network has also been considered. Refer Section 2.7
- **Environmental Hazards.** A description of the various environmental hazards that affect land within the West Cowra Growth Area including flooding and bushfire. Refer Section 2.8.
- **Infrastructure and Services.** A description of the public infrastructure, services and utilities that are provided to land within the West Cowra Growth Area. Water, sewer and stormwater has been considered. Refer Section 2.9.
- **Biodiversity.** A description of the biodiversity features of the West Cowra Growth Area. Riparian, terrestrial and urban vegetation has been considered.

2.2 Site Location

This Planning Proposal applies to land in West Cowra that is zoned R5 Large Lot Residential under Cowra Local Environmental Plan 2012. This area of land is referred to generally throughout this report as the West Cowra Growth Area.

The West Cowra Growth Area is defined generally by the Grenfell Road to the north, Airport Road to the west, Hartley Street to the East, and Boundary Road to the south. A map showing the location and extent of the West Cowra Growth Area is included in Figure 1.

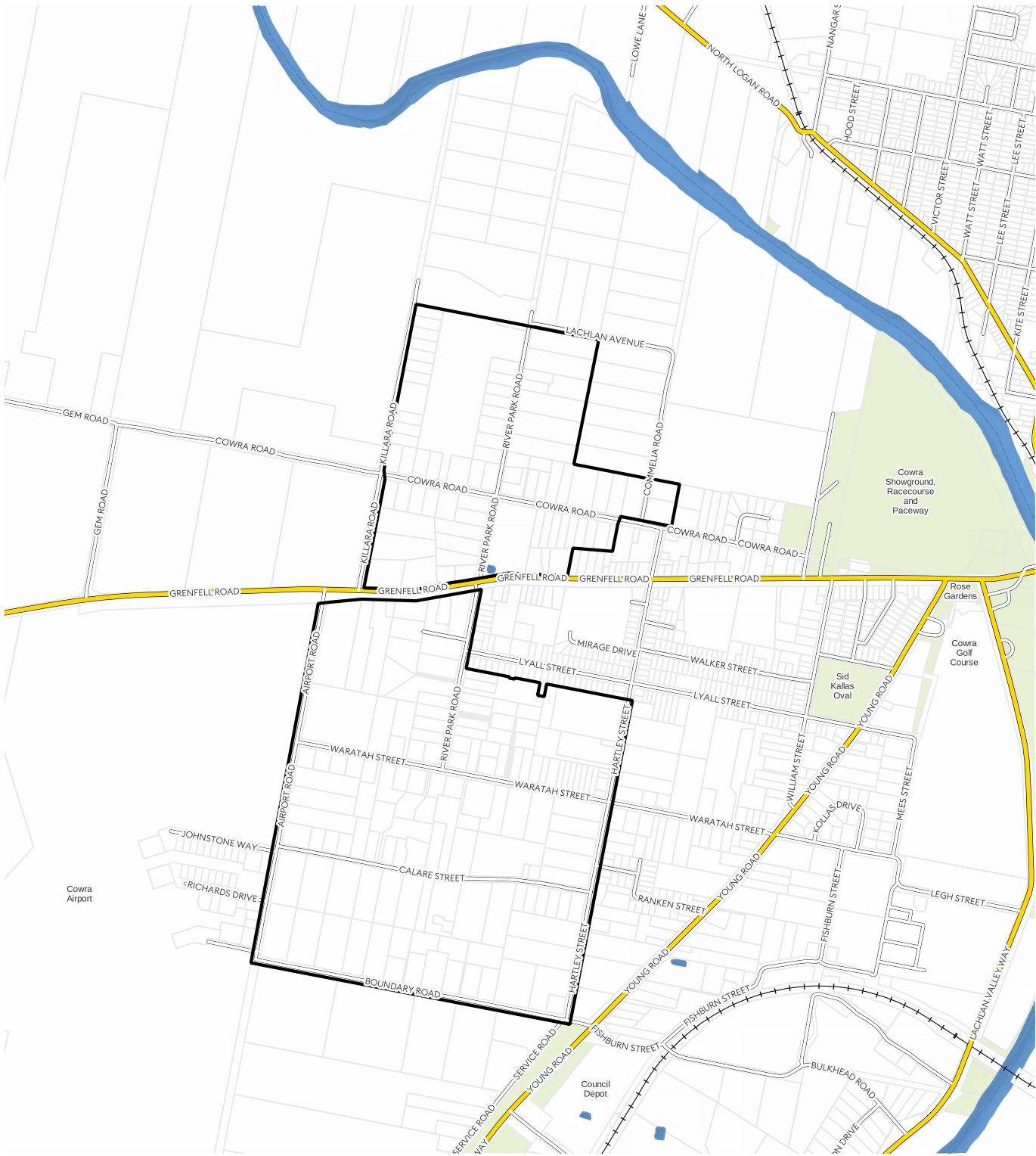


Figure 1 - Site Location Map

- West Cowra Growth Area
- Primary Road Network
- Local Road Network
- Railway Network
- Hydro Features
- Property Boundaries
- Crown Land

2.3 Land-use

The West Cowra Growth Area is an established residential location within the Cowra Township. The area is recognised by the planning framework in Cowra Township as an area where residential growth is planned to occur over the short, medium and longer term.

Figure 3 shows the current land-use mix within the West Cowra Growth Area. Further analysis shows:

- Approximately 80% of the area is comprised of allotments that contain an existing dwelling-house. Dwelling stock consists primarily of single storey dwellings on existing subdivided lots ranging in size from 4,000m² to 12,000m². Medium density housing forms are generally absent from the West Cowra Growth Area.
- Approximately 3% of the area is comprised of allotments that contain non-residential land-uses. These land-uses include a single education facility and low-key industrial operations which appear to be operating without major impact or conflict with adjoining residential land-use.
- Approximately 18% of the area is comprised of existing lots that are either vacant of an existing dwelling, or which have a land area that would enable the site to be further subdivided under existing planning controls.

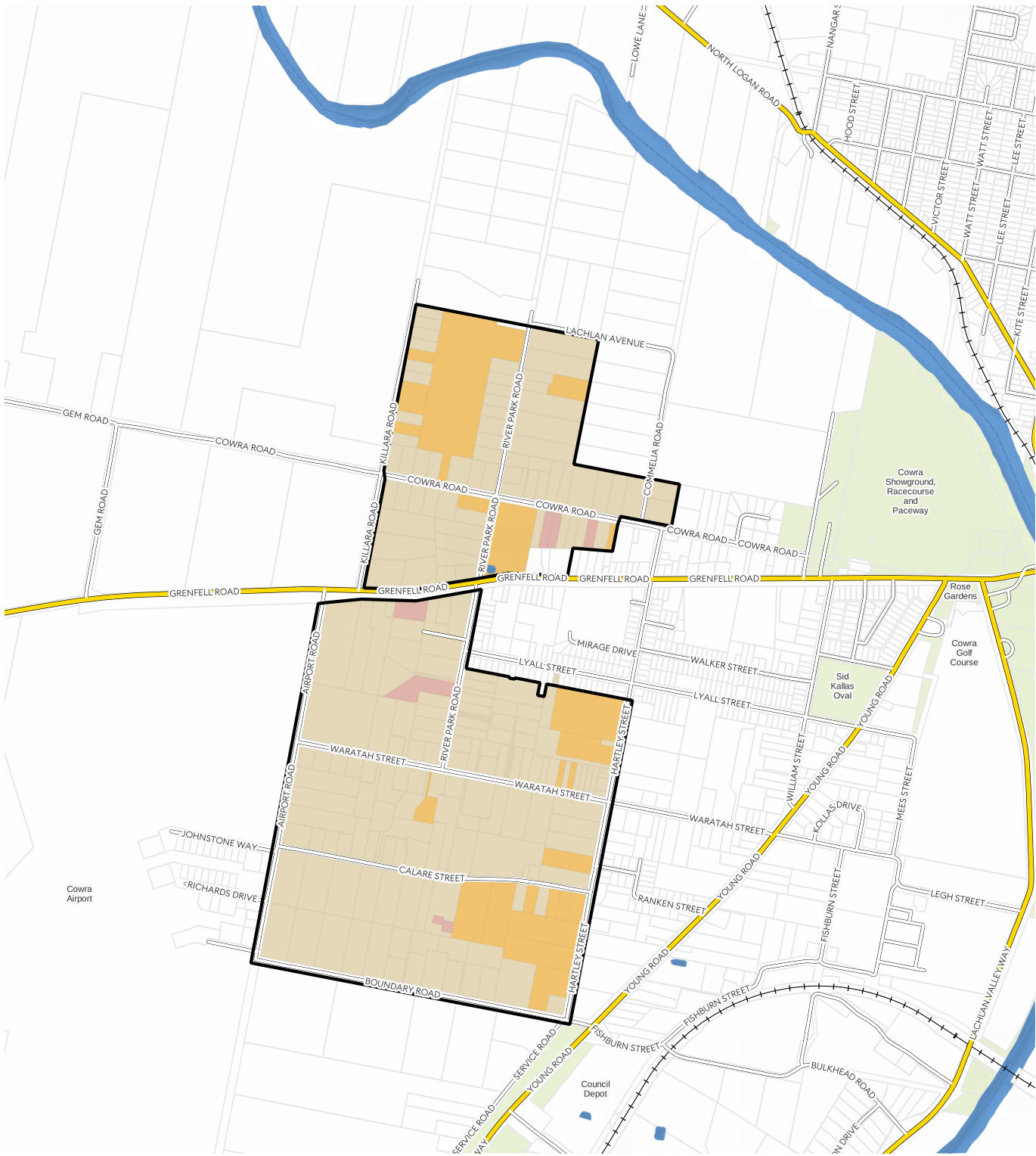


Figure 2 - Land-use Analysis Map

- West Cowra Growth Area
- Primary Road Network
- Local Road Network
- Railway Network
- Hydro Features
- Property Boundaries
- Crown Land
- Non Residential - Occupied
- Residential - Occupied
- Residential - Unoccupied



0 200 400 600 800 1,000 m

2.4 The Surrounding Environment

Beyond the boundaries of the West Cowra Growth Area, the following land-use activities are occurring:

- The Cowra Airport immediately adjoins the West Cowra Growth Area. The facility is located east of Airport Road and south of the Mid Western Highway. The Cowra Airport is a regional scale aerodrome facility. Cowra Council is developing a part of the site for the purposes of an airport related business park in accordance with the Cowra Airport Masterplan 2021. The Cowra DCP 2026 incorporates a number of controls and standards to ensure airport operations and residential land-use in the West Cowra Growth Area occurs without significant land-use conflict issues arising.
- The eastern edge of the West Cowra Growth Area is bordered by generally urban land-use including a mix of general industrial, standard residential, low-density residential and recreation land-uses.
- The remaining edges of the West Cowra Growth Area are bordered by existing agricultural land-use. Land to the north forms part of the flood plain relating to the agricultural river and is generally suitable for productive broad-acre cropping. Land to the south is generally suitable for small-lot primary production.

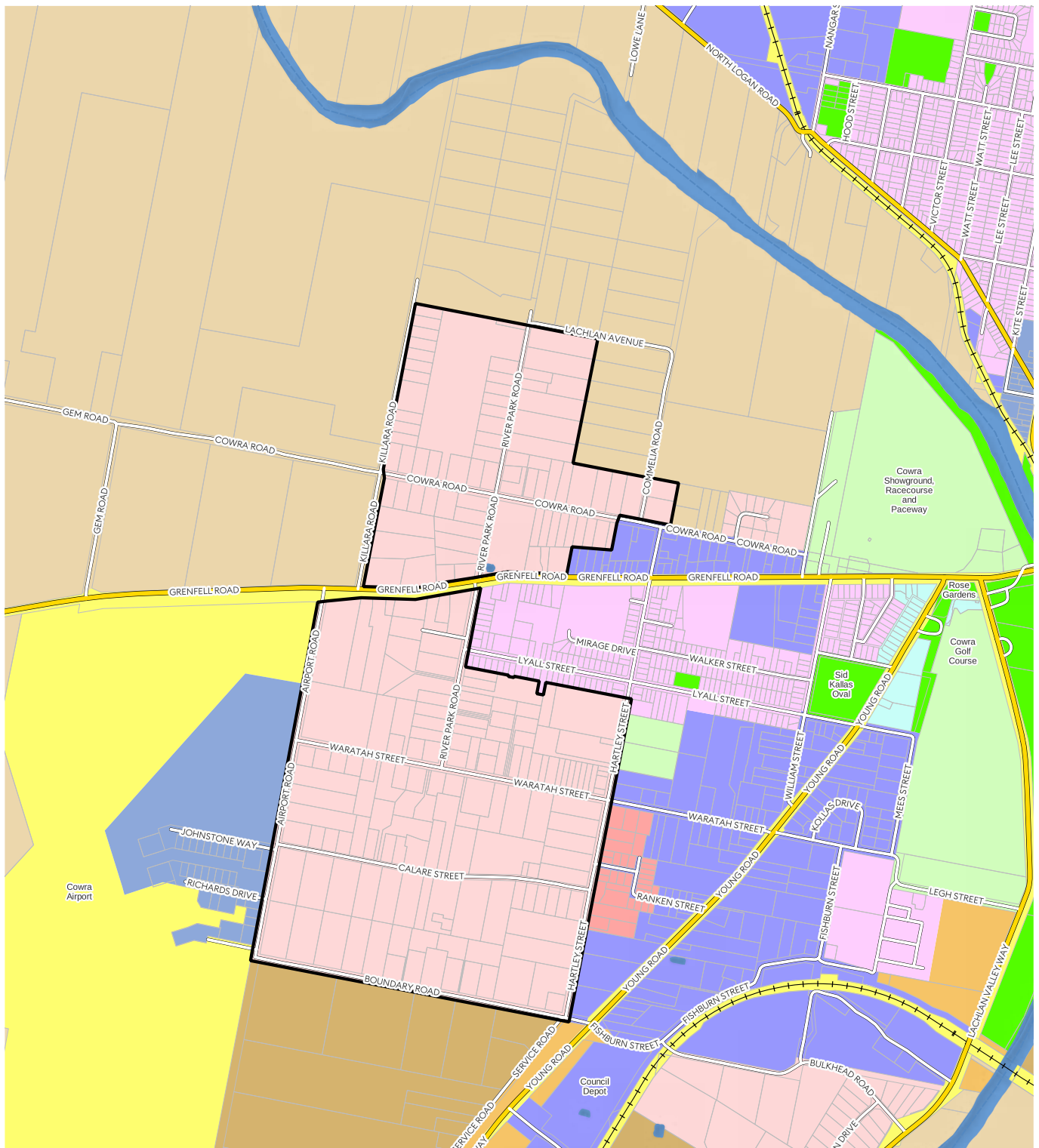


Figure 3 - Surrounding Environment Map

- | | | |
|------------------------|--------------------------|--------------------|
| West Cowra Growth Area | Low Density Residential | Public Recreation |
| Primary Road Network | Large Lot Residential | Private Recreation |
| Local Road Network | Neighbourhood Commercial | Agricultural |
| Railway Network | Airport | Infrastructure |
| Property Boundaries | Environmental | |
| Standard Residential | Industrial | |



0 200 400 600 800 1,000 m

2.5 Topography, Slope and Land-form

Figure 4 shows the key topographical features of the West Cowra Growth Area. Further analysis shows:

- South of the Mid-Western Highway, the West Cowra Growth Area is defined by some of the more elevated parts of the Cowra Township. A central ridge line creates quality aspect to the east and west and provides some property holdings with quality views back to the town centre and out into the surrounding agricultural areas.
- North of the Mid-Western Highway, the West Cowra Growth Area falls generally towards the Lachlan River, with small areas of land unsuitable for residential subdivision or housing development due to constraints posed by flooding from the Lachlan River and overland natural drainage.
- Generally, the topography, slope and land-form characteristics of the West Growth Area are suited to residential land-use and pose little constraint to residential building design on larger lot forms.

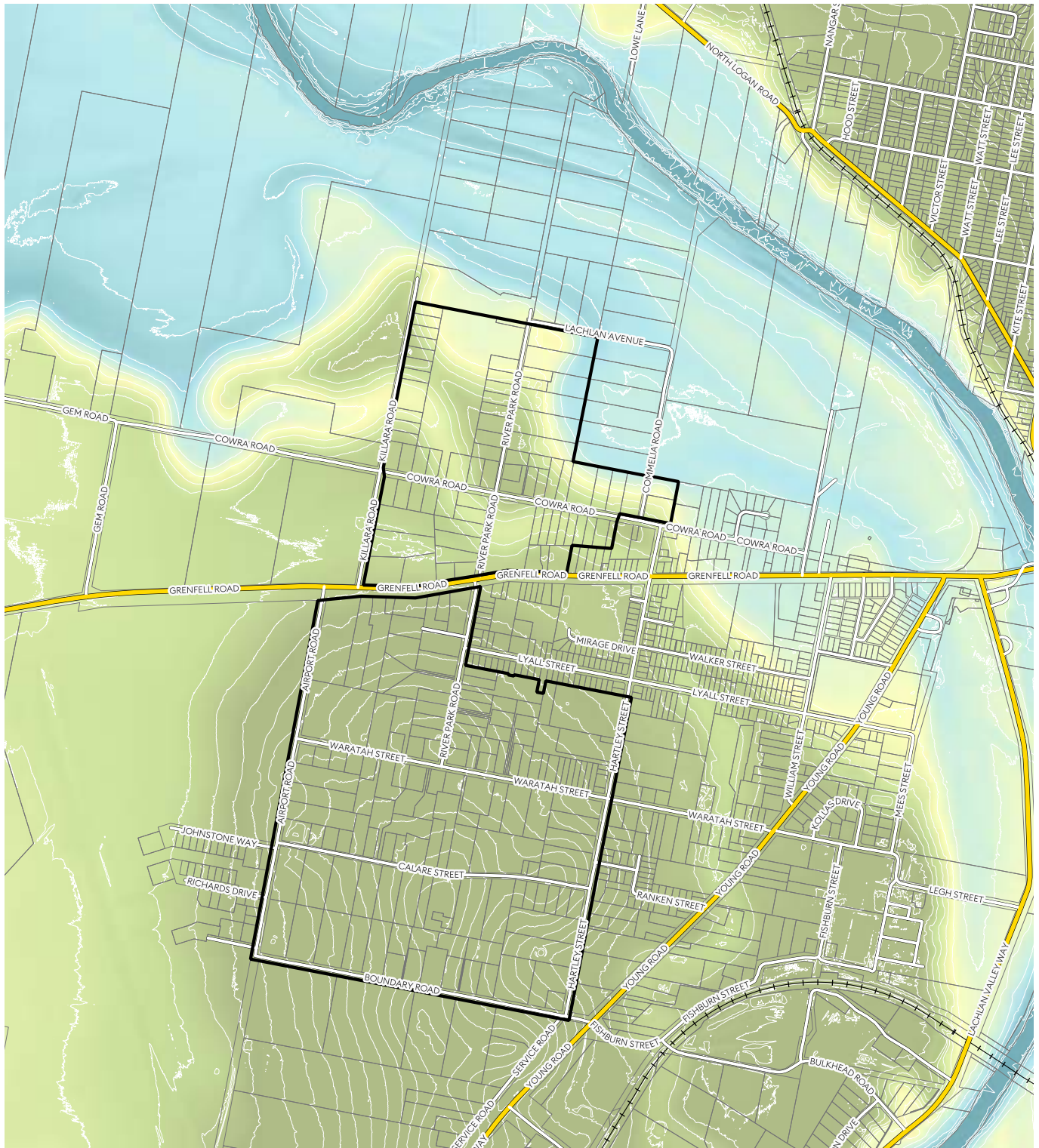


Figure 4 - Topography and Land-form Map

- West Cowra Growth Area
- Property Boundaries
- Primary Road Network
- Local Road Network
- Railway Network
- 300 AHD Elevation
- 280 AHD Elevation



0 200 400 600 800 1,000 m

2.6 Water Resources

Figure 5 shows the key water resource features of the West Cowra Growth Area. Further analysis shows:

- The Lachlan River is a key feature of the Cowra landscape. It provides a vital water source for agriculture and domestic water consumption in Cowra Township. The river is also a well utilised resource for local recreation and contributes generally to the regions economic well-being. Properties within the West Cowra Growth Area do not have direct access or frontage to the Lachlan River, but enjoy access through a network of well established road and pedestrian connections.
- The West Cowra Growth Area is a peri-urban location of the Cowra Township with long-established residential land-use history. Given the area is serviced by reticulated water supply, surface water collection dams are no longer featured prominently in the landscape.
- Large parts of the Cowra Township, including the West Cowra Growth Area are mapped in Cowra Local Environmental Plan 2012 as being impacted by vulnerable groundwater. The groundwater system is connected to the nearby Lachlan River and is an important environmental function of the local area. The under-lying groundwater system is a key reason why the minimum lot size controls for the West Cowra Growth Area under Cowra LEP 2012 currently require larger lot forms (20,000m²) where reticulated sewerage supply cannot be made available for the land. This is based on the planning rationale that environmental impacts are easier to manage when lot density is lower.
- Council's reticulated water supply system services the West Cowra Growth Area, which reduces reliance on groundwater bores for domestic water supply purposes. The Land Capability Assessment by McMahon Earth Science in Appendix A has identified 13 registered groundwater bores within the West Cowra Growth Area. Of these bores, two are for stock and domestic, one for irrigation and one for monitoring. The bores with information about the substrate show water bearing zones intersected at between 20.2m and 83m below ground level.

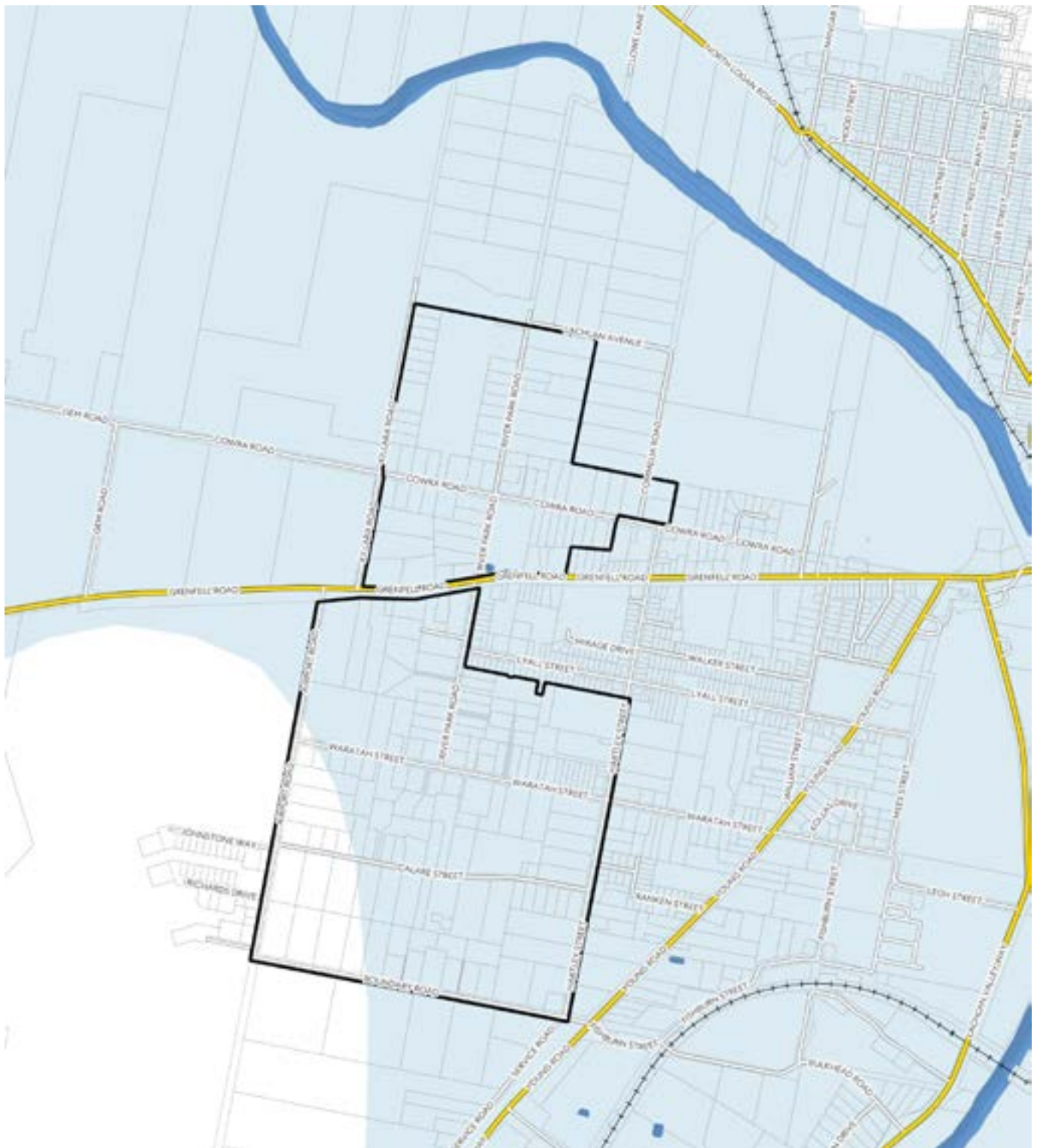


Figure 5 - Water Resources and Features Map

- West Cowra Growth Area
- Property Boundaries
- Primary Road Network
- Vulnerable Groundwater
- Local Road Network
- Surface Water Feature
- Railway Network



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2.7 Heritage

The West Cowra Growth Area does not contain any properties that are identified to be of local or state heritage significance in Schedule 5 of Cowra Local Environmental 2012. The nearest listed property is the Cowra Showground which is located between the West Cowra Growth Area and the Central Business District. European heritage is generally a not a key matter for consideration for new development occurring within the West Cowra Growth Area.

A search of the Aboriginal Heritage Information System (AHIMS) maintained by the NSW Office of Environment and Heritage indicates that there are numerous items, relics or places that have been recorded within the West Cowra Growth Area as being of Aboriginal heritage significance. Cowra Council has development assessment and consultation procedures in place to ensure the locations of these items are properly considered when new development is proposed that could result in impacts.



Figure 6 - Heritage Features Map

- West Cowra Growth Area
- Primary Road Network
- Local Road Network
- ++ Railway Network
- Property Boundaries
- Heritage - Cowra LEP 2012



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2.8 Access, Roads and Transport

The West Cowra Growth Area forms part of the urban area of the Cowra Township and is generally defined by Boundary Road, Hartley Street, Killara Road, Lachlan Avenue.

The Mid Western Highway forms part of the classified road system and provides primary road connection back into the Cowra Township. The remaining network of roads throughout the West Cowra Growth Area are part of the local road system, which is owned and maintained by Cowra Shire Council. The road network is sealed throughout and provides for a high standard of road access to the population base.

Roads are generally constructed to Council's minimum standards for rural residential road construction including minimum 7m wide sealed carriageways, roadside stormwater drainage infrastructure (generally table drains) and street lighting. The road network is in good condition, provides for a high standard of access to existing properties, and is generally suitable to accommodate residential expansion / intensification within the West Cowra Growth Area.

Closer analysis of the settlement patterns within the West Cowra Growth Area shows that the majority of properties have direct frontage to the road system. There are historic subdivisions on Calare Street, Waratah Street and River Park Road where the design creates battle-axe shaped lots, which is an indicator that subdivision development has been allowed to occur in the past without a master planned approach to urban form.

The West Cowra Growth Area is generally not serviced by a comprehensive active transport network. Footpath connections are available in adjoining neighbourhoods and streets. A review of the Cowra Pedestrian and Cycling Plan 2024 shows there are plans to extend new footpaths / shared paths along Lyall Street, Hartley Street, River Park Road, Airport Road and Boundary Road.

The local public transportation systems service the West Cowra Growth Area including the local taxis and school bus runs.



Figure 7 - Access, Roads and Transport Map

- West Cowra Growth Area
- Classified Road Network
- Local Road Network - Sealed
- Local Road Network - Unsealed
- Railway Network
- Property Boundaries



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2.9 Environmental Hazards

A review of the NSW Rural Fire Service Bushfire Prone Land maps shows that the West Cowra Growth Area is not impacted by bushfire risk. Subject to site specific investigations, new development (subdivision and / or dwellings) within the West Cowra Growth Area are not required to comply with the requirements of the NSW Planning for Bushfire Protection guidelines.

