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GUNNEDAH SHIRE COUNCIL

REVIEW OF LOCAL ENVIRONMENTAL STUDY



PREPARED BY

planning workshop australia

September, 2003

REVIEW OF LOCAL ENVIRONMENTAL STUDY

Prepared for

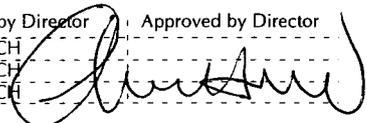
Gunnedah Shire Council

by

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APPENDIX A- SCHEDULE OF PROPOSED REZONINGS

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This study has been prepared by Planning Workshop Australia. The Study Team consisted of the following individuals:

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A third and invaluable source of information has been the community of Gunnedah itself, and of course, Gunnedah Shire Council. The planning exercise involved, in its earliest stages, a series of lengthy discussions with Council officers and representatives of various community and local groups. At a later stage, the public will be asked to make comment on the findings of the Environmental Study, and the recommendations embodied in the resultant Draft Local Environmental Plan. These are the two avenues of public involvement provided for in the planning process by the *Environmental Planning and Assessment Act, 1979*. In this manner, the subject Environmental Study can provide a basis for public discussion on those matters which are addressed during the preparation of a Local Environmental Plan. In particular, the Study will specify the kinds of aims, objectives, policies and strategies which the Draft Local Environmental Plan should adopt.

1 INTRODUCTION

The Shire of Gunnedah is located in the upper Namoi Valley in the north-west of New South Wales. The Shire has an area of 5,092 square kilometres and is bordered by the Shires of Parry, Quirindi, Manilla, Barraba, Narrabri and Coonabarabran (**Figure 1(a)**).

Located on the Oxley Highway, Gunnedah is the "service hub" of the Shire and is located approximately 450 kilometres from Sydney, 655 kilometres from Brisbane and just over 1,000 kilometres from Melbourne. Outlying villages include Curlewis and Breeza to the south-east, Carroll to the east and Tambar Springs and Mullaley to the south-west and west (**Figure 1(b)**).

The Shire is a rich agricultural region with approximately 403,000 hectares of farming country, where a variety of summer and winter crops are grown.

Coal mining is also an important industry, together with many service type industries. Gunnedah Shire is located on one of the largest underground coal seams in New South Wales; the Sydney-Gunnedah Basin.

The Shire is also well serviced by railway (with a line to Werris Creek, and then to Sydney via Newcastle) and roads. There is an airstrip at Gunnedah, but at the time of writing this report there were no regular services in or out of Gunnedah.

At present, Gunnedah Shire is regulated by one Local Environmental Plan which was gazetted in September 1998. This plan was based on the 1982 Environmental Study undertaken by Planning Workshop Pty Ltd.

This study had a 30-year time frame and based its recommendations on the Gunnedah Local Government Area experiencing continued growth over that period.

The changing growth patterns and land use needs and community expectations, however, have led to pressure being placed on the existing land-use zones.

As a result, there have been thirteen amendments to the Gunnedah Local Environmental Plan 1998, and it is expected that without a review of that plan, further changes may be required.

Subject to the above, Council has embarked on a review of the past environmental study and other planning related studies undertaken in conjunction with the preparation of the previous Local Environmental Plans.

The purpose of the new study is to assess the effectiveness of land-use controls under the current Local Environmental Plan and recommend any required amendments. The review process is to also examine the needs of the Shire and suggest possible adjustments to all zone boundaries, to ensure consistent development and appropriate land-uses.

2 STUDY OBJECTIVES

At its ordinary meeting on 17 April 2002, Gunnedah Shire Council resolved to review the existing Local Environmental Plan for the Shire.

To assist in the preparation of the new plan, Council has appointed Planning Workshop Australia to review the Environmental Study undertaken in 1982.

The Objectives of the study include:

- *“Assist in the formulation of appropriate discussions, objectives and strategies for a Draft Local Environmental Plan.*
- *Provide the community with sufficient information by which to base discussions and decision making.*
- *Provide a reference document for use by Council and others.”*

More particularly, Council has highlighted the following rural, urban and development control plan issues for assessment in the Environmental Study and review of the Local Environmental Plan.