Parts of the West Cowra Growth Area are situated within the flood planning area to the Lachlan River. Figure 8 shows the extent of the 1% AEP and Probable Maximum Flood (PMF) as mapped in the Cowra and Gooloogong Floodplain Risk Management Plan 2006. A small number of allotments are generally unsuitable for new housing development due to flood constraint and subsequent limitations posed by existing development standards relating to floor levels and safe standards of access. The remaining areas of the West Cowra Growth Area are not impacted by flooding and are suitable for new housing development and intensification of land-use through new subdivisions.

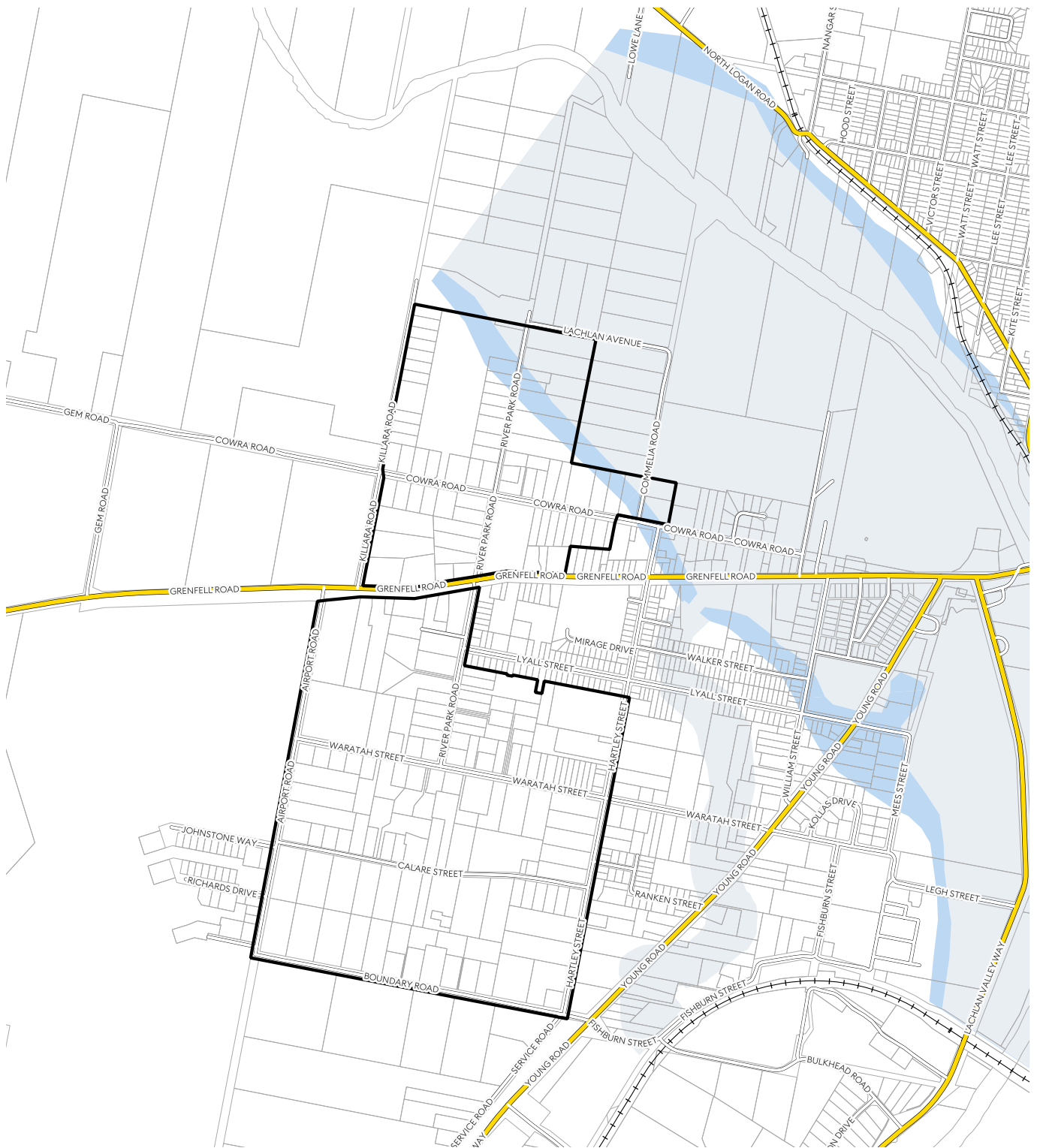


Figure 8 - Environmental Hazards Map

- West Cowra Growth Area
- Property Boundaries
- Primary Road Network
- Flood Planning Area - 1% AEP
- Local Road Network
- Probable Maximum Flood (PMF)
- Railway Network



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2.10 Infrastructure and Services

2.10.1 Stormwater

Figure 9 shows the existing stormwater drainage network within and surrounding the West Cowra Growth Area. Closer analysis shows that the West Cowra Growth Area is located outside of the urban stormwater catchment for the Cowra Township and is generally not connected to the underground stormwater drainage system (pits and pipes) connecting back to the Lachlan River.

Generally, the lot typologies in the West Cowra Growth Area are large enough to enable stormwater generated by from built form to be managed on-site or (in some circumstances) discharged directly to roadside table drainage infrastructure.

There is a natural overland drainage channel impacting some land in the vicinity of Cowra Road, River Park Road and Killara Road. The general extent and alignment of this channel is visible. This drainage is managed through a system of culverts in the local road system and is accounted for appropriately in new subdivision designs in this location.

2.10.2 Sewerage

Figure 11 shows that the West Cowra Growth Area is located outside of the urban catchment for gravity sewerage supply, except that a small number of lots on River Park Road are connected to the supply system, and a new subdivision on Killara Road has recently extended the main and installed connections to 12 lots.

Under present conditions, residential development is required to be serviced by an appropriately designed, installed and operating on-site waste management system.

Cowra Council does not have a strategy for on-site waste management that is specific to the West Cowra Growth Area. As part of the Development Application / Construction Certificate Application process for new development, Council requires a Geotechnical Report to be prepared which analyses the soil for the specific development site and provides recommendations for on-site treatment of domestic waste.

Further analysis shows that as many as 80% of the existing on-site waste management systems installed and operating within the West Cowra Growth Area are servicing dwellings on lots smaller than the currently MLS for the land (20,000m²), with the average lot size calculated to be 4800m² excluding vacant or undeveloped land.

2.10.3 Water Supply

Figure 10 shows the existing water supply network within and surrounding the West Cowra Growth Area. Closer analysis shows that all land within the West Cowra Growth Area benefits from a connection to the water supply system, or from availability to connect. Main locations are generally aligned with road reservations, providing for efficient connections to new development. The water supply system has capacity to accommodate new growth within the West Cowra Growth Area.

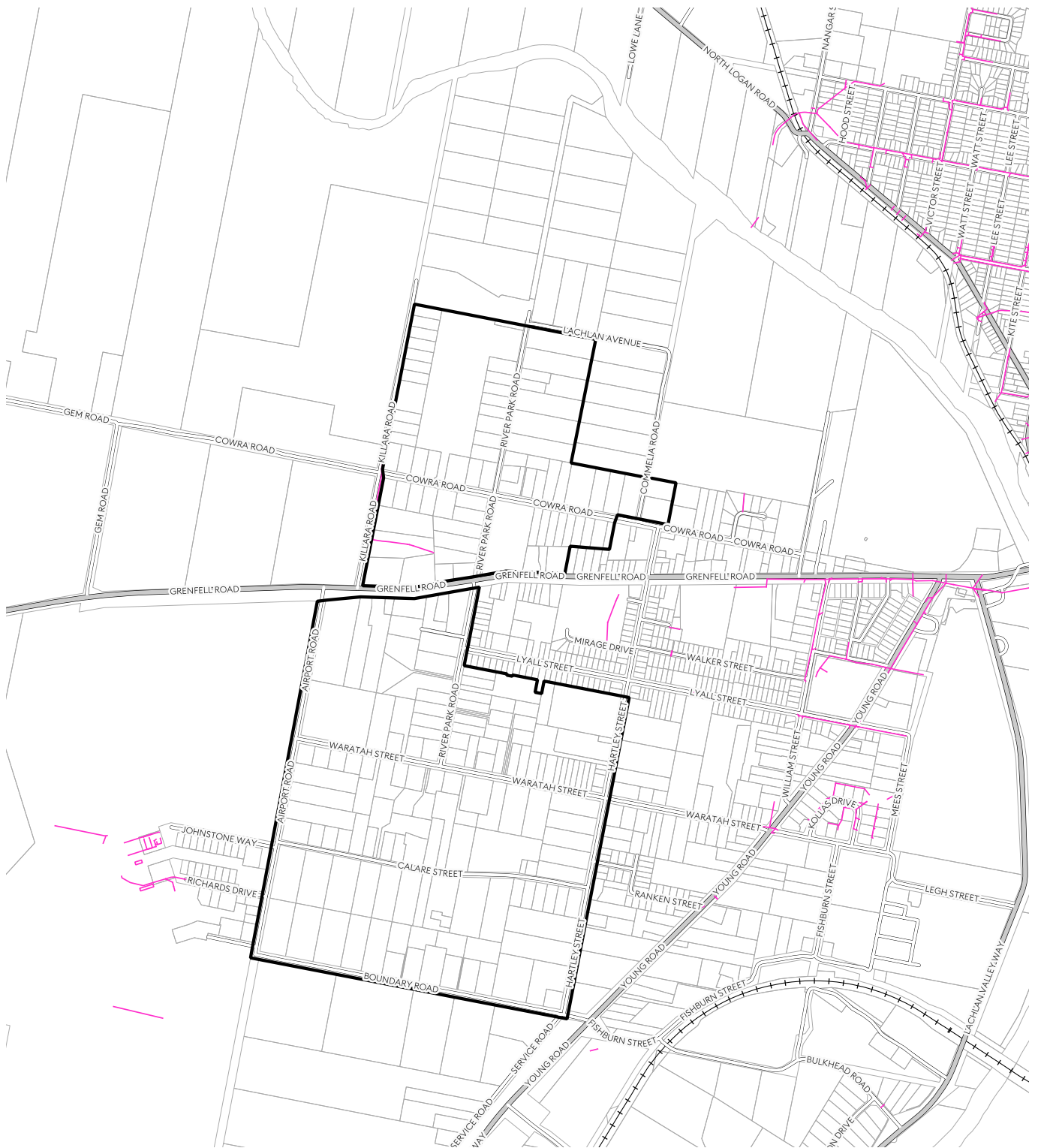


Figure 9 - Infrastructure & Servicing Map - Stormwater

- West Cowra Growth Area
- Primary Road Network
- Local Road Network
- Railway Network
- Property Boundaries
- Public Stormwater Drainage Network



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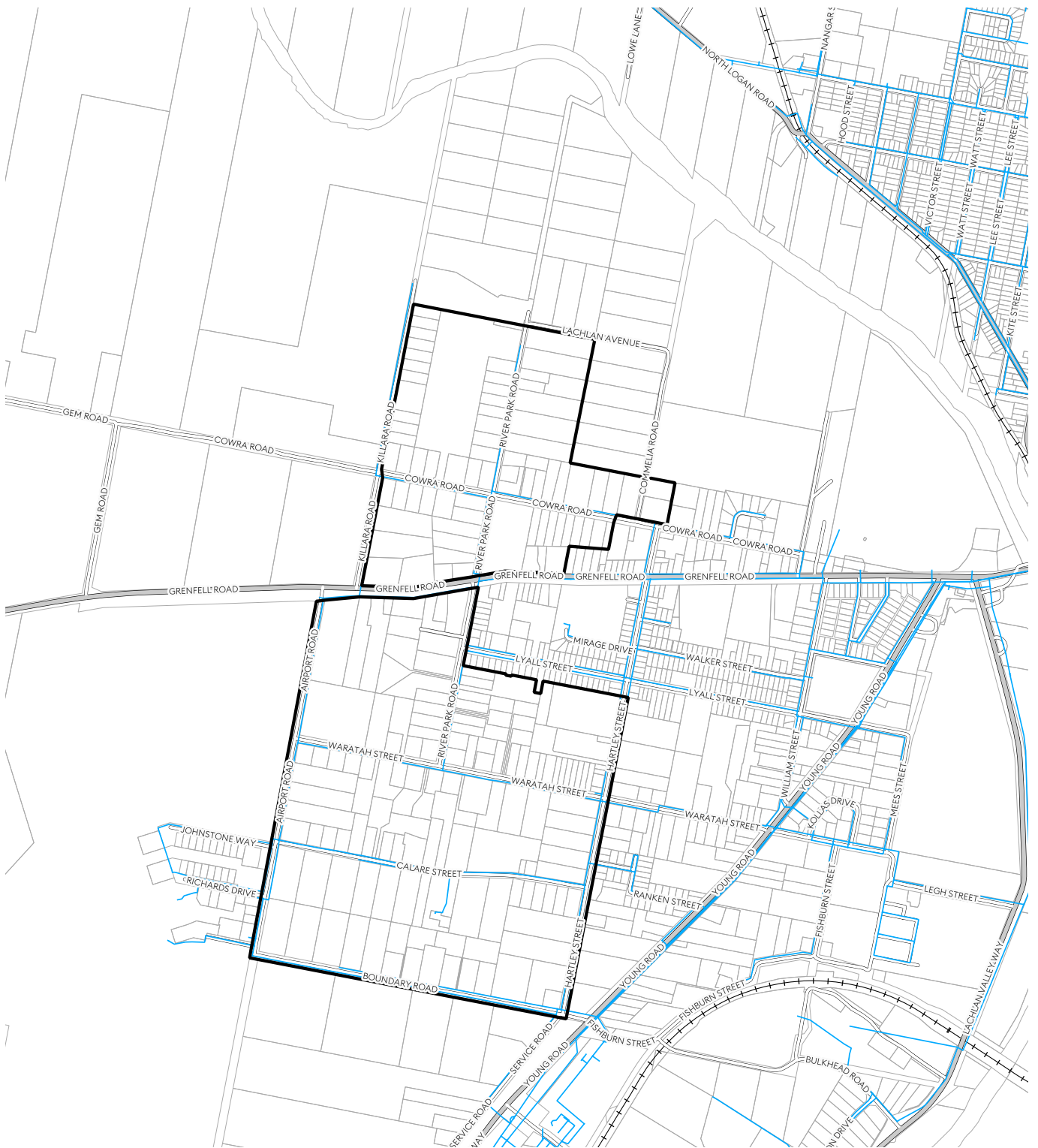


Figure 10 - Infrastructure & Servicing Map - Water Supply

- West Cowra Growth Area
- Primary Road Network
- Local Road Network
- Railway Network
- Property Boundaries
- water_mains



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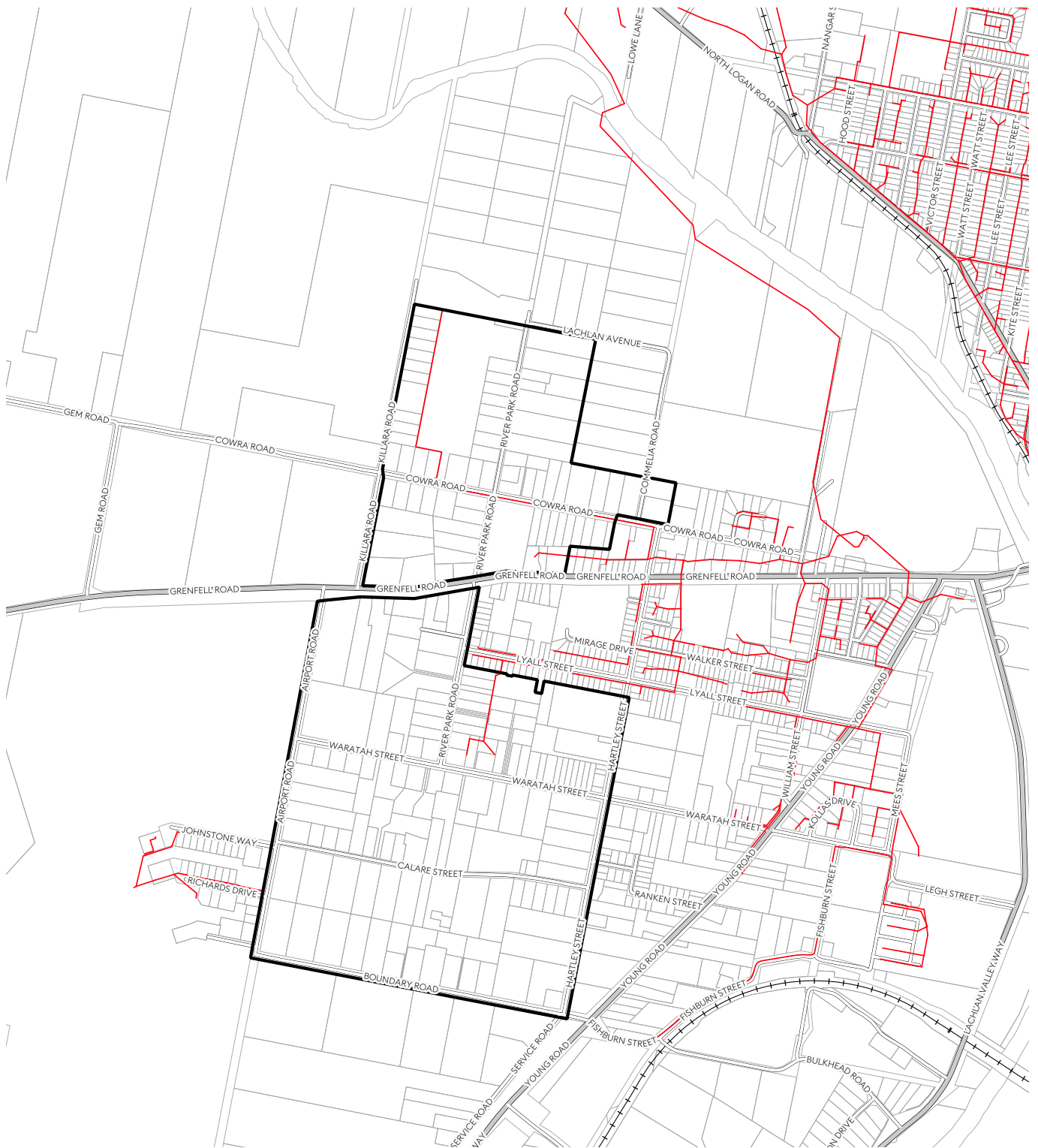


Figure 11 - Infrastructure & Servicing Map - Sewerage Supply

- West Cowra Growth Area
- Primary Road Network
- Local Road Network
- Railway Network
- Property Boundaries
- sewer_mains



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2.1.1 Biodiversity

Figure 12 shows the broader biodiversity features of the West Cowra Growth Area.

Mapped areas of sensitive biodiversity resources generally avoid the West Cowra Growth Area and are instead focused along the important riparian zones of the Lachlan River and found in isolated locations where roadside and / or remnant native vegetation remains in larger communities.

A study of the tree canopy of the West Cowra Growth Area shows that urban vegetation occurs primarily along roadside environments (either as street trees or remnant vegetation) and as landscaped elements on private development lots.

Generally the West Cowra Growth Area is not considered to be a location of high biodiversity value, and development generally occurs without significant impact to flora and fauna resources.

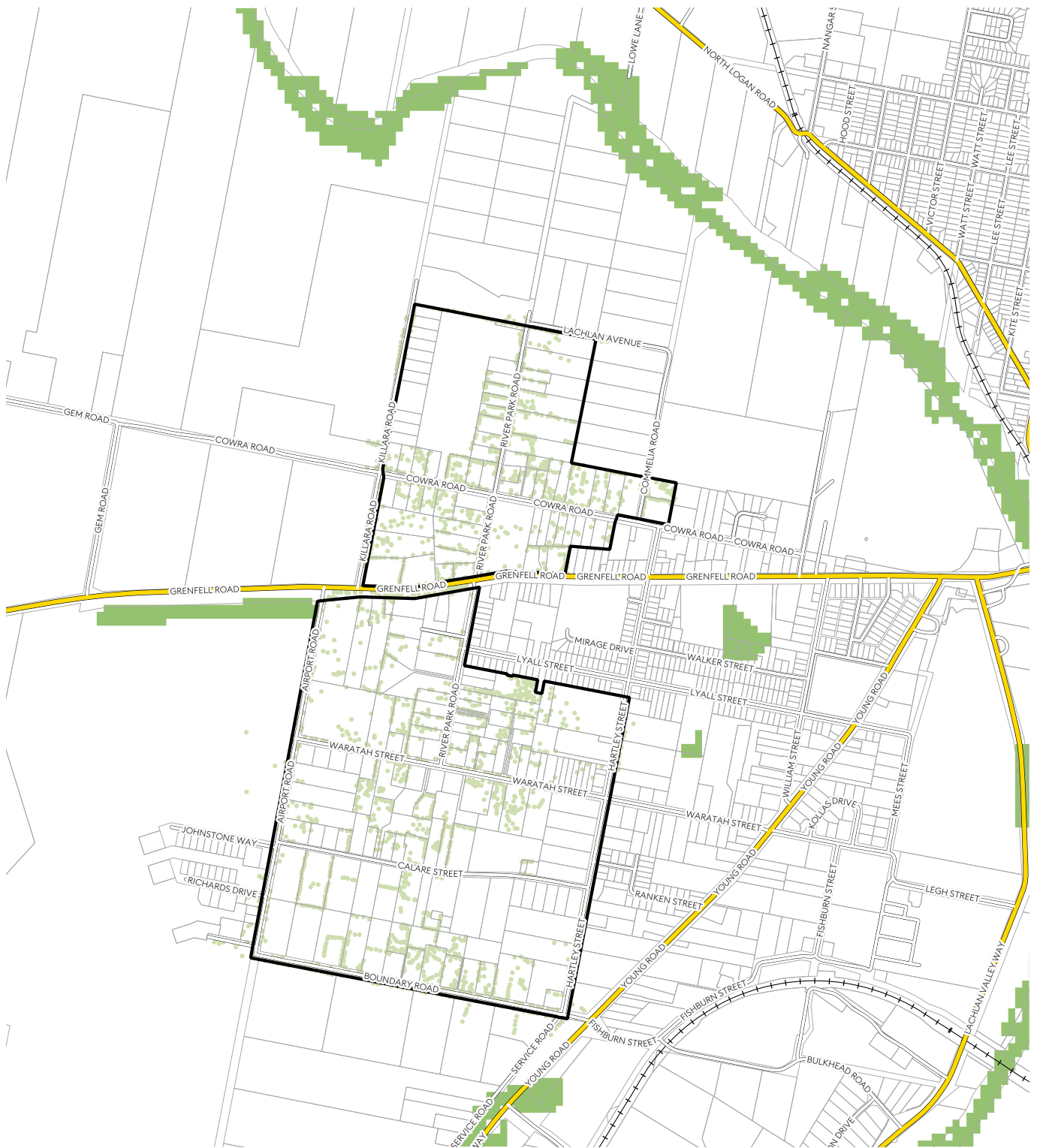


Figure 12 - Infrastructure & Servicing Map - Sewerage Supply

- West Cowra Growth Area
- Primary Road Network
- Local Road Network
- Railway Network
- Property Boundaries
- Terrestrial Biodiversity
- Urban Vegetation



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03

EXISTING PLANNING FRAMEWORK

3.1 Cowra Local Environmental Plan 2012

Cowra Local Environmental Plan 2012 is the principal environmental planning instrument applying to the West Cowra Growth Area.

The Cowra LEP provides the statutory framework for planning, development and building within Cowra. It manages land use through zoning controls, development standards, planning controls and other planning provisions. This section of the report provides an overview of the primary planning controls applying to the West Cowra Growth Area under Cowra LEP including zoning, minimum lot size and other map-based controls.

3.1.1 Zoning

Figure 13 shows the existing zoning framework applying to the West Cowra Growth Area under the Cowra Local Environmental Plan 2012. A closer analysis of the zoning framework applying to the land shows:

- The West Cowra Growth Area is zoned R5 Large Lot Residential. It is one of three locations west of the Lachlan River that is zoned R5, with the other two locations focused on Ribbands Way and Dawson Drive.
- The Cowra Airport immediately adjoins the West Cowra Growth Area. The facility is zoned SP2 Infrastructure and is a regional scale aerodrome facility. Cowra Council is developing a part of the site for the purposes of an airport related business park in accordance with the Cowra Airport Masterplan 2021. This part of the site is zoned E3 Productivity Support.
- The eastern edge of the West Cowra Growth Area is bordered by generally urban land-use including land that is zoned E4 General Industrial, R1 General Residential, RE2 Private Recreation and R2 Low Density Residential.
- The remaining edges of the West Cowra Growth Area are bordered by existing agricultural land-use within the RU1 Primary Production zone or the RU4 Primary Production Small Lots zone.

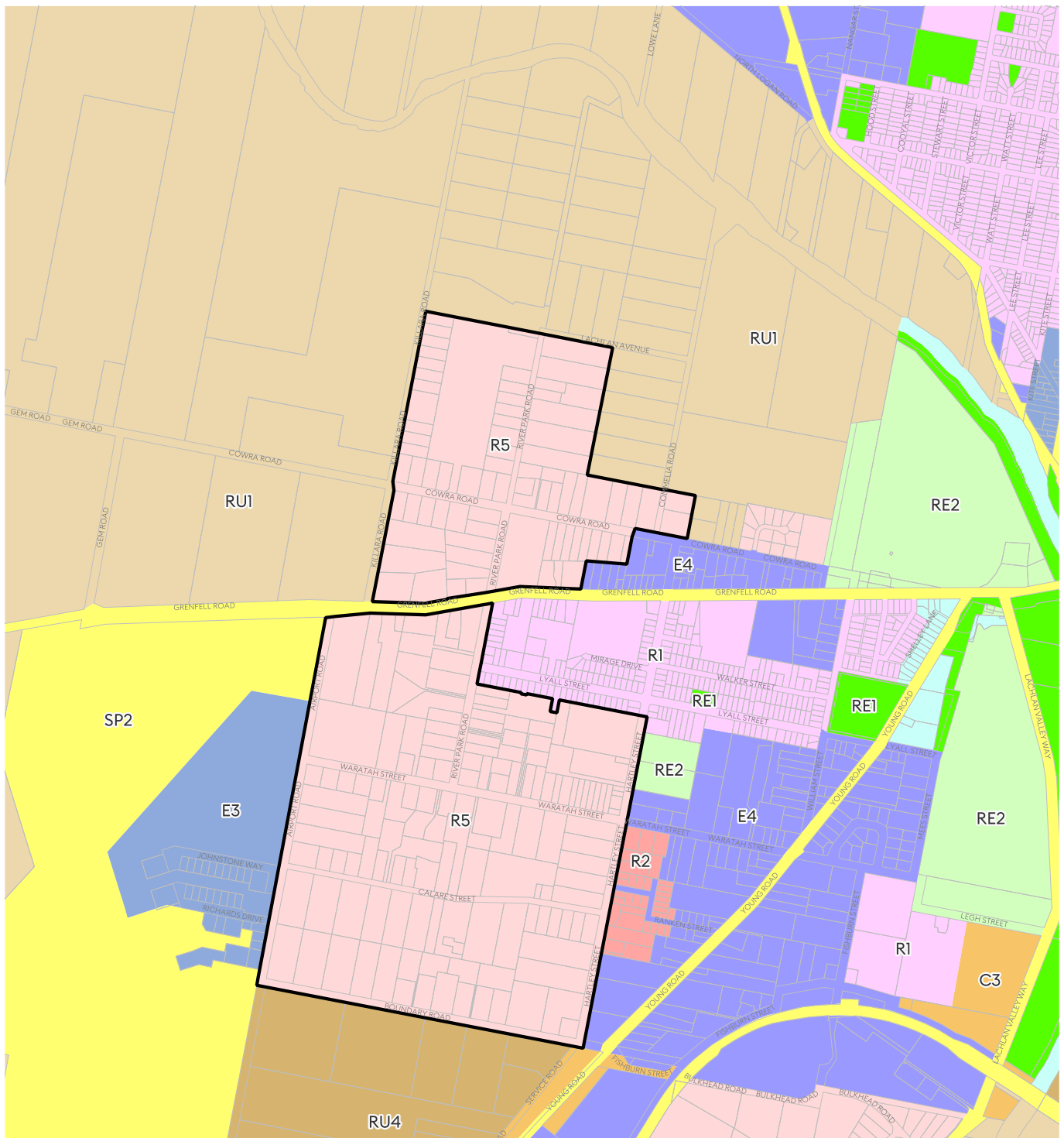


Figure 13 - Existing Land Zoning Map

West Cowra Growth Area

LEGEND - LAND USE ZONES

E1	E1 Local Centre	RE1	Public Recreation
E3	E3 Productivity Support	RE2	Private Recreation
C1	C1 National Parks and Nature Reserves	RU1	Primary Production
C2	C2 Environmental Conservation	RU3	Forestry
C3	C3 Environmental Management	RU4	Primary Production Small Lots
E4	E4 General Industrial	RU5	Village
R1	R1 General Residential	SP2	Infrastructure
R2	R2 Low Density Residential	SP3	Tourist
R5	R5 Large Lot Residential	W2	Recreational Waterways

North



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3.1.2 Minimum Lot Size

Figure 14 shows that the existing minimum lot size framework applying to the West Cowra Growth Area under the Cowra Local Environmental Plan 2012 is set at 2ha.

The minimum lot size mapping must be read together with the written instrument to Cowra Local Environmental Plan 2012 in order to fully understand the requirements for land subdivision in the West Cowra Growth Area.

Clause 4.1 of Cowra Local Environmental Plan 2012 includes additional provisions that must be considered when determining the minimum lot size for subdivisions creating new lots in the West Cowra Growth Area. The provisions of Clause 4.1 are repeated in full as follows:

4.1 Minimum subdivision lot size

(1) The objectives of this clause are as follows—

- (a) to ensure that new subdivisions reflect characteristic lot sizes and patterns in the surrounding locality,
- (b) to ensure that lot sizes for dwelling houses are consistent with lot sizes on adjoining land,
- (c) to ensure that lot sizes have a practical and efficient layout to meet the intended use of the lot,
- (d) to prevent the fragmentation of rural land.

(2) This clause applies to a subdivision of any land shown on the Lot Size Map that requires development consent and that is carried out after the commencement of this Plan.

(3) The size of any lot resulting from a subdivision of land to which this clause applies is not to be less than the minimum size shown on the Lot Size Map in relation to that land.

(3A) Despite subclause (3), if the consent authority is satisfied that each lot is, or will be, serviced by a water reticulation system—

- (a) land identified as “Area A” on the Lot Size Map may be subdivided to create lots of at least 2 hectares, and
- (b) land identified as “Area D” on the Lot Size Map may be subdivided to create lots of at least 5 hectares.

(3B) Despite subclause (3), if the consent authority is satisfied that each lot is, or will be, serviced by a sewage reticulation system—

- (a) land identified as “Area B” on the Lot Size Map may be subdivided to create lots of at least 4,000 square metres, and
- (b) land identified as “Area C” on the Lot Size Map may be subdivided to create lots of at least 1,000 square metres.

- (4) This clause does not apply in relation to the subdivision of any land—
- (a) by the registration of a strata plan or strata plan of subdivision under the Strata Schemes Development Act 2015, or
 - (b) by any kind of subdivision under the Community Land Development Act 2021.

The effect of clause 4.1(3B)(a) is that land within the West Cowra Growth Area may only be subdivided to create lots with an area of (not less than) 4000m² if the lots will be connected to a reticulated sewerage supply system.

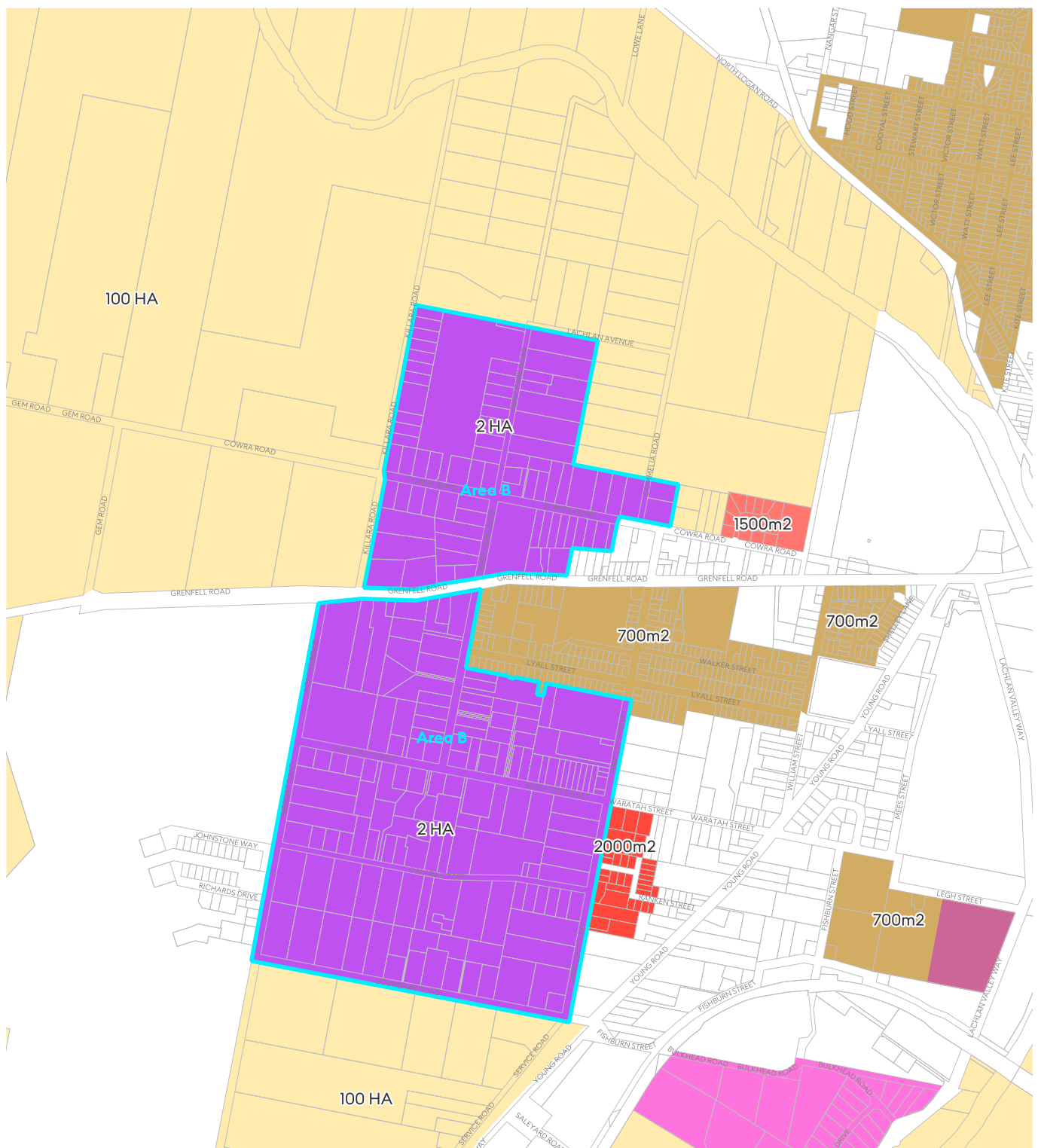
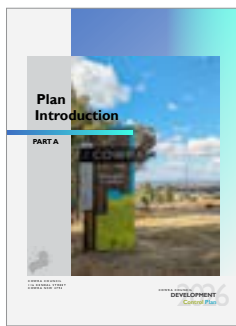


Figure 14 - Existing Minimum Lot Size Map

- West Cowra Growth Area - Area B
- 5ha (5,000m²)
- 100ha
- 700m²
- 2000m²
- 2ha (20,000m²)



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3.2 Cowra Council Development Control Plan 2026

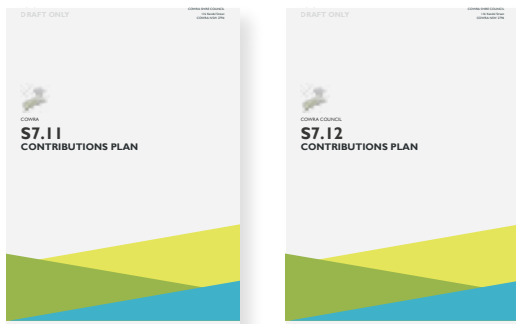
The Cowra Council Development Control Plan 2026 (Cowra DCP) provides detailed planning and design guidelines to support the Cowra LEP 2012. The Cowra DCP provides development controls relating to a variety of land-use activities and also includes controls relating to specific issues including subdivision, car parking, advertising and signage, landscaping, biodiversity management and environmental hazard management.

The following parts of the Cowra DCP contain provisions which are relevant to new development in the West Cowra Growth Area. A brief description of relevant provisions is also included.

Table I - Cowra DCP 2026 Overview

Part Heading	Description
A Plan Introduction	Part A of the DCP provides introductory information relating to the DCP including date of commencement, relationship to other plans and processes applying to applications involving variation to controls. Part A of the DCP must be considered for new development occurring within the West Cowra Growth Area.
B Land Management	Part B of the DCP outlines Council's requirements for soil erosion and sediment control on construction sites within the Cowra LGA. Part B of the DCP must be considered for new development occurring within the West Cowra Growth Area.
C Biodiversity Management	Part C of the DCP applies to all development in the Cowra Shire that proposes to directly remove or indirectly impact native vegetation or is in the proximity of an area that contains native vegetation. The controls contained in Part C detail and clarify the application of biodiversity legislation in NSW, and more specifically, within the Cowra Shire Local Government Area. Due to the nature of existing land-form and land-use occurring within West Cowra Growth Area, biodiversity issues do not feature prominently in new development processes. Site analysis shows that there are generally a limited number of properties where significant communities of native vegetation exist, and no properties where new development is likely to exceed the clearing thresholds.

Part Heading	Description
D Subdivision Development	Part D of the DCP applies to all new subdivision development in the Cowra Local Government Area and includes specific controls relating to greenfield and infill residential subdivision, large lot residential subdivision, village subdivision, rural subdivision, industrial subdivision and strata and community title subdivisions. The West Cowra Growth Area is zoned R5 Large Lot Residential and therefore the controls contained in Part D.4 must be considered for new subdivision development in this location.
G Large Lot Development	Part G of the DCP applies to all new residential and ancillary development in the R5 Large Lot Residential zones in the Cowra Local Government Area. Part G must be considered for new development occurring within the West Cowra Growth Area.
J Cowra Regional Airport	Part J of the DCP applies to new development at the Cowra Airport and includes controls relating to subdivision and built form. Part J of the DCP also includes controls relating to the Obstacle Limitation Surface, Non-directional Beacon, Wind-shear and turbulence, and lighting. Given the adjacency of the West Cowra Growth Area to the Cowra Airport, some of these controls must be considered as part of the siting and design of new development.
K Land-use Buffers	Part K of the DCP applies to land within the Cowra Local Government Area which is affected by a number of prescribed land-use buffers. Part K.7 of the DCP relates specifically to land which is located within the extent of the Cowra Airport Obstacle Limitation Surface (OLS). The West Cowra Growth Area is located within the outer surface contours, however new development is unlikely to be created at heights that will exceed the limits of the OLS.
O Environmental Hazard Management	Part O of the DCP applies to all land within the Cowra Local Government Area and includes controls relating to flood risk management, bushfire management and contaminated lands. Appendix A of the DCP includes a map which shows the flood planning area in relation to the Cowra Township. Except for a very small portion of land at the northern section of River Park Road, the West Cowra Growth Area is not located below the flood planning level.



3.1 Cowra Council S7.11 & S7.12 Development Contribution Plans 2026

3.1.1 Cowra Section S7.11 Contributions Plan 2026

Section 7.11 (formerly Section 94) of the Environmental Planning & Assessment Act 1979 enables Council to seek contributions from developers where the development is likely to increase the demand for public facilities. The power to levy a Section 7.11 contribution relies on there being a clear link between the development being levied the contribution and the need for the public amenity or service for which the levy is required.

Section 7.11 contributions only apply to developments in the following 'growth areas':

- Land in the Glen Logan Road INI Zone Urban Release Area.

Therefore, the West Cowra Growth Area is not land to which the Cowra Council Section 7.11 Contributions Plan 2026 applies. The payment of a Section 7.11 Contribution Levy will not be required in connection with the future subdivision of the land within the West Cowra Growth Area.

3.1.2 Cowra Section 7.12 Contributions Plan 2026

Section 7.12 (formerly Section 94A) of the Environmental Planning & Assessment Act 1979 also enables Council to seek contributions towards the provision, extension or augmentation of public facilities or toward recouping their costs.

A Section 7.12 contribution can be applied to development on any land in the Cowra Shire outside of the 'growth areas' to which the Section 7.11 Contributions plan applies. Unlike Section 7.11 contributions, there does not have to be a clear link between the development being levied and the need for the public amenity or service for which the levy is required.

The West Cowra Growth Area is land to which the Cowra Council Section 7.12 Contributions Plan 2026 applies. The payment of a Section 7.12 Contribution Levy will be required in connection with any development that exceeds \$100K in total capital cost and is to be constructed on land that has not previously been the subject of a contribution payment in accordance with Section 7.11 of the Act.



04

DESCRIPTION OF PROPOSAL

4.1 Changes to Written Instrument

The Planning Proposal seeks to amend the written instrument relating to Cowra Local Environmental Plan 2012 as follows:

- Amending the provisions contained in Clause 4.1(3B) by removing the requirement for reticulated sewerage supply to be connected to new subdivision lots within “Area B” (to which the West Cowra Growth Area relates).

4.2 Changes to Mapping

The Planning Proposal seeks to amend the mapping relating to Cowra Local Environmental Plan 2012 as follows:

- Amending Map Sheet LSZ_002C by changing the minimum lot size applying to the West Cowra Growth Area from “ZI – 2ha” to “V-4000m2”.

There is no proposal to change the zoning framework which currently applies to the West Cowra Growth Area. This is to remain R5 Large Lot Residential which continues to represent the primary land-use activity within the area – being detached residential dwellings on larger lot forms.

Figure 15 shows that the minimum lot size for the West Cowra Growth area is proposed at 4,000m², irrespective of whether a sewerage supply is proposed to service a new subdivision lot.

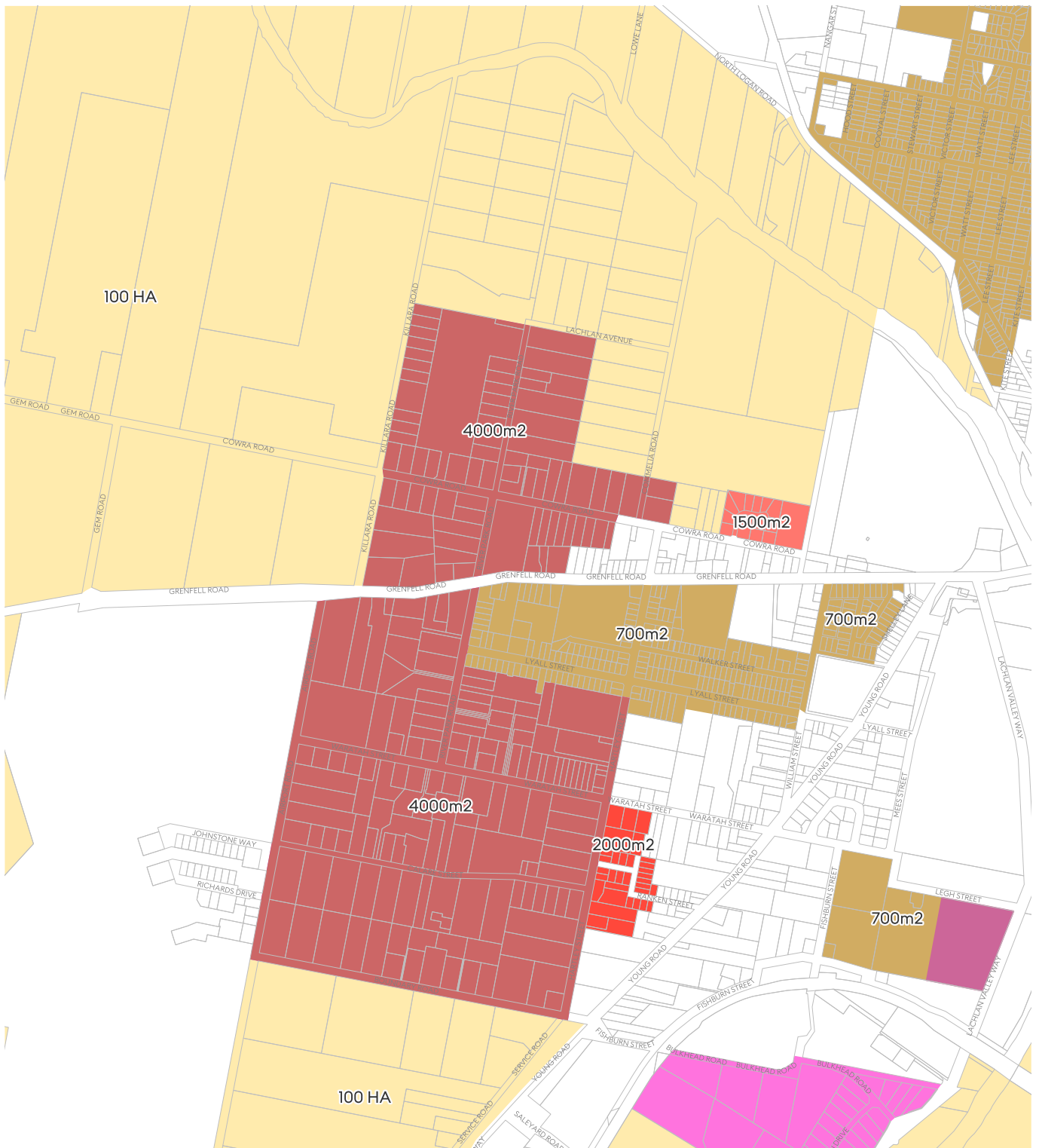


Figure 15 - Proposed Minimum Lot Size Map

- 5ha (5,000m2)
- 100ha
- 700m2
- 2000m2
- 2ha (20,000m2)
- 4,000m2



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05

STRATEGIC ALIGNMENT

5.1 Cowra Shire Land-use Strategy

The Cowra Shire Land-use Strategy 2009 (the Cowra LUS) provides a comprehensive strategic framework for land-use planning in the Cowra Shire. The Cowra LUS provided primary strategic recommendations that ultimately informed the preparation of the Cowra Local Environmental Plan 2012.

A review of the Cowra LUS shows that a number of key recommendations were made relating to the West Cowra Growth Area, and rural residential growth for the Cowra Township in general. Key excerpts from the Cowra LUS relating to rural residential land-use in Cowra Township are shown in Table 2.

The proposed changes to Cowra Local Environmental Plan 2012 remain generally consistent with the findings of the Cowra LUS and in particular:

- The West Cowra Growth Area is zoned R5 Large Lot Residential, which is similar to other rural residential locations of the Cowra Township. The application of a consistent zoning framework for these areas was a key recommendation of the Strategy. The Planning Proposal does not seek to change the zoning for the West Cowra Growth Area.
- Historically, planning controls applying to the West Cowra Growth Area (former I(c) Rural Small Holdings zone) have enabled subdivision and dwelling development on holding sizes down to 4,000m². The Planning Proposal is not seeking to reduce the minimum lot size to less than 4,000m² in the West Cowra Growth Area.
- The Strategy identified a healthy supply of land within the West Cowra Growth area to accommodate future growth. Higher lot yields were expected if minimum lot size controls remained at 4,000m², consistent with historic controls. The Planning Proposal recognises that the West Cowra Growth Area remains to be a key location for housing growth in the Cowra Township, and that subdivision of land into 4,000m² lots is necessary in order to realise the growth potential of the area.
- The Planning Proposal aligns with the planning principles for rural residential land. In particular, the Planning Proposal seeks to facilitate an outcome which encourages the development of land in a manner that maximises potential infrastructure and service provision. The Planning Proposal also seeks to demonstrate that a 4,000m² lot size for the West Cowra Growth Area will provide for the continued and improved social and economic well-being of the community, and is within the environmental capacity of the land.
- The Planning Proposal will seek to demonstrate that development within the West Cowra Growth Area can occur in accordance with a 4,000m² lot size without impacting on environmentally sensitive lands and water resources created by inappropriate settlement density.
- The Planning Proposal aligns with an identified key action to 'investigate a range of suitable minimum lot sizes for the various existing and proposed rural residential areas.'

Table 2 - Cowra Shire Land-use Strategy - Assessment

Section Heading		Relevant LUS Recommendation / Detail
7.1	Planning Context	There are two zones in the Cowra Shire that provide specifically for rural residential subdivision and living opportunities; being the I(c) Rural Small Holdings zone and the I(c1) Rural Residential zone. Geographically, the I(c) Rural Small Holdings zone is located to the north and south west of the Cowra Township and the I(c1) Rural Residential zone is located to the east of the Cowra Township. A key objective of the Strategy is to promote rural residential style development in appropriately zoned and located areas that are capable of meeting future rural residential growth requirements in a planned and sustainable manner.
7.1.1	Applications of Existing	The objectives of the I(c) Rural Small Holdings zone are: - To enable small rural holdings at West Cowra in order to accommodate particular lifestyle choice and needs and to compliment the Cowra urban area; - To enable the Council to prepare a development control plan to guide future development in the area; and - To ensure that development is carried out in a manner that maintains options for the future urban development of the land. The development standards prescribed under Cowra Local Environmental Plan 1990 relating to the subdivision of I(c) zoned land require new dwelling lots to have an area of not less than 4,000m² and not more than 20,000m² (2 ha). The development standards prescribed under Cowra Local Environmental Plan 1990 allow for the erection of a dwelling on land zoned I(c) that has an area between 4,000m² and 20,000m²

Section Heading		Relevant LUS Recommendation / Detail
7.2	Supply and Demand Forecasts	In terms of I(c) Rural Small Holdings zoned land, the Cowra Shire Issues Paper showed that there is 100 hectares of land that is available for further subdivision and development. Using current subdivision standards and based on historic lot yields, a further 146 lots could be created. A smaller lot yield could be expected if a larger minimum lot size is adopted. The areas of existing I(c) Rural Small Holdings and I(c1) Rural Residential zoned land are considered to be well placed to continue to supply the future needs of rural residential market demand in the Cowra Shire. Any demand for additional rural residential zoned land would be best served by extending the existing areas of I(c) Rural Small Holdings and I(c1) Rural Residential zoned land.
7.3	Planning Principles	The planning principles to be used to guide and shape the future management and development of rural residential land in the Cowra Shire are provided below. • Ensure that all rural residential areas are included under the one appropriate zone. • Ensure that the mainstay of rural residential development occurs in appropriately zoned and located areas. • Ensure that future rural residential zoned areas are located in close proximity to the Cowra Township. • Ensure that future rural residential zoned areas can be easily integrated into existing rural residential zoned areas. • Minimise the potential for land-use conflicts to occur resulting from inappropriately located rural residential development. • Provide for the continued and improved social and economic well-being of the community. • Ensure that rural residential style development has regard to the natural and cultural values and features of the Cowra Shire. • Consider the environmental capacity of the land and ensure that any development within rural residential zones is within the capability and is suitable to the land, having regard to the environmental sensitivity and hazard mapping. • Encourage the development of rural residential zoned land in such a manner that maximises the potential infrastructure and service provision.

Section Heading	Relevant LUS Recommendation / Detail
7.4 Future Land	A Rural Residential Framework Plan has been developed to address the future rural residential land requirements for the Cowra Shire. A copy of this plan is included in Map No. 40 of the Cowra LUS. There are two zones in the Cowra Shire that provide specifically for rural residential subdivision and living opportunities, these being the I(c) Rural Small Holdings zone and the I(c1) Rural Residential zone. Whilst the I(c) and I(c1) Rural Residential zones are separated in terms of their physical location, they are both characteristically similar and function as the one zone by accommodating the same rural residential living opportunities in the Cowra Shire. The infrastructure and servicing requirements and land management issues for both zones are also similar. It is considered appropriate for both zones to be consolidated into the one rural residential zone.
7.5	It is important to provide adequate infrastructure and services to the new rural residential zone and to ensure that environmentally sensitive lands and water resources are protected from over development. Much of the necessary strategic planning work required to achieve these objectives and guide sustainable rural residential growth and development in the Cowra Shire has already been undertaken as part of the recently developed Cowra Shire Council Development Control Plan – I(c1) Rural Residential. The Development Control Plan provides a sound framework for the strategic planning of rural residential land in the Cowra Shire and addresses environmental land sensitivity, design and siting issues, water supply requirements, infrastructure and service provisions, and minimum lot size requirements.

Section Heading	Relevant LUS Recommendation / Detail
7.6 Consistency with Strategic Principles	The proposed new rural residential areas in the Shire meet both the broad planning principles and the rural residential planning principles as follows. - Existing and proposed rural residential areas will provide for attractive and diverse living environments to meet the needs of a variety of residents and encourage rural residential settlement in appropriate areas. - Existing and proposed rural residential areas are confined within defined precincts that have regard to environmental constraints and opportunities and are in serviceable locations close to the Cowra Township. - Existing and proposed rural residential areas will provide for the continued and improved social and economic well-being of the community. - Existing and proposed rural residential areas can respond to natural and cultural values by ensuring that existing features are protected and that new development has regard to potential impacts on natural and cultural heritage. - Future rural residential areas will be provided subject to environmental suitability and will be planned to minimise potential land-use conflicts with adjoining agricultural land. - Future rural residential areas will be developed in such a manner that maximises the potential for infrastructure and service provision.

Section Heading	Relevant LUS Recommendation / Detail
7.7 Key Strategic Actions	• Consolidate the existing I(c) Rural Small Holdings and I(c1) Rural Residential zones into the one Standard Instrument zoning. • Rezone Battalion Drive, Military Parade and Dawson Drive for rural residential purposes. • Identify the Darbys Falls Road North Rural Residential Investigation Area for future rural residential purposes subject to environmental and planning studies and market demand. • Identify South Canowindra for rural residential purposes subject to planning and environmental studies and support from Cabonne Council. • Identify the Chardonnay Road / Andersons Lane Rural Residential Investigation Area for future rural residential purposes in the longer term. • Identify the North Cowra Urban Investigation Area for future residential and rural residential purposes subject to planning and environmental and market demand. • Investigate a range of suitable minimum lot sizes for the various existing and proposed rural residential areas.



5.2 Cowra Local Strategic Planning Statement

The Cowra Local Strategic Planning Statement (the Cowra LSPS) sets out the long-term vision for land-use planning in the Council area.

The Cowra LSPS is essentially a high-level based strategic plan for the whole of the Cowra Shire. To achieve the vision, a total of 9 Planning Priorities have been identified. For each Planning Priority, Council has identified a number of actions and the means by which Council will monitor progress and report back to the community.

The 9 Planning Priorities in the Cowra LSPS are detailed the following table, including brief commentary relating to strategic alignment of the PP with each priority.

Table 3 - Cowra LSPS - Assessment

Priority	Priority Name	Strategic Alignment
1	Leverage the central and strategic location of Cowra Shire to encourage growth and new economic opportunities.	The Planning Proposal will aim to facilitate a planning outcome that encourages growth.
2	Support and grow the agribusiness sector including horticultural/vegetable production, animal production and other agricultural industries by promoting sustainability, innovation and technological advancement.	The Planning Proposal does not relate to agricultural land.
3	Protect items and places with heritage significance and areas of high environmental value in Cowra Shire.	The Planning Proposal will not impact on land that is identified to be of heritage significance or of high environmental value.
4	Manage water resources for the greater benefit of all users within the Shire and the Lachlan Valley.	The Planning Proposal will not impact water resources. Studies have been prepared in support of the Planning Proposal which demonstrate that the proposed changes to Cowra LEP 2012 are capable of proceeding without unacceptable impact on groundwater.

Priority	Priority Name	Strategic Alignment
5	Advocate for new development to be supported by appropriate infrastructure.	The strategic need for the Planning Proposal is in response to an infrastructure provisioning challenge.
6	Work together with Government agencies and other stakeholders to promote beneficial outcomes for Cowra Shire.	The Planning Proposal will be progressed in consultation with relevant government agency stakeholders.
7	Improve the liveability of the Shire's villages through ongoing maintenance and improvements to services and facilities.	The Planning Proposal does not relate to village land.
8	Support the continued growth of the residential housing sector and ensure the availability of housing stock to meet the needs of the population.	The Planning Proposal will aim to facilitate a planning outcome that supports new residential development in the West Cowra Growth Area.
9	Provide recreational opportunities to meet the needs of residents and visitors to the Cowra Shire.	The Planning Proposal does not relate to recreational land.

5.3 Cowra Housing Strategy 2025

In March 2025, the Cowra Housing Strategy 2025 was adopted by Cowra Council. The Cowra Housing Strategy 2025 was funded by the NSW Government through the Regional Strategic Planning Fund in association with Cowra Council, and received the formal endorsement of NSW Department of Planning, Housing and Infrastructure in August 2025.