Rural Issues

- *“The capacity of agricultural land to sustain current and potential land use practices having regard to natural resource management.*
- *The impacts on the viability and sustainability of agricultural land due to soil erosion, salinity and water management issues.*
- *The environmental impacts on biodiversity, endangered species and water quality as a consequence of rural development and mechanism to mitigate these problems.*
- *Analyse and review the standards for rural subdivision having regard to the viability of agricultural land and potential long-term impacts of subdivision.*
- *Examine the potential, impacts and benefits of intensive agriculture development and appropriate locations for such development.*
- *Review the extent of marginal agricultural land and assess alternative development potential.*
- *Examine the appropriateness of zoning of travelling stock routes and the location and use of those in close proximity to Gunnedah.*
- *The incorporation of regional, catchment and sub-catchment strategies and plans in the assessment of the rural land use zoning.*

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- *The effects of government economic policy on agriculture and the impact on land use controls.*
- *The preservation, if possible, of rural heritage items including the built and natural environment.*

Urban Issues

- *The extent of business zones in Gunnedah and a review of the Central Business District Zone Plan with examination of flexible planning controls to perimeter and peripheral areas.*
- *The analysis of pedestrian access and disability access issues within the Central Business District of Gunnedah having regard to linkages to car parking, public facilities and community infrastructure.*
- *The preservation of the present character of urban areas and the identification and protection of historic or heritage significant sites involving both the built and natural environment.*
- *The effects of rural population adjustment as a result of changes in the rural economy and the effects on the physical, social and economic structure of the Gunnedah Local Government Area.*
- *The impact of flooding and the effect of the Gunnedah and Carroll Floodplain Management Plan on land uses.*
- *Analysis of the extent of Rural Residential land having regard to demand and development potential particularly west of Gunnedah.*
- *Examination and review of existing land use zones and development controls, with a view to a simpler, more flexible system consistent with the current pressures facing a medium size rural community.*
- *Review the extent and nature of industrial areas having regard to opportunities to broaden the industrial base of the district.*
- *Assess the extent to which urban consolidation and redevelopment of existing serviced land can be encouraged and achieved.*
- *Analysis of urban stormwater management and mechanisms to improve discharge qualities and linkages to reducing the impacts of urban salinity.*

The following environmental issues to be addressed in the Environmental Study and Review of the Local Environmental Plan includes:

- *Examination of pollution of hazard issues within the rural environment having regard to conflicting land uses particularly involving agricultural chemical usage.*
- *Analysis of land in the vicinity of Goran Lake relative to its environmental significance and current land use practices.*

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- *Assessment of the appropriateness of the Environment Protection (Scenic) Zone in terms of the extent of land use control it provides.*
- *The extent and impact of Urban Salinity and mechanisms to manage the problem.*
- *Assess the maintenance and extension of tree corridors in both rural and urban situations with the objective of establishing an Environmental Embellishment Plan.*

Development Control Plan Issues

- *Analysis of dwelling entitlements in the rural area.*
- *Assess the appropriateness of the Council's current Complying and Exempt Development schedules.*
- *The extent of the current Obstacle Limitation Surface (OLS) for the Gunnedah Aerodrome and the potential to control tree planting of a nature that would impinge upon the OLS.*
- *Examination of the current development control table format (objectives, development without consent, development with consent, prohibited development) and the potential for a system incorporating a more merit based approach to assessing development applications that meet the objectives of the zone.*
- *Examine the suitability of the current Village zoning."*

3 THE LEGISLATIVE FRAMEWORK

3.1 Background

The town of Gunnedah has grown in a relatively orderly manner from the time of the original Crown survey in 1856. Whilst Gunnedah Municipal Council had for some years been applying the principles of town and country planning, it was not until the early nineteen-fifties that it resolved to prepare the town's first joint planning scheme in association with Liverpool Plains Shire Council¹. In January 1966, however, the joint Gunnedah and Liverpool Plains Planning Scheme was proclaimed.

In the meantime, an Interim Development Order over the Municipality and that part of the Shire involved in the scheme was introduced. This scheme became operational in December 1957. Amalgamation of the two Councils in 1980 led to the formation of the present Gunnedah Shire Council.

Faced with the proliferation of twenty two amendments to the existing scheme, and the lack of planning control on some rural parts of the Shire, the new Council prepared and gazetted a Local Environmental Plan under the then new environmental planning legislation introduced in 1980.

Local Environmental Plan No. 1 – Shire of Gunnedah, gazetted in November 1981, placed the remainder of the Shire of Gunnedah under town planning controls.

At present, Council is regulated by the Local Environmental Plan 1998 which was gazetted in September 1998. The current plan is based on the 1982 Environmental Study undertaken by Planning Workshop Pty Ltd.

In 1996, Council embarked on a review of the Local Environmental Plan. The review was primarily to bring the document into line with the *Environmental Planning and Assessment Act 1979* and the standards and structure of modern Local Environmental Plans. It did not significantly change from the direction set in the 1982 study.