The specific objectives of the Cowra Housing Strategy are to:

- Respond to the current housing challenges being experienced across the shire and across the region.
- Review planning controls related to zoning, minimum lot size and permissible land-uses in residential zones and identify where changes may be necessary in order to ensure the sustainable use of land.
- Provide increased opportunities for housing diversity through infill and greenfield development.

- Manage and align the delivery of infrastructure to ensure there is an adequate supply of land for housing in the shire.
- Meet the needs of the community in a way that best fits our unique character and identity whilst planning for future growth.
- The Cowra Housing Strategy 2025 provides principal strategic guidance for Council's decision making on all matters relating to housing in the Cowra Local Government Area. The Cowra Housing Strategy 2025 is a 20 year plan and identifies a range of actions for short, medium and long-term implementation by Cowra Council and other stakeholders with interests and responsibilities in local housing matters.

The key findings of the Cowra Housing Strategy 2025 that are of relevance to this Planning Proposal are detailed in Table 4.

Table 4 - Cowra Housing Strategy 2025 - Assessment

Section	Heading	Relevant CHS Recommendation / Detail
2.2	Settlement Profiles - Cowra Township Residential Structure	The West Cowra R5 zone is identified in Map 4 as an existing residential neighbourhood of the Cowra Township.
	Settlement profiles - Cowra Township Lot Profile	Map 5 shows that the existing R5 Large Lot Residential zone in West Cowra has some capacity for further subdivision based on current planning standards.
3.2	Community Engagement	Feedback received as a result of early engagement and formal public exhibition of the Cowra Housing Strategy 2025 indicated strong demand and a community preference for large lot housing. A tightly held market for small-acreage properties and a lack of supply through subdivision activity has impacted affordability. The majority of residents felt strongly that it was important to strategically plan for new housing growth and development.
4.3	Housing Demand	NSW Government population forecast data predicts strong population growth for Cowra LGA in the order of 1500 people. This population growth translates to the need for an additional 1,193 new dwellings over the next 20 year period or the equivalent of 60 new dwellings per annum. For the Cowra Township, 48 new dwellings would be required per annum to meet project demand. The Cowra Housing Strategy aims to create a planning framework that fosters the majority of this growth in the existing R1 General Residential and R5 Large Lot Residential zones of the Cowra Township.

Section	Heading	Relevant CHS Recommendation / Detail
4.4.3	Cowra Township Supply Analysis - Large Lot Residential	There are 31 vacant lots in the West Cowra Growth Area that are 'development-ready' and capable of accommodating a new residential dwelling. Until sewerage is provided to the West Cowra Growth Area, the number of new subdivision lots that can potentially be created through new subdivision is 10 lots. Assuming subdivision is allowed to occur in the West Cowra Growth Area without connection to sewerage, the number of new subdivision lots that can potentially be created through new subdivision is 295. Until sewer is provided to West Cowra, the data shows that there is a reduced capacity for new housing growth to occur in these locations. There is strategic merit to investigate amendments to minimum lot size controls for the West Cowra Growth Area to incentivise subdivision activity and increase the supply of housing lands to meet short / medium term market demand. Council's commitment to supply sewerage to this location need not be abandoned as a result.
4.5	Environmental and Urban Form Analysis	Section 4.5 provides a strategic evaluation of the environmental constraints and opportunities impacting housing in Cowra. The evaluation includes heritage, contamination, flood, land-use, bushfire, crown land, biodiversity, water resources, land-use buffers, topography and slope. The evaluation did not identify the West Cowra Growth Area as being subject to any significant environmental constraints. The continued use of the land for large lot residential housing is supported by the Cowra Housing Strategy 2025.

Section	Heading	Relevant CHS Recommendation / Detail
4.6	Infrastructure and Servicing Analysis	Section 4.6 provides a strategic evaluation of the infrastructure and servicing issues impacting housing in Cowra. The evaluation includes electricity, water, sewerage, open space, roads, telecommunications, active transport, stormwater and gas. The evaluation did not identify the West Cowra Growth Area as being subject to any significant servicing constraints, except that the provision of sewerage is a current infrastructure project being designed and costed by Council. Gravity and pressurised sewerage options are being investigated, however the cost implications and the time-frames for delivery of the project are yet to be confirmed. Without sewer, the existing planning controls in Cowra LEP 2012 are restricting subdivision potential and therefore dwelling growth in West Cowra.
4.7	Housing Challenges	Section 4.7.3 of the Cowra Housing Strategy provides details of the challenges associated with the delivery of a sewerage supply scheme to the West Cowra Growth Area. In summary, delays with this project have reduced capacity for new housing growth to occur in this strategic location of Cowra. Map 29 of the Cowra Housing Strategy 2025 shows that there is potential for creation of only 10 new subdivision lots in the West Cowra Growth Area if minimum lot size controls in Cowra LEP 2012 remain unchanged. This is a poor planning outcomes, particularly as the West Cowra R5 Large Lot Residential zone is identified by Council's strategic plans as a growth area for residential development. To address this challenge, the Cowra Housing Strategy 2025 recommends that the provisions of Cowra LEP 2012 be amended to allow subdivision into the existing 4,000m² Minimum Lot Size irrespective of connection to reticulated sewerage.

Section	Heading	Relevant CHS Recommendation / Detail
4.8	Housing Opportunities	Section 4.8 of the Cowra Housing Strategy 2025 provides details of the housing opportunities that could be created in the West Cowra Growth Area if changes are made to the minimum lot size controls in Cowra LEP 2012. In summary, allowing subdivision lots at 4,000m² in the West Cowra Growth Area is considered to be of strategic merit for two main reasons: Already, planning controls permit dwellings in the R5 zones on a lot of any size without service connections. On this basis, allowing subdivision lots at 4,000m² in West Cowra, without service connections would not compromise Council objectives relating to dwelling density or character. This approach is also consistent with the planning controls for these locations pre-dating Cowra LEP 2012, which allowed subdivision at 4,000m² and resulted in the existing development patterns and residential densities observed in most locations of the R5 Large Lot Residential zone where developed capacity has already been achieved.
4.9	Housing Gaps	The evidence base suggests that there is strong demand for large lot housing in Cowra LGA, with 100% of the public submissions received by Council seeking to address a perceived shortage of supply on the local market. The community survey also identified large lot living as a key housing preference. The evidence base suggests that there is already a healthy amount of land that is zoned for large lot living and that the focus of Council's planning should be to investigate strategies that allow for the increased utilisation of existing zoned areas and available infrastructure.

Section	Heading	Relevant CHS Recommendation / Detail
5.3	Housing Framework Plans	Map 65 shows the Large Lot Residential Framework Plan for the Cowra Township. The features of the Framework Plan are varied, but in relation to the West Cowra Growth Area, the plan identifies the removal of the servicing restrictions in Clause 4.1 of Cowra LEP 2012 to allow subdivision into existing 4,000m ² Minimum Lot Size. This is identified for action in 2025 onwards.
5.4	Planning Priorities and Actions	Planning Priority 2 - Sustainable and Resilient promotes a compact settlement to utilise existing infrastructure and provide housing that is resilient to social and natural change. Planning Priority 2 identifies that a more sustainable approach to housing growth may be to focus on strategies that generate increased housing opportunities within existing zoned locations. Action 2.1 is to 'amend the Cowra LEP 2012 to allow subdivision in the R5 Large Lot Residential zone (West Cowra) into minimum 4,000m² lots. Remove the restriction relating to the need for reticulated sewerage supply in Clause 4.1(3B). Action 2.1 is proposed in response to an objective to generate increase housing opportunities within existing residential zones. The time-frame for completion of this action is short (1-2 years) and the responsibility rests with Council with support as necessary from NSW Department of Planning, Housing and Infrastructure.

The proposed changes to Cowra Local Environmental Plan 2012 are consistent with the recommendations of the Cowra Housing Strategy 2025 relating to land in the West Cowra Growth Area.



06

PLANNING PROPOSAL PART ONE

Plan Making Guidance – Part I

The NSW DPE Local Environmental Plan Making Guidelines require Part I of the Planning Proposal to:

- Provide a clear and concise description of the planning proposal and be written in plain English, so it is easily understood by the community.
- Provide a description of the objectives and intended outcomes of the planning proposal so that they are specific enough to reflect the objective of the proposal yet flexible enough to allow for alternatives.

6.1 Objectives and intended outcomes

Section 3.33(2)(a) of the Environmental Planning and Assessment Act 1979 (EP&A Act 1979) requires a Planning Proposal to include a statement of the objectives or intended outcomes of the proposed amendments.

Objective

To amend Cowra Local Environmental Plan 2012 to enable the subdivision of land in the R5 Large Lot Residential zone to a lesser minimum lot size without requiring the connection of reticulated sewerage infrastructure.

Intended Outcomes

- To enable the development of the West Cowra Growth Area consistent with the planning framework for rural residential growth in Cowra Township created by the Cowra Shire Land-use Strategy.
- To enable the development of the West Cowra Growth Area consistent with the vision for residential growth in the Cowra Township created by the Cowra Local Strategic Planning Statement.
- To ensure that the planning framework for the West Cowra Growth Area provides for new housing growth at suitable densities and within the environmental capacity of the land.
- To increase housing choice and diversity within the West Cowra Growth Area.



07

PLANNING PROPOSAL PART TWO

Plan Making Guidance – Part 2

The NSW DPE Local Environmental Plan Making Guidelines require Part 2 of the Planning Proposal to:

- Provide a detailed statement of how the objectives or intended outcomes will be achieved by amending the Cowra LEP 2012.
 - Provide an explanation of provisions, clearly stated and containing enough information on the proposal to assist legal drafting of the LEP.
 - Provide information relating to the proposed zones and / or development standards if known at this stage in the Planning Proposal.
- 

7.1 Explanation of Provisions

Section 3.33(2)(b) of the EP&A Act 1979 requires the Planning Proposal to include an explanation of the provisions that are to be included in the proposed amending instrument.

Intended Provisions

The objectives will be achieved (generally) by:

- Amending the provisions contained in Clause 4.1(3B) by removing the requirement for reticulated sewerage supply to be connected to new subdivision lots within “Area B” (to which the West Cowra Growth Area relates).
- Amending Map Sheet LSZ_002C by changing the minimum lot size applying to the West Cowra Growth Area from “Z1 – 2ha” to “V-4000m2”.

A series of maps clearly demonstrating the proposed scope of changes to the West Cowra Growth Area has been included in previous sections of this report. Refer generally to Section 4.



08

PLANNING PROPOSAL PART THREE

Plan Making Guidance

The NSW DPE Local Environmental Plan Making Guidelines require Part 3 of the Planning Proposal to:

- Provide a detailed assessment of the proposal's strategic and site-specific merit to determine whether the Planning Proposal should be supported.
 - Integrate findings from supporting studies and investigations.
 - Provide justification for the proposed amendments to the LEP.
 - Consider the interaction between these findings and whether the proposal will align with the strategic planning framework.
 - Consider whether the proposal will have any environmental, social or economic impacts.
- 

8.1 Need for the Planning Proposal

8.1.1 Is the Planning Proposal a result of any strategic study or report?

The Planning Proposal is seeking to amend the provisions of Cowra Local Environmental Plan 2012 by removing the need for subdivision down to minimum 4,000m² lots without the need for connection to reticulated sewerage. The Planning Proposal is a result of the recommendations of the Cowra Housing Strategy 2025 which was adopted by Cowra Council in March 2025 and formally endorsed by NSW Department of Planning, Housing and Infrastructure in August 2025. Refer to Section 5.3 of this Planning Proposal for further details on how the proposed amendments are aligned with the Cowra Housing Strategy 2025.

8.1.2 Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

As per Section 6.1.1, the objective of the Planning Proposal is to amend Cowra Local Environmental Plan 2012 to enable the subdivision of land in the R5 Large Lot Residential zone to a lesser minimum lot size without requiring the connection of reticulated sewerage infrastructure.

As per Section 6.1.2, the intended outcomes of the Planning Proposal are:

- To enable the development of the West Cowra Growth Area consistent with the planning framework for rural residential growth in Cowra Township created by the Cowra Shire Land-use Strategy.
- To enable the development of the West Cowra Growth Area consistent with the vision for residential growth in the Cowra Township created by the Cowra Local Strategic Planning Statement.
- To ensure that the planning framework for the West Cowra Growth Area provides for new housing growth at suitable densities and within the environmental capacity of the land.
- To increase housing choice and diversity within the West Cowra Growth Area.

Council has given consideration to a number of different options for achieving the objectives and intended outcomes. The details and merits of each option has been explored in Table 5 below.

Table 5 - Strategic Options Assessment

Option	Overview	Description and Planning Comment
1	Do nothing	Council has considered the option of doing nothing. This would involve retaining the provisions of Cowra LEP 2012 in its current format. The option lacks strategic merit as the development potential of the West Cowra Growth Area is unlikely to be realized in the short to medium term if reticulated sewerage supply infrastructure cannot be augmented by Council. This option would also be inconsistent with the recommendations of the adopted Cowra Housing Strategy 2025.
2	Rezoning of land	Council has the option of rezoning land in the West Cowra Growth Area from R5 Large Lot Residential to another land-use zone. The R1 General Residential or the R2 Low Density Residential Zone could be considered as these zones are already utilised in other areas of the Cowra Township to provide for residential land-use activity at densities smaller than is currently allowed for in the West Cowra Growth Area. Rezoning land in the West Cowra Growth Area lacks strategic merit and will not achieve the objectives and intended outcomes for the following reasons: • The strategic intent for land-use in the West Cowra Growth Area is for rural residential style housing (dwellings on larger lots). This is reinforced through the strategic framework developed for the Cowra Township in the Cowra LUS, Cowra LSPS and Cowra Housing Strategy 2025. The existing R5 zone is identified to be the most suitable zone to provide for the strategic intent of land-use within the West Cowra Growth Area. • As a stand-alone response, the rezoning of land would not enable subdivision development to occur in the West Cowra Growth Area at minimum 4,000m² lots. A change to minimum lot size controls is required.

Option	Overview	Description and Planning Comment
3	Changing the MLS	Changing the minimum lot size for land in the West Cowra Growth Area is identified to be the preferred planning response for achieving the objectives and intended outcomes. This options holds strategic merit for the following reasons: • It will enable the development of the West Cowra Growth Area in a way that is consistent with the planning framework for rural residential growth created by the Cowra Shire Land-use Strategy. • It will enable the development of the West Cowra Growth Area consistent with the vision for residential growth created by the Cowra Local Strategic Planning Statement. • It will enable the development of the West Cowra Growth Area consistent with the recommendations of the adopted Cowra Housing Strategy 2025. • It will enable housing growth within the West Cowra Growth Area at higher densities (than are currently allowed) within the environmental and servicing capacity of the land. • It will increase housing choice and diversity within the West Cowra Growth Area.
4	Changing land-use	This option will not achieve the objectives and intended outcomes of the Planning Proposal. The existing R5 Large Lot Residential zone that applies to the West Cowra Growth Area already permits development for the purposes of new dwellings.
5	Using Schedule I	Schedule I allows Council to nominate a permissible land-use activity on a site by site basis where that land-use activity is ordinarily prohibited within the land-use zone. This option will not achieve the objectives and intended outcomes of the Planning Proposal. The existing R5 Large Lot Residential zone that applies to the West Cowra Growth Area already permits development for the purposes of new dwellings. Schedule I cannot be utilised to allow subdivision of land into smaller lot sizes.

Option	Overview	Description and Planning Comment
6	Using Clause 4.6	Clause 4.6 is a provision in the Standard Instrument LEP (and therefore Cowra LEP 2012) that allows an applicant to request a variation to a particular development standard including, for example, a minimum lot size. In the context of the Cowra LEP 2012, Clause 4.6 cannot be utilised in the following circumstances: • The subdivision involves land in the R5 Large Lot Residential zone, and the subdivision will result in 2 or more lots of less than minimum area specified for the land, or at least 1 lot that is less than 90% of the minimum area specified for the land. • The use of Clause 4.6 of the LEP will not achieve the objectives and intended outcomes of the Planning Proposal for the following reasons: • The use of Clause 4.6 for every subdivision proposal creating lots less than the current minimum lot size of 20,000m² (2ha) would result in an inefficient use of planning resources both at Cowra Council and at NSW Planning. • The need for widespread use of Clause 4.6 of the LEP may place landowners at a disadvantage by creating additional complexities for preparing routine Development Applications to subdivide land. • The limitations created by Clause 4.6(6) of the LEP means that the majority of new subdivisions in the West Cowra Growth Area would not qualify for approval using this pathway.

Option	Overview	Description and Planning Comment
7	Extending reticulated sewerage to service the West Cowra Growth Area	The provision of reticulated sewerage to service the West Cowra Growth Area is an infrastructure project that has been the subject of continued investment and investigation from Cowra Shire Council over a number of years. Section 1.2 of this Planning Proposal provides further detail relating to the status of the project and key outcomes of the planning and design work completed by Cowra Council (and others) to date. In summary, the provision of a sewerage scheme to the West Cowra Growth Area is now identified to require a long-term financial commitment from Cowra Shire Council. This infrastructure project cannot be realistically relied upon as the primary option to unlocking the future development potential of land within the West Cowra Growth Area. The provision of a sewerage scheme to West Cowra has not been discounted by Council at this stage and investigations are ongoing. Notwithstanding, the time-frame for delivery of the project is likely to mean that the objectives and intended outcomes of this Planning Proposal will not be achieved in the short to medium term.

8.2 Relationship to the strategic planning framework

8.2.1 Will the planning proposal give effect to the objectives and actions of the applicable regional plan?

The Central West and Orana Regional Plan 2041 establishes a strategic framework, vision and direction for land use, addressing future needs for housing, jobs, infrastructure, a healthy environment, access to green spaces and connected communities. It leverages the region's central location and builds on its strengths to provide smart, efficient and reliable connections that bring residents and visitors closer to jobs, centres, education and the natural environment.

The CWORP is structured around 23 objectives, which belong to the following themes:

- Region-shaping investment
- A sustainable and resilient place
- People, centres, housing and communities
- Prosperity, productivity and innovation.

The following objectives are particularly relevant in the context of the Planning Proposal:

- Objective 7 - Plan for resilient places and communities
- Objective 12 - Sustain a network of healthy and prosperous centres.
- Objective 13 - Provide well located housing options to meet demand.
- Objective 14 - Plan for diverse, affordable, resilient and inclusive housing.

The following Local Government Priorities for Cowra are also particularly relevant in the context of this Planning Proposal:

- Ensuring suitable housing supply by supporting a diversity in housing supply and clearly planned land releases.

Table 6 includes a brief assessment of the Planning Proposal against the relevant objectives and priorities in the Regional Plan.

Table 6 - Regional Plan Assessment

Objective / Priority	Planning Comment
Plan for resilient places and communities	Implementation of the lot size changes in this Planning Proposal will allow for the subdivision of the land to create new housing opportunities for a key growth precinct of the Cowra Township. The Planning Proposal demonstrates that the land is not environmentally constrained and is generally suitable to accommodate planned residential growth.
Sustain a network of healthy and prosperous centres	According to the Regional Plan, the growth of regional cities, strategic centres and smaller centres across the region, will encourage investment, increase housing choice, diversify industry and create new job opportunities – all of which will benefit the immediate and broader regional community. Cowra is identified in the Regional Plan as a strategic centre, with a stable population base, and with opportunities to grow and prosper by leveraging economic opportunities related to its proximity to the nearby larger centres of Bathurst, Orange and Canberra. The Planning Proposal seeks changes to Cowra LEP 2012 that will unlock development potential within the West Cowra Growth Area, creating opportunities for new housing growth and diverse housing types. This is a priority for Council and will assist Cowra in sustaining its role as a healthy and prosperous strategic centre in the Central West region of NSW.

Objective / Priority	Planning Comment
Provide well located housing options to meet demand.	The West Cowra Growth Area is an established residential location within the Cowra Township. The area is recognised by the planning framework in Cowra Township as an area suitable to accommodate residential growth over the short, medium and longer term. The growth is to be accommodated through new residential housing constructions on existing lots and through the further subdivision of existing property holdings to create new dwelling opportunities. The West Cowra Growth Area is ideally located on the western fringe of the Cowra Township, with excellent access to the Cowra CBD, other key commercial and industrial precincts and primary locations for public open space and recreation.
Plan for diverse, affordable, resilient and inclusive housing.	The current planning framework for the West Cowra Growth Area aims to facilitate residential land-use on larger lot forms. Higher density residential forms (including affordable housing etc) are not permitted in the current R5 Large Lot Residential zone and are to be accommodated in other parts of Cowra including land in the R1 General Residential and EI Local Centre zones.

8.2.2 Is the planning proposal consistent with a council LSPS that has been endorsed by the Planning Secretary or another endorsed local strategy or strategic plan?

Section 5 of this Planning Proposal includes a detailed analysis of the Planning Proposal against the Cowra Shire Land-use Strategy and the Cowra Local Strategic Planning Statement, both of which are endorsed by NSW Planning.

8.2.3 Is the planning proposal consistent with any other applicable State or Regional studies or strategies?

The following strategies have applicability at the state level and are relevant for consideration as part of the assessment of the Planning Proposal.

Environment and Health Protection Guidelines – On-site Sewage Management for Single Households.

These guidelines have been developed as part of a NSW Government commitment to a consistent and comprehensive approach to the use of small tanks and other on-site sewage management systems.

According to the Guidelines, there are a number of matters that should be taken into consideration as part of the planning process for large lot residential areas. These matters are listed in the Table 7 overage and a planning response is provided indicating how the Planning Proposal is consistent.

Table 7 - Matters for Consideration - Environment and Health Protection Guidelines

Matter for consideration	Planning Comment
Rural Residential Strategies	
Rural Residential strategies should include a desktop analysis of environmental constraints and representative testing of different soil types.	A desktop analysis of environmental constraints has been completed in Section 2 of this Planning Proposal. The Planning Proposal is also supported by a Land Capability Assessment (refer Appendix A) which includes representative soil testing at strategic locations within the West Cowra Growth Area.

Matter for consideration	Planning Comment
On-site sewage management has major implications for the amount and location of land released and the resultant minimum lot sizes.	The West Cowra Growth Area is already zoned R5 Large Lot Residential, consistent with the recommendations of the Cowra Shire Land-use Strategy and framework developed in the Cowra LSPS. The Planning Proposal seeks to demonstrate that the proposed MLS of 4,000m² is suitable and within the environmental capacity of the land.
Local Environmental Plans	
LEPs should identify areas that should be eliminated from rezoning because they cannot sustain on-site sewage management or cannot be seweraged.	The West Cowra Growth Area is not identified in the Cowra LEP 2012 as a location that cannot sustain on-site sewage management.
LEPs should identify the appropriate density of development to ensure that development is sustainable and public health is protected.	The Planning Proposal seeks to demonstrate that a reduction in the MLS (and therefore an increase in residential density) is appropriate for the West Cowra Growth Area.
If site specific rezonings are proposed, it is important that the level of analysis that occurs in relation to on-site sewage management is similar to that required for subdivision.	The Planning Proposal does not seek to rezone land within the West Cowra Growth Area. The existing R5 Large Lot Residential zone will continue to apply under Cowra LEP 2012.
Development Control Plans	

Matter for consideration	Planning Comment
DCPs should contain additional detail such as minimum land application areas, setbacks to watercourses, boundaries, recommended treatment technologies and on-site sewage management methods.	The Cowra DCP 2026 already contains a suite of development controls requiring new on-site waste management systems to be designed according to the recommendations of a Geotechnical Report (prepared for the individual property and submitted with the DA for any new dwelling). The controls address key issues relating to recommended setbacks to watercourses, boundaries, buildings and other relevant site features. The Land Capability Assessment prepared by McMahon's Earth Science (refer Appendix A) recommends Aerated Wastewater Treatment Systems (AWTS) as the preferred treatment units over conventional septic tanks and trench disposal. Updates to the Cowra DCP 2026 and its book-marked Part D.9 West Cowra Planning controls will ensure new development in the West Cowra Growth Area is serviced by AWTS as the preferred method for on-site waste disposal.
Site Evaluation	
The key steps in a site evaluation for on-site waste management include a broad evaluation (desktop study) of site opportunities and constraints, and a site and soil assessment. In general, the broad evaluation would be the responsibility of the relevant Council and the site and soil assessment would be the responsibility of the developer or land holders.	A desktop analysis of environmental constraints has been completed in Section 2 of this Planning Proposal. The Planning Proposal is also supported by a Land Capability Assessment prepared by McMahon Earth Science. The report confirms the suitability of the proposed minimum lot size for the West Cowra Growth Area. Refer Appendix A.
Site and soil evaluation should be done by suitably qualified soil scientists /	As above.

NSW Aquifer Interference Policy

The NSW Government policy for the licensing and assessment of aquifer interference activities clarifies the requirements for obtaining water licenses for aquifer interference activities under NSW water legislation, and establishes and objectively defines considerations in assessing and

providing advice on whether more than minimal impacts might occur to a key water-dependent asset.

Importantly, this Policy will assist proponents of aquifer interference activities in preparing the necessary information and studies to be used by the Minister in the assessment of project proposals that have some level of aquifer interference. Furthermore, this Policy will form the basis of the assessment and subsequent advice provided by the Minister (or the NSW Office of Water) at the various stages of an assessment under the Environmental Planning and Assessment Act 1979.

An aquifer interference activity as that which involves any of the following:

- The penetration of an aquifer,
- The interference with water in an aquifer,
- The obstruction of the flow of water in an aquifer,
- The taking of water from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations, and
- The disposal of water taken from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations.

Examples of aquifer interference activities include mining, coal seam gas extraction, injection of water, and commercial, industrial, agricultural and residential activities that intercept the water table or interfere with aquifers.

This Policy applies to all aquifer interference activities but has been developed in particular to address a number of high-risk activities including activities with the potential to contaminate groundwater or result in unacceptable loss of storage or structural damage to an aquifer.

There are a number of activities that are considered as having a minimal impact on water dependent assets, these include septic tanks, associated trenches and pit toilets if constructed, operated and abandoned in accordance with the “Environment and Health Protection Guidelines: On-Site Sewage Management for Single Households” (January 1998 – prepared NSW Aquifer Interference Policy 29 | DPI - NSW Office of Water; September 2012 jointly by NSW EPA; NSW Health; Dept of Local Govt; DLWC; and Dept of Urban Affairs and Planning) as may be updated from time to time.

8.2.4 Is the planning proposal consistent with applicable State Environmental Planning Policies?

Table 8 shows a list of the State Environmental Planning Policies that have applicability to land within the Cowra Local Government Area. Table 8 also includes an assessment about whether there are provisions within the each SEPP that need to be considered in relation to the Planning

Proposal. Where it is identified that further assessment is required, this work is presented in the following pages.

Table 8 - Preliminary SEPP Assessment

Name of SEPP	Applicability	Further Assessment Warranted?
SEPP (Biodiversity and Conservation) 2021	Not applicable	No
SEPP (Sustainable Buildings) 2022	Not applicable	No
SEPP (Exempt and Complying Development Codes) 2008	Not applicable	No
SEPP (Housing) 2021	Applicable	Yes
SEPP (Industry and Employment) 2021	Not applicable	No
SEPP 65 (Design Quality of Residential Apartment Development)	Not applicable	No
SEPP (Planning Systems) 2021	Not applicable	No
SEPP (Primary Production) 2021	Not applicable	No
SEPP (Precincts - Central River City) 2021	Not applicable	No
SEPP (Precincts - Eastern Harbour City) 2021	Not applicable	No
SEPP (Precincts - Western Parkland City) 2021	Not applicable	No
SEPP (Precincts - Regional) 2021	Not applicable	No
SEPP (Resilience and Hazards) 2021	Applicable	Yes
SEPP (Resources and Energy) 2021	Not applicable	Yes
SEPP (Transport and Infrastructure) 2021	Not applicable	No

SEPP (Housing) 2021

This SEPP aims to enable the delivery of diverse housing types, encourage housing that meets the needs of more vulnerable members of the community, and promote the delivery of appropriately designed housing in appropriately planned locations. The Housing SEPP includes the planning provisions for:

- Boarding houses
- Built-to-rent housing
- Seniors housing
- Caravan parks and manufactured home estates
- Group homes
- Retention of existing affordable rental housing
- Secondary dwellings (granny flats)
- Social and affordable housing
- Short-term rental accommodation
- Design of quality residential apartment development

The Planning Proposal relates to land in the West Cowra Growth Area which is zoned R5 Large Lot Residential. There is no proposal to change the range of permissible uses within the R5 Large Lot Residential zone. Development for the purposes of affordable housing, secondary dwellings, group homes, co-living housing, build-to-rent housing, and housing for seniors and people with a disability will remain permissible in the R5 Large Lot Residential zone.

The Planning Proposal will not create any inconsistencies with the Housing SEPP 2021.

SEPP (Resilience and Hazards) 2021

This SEPP contains planning provisions for land use planning within the coastal zone and for managing hazardous and offensive development. The SEPP requires that a consent authority must consider the contamination potential of the land, and if the land is contaminated, it is satisfied that the land is suitable for the development in its contaminated state, or that appropriate arrangements have been made to remediate the site prior to the development being carried out.

Section 2.2 of the Planning Proposal includes an analysis of the existing land-use activities which are carried out on land within the West Cowra Growth Area. The analysis shows that residential land-use predominates and there are only a few specific sites where non-residential land-use is occurring, none of which are cause for concern about contamination risk. On the basis of this land-use analysis, contamination risk within the West Cowra Growth Area is not considered to be a significant issue. Furthermore, as the Planning Proposal is not seeking to change the permissibility of land-use within the West Cowra Growth Area, the need for additional studies relating to potential land contamination is not considered to be necessary.

8.2.5 Is the planning proposal consistent with applicable Ministerial Directions (Section 9.1 Directions)?

An assessment of the Planning Proposal against each Section 9.1 Ministerial Direction is included as follows.

Focus Area 1 - Planning Systems

Direction 1.1 - Implementation of Regional Plans

The Direction applies to the Planning Proposal as it relates to land to which the Central West and Orana Regional Plan applies. The Direction requires the Planning Proposal to be consistent with the requirements of the Central West and Orana Regional Plan.

A detailed assessment against the Regional Plan is included in Section 8.2 of this Planning Proposal. No inconsistencies have been identified.

Direction 1.2 - Development of Aboriginal Land Council Land

The Direction does not apply to the Planning proposal as it does not relate to any land that is shown on the Land Application Map of chapter 3 of the State Environmental Planning Policy (Planning Systems) 2021.

Direction 1.3 - Approval and referral requirements

The Direction applies to all Planning Proposals. The Direction generally requires that the Planning Proposal must not include provisions which require concurrence, consultation or referral of Development Applications to a Minister of public authority without prior approval.

The Planning Proposal seeks only to make changes to Lot Size Map - Sheet LSZ_002C of Cowra Local Environmental Plan 2012. These changes will not change any existing consultation or concurrence obligations for Council in assessing a future Development Application for the land. The Planning Proposal is assessed to be consistent with Ministerial Direction 1.3.

Direction 1.4 - Site specific provisions

The Direction applies when a Planning Proposal will allow a particular development to be carried out. Direction 1.4(1) does not apply because the Planning Proposal does not include a request to introduce or change the permissibility of a land-use on any of the existing zonings that affect the subject land.

Direction 1.4(2) requires that the Planning Proposal must contain or refer to drawings that show details of the proposed development. The Planning Proposal is assessed to be consistent with Ministerial Direction 1.4(2).

Focus Area 2 - Planning Systems - Place Based

Ministerial Directions 1.5 to 1.22 have no applicability to the subject land. Further consideration is not considered to be necessary.

Focus Area 2 - Design and Place

This Focus Area was blank when the Directions were made.

Focus Area 3 - Biodiversity and Conservation

Direction 3.1 - Conservation Zones

The Direction applies to all Planning Proposals.

Direction 3.1(1) requires that the Planning Proposal must include provisions that facilitate the protection and conservation of environmentally sensitive areas.

Direction 3.1(2) requires that the Planning Proposal must not reduce the conservation standards that apply to the land.

The Planning Proposal is not inconsistent. There are no changes to existing conservation zones and no proposal to change any of the existing standards in Cowra Local Environmental Plan 2012 which are designed to facilitate conservation measures.

Direction 3.2 - Heritage Conservation

The Direction applies to all Planning Proposals.

Direction 3.2(1) requires that the Planning Proposal must contain provisions that facilitate the conservation of any environmental heritage items identified in a study of the environmental heritage of the area, Aboriginal objects or places protected under the National Parks and Wildlife Act 1974 or identified by an Aboriginal heritage survey prepared by or on behalf an Aboriginal Land Council, Aboriginal body or public authority.

The planning proposal is assessed to be consistent with this Ministerial Direction for the following reasons:

- The Planning Proposal does not impact on any known items of Aboriginal significance.
- The subject land is not mapped in Cowra Local Environmental Plan 2012 as containing any items of environmental heritage significance.
- The suitability of the land for large lot residential purposes has already been established by the existing zoning framework in the Cowra Local Environmental Plan 2012.
- The Planning Proposal does not change, alter or reduce any of the existing provisions in Cowra Local Environmental Plan 2012 which facilitate the protection and conservation of heritage areas. Clause 5.10 would continue to apply to any future development on the land, and provides an appropriately regulatory framework for the assessment of heritage issues and matters as part of a Development Application to Cowra Shire Council.

Direction 3.3 - Sydney Drinking Water Catchments

The Direction does not apply to the Planning Proposal as it does not affect land in any of the Local Government Areas located within the Sydney Drinking Water Catchment.

Direction 3.4 - Application of C2 and C3 zones and Environmental Overlays in Far North Coast LEPs.

The Direction does not apply to the Planning Proposal as it does not affect land on the New South Wales Far North Coast.

Direction 3.5 - Recreation Vehicle Areas

The Direction applies to all Planning Proposals. Direction 3.5(1) requires that a Planning Proposal must not enable land to be developed for the purposes of a recreation vehicle area where:

- The land is within a conservation zone,
- The land comprises a beach or a dune adjacent to or adjoining a beach.
- The land is not within an area or zone referred to in paragraphs (a) or (b) unless the relevant planning authority has taken into consideration the provisions of the guidelines entitled Guidelines for Selection, Establishment and Maintenance of Recreation Vehicle Areas, Soil Conservation Service of New South Wales, September, 1985, and
- The provisions of the guidelines entitled Recreation Vehicles Act 1983, Guidelines for Selection, Design, and Operation of Recreation Vehicle Areas, State Pollution Control Commission, September 1985.

The planning proposal is assessed to be consistent with this Ministerial Direction as there are no planned changes to the permissibility of a Recreation Vehicle Area (currently prohibited) in the R5 Large Lot Residential zone under Cowra LEP 2012.

Direction 3.6 - Strategic Conservation Planning

This Direction does not apply to the Planning Proposal as it does not relate to land that is identified as 'avoided land' or a 'strategic conservation area' under State Environmental Planning Policy (Biodiversity and Conservation) 2021.

Direction 3.7 - Public Bushland

This Direction does not apply to the Planning Proposal as it does not relate to land in a prescribed Local Government Area.

Direction 3.8 - Willandra Lakes Region

This Direction does not apply to the Planning Proposal as it does not relate to land identified as the Willandra Lakes World Heritage Property.

Direction 3.9 - Sydney Harbour Foreshores and Waterways area

This Direction does not apply to the Planning Proposal as it does not relate to land within the Foreshores and Waterways Area.

Direction 3.10 - Water Catchment Protection

This Direction does not apply to the Planning Proposal as it does not relate to land within a regulated catchment.

Focus Area 4 - Resilience and Hazards**Direction 4.1 – Flooding**

The Direction applies to the Planning Proposal as it relates to land which is located within the flood planning area.

Direction 4.1(1) requires that the planning proposal must include provisions that give effect to and are consistent with:

- The NSW Flood Prone Land Policy,
- The principles of the Floodplain Development Manual 2005,
- The Considering flooding in land use planning guideline 2021, and
- Any adopted flood study and/or floodplain risk management plan prepared in accordance with the principles of the Floodplain Development Manual 2005 and adopted by the relevant council.

Direction 4.1(2) requires that the planning proposal must not rezone land within the flood planning area from Recreation, Rural, Special Purpose or Conservation Zones to a Residential, Employment, Mixed Use, W4 Working Waterfront or Special Purpose zone.

Direction 4.1(3) requires that the planning proposal must not contain provisions that apply to the flood planning area which:

- a. Permit development in flood-way areas,
- b. Permit development that will result in significant flood impacts to other properties,
- c. Permit development for the purposes of residential accommodation in high hazard areas,
- d. Permit a significant increase in the development and/or dwelling density of that land,
- e. Permit development for the purpose of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate,
- f. Permit development to be carried out without development consent except for the purposes of exempt development or agriculture. Dams, drainage canals, levees, still require development consent,
- g. Are likely to result in a significantly increased requirement for government spending on emergency management services, flood mitigation and emergency response measures, which can include but are not limited to the provision of road infrastructure, flood mitigation infrastructure and utilities, or

- h. Permit hazardous industries or hazardous storage establishments where hazardous materials cannot be effectively contained during the occurrence of a flood event.

Direction 4.1(4) requires that a planning proposal must not contain provisions that apply to areas between the flood planning area and probable maximum flood to which Special Flood Considerations apply which:

- a. Permit development in floodway areas,
- b. Permit development that will result in significant flood impacts to other properties,
- c. Permit a significant increase in the dwelling density of that land,
- d. Permit the development of centre-based childcare facilities, hostels, boarding houses, group homes, hospitals, residential care facilities, respite day care centres and seniors housing in areas where the occupants of the development cannot effectively evacuate,
- e. Are likely to affect the safe occupation of and efficient evacuation of the lot, or
- f. Are likely to result in a significantly increased requirement for government spending on emergency management services, and flood mitigation and emergency response measures, which can include but not limited to road infrastructure, flood mitigation infrastructure and utilities.

Section 2.8 of this Planning Proposal provides an analysis of flood impact relating to the West Cowra Growth Area and Figure 8 shows the extent of land within the flood planning area as mapped in the Cowra and Gooloogong Floodplain Risk Management 2006. The mapping shows that the large majority of the West Cowra Growth Area is not impacted by flooding, with only a small number of lots at the northern end of River Park Road / Lachlan Avenue / Commelia Road shown to be within the flood planning area.

The Planning Proposal is consistent with all of the requirements of Ministerial Direction 4.1, except that the changes to the MLS for the West Cowra Growth Area would result in an increase in the dwelling density land for a small number of lots that are identified to be within the flood planning area. Closer analysis shows that:

- A total of eight (8) existing lots are either partially or wholly within the flood planning area.
- Of the 8 lots, 6 lots already have existing dwellings.
- The lots have no realistic option for further subdivision due to constraints posed by existing lot size and / or configuration, dwelling placement (where one exists), road access limitations and flood related development controls in the Cowra DCP 2026.

Whilst the proposed MLS changes would apply to these lots, the changes are not expected to result in a significant increase (if at all) in the number and / or density of dwellings to be constructed within the flood planning area. On this basis, the inconsistency with Direction 4.1 is deemed to be acceptable on the grounds of minor significance.

Direction 4.2 – Coast Management

The Direction does not apply to the Planning proposal as it does not relate to any land that is within the coastal zone, as defined under the Coastal Management Act 2016 - comprising the

coastal wetlands and littoral rain-forests area, coastal vulnerability area, coastal environment area and coastal use area - and as identified by chapter 2 of the State Environmental Planning Policy (Resilience and Hazards) 2021.

Direction 4.3 Planning For Bushfire Protection

The Direction does not apply to the Planning proposal as it does not relate to any land that is mapped as bushfire prone.

Direction 4.4 – Remediation of Contaminated Land

The Direction does not apply to the Planning Proposal as it does not propose any changes to the range of land-use activities currently permissible in the R5 Large Lot Residential under Cowra LEP 2012. There are also no changes proposed to the extent of the R5 Large Lot Residential zone.

Direction 4.5 – Acid Sulfate Soils

The Direction does not apply to the Planning Proposal as it does not relate to any land that is identified on the Acid Sulfate Soils Planning Maps held by the Department of Planning and Environment.

Direction 4.6 – Mine Subsidence and Unstable Land

The Direction does not apply to the Planning Proposal as it does not relate to any land that is within a declared mine subsidence district in the Coal Mine Subsidence Compensation Regulation 2017 pursuant to section 20 of the Coal Mine Subsidence Compensation Act 2017, or other land that has been identified as unstable in a study, strategy or other assessment undertaken by or on behalf of the relevant planning authority.

Focus Area 5 – Transport and Infrastructure

Direction 5.1 – Integrating Land Use and Transport

The Direction applies to the Planning Proposal as it proposes to alter a provision relating to urban land, including land zoned for residential, employment, village or tourist purposes.

Direction 5.1(1) requires that the planning proposal must locate zones for urban purposes and include provisions that give effect to and are consistent with the aims, objectives and principles of:

- a. Improving Transport Choice – Guidelines for planning and development (DUAP 2001), and
- a. The Right Place for Business and Services – Planning Policy (DUAP 2001).

Section 2.7 of this Planning Proposal provides an analysis of the West Cowra Growth Area in terms of access, roads and transport. The analysis shows that the West Cowra Growth Area is strategically located on the western edge of the Cowra Township with excellent standards of

road access and opportunities for active travel through connections in adjoining neighbourhoods and streets. The area is also within the public transport catchment for the Cowra Township. The West Cowra Growth Area is suited to low density housing growth and settlement intensification, consistent with the aims of the objectives of the existing R5 Large Lot Residential zone.

The planning proposal is assessed to be consistent with this Ministerial Direction.

Direction 5.2 – Reserving Land for Public Purposes

The Direction applies to all Planning Proposals.

Direction 5.2(1) requires that the planning proposal must not create, alter or reduce existing zonings or reservations of land for public purposes without the approval of the relevant public authority and the Planning Secretary (or an officer of the Department nominated by the Secretary). The planning proposal does not relate to land reserve for public purposes. The Planning Proposal is consistent with the requirements of the Ministerial Direction.

Direction 5.3 – Development Near Regulated Airports and Defence Airfields

This Direction applies to the Planning Proposal as it alters a provision (minimum lot size control) relating to land near a regulated airport. The Cowra Airport is located along the western edge of the West Cowra Growth Area and the facility is managed under the Cowra Aerodrome Manual 2021 and the relevant regulatory requirements of the Civil Aviation Safety Authority (CASA).

Direction 5.3(1) requires that the relevant planning authority must, in the preparation of a planning proposal that sets controls for development of land near a regulated airport:

- a. Consult with the lessee/operator of that airport;
- b. Take into consideration the operational airspace and any advice from the lessee/operator of that airport;
- c. For land affected by the operational airspace, prepare appropriate development standards, such as height controls.
- d. Not allow development types that are incompatible with the current and future operation of that airport.

Direction 5.2(2) relates to planning proposals that set controls for development of land near a core regulated airport, which does not include the Cowra Airport.

Direction 5.2(3) relates to planning proposals that set controls for development of land near a defence airfield, which does not include the Cowra Airport.

The Planning Proposal is consistent with all of the requirements of Ministerial Direction 5.3, and in particular:

- Cowra Airport is a community asset that is owned and operated by Cowra Shire Council, who is also the relevant planning authority and initiator of this Planning Proposal.
- No parts of the West Cowra Growth Area are located within the Public Safety Areas relating to the Cowra Airport. Refer Map 14 of the Cowra Airport Masterplan.

- Small areas of the West Cowra Growth Area are located within the Obstacle Limitation Surfaces of the Cowra Airport. The Cowra Airport Masterplan reports that there are no significant obstacles in relation to the Cowra Airport that penetrate the obstacle free gradients for approach and take-offs for all four runway ends. Building heights associated with low density residential built form in the West Cowra Growth Area will not penetrate the OLS.
- Small areas of the West Cowra Growth Area are located within Zones C and / or Zone D of the Light Control Map relating to the Cowra Airport. Refer Map 11 of the Cowra Airport Masterplan. Significant light sources are unlikely to be associated with the nature of permissible land-use within the R5 Large Lot Residential zone.

In summary, the adjacency of the West Cowra Growth Area to the Cowra Airport facility is not identified in the Cowra Airport Masterplan as a key issue impacting aerodrome operations. The Planning Proposal is not inconsistent with the requirements of the Ministerial Direction.

Direction 5.4 – Shooting Ranges

The Direction does not apply to the Planning Proposal as it does not affect, create, alter or remove a zone or a provision relating to land adjacent to and/ or adjoining an existing shooting range.

Direction 5.5 – High Pressure dangerous goods pipelines

The Direction does not apply to the Planning Proposal, as it does not permit development for one or more of the specified uses in the application area of relevant pipelines.

Focus Area 6 - Housing

Direction 6.1 – Residential Zones

This direction applies to the Planning Proposal as it will affect land within an existing or proposed residential zone, which includes the R5 Large Lot Residential zone.

Direction 6.1(1) requires the planning proposal must

- Broaden the choice of building types and locations available in the housing market, and
- Make more efficient use of existing infrastructure and services, and
- Reduce the consumption of land for housing and associated urban development on the urban fringe, and
- Be of good design

Direction 6.1(2) requires the planning proposal must,

- Contain a requirement that residential development is not permitted until land is adequately serviced (or arrangements satisfactory to the council, or other appropriate authority, have been made to service it), and

- b. Not contain provisions which will reduce the permissible residential density of land.

The Planning Proposal is consistent with all of the requirements of Ministerial Direction 6.1, and in particular:

- c. The Planning Proposal reinforces the West Cowra Growth Area as a strategic area for housing growth in the Cowra Township. There is no proposal to change the zoning of the land. The R5 Large Lot Residential will continue to apply to the West Cowra Growth Area, and this zone currently permits a range of residential building types.
- d. Section 1.2.2 of this Planning Proposal provides further details on the West Cowra Sewer Project. The cost implications and anticipated time frame for the delivery of the West Cowra Sewer Project means that the objectives and intended outcomes of the Planning Proposal will not be achieved in the short to medium term. A change to the minimum lot size provisions is proposed in order to ensure that growth and development in West Cowra is not compromised by long-term infrastructure provisioning.
- e. The proposed minimum lot size changes to the R5 Large Lot Residential zone in the West Cowra Growth Area will reduce the consumption of land for housing and associated urban development on the urban fringe. This is to be achieved by increasing the permissible dwelling density on land that is already zoned to allow residential land-use.
- f. The Planning Proposal seeks to demonstrate that adequate services are in place at the West Cowra Growth Area to enable planned subdivision and housing growth.
- g. The Planning Proposal does not reduce the permissible residential density of land. The minimum lot size changes will instead increase the permissible density.

On the basis of the above, the Planning Proposal is consistent with the requirements of Ministerial Direction 6.1.

Direction 6.2 – Caravan Parks and Manufactured Home Estates

The Direction applies to all Planning Proposals. Direction 6.2(1) requires that a Planning Proposal must retain provisions that permit development for the purposes of a caravan park to be carried out on land, and retain the zonings of existing caravan parks. The Planning Proposal does not propose to change the permissibility of caravan parks in the existing R5 Large Lot Residential. The Planning Proposal is not inconsistent with the requirements of Ministerial Direction 6.2.

Focus Area 7: Industry and Employment

Direction 7.1 – Employment Zones

The Direction does not apply to the Planning Proposal as it does not relate to land within an existing or proposed Employment zone.

Direction 7.2 – Reduction in non-hosted short-term rental accommodation period

This Direction does not apply to the Planning Proposal as it does not relate to within the Bryon Shire Council.

Direction 7.3 – Commercial and Retail Development along the Pacific Highway, North Coast

This Direction does not apply to the Planning Proposal as it does not relate to within those council areas on the North Coast that the Pacific Highway traverses.

Focus Area 8: Resources and EnergyDirection 8.1 – Mining, Petroleum Production and Extractive Industries

The Direction does not apply to the Planning Proposal as it would not have the effect of:

- a. Prohibiting the mining of coal or other minerals, production of petroleum, or winning or obtaining of extractive materials, or
- b. Restricting the potential development of resources of coal, other minerals, petroleum or extractive materials which are of State or regional significance by permitting a land use that is likely to be incompatible with such development.

Focus Area 9: Primary ProductionDirection 9.1 – Rural Zones

This Direction does not apply to the Planning Proposal as it does not relate to land within an existing or proposed rural zone.

Direction 9.2 – Rural Lands

This Direction does not apply to the Planning Proposal as it does not affect land within an existing or proposed rural or conservation zone, or change the existing minimum lot size on land within a rural or conservation zone.

Direction 9.3 – Oyster Aquaculture

This Direction does not apply to the Planning Proposal as it does not affect land within 'Priority Oyster Aquaculture Areas' and oyster aquaculture outside such an as identified in the NSW Oyster Industry Sustainable Aquaculture Strategy (2006).

Direction 9.4 – Farmland of State and Regional Significance on the NSW Far North Coast

This Direction does not apply to the Planning Proposal as it does not affect land within Ballina Shire, Byron Shire, Kyogle Shire, Lismore City, Richmond Valley or Tweed Shire Local Government Areas.

8.3 Environmental, Social and Economic Impact

8.3.1 Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected because of the proposal?

Section 2 of the Planning Proposal includes a desktop based environmental analysis of the land within the West Cowra Growth Area. Figure 12 shows the broader biodiversity features of the West Cowra Growth Area.

Mapped areas of sensitive biodiversity resources generally avoid the West Cowra Growth Area and are instead focused along the important riparian zones of the Lachlan River and found in isolated locations where roadside and / or remnant native vegetation remains in larger communities.

A study of the tree canopy of the West Cowra Growth Area shows that urban vegetation occurs primarily along roadside environments (either as street trees or remnant vegetation) and as landscaped elements on private development lots.

Generally the West Cowra Growth Area is not considered to be a location of high biodiversity value, and development generally occurs without significant impact to flora and fauna resources.

There is a low likelihood of significant impacts on a critical habitat, threatened species, populations or ecological communities, or their habitats. The Planning Proposal is capable of proceeding without a more detailed impact statement being prepared. The lodgement of a DA with Council for new proposals on individual lots will provide further opportunity for relevant issues to be assessed by Council.

8.3.2 Are there any other likely environmental effects of the planning proposal and how are they proposed to be managed?

In order to properly understand the likely environmental impacts of allowing intensification of residential growth and development in West Cowra in unsewered locations, Cowra Shire Council has commissioned a Land Capability Assessment by McMahon Earth Science.

McMahon Earth Science was commissioned to carry out a geotechnical investigation at strategically selected sites within the West Cowra Growth Area and prepare a report into the following matters:

1. The geotechnical characteristics of each test site.
2. The likely geotechnical characteristics of the broader West Cowra Growth Area.
3. Identification of any environmental issues relating to existing patterns of housing and subdivision growth in West Cowra and associated on-site effluent management practices.

4. The environmental suitability of the West Cowra Growth Area to support subdivision developments into minimum 4,000m² lots without reticulated sewerage supply.
5. Any specific requirements for managing on-site effluent management within the West Cowra Growth area having regard to the findings of the geotechnical analysis, relevant industry guidelines and / or Australian Standards.

A copy of the report prepared by McMahon Earth Science is included in Appendix A to this Planning Proposal. A summary of the key findings of the report is included as follows:

1. There are no significant limitations to note regarding the proposed siting of land application systems with a reduced lot size of 0.4ha (4000m²) by reference to AS/NZS 1547:2012 On-site domestic wastewater management.
2. When determining the type and placement of land application systems within the West Cowra Growth Area, vertical and horizontal setback distances from boundaries, dams, water courses, flood zoning, groundwater bores and infrastructure will have to be considered in accordance with Council guidelines and AS/NZS 1547:2012 On-site domestic wastewater management. Generally, setback distances should be assessed on a site-specific basis.
3. Risk to soil is assessed to be minimal given adherence to Council guidelines and industry best practices in accordance with public standards and guidelines are adhered to. Land application areas provided in the Land Capability Assessment have been sized to accommodate both effluent discharge volumes and nutrient load to ensure assimilation of discharged nutrients and net zero water storage is achieved with a reduced lot size of 0.4ha (4,000m²).
4. The planning proposal presents a limited risk to surface waters and groundwater. Surface waters do not concentrate within the West Cowra Growth Area, with rainfall likely to infiltrate then run off into the relatively permeable soil. Surface waters to the east in existing built-up areas are conveyed to the Lachlan River by municipal stormwater networks, and surface waters to the west are likely to end up in Crowther Creek, a tributary to the Lachlan River. Land application areas are designed to achieve a net zero water storage, reducing the risk of overland flow, interflow, and off site migration of surface waters. Groundwater is at deep depths in the West Cowra Growth Area and typically there is a low level of connectivity to groundwater in the underlying geology.
5. The chemical analysis and physical testing conducted throughout the West Cowra Growth Area characterises the site as having nil or slight limitations - none of which preclude the Planning Proposal regarding wastewater management.
6. Aerated Wastewater Treatment Systems (AWTS) are recommended for treatment units with land application via drip or low-pressure spray irrigation. The AWTS is preferred over conventional septic tanks and trench disposal as it offers the highest level of treatment and offers a low application risk owing to the comparatively large irrigation area and lower bacteria concentration.

7. Based on the soil testing, sampling and analysis, the Land Capability Assessment expects that the amount of land area (upper limits) required to sustainably dispose of domestic effluent on-site within the West Cowra Growth Area would be in the order of:
- 298m² for a three bedroom house with two living areas.
 - 358m² for a four bedroom house with two living areas.
 - 417m² for a five bedroom house with two living areas.

8.3.3 Has the planning proposal adequately addressed any social and economic effects?

Social Impact Assessment

An assessment of potential impacts of the Planning Proposal has been undertaken with regards to scoping methodology outlined in the Social Impact Assessment Guideline 2017 (SIA Guideline), published by the Department of Planning and Environment. Table 8 provides an assessment of the proposal against the criteria in the SIA Guideline.

Table 9 - Social Impact Assessment

Matters	Key links to social impacts	Risk of impact without action	Nature of impact	Assessment findings
Amenity				
Acoustic	Way of life	Unlikely	Negative	Acoustic impacts are unlikely to result from the PP
Visual	Surroundings	Unlikely	Negative	The PP will not alter the existing residential setting of the West Cowra Growth Area.
Odour	Surroundings	Unlikely	Negative	Acoustic impacts are unlikely to result from the PP
Micro-climate	Surroundings	Unlikely	Nil	The PP will not significantly impact micro climate
Access				
Access to property	Way of life	N/A	Nil	The PP will not impact on access to property

Matters	Key links to social impacts	Risk of impact without action	Nature of impact	Assessment findings
Utilities and public transport	Access to infrastructure, services and facilities	Likely.	Negative	Cowra Council has identified the provision of a sewerage scheme to West Cowra as a long term proposition. The PP is required as an interim measure to ensure residential growth is not restricted by infrastructure capacity
Road and rail	Personal and property rights	Unlikely	Negative	The West Cowra Growth Area has a suitable standard of access. Rail is not identified as a key issue
Built Environmental				
Public domain	Community	Unlikely	Nil	The PP will not impact the public domain . Residents in West Cowra have adequate access to public recreation land
Public infrastructure	Access to infrastructure, services and facilities	Unlikely	Negative	Cowra Council has identified the provision of a sewerage scheme to West Cowra as a long term proposition. The PP is required as an interim measure to ensure residential growth is not restricted by infrastructure capacity
Other built assets	Surroundings; Personal and property rights	Unlikely	Nil	The PP will not preclude public access to built assets
Heritage				
Natural	Way of life	Unlikely	Nil	Natural heritage is not compromised by the PP

Matters	Key links to social impacts	Risk of impact without action	Nature of impact	Assessment findings
Cultural	Community	Unlikely	Negative	The PP will not impact on cultural values in the public domain
Aboriginal culture	Culture	Unlikely	Negative	The PP has considered the likelihood that the land contains items of Aboriginal cultural significance. Impacts are unlikely
Built	Surroundings	Unlikely	Nil	There are no built heritage items located within West Cowra
Community				
Health	Health and wellbeing	Unlikely	Nil	The PP is unlikely to generate impacts
Safety	Surroundings	Unlikely	Negative	Environmental hazards have been identified and assessed. The PP has been assessed as not increasing a known safety risk
Services and facilities	Way of life, Access to infrastructure, services and facilities	Likely	Negative	Cowra Council has identified the provision of a sewerage scheme to West Cowra as a long term proposition. The PP is required as an interim measure to ensure residential growth is not restricted by infrastructure capacity
Cohesion, capital and resilience	Way of life; Community; Culture	Unlikely	Nil	The PP is unlikely to generate impacts
Housing	Way of life, Personal and property rights	Likely	Negative	The PP will facilitate a planning outcome that is likely to create new housing opportunities for Cowra. Positive impacts are likely to result

Matters	Key links to social impacts	Risk of impact without action	Nature of impact	Assessment findings
Economic				
Natural resource area	Way of life	Unlikely	Nil	The PP is unlikely to generate impacts
Livelihood	Surroundings	Unlikely	Nil	The PP is unlikely to generate impacts
Opportunity cost	Personal and property rights	Unlikely	Negative	The net benefit of the PP in providing opportunities for new housing allotments outweighs the utilisation of building costs and resources
Air				
Air emissions	Surroundings	Unlikely	Nil.	The PP is unlikely to generate impacts
Biodiversity				
Native vegetation and fauna	Surroundings	Unlikely	Negative	Vegetation clearing is not proposed
Land				
Structural stability, land capability, topography	Surroundings	Unlikely	Negative	The PP has demonstrated that the MLS changes to the West Cowra Growth Area will facilitate a planning outcome that is within the environmental capability of the land
Water				

Matters	Key links to social impacts	Risk of impact without action	Nature of impact	Assessment findings
Quality, availability, hydrological flows	Surroundings	Unlikely	Negative	The PP has demonstrated that the MLS changes to the West Cowra Growth Area will facilitate a planning outcome that is within the environmental capability of the land

Economic Impact Assessment

Section 1.2.2 of the Planning Proposal provides an overview of the West Cowra Sewer Project including details of the financial implications to Cowra Council and the local community of providing a sewerage scheme to service the West Cowra Growth Area.