Subject to the above there have been thirteen amendments to the Gunnedah Local Environmental Plan and as Council anticipates further changes, there is an opportunity to further modernise its planning schemes having regard to the new initiatives proposed by the Department of Planning, Infrastructure and Natural Resources (DIPNR), formerly PlanningNSW, within a new regional planning framework.

3.2 Environmental Planning Instruments- State Level

Gunnedah Shire Council is subject to the provisions of a number of planning instruments at the state level, which provide the planning framework and guidance for

¹ Gunnedah and Liverpool Plains Town Planning Report to accompany the preparation of the original scheme.

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development throughout the area. The following instruments relate specifically to Gunnedah Shire.

3.2.1 *The Environmental Planning and Assessment Act, 1979*

The Environmental Planning and Assessment Act forms the framework for the planning system in New South Wales. This Act creates the mechanism to prepare Local Environmental Plans, Development Control Plans and State Environmental Planning Policies.

The objectives of the Act are:

(a) to encourage:

- (i) the proper management, development and conservation of natural man-made resources for the purpose of promoting the social and economic welfare of the community and a better environment;*
- (ii) the promotion and co-ordination of the orderly and economic use and development of land;*
- (iii) the protection, provision and co-ordination of communication and utility services;*
- (iv) the provision of land for public purposes;*
- (v) the provision and co-ordination of community services and facilities;*
- (vi) the protection of the environment;*
- (vii) ecologically sustainable development; and*

(b) to promote the sharing of responsibility for environmental planning between different levels of government in the State; and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

3.2.2 *S. 117 Ministerial Directions*

The Minister for Planning has made a number of Directions under Section 117 of the *Environmental Planning & Assessment Act 1979*, to be taken into consideration during the preparation of Local Environmental Plans. Relevant directions under this section include:

Direction G2- Circulars to Councils

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- Direction G3- Reservations
- Direction G4- Minister of public authority approval/concurrence
- Direction G5- Development by the Crown
- Direction G6- Savings
- Direction G7- Existing general provisions
- Direction G8- Rural zones
- Direction G9- Residential zones
- Direction G10- Business zones
- Direction G11- Industrial zones
- Direction G12- Environmental protection zones
- Direction G13- Corridors
- Direction G14- Designated Development
- Direction G16- Airport Noise
- Direction G17- Acquisition
- Direction G18- Community use of schools
- Direction G19- Public recreation zones
- Direction G20- Planning in bushfire prone areas
- Direction G21- Conservation of environmental heritage and ecologically significant items and areas
- Direction G23- Recreation vehicle areas
- Direction G24- Concurrence of Mine Subsidence Board
- Direction G25- Flood Liable Land
- Direction G26- Residential Allotment Sizes
- Direction G27- Planning for bus services
- Direction G28- Coal, other minerals, petroleum and extractive resources

3.2.3 State Environmental Planning Policies

The *Environmental Planning and Assessment Act 1979* has a provision for the Minister to make State Environmental Planning Policies, which are guidelines for specific issues for the State. They include development standards and policies on various matters.

The following is the list of State Environmental Planning Policies that apply to the Gunnedah Shire Local Government Area:

SEPP 1 - Development Standards

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- SEPP 4 - Development without Consent and Miscellaneous Complying Development
- SEPP 5 - Housing for Older People or People with a Disability
- SEPP 6 - Number of Storeys in a Building
- SEPP 8 - Surplus Public Land
- SEPP 9 - Group Homes
- SEPP 11 - Traffic Generating Developments
- SEPP 15 - Rural Land Sharing Communities
- SEPP 16 - Tertiary Institutions
- SEPP 21 - Caravan Parks
- SEPP 22 - Shops and Commercial Premises
- SEPP 30 - Intensive Agriculture
- SEPP 32 - Urban Consolidation (Redevelopment or Urban Land)
- SEPP 33 - Hazardous and Offensive Development
- SEPP 34 - Major Employment Generating Industrial Development
- SEPP 36 - Manufactured Home Estates
- SEPP 37 - Continued Mines and Extractive Industry
- SEPP 44 - Koala Habitat Protection
- SEPP 45 - Permissibility of Mining
- SEPP 48 - Major Putrescible Landfill Sites
- SEPP 55 - Remediation of Land
- SEPP 64 - Advertising and Signage.