The augmentation of a reticulated sewerage supply to service the wider West Cowra area is an expensive infrastructure project, with cost estimates indicating a total capital investment value in the order of \$60M. Funding of the project is heavily dependent on State Government subsidy. The infrastructure project is likely to require a longer-term financial commitment from Cowra Council.

The time-frame for delivery of the overall project is likely to mean that the objectives and intended outcomes of this Planning Proposal to deliver timely additional R5 Large Lot residential Housing possibilities in the West Cowra Growth Area will not be achieved in the short to medium term. A change to existing minimum lot size provisions is proposed in order to ensure that growth and development within the West Cowra Growth Area is not compromised by long-term infrastructure provisioning, to the overall area.

Accelerating the delivery of 195 residential lots represents a significant opportunity to stimulate Cowra's regional economy. The initiative will inject short-term economic activity through civil works and housing construction, creating employment for local contractors, trades, and suppliers. Beyond the construction phase, the release will enable population growth by attracting new residents and retaining local workers, increasing demand across retail, health, education, and service sectors. This expanded economic base supports business viability, enhances Council revenue streams, and strengthens Cowra's capacity to sustain essential community infrastructure.

8.4 Infrastructure (Local, State and Commonwealth)

8.4.1 Is there adequate public infrastructure for the Planning Proposal

Section 3.2 of this Planning Proposal includes an environmental analysis of the West Cowra Growth Area including an assessment of the following public infrastructure:

- Access, Roads and Transport
- Reticulated Water
- Reticulated Sewer
- Public Stormwater Drainage.

The analysis has not identified any significant infrastructure related issues which are likely to result from the planning outcomes that are to be facilitated by this Planning Proposal.

8.5 State and Commonwealth Interests

8.5.1 What are the views of state and federal public authorities and government agencies consulted in order to inform the Gateway determination?

State Government Interests

Given the West Cowra Growth Area contains land that is mapped in Cowra LEP 2012 as having vulnerable groundwater, Council intends to consult with the NSW Office of Water as part of the public exhibition of the Planning Proposal. Informal consultation has already been undertaken.

The Planning Proposal is unlikely to be of interest to most other State Government agencies. Council will however complete consultation with specific agencies if this is conditioned in the Gateway Determination issued by NSW Planning.

Federal Government Interests

Due to the nature of the Planning Proposal, Federal Government interests are expected to be limited. The Planning Proposal relates to a matter that is of local planning significance.



09

PLANNING PROPOSAL PART FOUR

Plan Making Guidance – Part 4

The NSW DPE Local Environmental Plan Making Guidelines provides the following guidance:

- Mapping must be consistent with the Department's Standard Technical Requirements for Spatial Datasets and Maps, using the same format, symbology, labeling and appropriate scale.
- All existing and proposed mapping submitted to the Department as part of a Planning Proposal should be accompanied by GIS data. All LEP mapping should commence as early as possible in GIS, particularly with complex planning proposals or Principal LEPs.
- Mapping may include the subject site and immediate surrounds, current zoning, current development standards and any alternative zones if a change is proposed.
- Other relevant maps or figures may include maps illustrating changes of development standards, extent of heritage conservation areas, location of specific heritage items, extent of native vegetation, extent of environmental conservation areas and areas to which a local provision will apply.
- Additional material such as aerial photographs clearly identifying the subject site should also be included where appropriate.

9.1 Project Mapping

This Planning Proposal has been prepared to include a number of different maps and visuals that:

- Show the location of the subject land both in terms of the immediately surrounding environment and the wider locality
- Demonstrate an understanding of the existing environmental conditions applying to the subject land.
- Shows the existing and proposed planning controls applying to the land under Cowra Local Environmental Plan 2012.

The mapping presented in this Planning Proposal is adequate to enable assessment of the key issues by the Planning Proposal Authority (Cowra Council) and to enable the community to understand the scope of the proposed amendments to Cowra Local Environmental Plan 2012.

Cowra Shire Council will arrange for the preparation of final map datasets consistent with the Department's Standard Technical Requirements for Spatial Datasets and Maps.



10

PLANNING PROPOSAL PART FIVE

Plan Making Guidance – Part 5

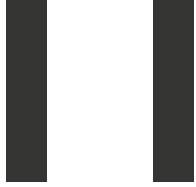
Plan Making Guidance - Part 5 The NSW DPE Local Environmental Plan Making Guidelines provides that Part 5 of the Planning should describe:

- Consultation and outcomes undertaken with council, state agencies or authorities during the pre-lodgement stage.
 - Any community consultation undertaken, or consultation with other key stakeholders
 - The extent of consultation having regard for the public exhibition requirements in Section 1 of the guideline.
 - The required public exhibition period based on the different planning proposal categories.
- Community consultation will be considered at the Gateway stage, with the Gateway determination confirming the requirements.
 - The Gateway determination may also specify additional information or studies to be finalised before any consultation commences, often to make sure that everyone can make an informed opinion. In some cases, the Gateway determination may require the PPA to submit studies to the Department for review prior to public exhibition.

10.2 Consultation

In accordance with the Cowra Community Participation Plan 2025, the Planning Proposal will require public exhibition for a minimum of 28 days, or any other period as might be specified in a Gateway Determination issued by NSW Department of Planning and Environment.

Cowra Shire Council will complete all tasks involved in the public exhibition of the Planning Proposal in accordance with the Cowra Community Participation Plan and any requirements of the Gateway Determination.



PLANNING PROPOSAL PART SIX

Plan Making Guidance – Part 6

The NSW DPE Local Environmental Plan Making Guidelines provides that Part 6 of the Planning should describe the project timeline as a tool for the Planning Proposal Authority, the Department and the Parliamentary Counsel's Office to monitor the project through the LEP making process and manage resources accordingly.

As a minimum, the project timeline should describe:

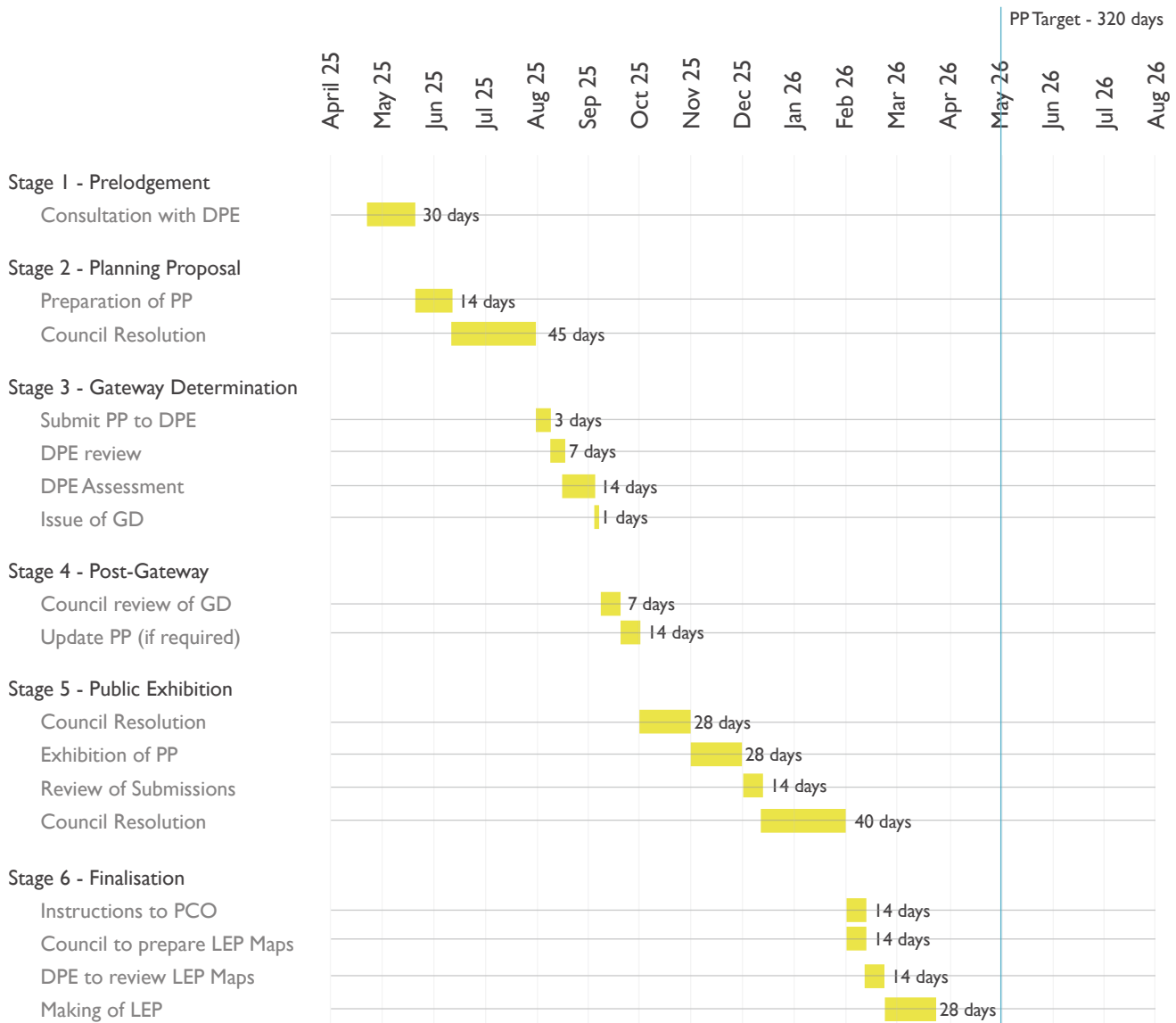
- Anticipated commencement date (date of Gateway determination)
- Anticipated time frame to finalise the infrastructure studies/plan
- Anticipated time frame for completion of any additional technical studies, not completed prior to Gateway
- Time frame for public agency consultation
- Anticipated dates of public exhibition and, if required, a public hearing
- Time frame for submissions to be considered
- Time frame for the consideration of a proposal after the exhibition.
- Date the plan will be made (where council is the LPMA) or date of submission to the Department to finalise the LEP
- Date of notification

11.1 Project Timeline

An anticipated timeline has been developed for the project and is based on the maximum time frame recommendations provided in the NSW DPE Local Environmental Plan Making Guidelines for a standard category Planning Proposal.

The timeline is estimated in Figure 16. The Planning Proposal is deemed to fall into the Standard Planning Proposal Category.

Figure 16 - Planning Proposal - Project Timeline





A

APPENDIX

Land Capability Statement

McMahon Earth Science

3 April 2024

Attention: Janine Finlayson
Cowra Shire Council
Private Bag 342
Cowra NSW 2794
janine.finlayson@cowra.nsw.gov.au

BY EMAIL

Dear Janine

Re: Land Capability Assessment – West Cowra Growth Area

I refer to the written request from yourself to conduct a Land Capability Assessment (LCA) for the West Cowra Growth Area which is subject to a planning proposal to reduce the minimum lot size from the current 2ha to 0.4ha. The intended recipient of this report is Cowra Shire Council and the NSW Department of Planning to assess the feasibility of using on-site wastewater treatment units and land application systems on a reduced 0.4ha lot size. It is assumed that landowners, designers, installers, and regulators may rely on this report for guidance in the future, however DM McMahon Pty Ltd is required to be consulted to confirm site conditions in relation to any site-specific development.

Objective and scope

The objective of this LCA is to adopt the approaches outlined in AS 1547 (2012) On-site Domestic Wastewater Management and the NSW Department of Environment and Conservation (DEC 2004) Use of Effluent by Irrigation, to achieve sustainable and effective on-site wastewater management, to protect public health and the environment. AS 1547 (2012) and DEC (2004) have been adopted to provide a clear and consistent approach to conduct LCAs and has been used in preference to other guidelines owing to its relevance and statewide acceptance. Our role is designated as a site evaluator and assessor to evaluate the capacity of a site and its soil for accepting treated wastewater.

The agreed scope of works included:

- Where available, review plans and other general related documents provided to us to gain a comprehensive understanding of the site.
- Undertake a site and soil check within the proposed West Cowra Growth Area as instructed by yourself to collate relevant site information and environmental factors.
- Conduct a site and soil assessment to examine and record the soil profile and soil features within the proposed West Cowra Growth Area.
- Detail the results of an assessment of the area for environmental factors (setbacks and constraints) which are likely to impinge on the siting and design of a land application system; and evaluate the site and soil characteristics to determine feasible options for designing and sizing a land application system.

Location and description of the project site and its history

The West Cowra Growth Area (the site) is around 215ha in area and is located to the west of Cowra, approximately 2km southeast of the town centre. The site is bound by Lachlan Avenue to the north, Boundary Road to the south, Hartley Street and Commelia Road to the east, Airport Road, and Killara Road to the west, and is intersected by the east west oriented Grenfell Road. A location map and site map can be seen in **Attachment A**.

From a review of available historical aerial and satellite imagery (1964-2024), the site has been used mainly for broad acre agriculture with some irrigation from the 1960s to 1980s with large lot residential development becoming more prevalent in the 1990s. Currently the site is a mix of large lot residential and undeveloped land.

Description of the regional and local environment

The site lies on north trending gently undulating hills extending to the Lachlan River floodplain to the north with an elevation range from top to bottom (south to north) from around 320 mAHD at Boundary Road to around 288 mAHD at Lachlan Avenue.

Soils on the upper and mid elevations are well drained deep reddish brown to yellow sandy clay Chromosols, where the lower elevations (Lachlan floodplain) are typified by deep complex darker brown silty clay alluvial Tenosols with recent (Quaternary) addition. The underlying geology is mapped as Silurian Canowindra Volcanics of the Cudal Group typically described as garnetiferous quartz-feldspar-cordierite porphyritic lava, tuff, ashstone and ignimbrite.

The site lies within the Lachlan River catchment with drainages being poorly defined and highly altered with no named waterways. Owing to the poorly defined drainages there is only one farm dam on site along Hartley Street. The Lachlan River lies around 650m to the north of Lachlan Avenue and around 1.5km to the east of Hartley Street. Around 12ha of the northeastern extent of the site lies within the Cowra (2012) Local Environment Plan flood planning area, around Lachlan Avenue and Commelia Road.

There are 13 registered groundwater bores on site, nine used for water supply, two for stock and domestic, one for irrigation, and one for monitoring (**Attachment B**). Groundwater is a resource in the locale owing to the limited surface water. The bores with information about the substrate are constructed into a mix of alluvial material and the underlying geology (described as granite) with water bearing zones intersected at between 20.2m and 83m below ground level. The bores are low yielding ranging from 0.126 litres per second to 1.6 litres per second with the higher yields found in the alluvial material north of Grenfell Road. Some interflow and throughflow could exist in the transferral, colluvial, and alluvial soils after periods of extended wet weather but was not observed during the site investigation. Interflow being subsurface runoff in the unsaturated zone that may return to the surface as overland flow as elevation and relative incline decreases, most likely to occur on lower slopes and elevated drainage basins. Most of the site lies within the Cowra (2012) Local Environmental Plan 2012 groundwater vulnerability area.

Cowra's climate is typified by warm summers and cool winters. The long term (1889-2023) average annual rainfall for Cowra is 595mm per annum and is evenly spread with evaporation (1590mm per annum) exceeding rainfall in all months except for June and July, see **Attachment C**.

Records of fieldwork, including methods and results

A moderately high (detailed) sampling intensity level was chosen for the site and soil assessment as the objective was detailed project planning by reference to McKenzie et. al (2008) Guidelines for Surveying Soil and Land Resources.

The methodology for the distribution of sample points was an integrated survey where the assumption was made that land characteristics are interdependent and tend to occur in correlated sets. This methodology is justified by the general relationship between toposquences and soil types of the Koorawatha-Billimari soil landscape outlined in the Soil Landscapes of the Bathurst 1:250,000 Sheet (Kovac M., Murphy B.W. and Lawrie J.A., 2010).

Soil profiles were described in general accordance with the Australian Soil and Land Survey Field Handbook (The National Committee on Soil and Terrain (NCST) (2009).

The sample depths were designed to satisfy the criteria outlined in DEC (2004) around the limitations of typical soil characteristics for effluent irrigation systems. The investigation depth was to a maximum of 4.5m with samples taken within major soil horizons for physico-chemical analysis in the upper profile and observations for depth to bedrock or hardpan and the water table in the deeper holes.

In situ soil permeability was tested in accordance with AS1547 (2012) – Appendix G, which sets out the Talsma-Hallam method of soil permeability measurement using a constant head permeameter. The permeameter apparatus is suitable for determining a soil permeability range of 0.009 to 2.9m/day. The design of the test apparatus limits the depth of permeability assessment to 0.5m depth. The test method is assessed to be suitable for comparison of results to the DEC (2004) guidelines, provided the assumptions of test validity are met.

Based on the above the sampling intensity, depths and subsequent field and laboratory analysis, the methodology is assessed to be suitable for the detailed project planning purposes.

The site and soil assessment identified four major soil types within the West Cowra Growth Area. The soil types are generally divided by the existing surface topography with upper elevations being typical of residual soil forming processes; upper to middle elevations typical of colluvial and transferral soil forming processes; elevated lower slopes and drainage basins typical of transferral soil forming processes, consisting of deeper colluvial silty slopewash topsoils; and lower elevations being typically higher in clay and silt content from alluvial additions on the Lachlan floodplain.

The soils identified exhibited the following soil characteristics:

Chromosol – Crests and upper slopes of undulating hills – Located in the south, approximate middle of Calare Street and extends in all directions until transitioning to midslopes.

A1 Horizon	Brown to reddish-brown sandy loam, granular structure, sandy fabric and a weak to firm consistence. Inferred moderate to high permeability. Non-saline and non-sodic. Slightly acidic. Fine to coarse roots common. Clear boundary to -
A2 Horizon	Pale reddish-brown sandy clay loam, granular structure, sandy fabric, and moderate consistence. Common stratified small to medium pebbles of rounded residual quartz. Inferred moderate to high permeability. Fine rootlets present. Diffuse boundary to -
B2 Horizon	Red sandy clay and clay, moderate sub-angular blocky pedality and firm to stiff consistence. Few to very few stratified small to medium pebbles of rounded residual quartz present in upper transitional zone (B1 Horizon). Moderate permeability and calculated available water holding capacity of 130-150mm/m. Non-saline and non-sodic. Slightly alkaline. Well drained.

Chromosol – Mid slopes on undulating hills – Encompasses the majority of the West Cowra Growth Area, extending from the south off the crests and upper slopes to the north until intersection with alluvial plains. Excludes lower slopes and elevated drainage basins.

A1 Horizon	Brown fine sandy clay loam, granular structure, sandy fabric and a weak to firm consistence. Inferred moderate to high permeability. Non-saline and non-sodic. pH approximately neutral, range of slightly acidic to slightly alkaline. Fine to coarse roots common. Clear boundary to -
A2 Horizon	Yellowish-brown sandy clay loam, massive, earthy fabric, moderate consistence. Inferred moderate to high permeability. Fine rootlets present. Clear boundary to -
B2 Horizon	Brown-yellow to yellow clay to sandy clay, moderate sub-angular blocky pedality and firm to stiff consistence. Moderate permeability and calculated available water holding capacity of 130-150mm/m. Non-saline and non-sodic. Slightly alkaline. Moderately well drained.

Chromosol – Lower slopes of undulating hills and elevated drainage basins – Located in the approximate centre of Killara Road between Cowra Road and end of street visually presents as an open depression.

A1 Horizon	Pale yellow-brown silty clay loam, granular pedality, earthy fabric and weak consistence. Inferred moderate to high permeability. Non-saline and non-sodic. Slightly alkaline. Fine to coarse roots common. Clear boundary to -
A2 Horizon	Yellow-brown silty clay loam, massive, moderate consistence. Inferred moderate to high lateral permeability. Fine rootlets present. Abrupt boundary to -
B2 Horizon	Brown-yellow silty clay, moderate sub-angular blocky pedality, firm to stiff consistence. Moderate permeability and calculated available water holding capacity of 100-130mm/m. Non-saline and non-sodic. Slightly alkaline. Imperfect to moderately well-drained.

Alluvial Tenosols – Located on the north-eastern boundary of the West Cowra Growth Area, limited to the alluvial plains, and do not extend onto lower slopes.

A1 Horizon	Dark brown silty loam, moderate granular pedality, earthy fabric and weak to firm consistence. Inferred moderate to high permeability. Non-saline and non-sodic. Slightly acidic. Fine to coarse roots common. Clear boundary to -
B21 Horizon	Yellow-brown clay loam, firm consistence, and earthy fabric. Inferred low to moderate permeability. Fine rootlets present. Abrupt boundary to -
2A2 Horizon	Bleached brown silt, massive, weak consistence. Inferred high lateral permeability. Diffuse boundary to -
2B22 Horizon	Dark brown silty clay, weak to moderate polyhedral pedality and firm to stiff consistence. Low permeability and calculated available water holding capacity of 110-120mm/m. Non-saline and non-sodic. Slightly acidic. Some fine rootlets, well drained.

A map of the investigation locations and soil types can be seen in **Attachment D**.

Field and laboratory results

Soil permeability testing results ranged from 6.5 to 167mm/hr and the results can be seen in **Attachment E**. The test assumptions of depth to water table, hardpan, bedrock, and saturated soils were met at all test locations and the results lie within the acceptable range of the test apparatus. As such, the soil permeability results are considered suitable for comparison to the DEC (2004) guidelines.

Discrete samples were obtained from the topsoil and subsoil from all investigated locations. Samples were analysed for chemical parameters pH (CaCl₂), electrical conductivity, exchangeable cations, exchangeable sodium percentage, phosphorus sorption; and physical parameter aggregate stability (Emerson class).

The topsoil chemical results are as follows:

- pH (CaCl₂) ranged from 5.6 to 6.4.
- Electrical conductivity ranged from 0.061 to 0.196 dS/m.
- Cation exchange capacity ranged from 3.29 to 28.76 cmol(+)/kg.
- Sodium % ranged from 0.3 to 5.3.
- Phosphorus sorption ranged from 24 to 748 mg/kg.

The subsoil chemical analysis results are as follows:

- pH (CaCl₂) ranged from 5.9-6.5.
- Electrical conductivity ranged from 0.046 to 0.181 dS/m.
- Cation exchange capacity ranged from 5.13 to 11.69 cmol(+)/kg.
- Sodium % ranged from 0.4 to 1.7.
- Phosphorus sorption ranged from 294 to 434 mg/kg.

The chemical analysis results can be seen in **Attachment F**.

The Emerson class number results were 4 and 5. Classes 4 and 5 indicate an aggregated soil with low likelihood of dispersibility and are unlikely to be sodic (**Attachment G**).

Summary of results

There are no significant limitations to note regarding the proposed siting of land application systems with a reduced lot size of 0.4ha, by reference to AS 1547 (2012). However, vertical, and horizontal setback distances from boundaries, dams, water courses, flood zoning, groundwater bores, and infrastructure will have to be considered in line with Council guidelines and AS1547 (2012) when designing the type and placement of land application systems. Setback distances should be assessed on a site-specific basis.

Risk to soil is assessed to be minimal given Council guidelines and industry best practices in accordance with published standards and guidelines are adhered to. Land application areas provided in this report have been sized to accommodate both effluent discharge volumes and nutrient load to ensure assimilation of discharged nutrients and net zero water storage is achieved with a reduced lot size of 0.4ha.

The planning proposal presents a limited risk to surface waters and groundwater. Surface waters do not concentrate within the West Cowra Growth Area, with rainfall likely to infiltrate then run off into the relatively permeable soil. Surface waters to the east in existing built-up areas are conveyed to the Lachlan River by municipal stormwater networks, and surface waters to the west are likely to end up in Crowther Creek, a tributary to the Lachlan River. Land application areas are designed to achieve a net zero water storage, reducing the risk of overland flow, interflow, and offsite migration of surface waters. Groundwater is at deep depths in the West Cowra Growth Area and typically there is a low level of connectivity to groundwater in the underlying geology, NSW DPI (2018) Lachlan Alluvium Water Resource Plan—Groundwater Resource Description.

The chemical analysis and physical testing conducted characterises the site as having nil or slight limitations compared to the DEC (2004) guidelines (**Attachment H**), except for moderate limitations for pH, exchangeable sodium %, and saturated hydraulic conductivity which can be ameliorated with the addition of lime, gypsum, and organic matter. The moderate limitations identified do not preclude the West Cowra Growth Area planning proposal regarding wastewater management.

Aerated Wastewater Treatment Systems (AWTS) are recommended for treatment units with land application via drip or low-pressure spray irrigation. The AWTS is preferred over conventional septic tanks and trench disposal as:

- The AWTS offers the highest level of treatment compared to conventional septic tanks.
- The irrigated drip or spray also offers a low application risk owing to the comparatively large irrigation area compared to trenches or beds, meaning nutrients and bacteria are not concentrated.

To calculate the irrigation area required to effectively utilise the wastewater the volume of wastewater produced from the dwellings has been estimated based on the following population equivalent scenarios:

- Three bedrooms two living areas – 700L/day.
- Four bedrooms and two living areas – 840L/day.
- Five bedrooms and two living areas – 980L/day.

Based on such the following applies to the land application system sizing for a reduced lot size of 0.4ha using the design irrigation rates as presented in AS 1547 (2012) for the soil types identified on site are as follows:

Chromosols and Alluvial Tenosols – Crests, upper slopes and mid slopes on undulating hills and alluvial plains.

- A land application area of 298m² for a three-bedroom house with two living areas.
- A land application area of 358m² for a four-bedroom house with two living areas.
- A land application area of 417m² for a five-bedroom house with two living areas.

Chromosol – Lower slopes of undulating hills and elevated drainage basins

- A land application area of 246m² for a three-bedroom house with two living areas.
- A land application area of 295m² for a four-bedroom house with two living areas.
- A land application area of 344m² for a five-bedroom house with two living areas.

The water balance calculations can be seen in **Attachment I**.

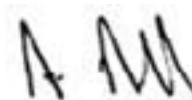
If you have any queries about the contents of this assessment, please contact the undersigned.

Yours sincerely,



David McMahon

Certified Professional Soil Scientist
Certified Environmental Practitioner
(Site Contamination Specialist)
BAppSc (Ag) GradDip (Water) MEnvMgmt
MALGA MEIANZ MSSA



Alexander Rudd

Certified Professional Soil Scientist
BSc
MAGS MEIANZ MSSA



Disclaimer

The information contained in this report has been extracted from sources believed to be reliable and accurate. DM McMahon Pty Ltd will not assume any responsibility for the misinterpretation of information supplied in this report. The accuracy and reliability of recommendations identified in this report need to be evaluated with due care according to individual circumstances. The results of the assessment undertaken are an overall representation of the conditions encountered. It should be noted that the recommendations and findings in this report are based solely upon the said site location and the ground level conditions at the time of testing. The results of the said investigations undertaken are an overall representation of the conditions encountered. The properties of the soil within the location may change due to variations in ground conditions outside of the tested area. The author has no control or liability over site variability that may warrant further investigation that may lead to significant design changes.

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Attachments

- A.** Location map and site map
- B.** Registered groundwater bore information
- C.** Climate data
- D.** Investigation locations and soil type mapping
- E.** Soil permeability results
- F.** Chemical analysis laboratory results
- G.** Emerson class number laboratory results
- H.** Soil characterisation
- I.** Water balance



Attachment A : *Location map and site map*

West Cowra Growth Area

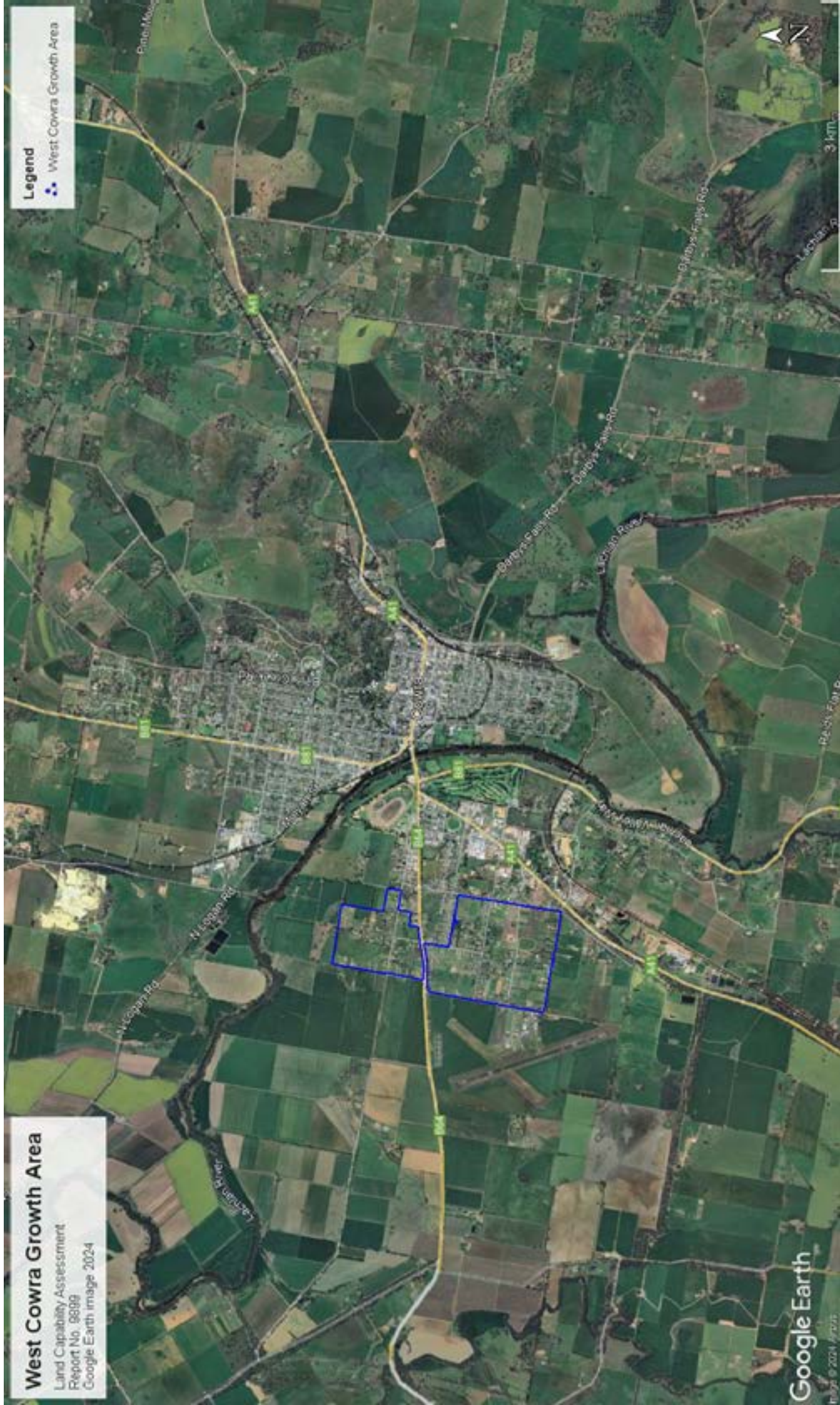
Land Capability Assessment
Report No. 9899
Google Earth image 2024

Legend

West Cowra Growth Area

Google Earth

Maps © 2024 Apple

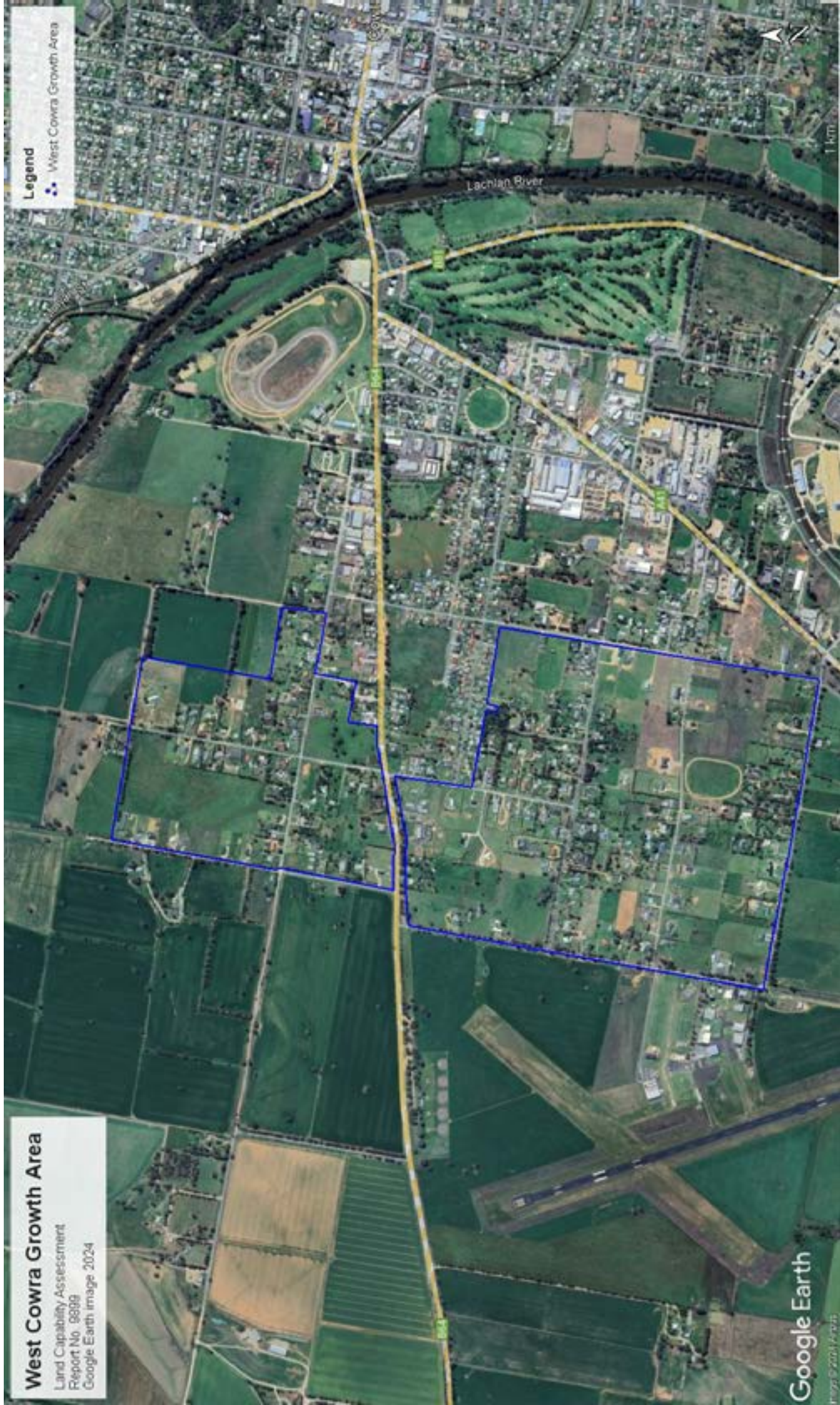


West Cowra Growth Area

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West Cowra Growth Area

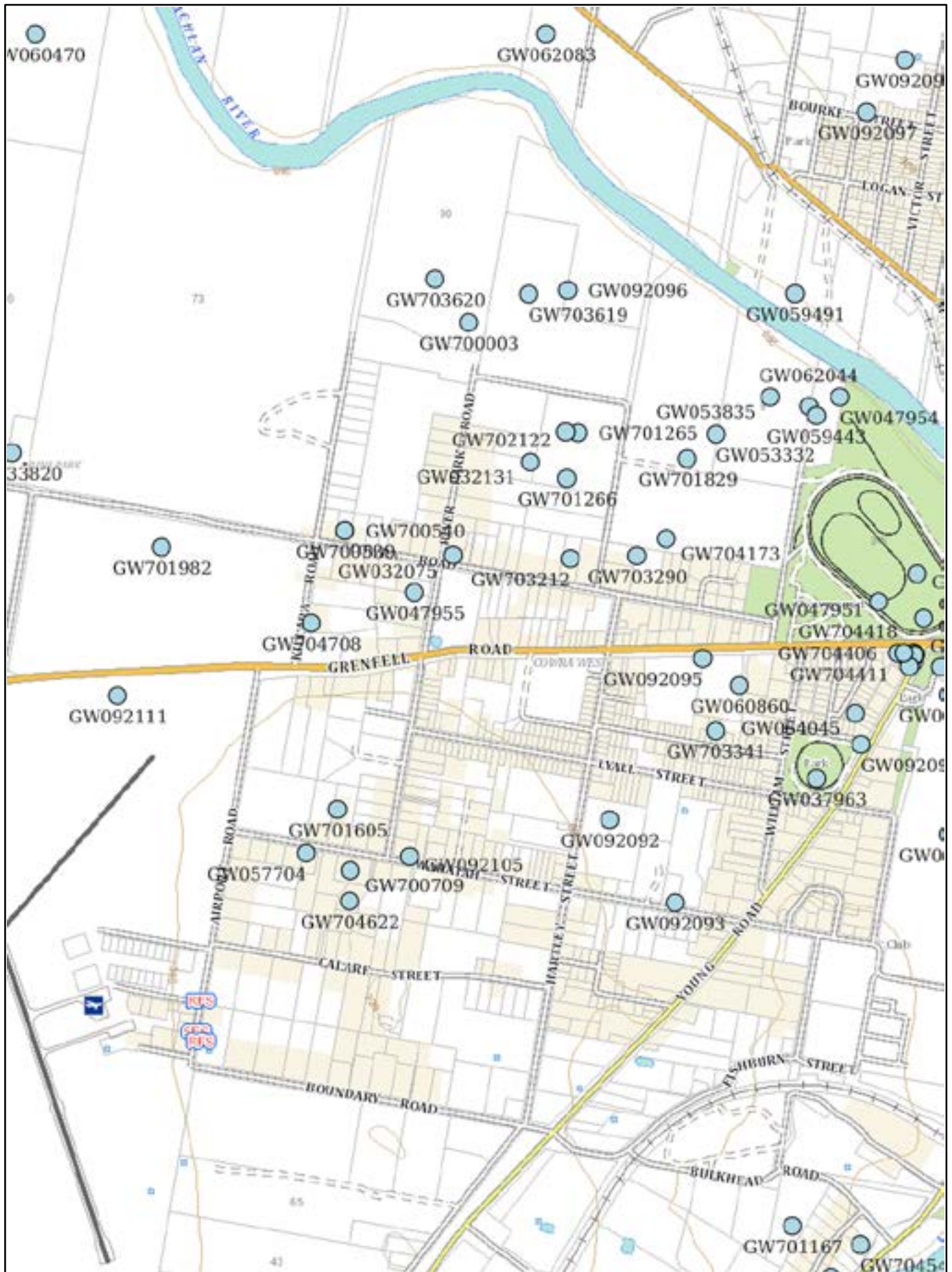
West Cowra Growth Area

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Attachment B : *Registered groundwater bore information*

West Cowra Growth Area Registered Bores



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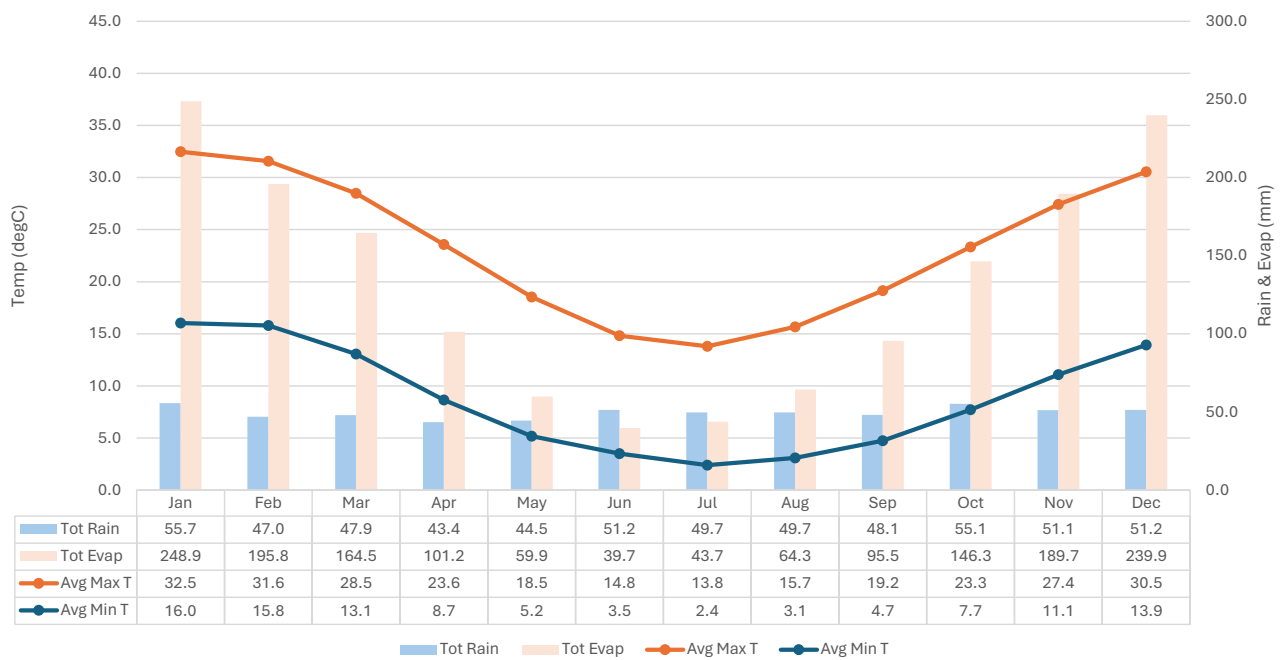
West Cowra Growth Area - Registered Bore Summary

Bore ID	Drilled Date	Purpose	Status	Bore Depth (m)	Water bearing zone (m)	Geology	Yield m/s	Latitude	Longitude
GW032075.1.1	?	Stock and Domestic	Unknown	21.3	?	?	?	-33.836246	148.650810
GW032131.1.1	1968-01-01	Stock and Domestic	Unknown	11.3	?	?	?	-33.831816	148.652389
GW047955.1.1	1983-03-01	Water Supply	Proposed	23.6	?	Granite	?	-33.840942	148.657583
GW057704.1.1	1980-04-01	Irrigation	Unknown	48.8	?	Granite	?	-33.831322	148.658971
GW092105.1.1	1997-02-21	Monitoring	Proposed	5.7	?	Gravel	?	-33.833165	148.661472
GW700539.1.1	1990-12-16	Water Supply	Unknown	53.0	?	Clay	?	-33.825109	148.663416
GW700540.1.1	1991-12-18	Water Supply	Functioning	26.0	20.2	Granite	0.760	-33.824261	148.665579
GW700709.1.1	1998-01-12	Water Supply	Functioning	76.2	62.5	Granite	0.760	-33.829276	148.665639
GW701605.1.1	2003-07-02	Water Supply	Removed	96.0	?	?	?	-33.824144	148.666979
GW703212.1.1	2006-12-20	Water Supply	Functioning	24.0	22.5	Gravel	1.330	-33.839949	148.668486
GW703290.1.1	2008-03-25	Water Supply	Functioning	22.7	20.7	Sand	1.600	-33.832072	148.669459
GW704622.1.1	2013-05-04	Water Supply	Functioning	94.0	83	Granite	0.126	-33.835134	148.671828
GW704708.1.1	2014-02-19	Water Supply	Functioning	29.5	29	Sand	1.000	-33.8373	148.672295



Attachment C : *Climate data*

West Cowra - Climate Summary 1889-2024 (Source SILO data drill)





Attachment D : *Investigation locations and soil type mapping*

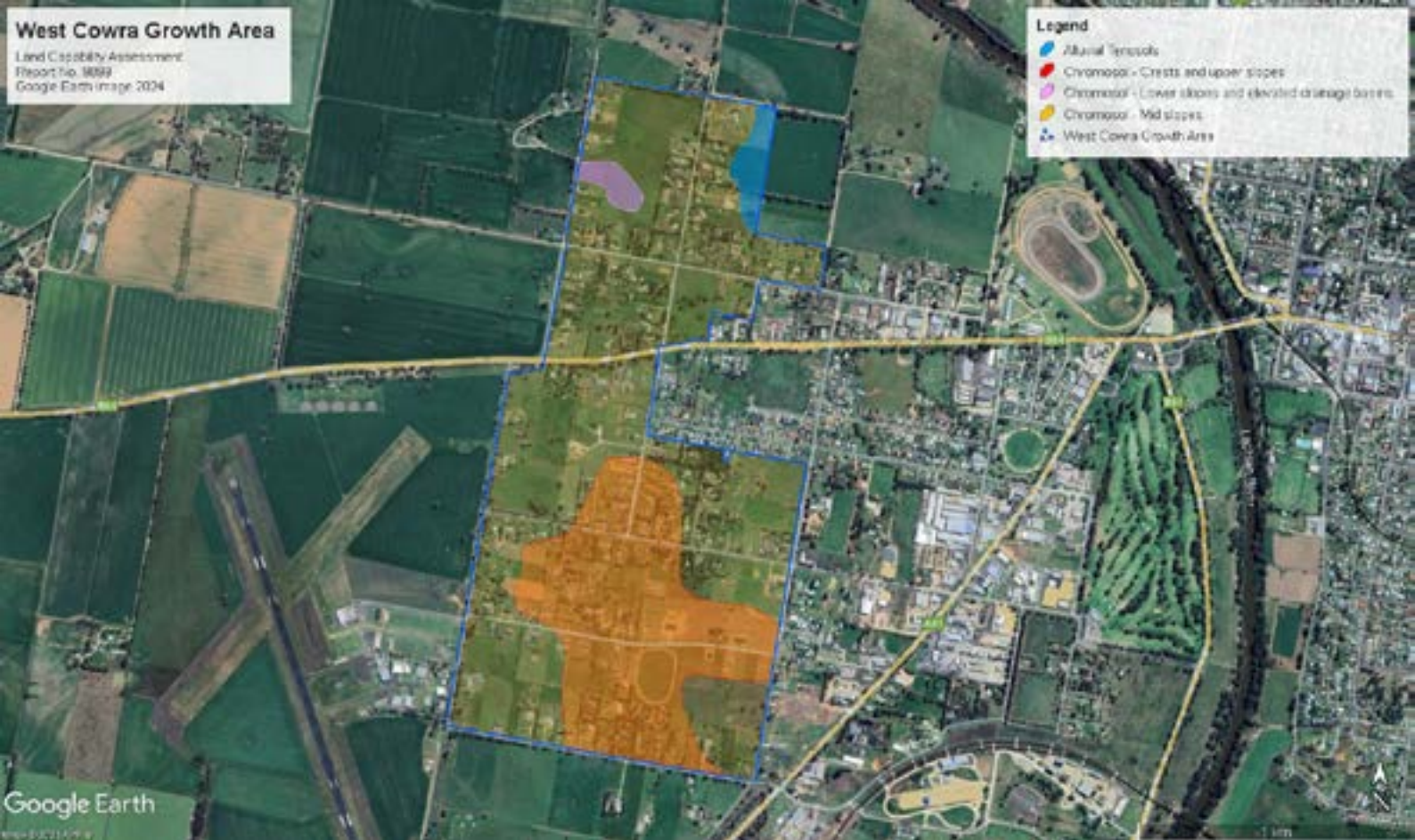
West Cowra Growth Area

Land Capability Assessment
Report No. 9899
Google Earth image 2024

Legend

- Bore holes (deep)
- Soil check inc. permeability
- West Cowra Growth Area







Attachment E : *Soil permeability results*

DM McMahon Pty Ltd
PO Box 6118
WAGGA WAGGA NSW 2650
Ph: 0269 310 510



Soil Permeability
Using a well permeameter.
AS/NZS 1547 Appendix G

JOB NO.: 9899

CLIENT: Cowra Council

JOB DESCRIPTION: West Cowra Growth Area

Equipment ID: Well Permeameter

Test Hole:	S01		S02		S03		S04		S05		S06	
Tested By:	AR		AR		AR		AR		AR		AR	
Date:	12/03/2024		12/03/2024		12/03/2024		12/03/2024		12/03/2024		12/03/2024	
Time (mm:ss)	Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)	
0:00	245		270		280		275		180		225	
0:30	220		250		225		265		0		165	
1:00	200		235		180		245				140	
1:30	185		220		130		230				120	
2:00	170		205		85		215				100	
2:30	155		190		45		205				85	
3:00	135		170		5		195				65	
3:30	120		155				185				50	
4:00	105		140				170				35	
4:30	95		125				155				20	
5:00	80		107				145				5	
5:30	65		93				135					
6:00	50		76				125					
6:30	40		60				115					
7:00	30		45				105					
7:30	20		32				95					
Q (cm/min)	2		2.8		8		2		36		3	

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PO Box 6118
WAGGA WAGGA NSW 2650
Ph: 0269 310 510



Soil Permeability
Using a well permeameter.
AS/NZS 1547 Appendix G

JOB NO.: 9899

CLIENT: Cowra Council

JOB DESCRIPTION: West Cowra Growth Area

Equipment ID: Well Permeameter

Test Hole:	S07		S08		S09		S10		S11		S12	
Tested By:	AR		AR		AR		AR		AR		AR	
Date:	12/03/2024		12/03/2024		12/03/2024		12/03/2024		12/03/2024		12/03/2024	
Time (mm:ss)	Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)	
0:00	260				290		295		270		210	
0:30	230		265		275		225		210		204	
1:00	210		220		265		150		175		195	
1:30	180		180		255		95		130		185	
2:00	165		140		245		50		90		175	
2:30	150		110		235		0		45		170	
3:00	135		75		225				5		160	
3:30	120		45		215						155	
4:00	105		10		205						150	
4:30	95				195						140	
5:00	85				185						135	
5:30	75				175						130	
6:00	65				165						125	
6:30					155						120	
7:00					145						115	
7:30					135						105	
Q (cm/min)	2		6.5		2		10		8.5		1.5	

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Soil Permeability
Using a well permeameter.
AS/NZS 1547 Appendix G
JOB NO.: 9899

CLIENT: Cowra Council

JOB DESCRIPTION: West Cowra Growth Area

Equipment ID: Well Permeameter

Test Hole:	S13		S14		S15		-		-		-	
Tested By:	AR		AR		AR		-		-		-	
Date:	12/03/2024		12/03/2024		12/03/2024		-		-		-	
Time (mm:ss)	Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)		Permeameter Level (mm)	
0:00	280		225		285		-		-		-	
0:30	270		200		245		-	-	-	-	-	-
1:00	260		180		205		-	-	-	-	-	-
1:30	250		160		170		-	-	-	-	-	-
2:00	240		145		140		-	-	-	-	-	-
2:30	230		125		105		-	-	-	-	-	-
3:00	220		110		70		-	-	-	-	-	-
3:30	210		95		40		-	-	-	-	-	-
4:00	205		75		5		-	-	-	-	-	-
4:30	195		60				-	-	-	-	-	-
5:00	190		45				-	-	-	-	-	-
5:30	180		30				-	-	-	-	-	-
6:00	175		15				-	-	-	-	-	-
6:30	165		0				-	-	-	-	-	-
7:00	155						-	-	-	-	-	-
7:30	150						-	-	-	-	-	-
Q (cm/min)	1.5		3		6.5		-		-		-	
							-		-		-	
							-		-		-	



Attachment F : *Chemical analysis laboratory results*

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PO Box 6118 6 Jones Street
Wagga Wagga NSW 2650
Attention: David McMahon

Monday, March 25, 2024



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REPLACEMENT LABORATORY ANALYSIS REPORT

This Report Replaces Report Sent on 22/03/2024

Report Number: 2403-0044

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For all enquiries related to this report please quote document number: 2403-0044

Facility:	Order #	Date Analysis Commenced
	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0103	S01/1 13.03.24	Calcium, exchangeable	1120 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	5.60 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	136 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	270 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	2.22 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	344 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.4 pH units	LTM-S-004	
		Potassium, exchangeable	101 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.26 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	40 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.17 cmol/kg	LTM-S-005	0.02
24Mar-0104	S01/2 13.03.24	Calcium, exchangeable	834 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	4.17 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	81 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	240 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.98 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	411 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.0 pH units	LTM-S-004	
		Potassium, exchangeable	65 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.17 cmol/kg	LTM-S-005	0.05

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Facility:	Order #	Date Analysis Commenced
	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0104	S01/2 13.03.24	Sodium, exchangeable	44 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.19 cmol/kg	LTM-S-005	0.02
24Mar-0105	S02/1 13.03.24	Calcium, exchangeable	1340 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	6.70 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	182 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	215 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.77 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	120 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.7 pH units	LTM-S-004	
		Potassium, exchangeable	207 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.53 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	38 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.16 cmol/kg	LTM-S-005	0.02
24Mar-0106	S02/2 13.03.24	Calcium, exchangeable	1530 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	7.65 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	103 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	327 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	2.69 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	383 mg/kg	* R&L 9I2a	

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	9899	14-March-2024

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Soil	A. Rudd	14-March-2024

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
24Mar-0106	S02/2 13.03.24	pH (1:5 soil/water)	6.9 pH units	LTM-S-004	
		Potassium, exchangeable	147 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.38 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	48 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.21 cmol/kg	LTM-S-005	0.02
24Mar-0107	S03/1 13.03.24	Calcium, exchangeable	1550 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	7.75 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	146 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	287 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	2.36 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	434 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.9 pH units	LTM-S-004	
		Potassium, exchangeable	211 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.54 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	36 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.16 cmol/kg	LTM-S-005	0.02
24Mar-0108	S03/2 13.03.24	Calcium, exchangeable	1390 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	6.95 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	106 µS/cm	LTM-S-003	1

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Facility:	Order #	Date Analysis Commenced
	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0108	S03/2 13.03.24	Magnesium, exchangeable	342 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	2.82 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	613 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.1 pH units	LTM-S-004	
		Potassium, exchangeable	200 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.51 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	44 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.19 cmol/kg	LTM-S-005	0.02
24Mar-0109	S04/1 13.03.24	Calcium, exchangeable	975 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	4.88 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	111 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	135 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.11 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	114 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.0 pH units	LTM-S-004	
		Potassium, exchangeable	174 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.44 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	15 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.06 cmol/kg	LTM-S-005	0.02
24Mar-0110	S04/2 13.03.24				

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Wagga Wagga NSW 2650
Attention: David McMahon

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
	9899	14-March-2024

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Soil	A. Rudd	14-March-2024

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
24Mar-0110	S04/2 13.03.24	Calcium, exchangeable	1150 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	5.75 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	46 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	504 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	4.15 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	484 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.1 pH units	LTM-S-004	
		Potassium, exchangeable	125 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.32 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	56 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.24 cmol/kg	LTM-S-005	0.02

24Mar-0111	S05/1 13.03.24	Calcium, exchangeable	1580 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	7.90 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	142 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	192 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.58 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	288 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.6 pH units	LTM-S-004	
		Potassium, exchangeable	178 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.46 cmol/kg	LTM-S-005	0.05

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Facility:	Order #	Date Analysis Commenced
	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0111	S05/1 13.03.24	Sodium, exchangeable	18 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.08 cmol/kg	LTM-S-005	0.02
24Mar-0112	S05/2 13.03.24	Calcium, exchangeable	1380 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	6.90 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	85 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	199 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.64 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	294 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.9 pH units	LTM-S-004	
		Potassium, exchangeable	42 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.11 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	19 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.08 cmol/kg	LTM-S-005	0.02
24Mar-0113	S06/1 13.03.24	Calcium, exchangeable	922 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	4.61 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	109 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	143 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.18 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	333 mg/kg	* R&L 9I2a	

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<u>Facility:</u>	<u>Order #</u>	<u>Date Analysis Commenced</u>
	9899	14-March-2024