3.2.4 Additional Legislation

In addition to the provisions of the *Environmental Planning and Assessment Act, 1979* and those plans and policies created under this, Council has from time to time, requirements to consider the provisions of other Acts and legislation, such as:

- Native Vegetation and Conservation Act, 1997
- National Parks and Wildlife Act, 1974
- Wilderness Act, 1987
- Land Management Regulation, 1995
- Heritage Act, 1977

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- Heritage Regulations, 1993
- Noxious Weeds Act, 1993
- Soil Conservation Act, 1938
- Water Management Act, 2000
- Rivers and Foreshores Improvement Act 1948
- Protection of the Environment Operations Act, 1997
- Catchment Management Act, 1989
- Crown Lands Act, 1989.

3.3 Environmental Planning Instruments – Regional Level

3.3.1 Regional Plans

The *Environmental Planning and Assessment Act 1979*, provides for the making of regional plans, which cover such issues as urban growth, expansion or specific areas.

A Regional Environmental Plan – *Orana Regional Environmental Plan No.1 – Siding Spring*, has been prepared as part of an overall strategy for the protection of the Siding Springs Observatory, which is situated approximately 70 kilometres from the Gunnedah Shire Boundary (**Figure 1**). Currently one of the world's best facilities, problems with artificial light glow can interfere with the effective operation of the equipment.

The Plan controls both light emissions from buildings and external lighting so that critical light levels are not exceeded.

Although the *Orana Regional Environmental Plan No. 1 – Siding Spring* does not apply to Gunnedah Shire at this stage, DIPNR has foreshadowed changes to the plan that will see the plan applying to an area within a 200km radius of this existing facilities. Accordingly, it is appropriate that the Shire embraces the contents of the REP and ensures that any future developments comply with this Regional Environmental Plan.

3.4 Local Statutory and Non-Statutory Planning Controls

3.4.1 Gunnedah Local Environmental Plans

A Local Environmental Plan is the instrument whereby most day-to-day planning decisions are made in Gunnedah Shire. It is a Plan that is prepared in respect to one specific Local Government Area, to meet the objectives and requirements of both the *Environmental Planning and Assessment Act, 1979* and the local Council and community. It provides a means by which development is assessed and should reflect

the values and objectives of the local community, as well as incorporating those of the region and the state.

Currently, Gunnedah Shire has one planning instrument, being the *Gunnedah Local Environmental Plan 1998* (LEP), which was gazetted on 25 September 1998, and applies to the whole of the Shire.

The above LEP, however, has had thirteen minor amendments to this base instrument, as well as amendments to the Environmental Planning and Assessment Act and a number of other legislative changes. The shortcomings of Council's current planning document have been highlighted and Gunnedah Council has resolved to prepare this Study, leading to the preparation of the Draft Local Environmental Plan.

3.4.2 Gunnedah Shire Council Development Control Plans

In addition to the current Local Environmental Plans, Gunnedah Shire has a number of Development Control Plans that add greater detail to specific areas. These are formed and prepared under the provision of the *Environmental Planning and Assessment Act, 1979*.

The following is a list of Development Control Plans, currently relating to the Gunnedah Shire.

- Development Control Plan No. 1 – Dual Occupancy Development
- Development Control Plan No. 2 – Medium Density Development
- Development Control Plan No. 5- South Gunnedah
- Development Control Plan No. 6 – East Gunnedah
- Development Control Plan No. 7 – Pine Hill Rural Residential and Warranurra Industrial Estate.
- Development Control Plan No. 8 – Local Development Advertising and Notifications Policy
- Development Control Plan No. 10 – Rural Residential Development
- Development Control Plan No. 12 – Gunnedah and Carroll Floodprone Land
- Development Control Plan No. 13- Outdoor Dining Areas and the Display of Merchandise on Footpaths
- Development Control Plan No. 14- Installation of Rainwater Tanks
- Carparking Policy
- Draft Development Control Plan- Footpath Cafes and Outdoor Trading

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It is planned that all Development Control Plans will be revised once the new Local Environmental Plan has been prepared, if appropriate.

3.5 Changes to Legislation (PlanFirst)

The NSW Government, through DIPNR, has undertaken a review and modernising of the existing plan making system.

Although legislation has not been adopted at this stage, the objective of the new planning system known as Plan First is to:

promote economic development and job creation and help achieve an ecological sustainable future.

The aim of the new planning system (if adopted) is to simplify the plan making system by reducing the number and layers of plans applying to land and making those plans easy to find and understand.

New Regional Strategies are proposed, which will enable the State Government and Councils to set clear directions for the future of the region and which will form the basis for the preparation of local environmental plans.