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Soil	A. Rudd	14-March-2024

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
24Mar-0113	S06/1 13.03.24	pH (1:5 soil/water)	6.9 pH units	LTM-S-004	
		Potassium, exchangeable	300 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.77 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	13 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.06 cmol/kg	LTM-S-005	0.02
24Mar-0114	S06/2 13.03.24	Calcium, exchangeable	1050 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	5.25 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	82 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	211 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.74 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	506 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.9 pH units	LTM-S-004	
		Potassium, exchangeable	321 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.82 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	17 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.07 cmol/kg	LTM-S-005	0.02
24Mar-0115	S07/1 13.03.24	Calcium, exchangeable	1790 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	8.95 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	196 µS/cm	LTM-S-003	1

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Facility:	Order #	Date Analysis Commenced
	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0115	S07/1 13.03.24	Magnesium, exchangeable	108 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	0.89 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	210 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.9 pH units	LTM-S-004	
		Potassium, exchangeable	154 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.39 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	11 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.05 cmol/kg	LTM-S-005	0.02
24Mar-0116	S07/2 13.03.24	Calcium, exchangeable	1190 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	5.95 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	116 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	80 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	0.66 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	322 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.0 pH units	LTM-S-004	
		Potassium, exchangeable	70 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.18 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	8 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.04 cmol/kg	LTM-S-005	0.02
24Mar-0117	S08/1 13.03.24				

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Monday, March 25, 2024



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	9899	14-March-2024

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Soil	A. Rudd	14-March-2024

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
24Mar-0117	S08/1 13.03.24	Calcium, exchangeable	1980 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	9.90 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	169 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	141 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.16 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	434 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.9 pH units	LTM-S-004	
		Potassium, exchangeable	207 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.53 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	22 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.10 cmol/kg	LTM-S-005	0.02

24Mar-0118	S08/2 13.03.24	Calcium, exchangeable	5230 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	26.2 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	181 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	158 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.30 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	742 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.9 pH units	LTM-S-004	
		Potassium, exchangeable	422 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	1.08 cmol/kg	LTM-S-005	0.05

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	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0118	S08/2 13.03.24	Sodium, exchangeable	42 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.18 cmol/kg	LTM-S-005	0.02
24Mar-0119	S09/1 13.03.24	Calcium, exchangeable	1370 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	6.85 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	128 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	72 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	0.59 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	24 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.9 pH units	LTM-S-004	
		Potassium, exchangeable	95 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.24 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	<5 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	<0.02 cmol/kg	LTM-S-005	0.02
24Mar-0120	S09/2 13.03.24	Calcium, exchangeable	1580 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	7.90 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	93 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	216 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.78 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	467 mg/kg	* R&L 9I2a	

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	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0120	S09/2 13.03.24	pH (1:5 soil/water)	7.0 pH units	LTM-S-004	
		Potassium, exchangeable	167 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.43 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	16 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.07 cmol/kg	LTM-S-005	0.02
24Mar-0121	S10/1 13.03.24	Calcium, exchangeable	551 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	2.76 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	80 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	56 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	0.46 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	232 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.2 pH units	LTM-S-004	
		Potassium, exchangeable	<20 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	<0.05 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	<5 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	<0.02 cmol/kg	LTM-S-005	0.02
24Mar-0122	S10/2 13.03.24	Calcium, exchangeable	1070 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	5.35 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	52 µS/cm	LTM-S-003	1

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	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0122	S10/2 13.03.24	Magnesium, exchangeable	271 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	2.23 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	613 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.3 pH units	LTM-S-004	
		Potassium, exchangeable	135 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.34 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	12 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.05 cmol/kg	LTM-S-005	0.02
24Mar-0123	S11/1 13.03.24	Calcium, exchangeable	1110 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	5.55 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	125 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	70 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	0.58 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	350 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.1 pH units	LTM-S-004	
		Potassium, exchangeable	34 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.09 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	<5 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	<0.02 cmol/kg	LTM-S-005	0.02
24Mar-0124	S11/2 13.03.24				

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Facility:	Order #	Date Analysis Commenced
	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0124	S11/2 13.03.24	Calcium, exchangeable	1200 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	6.00 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	77 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	177 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.46 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	535 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.2 pH units	LTM-S-004	
		Potassium, exchangeable	51 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.13 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	22 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.10 cmol/kg	LTM-S-005	0.02
24Mar-0125	S12/1 13.03.24	Calcium, exchangeable	745 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	3.72 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	61 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	153 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.26 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	361 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.2 pH units	LTM-S-004	
		Potassium, exchangeable	<20 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	<0.05 cmol/kg	LTM-S-005	0.05

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	9899	14-March-2024

<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Soil	A. Rudd	14-March-2024

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
24Mar-0125	S12/1 13.03.24	Sodium, exchangeable	12 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.05 cmol/kg	LTM-S-005	0.02
24Mar-0126	S12/2 13.03.24	Calcium, exchangeable	952 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	4.76 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	76 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	420 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	3.46 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	490 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.5 pH units	LTM-S-004	
		Potassium, exchangeable	91 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.23 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	109 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.47 cmol/kg	LTM-S-005	0.02
24Mar-0127	S13/1 13.03.24	Calcium, exchangeable	997 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	4.98 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	102 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	162 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.33 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	394 mg/kg	* R&L 9I2a	

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Facility:	Order #	Date Analysis Commenced
	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0127	S13/1 13.03.24	pH (1:5 soil/water)	7.1 pH units	LTM-S-004	
		Potassium, exchangeable	43 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.11 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	<5 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	<0.02 cmol/kg	LTM-S-005	0.02
24Mar-0128	S13/2 13.03.24	Calcium, exchangeable	1170 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	5.85 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	77 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	252 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	2.07 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	580 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.2 pH units	LTM-S-004	
		Potassium, exchangeable	120 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.31 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	6 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.03 cmol/kg	LTM-S-005	0.02
24Mar-0129	S14/1 13.03.24	Calcium, exchangeable	740 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	3.70 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	62 µS/cm	LTM-S-003	1

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	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0129	S14/1 13.03.24	Magnesium, exchangeable	25 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	0.21 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	282 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.1 pH units	LTM-S-004	
		Potassium, exchangeable	<20 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	<0.05 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	<5 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	<0.02 cmol/kg	LTM-S-005	0.02
24Mar-0130	S14/2 13.03.24	Calcium, exchangeable	701 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	3.50 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	49 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	189 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	1.56 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	540 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.2 pH units	LTM-S-004	
		Potassium, exchangeable	21 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.05 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	<5 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	<0.02 cmol/kg	LTM-S-005	0.02
24Mar-0131	S15/1 13.03.24				

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	9899	14-March-2024

Sample Type	Collected By	Date Received
Soil	A. Rudd	14-March-2024

EAL ID	Client ID. Date/Time sample taken	Test	Result (units)	Method Reference	Limit of Reporting
24Mar-0131	S15/1 13.03.24	Calcium, exchangeable	580 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	2.90 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	62 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	70 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	0.58 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	243 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	6.8 pH units	LTM-S-004	
		Potassium, exchangeable	<20 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	<0.05 cmol/kg	LTM-S-005	0.05
		Sodium, exchangeable	<5 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	<0.02 cmol/kg	LTM-S-005	0.02

24Mar-0132	S15/2 13.03.24	Calcium, exchangeable	1450 mg/kg	* LTM-S-005	5
		Calcium, soluble/exchangeable	7.25 cmol/kg	LTM-S-005	0.02
		Conductivity (1:5 soil/water)	84 µS/cm	LTM-S-003	1
		Magnesium, exchangeable	593 mg/kg	* LTM-S-005	2
		Magnesium, soluble/exchangeable	4.88 cmol/kg	LTM-S-005	0.02
		Phosphorous Sorption	748 mg/kg	* R&L 9I2a	
		pH (1:5 soil/water)	7.1 pH units	LTM-S-004	
		Potassium, exchangeable	182 mg/kg	* LTM-S-005	20
		Potassium, soluble/exchangeable	0.46 cmol/kg	LTM-S-005	0.05

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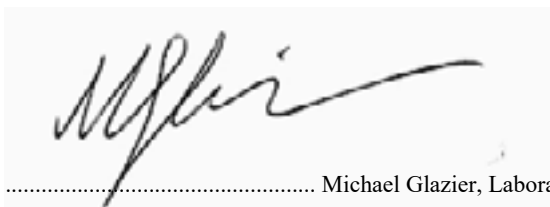
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	9899	14-March-2024
<u>Sample Type</u>	<u>Collected By</u>	<u>Date Received</u>
Soil	A. Rudd	14-March-2024

<u>EAL ID</u>	<u>Client ID.</u> Date/Time sample taken	<u>Test</u>	<u>Result (units)</u>	<u>Method Reference</u>	<u>Limit of Reporting</u>
24Mar-0132	S15/2 13.03.24	Sodium, exchangeable	36 mg/kg	* LTM-S-005	5
		Sodium, soluble/exchangeable	0.16 cmol/kg	LTM-S-005	0.02

Note:

* NATA Accreditation does not cover the performance of this service.



Signed Michael Glazier, Laboratory Manager.

All samples analysed as received.
All soil results are reported on a dry basis.
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Attachment G : *Emerson class number laboratory results*

Material Test Report

Report Number: 9899-1
Issue Number: 1
Date Issued: 25/03/2024
Client: Cowra Council

Contact: Janine Finlayson
Project Number: 9899
Project Name: Emerson Class
Project Location: Cowra NSW 2794
Work Request: 1787
Dates Tested: 21/03/2024 - 22/03/2024
Location: Cowra NSW 2794



DM McMahon Pty Ltd
Wagga Wagga Laboratory
6 Jones Street Wagga Wagga NSW 2650
Phone: (02) 6931 0510
Email: han@dmmcmahon.com.au



Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Dr Hoang Han Nguyen
Lab manager
NATA Accredited Laboratory Number: 3349

Sample Details						
Sample Number	1787A	1787B	1787C	1787D	1787E	
Date Sampled	13/03/2024	13/03/2024	13/03/2024	13/03/2024	13/03/2024	
Sample Location	S01 E: 653554 N: 6255930	S01 E: 653554 N: 6255930	S02 E: 654176 N: 6255763	S02 E: 654176 N: 6255763	S03 E: 653478 N: 6255569	
Sample Depth	0.0-0.4 m	0.4-1.0 m	0.0-0.4 m	0.4-1.0 m	0.0-0.4 m	
Material	CLAY	CLAY	CLAY	CLAY	CLAY	
Emerson Class Number of a Soil (AS 1289 3.8.1)						Min Max
Soil Description	Clay	Clay	Clay	Clay	Clay	
Nature of Water	Deionised	Deionised	Deionised	Deionised	Deionised	
Temperature of Water (°C)	20.0	20.0	20.0	20.0	20.0	
Emerson Class	5	5	5	5	5	

Material Test Report

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NATA Accredited Laboratory Number: 3349

Sample Details							
Sample Number	1787F	1787G	1787H	1787I	1787J		
Date Sampled	13/03/2024	13/03/2024	13/03/2024	13/03/2024	13/03/2024		
Sample Location	S03 E: 653478 N: 6255569	S04 E: 653857 N: 6255284	S04 E: 653854 N: 6255284	S05 E: 654388 N: 6255345	S05 E: 654388 N: 6255345		
Sample Depth	0.4-1.0 m	0.0-0.4 m	0.4-1.0 m	0.0-0.4 m	0.4-1.0 m		
Material	CLAY	CLAY	CLAY	CLAY	CLAY		
Emerson Class Number of a Soil (AS 1289 3.8.1)						Min	Max
Soil Description	Clay	Clay	Clay	Clay	Clay		
Nature of Water	Deionised	Deionised	Deionised	Deionised	Deionised		
Temperature of Water (°C)	20.0	20.0	20.0	20.0	20.0		
Emerson Class	5	5	5	5	5		

Material Test Report

Report Number: 9899-1
Issue Number: 1
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Sample Details							
Sample Number	1787K	1787L	1787M	1787N	1787O		
Date Sampled	13/03/2024	13/03/2024	13/03/2024	13/03/2024	13/03/2024		
Sample Location	S06 E: 653363 N: 6254867	S06 E: 653363 N: 6254867	S07 E: 653927 N: 6254917	S07 E: 653927 N: 6254917	S08 E: 653184 N: 6254728		
Sample Depth	0.0-0.4 m	0.4-1.0 m	0.0-0.4 m	0.4-1.0 m	0.0-0.4 m		
Material	CLAY	CLAY	CLAY	CLAY	CLAY		
Emerson Class Number of a Soil (AS 1289 3.8.1)							Min Max
Soil Description	Clay	Clay	Clay	Clay	Clay		
Nature of Water	Deionised	Deionised	Deionised	Deionised	Deionised		
Temperature of Water (°C)	20.0	20.0	20.0	20.0	20.0		
Emerson Class	5	5	5	5	5		

Material Test Report

Report Number: 9899-1
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Date Issued: 25/03/2024
Client: Cowra Council

Contact: Janine Finlayson
Project Number: 9899
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Approved Signatory: Dr Hoang Han Nguyen
Lab manager
NATA Accredited Laboratory Number: 3349

Sample Details							
Sample Number	1787P	1787Q	1787R	1787S	1787T		
Date Sampled	13/03/2024	13/03/2024	13/03/2024	13/03/2024	13/03/2024		
Sample Location	S08 E: 653184 N: 6254728	S09 E: 653706 N: 6254610	S9 E: 653706 N: 6254610	S10 E: 654294 N: 6254391	S10 E: 654294 N: 6254391		
Sample Depth	0.4-1.0 m	0.0-0.4 m	0.4-1.0 m	0.0-0.4 m	0.4-1.0 m		
Material	CLAY	CLAY	CLAY	CLAY	CLAY		
Emerson Class Number of a Soil (AS 1289 3.8.1)						Min	Max
Soil Description	Clay	Clay	Clay	Clay	Clay		
Nature of Water	Deionised	Deionised	Deionised	Deionised	Deionised		
Temperature of Water (°C)	20.0	20.0	20.0	20.0	20.0		
Emerson Class	4 *	5	5	5	5		

Material Test Report

Report Number: 9899-1
Issue Number: 1
Date Issued: 25/03/2024
Client: Cowra Council

Contact: Janine Finlayson
Project Number: 9899
Project Name: Emerson Class
Project Location: Cowra NSW 2794
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Sample Details							
Sample Number	1787U	1787V	1787W	1787X	1787Y		
Date Sampled	13/03/2024	13/03/2024	13/03/2024	13/03/2024	13/03/2024		
Sample Location	S11 E: 653141 N: 6254331	S11 E: 653141 N: 6254331	S12 E: 654196 N: 6254107	S12 E: 654196 N: 6254107	S13 E: 653569 N: 6253844		
Sample Depth	0.0-0.4 m	0.4-1.0 m	0.0-0.4 m	0.4-1.0 m	0.0-0.4 m		
Material	CLAY	CLAY	CLAY	CLAY	CLAY		
Emerson Class Number of a Soil (AS 1289 3.8.1)						Min	Max
Soil Description	Clay	Clay	Clay	Clay	Clay		
Nature of Water	Deionised	Deionised	Deionised	Deionised	Deionised		
Temperature of Water (°C)	20.0	**	20.0	20.0	20.0		
Emerson Class	4 *	5	5	5	5		

Material Test Report

Report Number: 9899-1
Issue Number: 1
Date Issued: 25/03/2024
Client: Cowra Council

Contact: Janine Finlayson
Project Number: 9899
Project Name: Emerson Class
Project Location: Cowra NSW 2794
Work Request: 1787
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Approved Signatory: Dr Hoang Han Nguyen
Lab manager
NATA Accredited Laboratory Number: 3349

Sample Details						
Sample Number	1787Z	1787AA	1787AB	1787AC	1787AD	
Date Sampled	13/03/2024	13/03/2024	13/03/2024	13/03/2024	13/03/2024	
Sample Location	S13 E: 653569 N: 6253844	S14 E: 652995 N: 6253553	S14 E: 652995 N: 6253553	S15 E: 654048 N: 6253341	S15 E: 654048 N: 6253341	
Sample Depth	0.4-1.0 m	0.0-0.4 m	0.4-1.0 m	0.0-0.4 m	0.4-1.0 m	
Material	CLAY	CLAY	CLAY	CLAY	CLAY	
Emerson Class Number of a Soil (AS 1289 3.8.1)						Min Max
Soil Description	Clay	Clay	Clay	Clay	Clay	
Nature of Water	Deionised	Deionised	Deionised	Deionised	Deionised	
Temperature of Water (°C)	20.0	20.0	20.0	20.0	20.0	
Emerson Class	5	5	5	5	5	



Attachment H : *Soil characterisation*

Landform and soil characterisation – West Cowra Growth Area, Cowra NSW

Property	Result	Landform limitations			Restrictive Feature
		Nil or Slight	Moderate	Severe	
Slope (%) (for following irrigation methods): - flood/surface/underground - sprinkler - trickle/micro spray	n/a < 6 n/a	< 1 < 6 < 10	1 – 3 6 – 12 10 - 20	> 3 > 12 > 20	Excess runoff and erosion risk
Flooding	Nil risk on upper slopes. See CSC flood plan mapping for high risk areas adjacent to floodplain.	None or rare	Occasional	Frequent	Limited irrigation opportunities
Landform	Convex slope	crests, convex slopes and plains	concave slopes and foot-slopes	Drainage lines and incised channels	Erosion and seasonal water-logging risk
Surface rock outcrop (%)	Nil for majority of planning area.	Nil	0 -5	> 5	Interferes with irrigation and/or cultivation equipment; risk of runoff
	Moderate on upper crests to the south.				

Soil limitations

Property	Result	Nil or Slight	Moderate	Severe	Restrictive Feature
Exchangeable sodium percentage 0-40cm	0.3-0.4	0-5	5-10 ²	> 10	Structural degradation and waterlogging
Exchangeable sodium percentage (40-100 cm)	0.4-5.3	< 10	>10	—	Structural degradation and waterlogging
Salinity measured as electrical conductivity (ECe) (dS/m at 0-70cm)	0.52-1.69	< 2	2-4	> 4 ³	Excess salt may restrict plant growth
Salinity measured as electrical conductivity (ECe) (dS/m at 70-100cm)	0.40-1.56	< 4	4-8	> 8 ³	Excess salt may restrict plant growth, potential seasonal groundwater rise
Depth to top of seasonal high water table (metres)	> 3	> 3 ⁴	0.5-3 ⁴	< 0.5	Poor aeration, restricts plant growth, risk to groundwater ⁵
Depth to bedrock or hardpan (metres)	> 1	> 1	0.5-1	< 0.5	Restricts plant growth, excess runoff, waterlogging
Saturated hydraulic conductivity (Ks, mm/h, 0-100 cm)* Field tested to 50cm depth owing to apparatus limitations when tested in accordance with AS1547 (2012) – Appendix G.	6.5-157 Nil to Moderate limitations.	20-80	5-20 ⁶ or >80 ⁶	<5	Excess runoff, waterlogging, poor infiltration
Available water capacity (AWC, mm/m)	100-150	>100	<100 ⁶	-	Little plant-available water in reserve, risk to groundwater
Soil pH CaCl ₂ (surface layer)	5.6-6.4	>6-7.5	3.5-6.0	<3.5	Reduces optimum plant growth
Effective cation exchange capacity (ECEC, cmol (+)/kg, average 0-40 cm)	3.29-11.69	>15	3-15 ⁸	<3	Unable to hold plant nutrients
Emerson aggregate test (0-100cm)	4, 5	4, 5, 6, 7, 8	2, 3	1	Poor structure
Phosphorus (P) sorption (kg/ha at total 0-100 cm)	Moderate-High	high ⁹	moderate ⁹	Low	Unable to immobilise any excess phosphorus



Attachment I : *Water balance*

Water Balance

Irrigation area sizing using Nominated Area Water Balance & Storage Calculations																
Site Address:			West Cowra Growth Area													
Date:			March 2024				Assessor:		A. Rudd							
INPUT DATA																
Design Wastewater Flow	Q	700	L/day	Based on supplied data by client												
Design Irrigation Rate	DIR	3.5	mm/day	Based on soil texture class/permeability and derived from Table 5.2 of AS 1547:2012												
Nominated Land Application Area	L	246	m ²	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type ² Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff SILO Data Drill datasets (1889-2024) are constructed from observational records provided by the Bureau of Meteorology . SILO interpolates the raw data, which may contain missing values, to derive datasets which are both spatially and temporally complete.												
Crop Factor	C	0.8-1.0	unitless													
Rainfall Runoff Factor	RF	1	unitless													
Mean Monthly Rainfall Data	West Cowra Data Drill (-33.85, 148.65)															
Mean Monthly Pan Evaporation Data	West Cowra Data Drill (-33.85, 148.65)															
Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	365
Rainfall	R		mm/month	55.7	47.0	47.9	43.4	44.5	51.2	49.7	49.7	48.1	55.1	51.1	51.2	594.6
Evaporation	E		mm/month	248.9	195.8	164.5	101.2	59.9	39.7	43.7	64.3	95.5	146.3	189.7	239.9	1589.5
Crop Factor	C		unitless	1.00	1.00	0.90	0.90	0.80	0.80	0.80	0.80	0.80	0.90	0.90	1.00	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	249	196	148	91	48	32	35	51	76	132	171	240	1468.7
Percolation	B	DIRxD	mm/month	108.5	98	108.5	105.0	108.5	105.0	108.5	108.5	105.0	108.5	105.0	108.5	
Outputs		ET+B	mm/month	357.4	293.8	256.6	196.1	156.4	136.8	143.5	160.0	181.4	240.2	275.7	348.4	2746.2
INPUTS																
Retained Rainfall	RR	RxRF	mm/month	55.7	47.0	47.9	43.4	44.5	51.2	49.7	49.7	48.1	55.1	51.1	51.2	594.6
Applied Effluent	W	(QxD)/L	mm/month	88.2	79.7	88.2	85.4	88.2	85.4	88.2	88.2	85.4	88.2	85.4	88.2	1038.6
Inputs		RR+W	mm/month	143.9	126.6	136.1	128.8	132.7	136.6	137.9	137.9	133.5	143.3	136.4	139.5	1633.2
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-213.6	-167.2	-120.5	-67.3	-23.7	-0.2	-5.6	-22.1	-67.8	-139.3	-139.3	-208.9	
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Maximum Storage for Nominated Area	N		mm	0.00												
	V	NxL	L	0												
LAND AREA REQUIRED FOR ZERO STORAGE			m ²	72	79	104	138	194	246	231	197	158	117	93	73	
MINIMUM AREA REQUIRED FOR ZERO STORAGE:			246.0 m ²													

[illegible]

Water Balance

[illegible]

Water Balance

Irrigation area sizing using Nominated Area Water Balance & Storage Calculations																
Site Address:		West Cowra Growth Area														
Date:		March 2024				Assessor:		A. Rudd								
INPUT DATA																
Design Wastewater Flow	Q	700	L/day	Based on supplied data by client												
Design Irrigation Rate	DIR	3.0	mm/day	Based on soil texture class/permeability and derived from Table 5.2 of AS 1547:2012												
Nominated Land Application Area	L	298	m ²													
Crop Factor	C	0.8-1.0	unitless	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type ²												
Rainfall Runoff Factor	RF	1	unitless	Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff												
Mean Monthly Rainfall Data	West Cowra Data Drill (-33.85, 148.65)			SILO Data Drill datasets (1889-2024) are constructed from observational records provided by the Bureau of Meteorology . SILO												
Mean Monthly Pan Evaporation Data	West Cowra Data Drill (-33.85, 148.65)			interpolates the raw data, which may contain missing values, to derive datasets which are both spatially and temporally complete.												
Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	365
Rainfall	E		mm/month	55.7	47.0	47.9	43.4	44.5	51.2	49.7	49.7	48.1	55.1	51.1	51.2	594.6
Evaporation	E		mm/month	248.9	195.8	164.5	101.2	59.9	39.7	43.7	64.3	95.5	146.3	189.7	239.9	1589.5
Crop Factor	C		unitless	1.00	1.00	0.90	0.90	0.80	0.80	0.80	0.80	0.80	0.80	0.90	1.00	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	249	196	148	91	48	32	35	51	76	132	171	240	1468.7
Percolation	B	DIRxD	mm/month	93.0	84	93.0	90.0	93.0	90.0	93.0	93.0	90.0	93.0	90.0	93.0	1095.0
Outputs		ET+B	mm/month	341.9	279.8	241.1	181.1	140.9	121.8	128.0	144.5	166.4	224.7	260.7	332.9	2563.7
INPUTS																
Retained Rainfall	RR	RxF	mm/month	55.7	47.0	47.9	43.4	44.5	51.2	49.7	49.7	48.1	55.1	51.1	51.2	594.6
Applied Effluent	W	(QxD)/L	mm/month	72.8	65.8	72.8	70.5	72.8	70.5	72.8	72.8	70.5	72.8	70.5	72.8	857.4
Inputs		RR+W	mm/month	128.5	112.7	120.7	113.9	117.3	121.7	122.5	122.5	118.6	128.0	121.5	124.1	1452.0
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-213.4	-167.1	-120.4	-67.2	-23.6	-0.1	-5.5	-21.9	-96.7	-139.2	-208.8		
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Maximum Storage for Nominated Area	N		mm	0.00												
	V	NxL	L	0												
LAND AREA REQUIRED FOR ZERO STORAGE			m ²	76	84	112	153	225	298	277	229	178	128	100	77	
MINIMUM AREA REQUIRED FOR ZERO STORAGE:			298.0	m ²												

Water Balance

Irrigation area sizing using Nominated Area Water Balance & Storage Calculations																
Site Address:		West Cowra Growth Area														
Date:		March 2024				Assessor:		A. Rudd								
INPUT DATA																
Design Wastewater Flow	Q	840	L/day	Based on supplied data by client												
Design Irrigation Rate	DIR	3.0	mm/day	Based on soil texture class/permeability and derived from Table 5.2 of AS 1547:2012												
Nominated Land Application Area	L	358	m ²	Estimates evapotranspiration as a fraction of pan evaporation; varies with season and crop type ² Proportion of rainfall that remains onsite and infiltrates, allowing for any runoff SILO Data Drill datasets (1889-2024) are constructed from observational records provided by the Bureau of Meteorology . SILO interpolates the raw data, which may contain missing values, to derive datasets which are both spatially and temporally complete.												
Crop Factor	C	0.8-1.0	unitless													
Rainfall Runoff Factor	RF	1	unitless													
Mean Monthly Rainfall Data	West Cowra Data Drill (-33.85, 148.65)															
Mean Monthly Pan Evaporation Data	West Cowra Data Drill (-33.85, 148.65)															
Parameter	Symbol	Formula	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Days in month	D		days	31	28	31	30	31	30	31	31	30	31	30	31	365
Rainfall	R		mm/month	55.7	47.0	47.9	43.4	44.5	51.2	49.7	49.7	48.1	55.1	51.1	51.2	594.6
Evaporation	E		mm/month	248.9	195.8	164.5	101.2	59.9	39.7	43.7	64.3	95.5	146.3	189.7	239.9	1589.5
Crop Factor	C		unitless	1.00	1.00	0.90	0.90	0.80	0.80	0.80	0.80	0.80	0.90	0.90	1.00	
OUTPUTS																
Evapotranspiration	ET	ExC	mm/month	249	196	148	91	48	32	35	51	76	132	171	240	1468.7
Percolation	B	DIRxD	mm/month	93.0	84	93.0	90.0	93.0	90.0	93.0	93.0	90.0	93.0	90.0	93.0	1095.0
Outputs		ET+B	mm/month	341.9	279.8	241.1	181.1	140.9	121.8	128.0	144.5	166.4	224.7	260.7	332.9	2563.7
INPUTS																
Retained Rainfall	RR	RxRF	mm/month	55.7	47.0	47.9	43.4	44.5	51.2	49.7	49.7	48.1	55.1	51.1	51.2	594.6
Applied Effluent	W	(QxD)/L	mm/month	72.7	65.7	72.7	70.4	72.7	70.4	72.7	72.7	70.4	72.7	70.4	72.7	856.4
Inputs		RR+W	mm/month	128.4	112.7	120.6	113.8	117.2	121.6	122.4	122.4	118.5	127.9	121.5	124.0	1451.0
STORAGE CALCULATION																
Storage remaining from previous month			mm/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Storage for the month	S	(RR+W)-(ET+B)	mm/month	-213.5	-167.1	-120.4	-67.3	-23.7	-0.1	-5.6	-22.0	-47.9	-96.8	-139.2	-208.9	
Cumulative Storage	M		mm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Maximum Storage for Nominated Area	N		mm	0.00												
	V	NxL	L	0												
LAND AREA REQUIRED FOR ZERO STORAGE			m ²	91	101	135	183	270	357	332	275	213	154	120	92	
MINIMUM AREA REQUIRED FOR ZERO STORAGE:			358.0 m ²													