It is also proposed to make State Policies and environmental planning instruments available in one place with clearly expressed outcomes to be achieved.

According to DIPNR, **PlanFirst** will:

- simplify the current complex web of plans and processes;
- provide greater certainty to business and the community and clear, accessible information to users;
- co-ordinate decisions and actions that shape the future of neighbourhoods and environments;
- recognise the diversity and dynamic nature of our neighbourhoods and environment by managing whole places, drawing together different issues into a single plan;
- better involve the community and key interest groups, including those that are often marginalised: older people, young people, and ethnic and indigenous communities;
- produce strategies and plans that are up-to-date and actively implemented, and have measured results;
- produce strategies and plans that help to deliver:
 - sustainable management of our resources;
 - environmental protection;

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- jobs and infrastructure
- suitable and affordable housing;
- healthy and vibrant communities; and
- neighbourhoods that are attractive and safe.

Notable key features of the new system include:

Plan First contains four key features to improve plan making in NSW. These can be summarised as follows:

- Clear Rules in Accessible, User Friendly Plans
- A More Versatile Planning "Toolbox"

An aim of Plan First is to also ensure that the community is involved from the outset in the plan preparation process, and not just commenting when a draft local plan is exhibited.

Since this study was commenced however, the NSW Government has decided to review PlanFirst. In the absence of any other guidance to the contrary, however, the Study (and the subsequent LEP) has been prepared based on the principles of PlanFirst.

4 THE ENVIRONMENTAL CONTEXT OF GUNNEDAH

4.1 Natural Environment

4.1.1 Regional Context

Gunnedah Shire Council LGA is located in the NW New England Region of New South Wales (**Figures 1a & 1b**). Nestled in the alluvial flood plains of the Namoi River basin, the Shire is some 5092 square kilometres in area, with a population of 11, 993 (ABS 2001). The region is characterised by undulating plains and fertile soils. Although identified geographically as part of the New England Region, the Shire has strong links with the natural environment of the Liverpool Plains and Namoi River Catchment, at a more local scale.

By road, Gunnedah is around 450 kilometres from Sydney and approximately 655 kilometres from Brisbane and approximately 1,000 kilometres from Melbourne.

Primary production is the major land use in the Shire, with agriculture the predominant land use, and coal mining another significant land use in the Shire. The township of Gunnedah is located central to the remainder of the Shire, and as such has a strong service role to the outlying agricultural areas of the Shire. Boggabri is the closest town of a substantial population, whilst some 90 kilometres east is the City of Tamworth, the closest major regional centre for the area.

Gunnedah Shire Council is surrounded by the local government areas (LGAs) of (clockwise from the east) Coonabarabran, Narrabri, Barraba, Manilla, Parry and Quirindi Shire Councils. The location of Gunnedah to these LGAs is shown at **Figure 2**.

Within the Shire, there are several small villages, in an almost satellite-like settlement pattern (**Figure 3**), to the south Curlewis and Breeza, to the west Mullaley, to the south-west Tambar Springs, and Carroll to the east. Major natural land features in the area include Lake Goran (an ephemeral flooding lake to the south) and Lake Keepit on the Namoi River near the eastern boundary to the Shire provides recreational facilities whilst also serving the function of protecting and regulating the flow of the Namoi during peak flow events. The prime purpose of Keepit Dam is to regulate river flows to assist irrigation downstream.

The Namoi Valley is traditionally 'black soil' (*Cracking Clay Soils*) country, and thus are exceptionally fertile, however, these types of soil are volatile in terms of their expansion and contraction and become heavy and wet after rains, and during extended dry seasons, crack easily. Issues of flooding during peak flows are problematic for a significant proportion of the Shire.

Gunnedah, like many other rural centres across NSW and Australia is experiencing challenges of demographic, economic and social issues that need careful, considered

planning along with trans-border co-operative approaches to these issues. This report will identify these issues and suggest patterns for change that may occur over time to hopefully arrest the population decline in the area and to assist in the continuing adaptation to the changing economy of Gunnedah.

The importance of primary production, and indeed other industries important to Gunnedah's economy, in terms of economic output is examined in **Section 4.4** of this report.

4.1.2 Topography

As identified in the 1982 Environmental Study, the Shire is located on the Liverpool Plains and in the Namoi River Valley Catchment. The topography of the Shire could be described as generally flat, with approximately 85% of the Shire having a land slope of less than 5%, with an average height of 264 metres above sea level (ASL). The floodplains of the Namoi Valley typically range from 15 to 40 kilometres across. Only 1% of the Shire has land sloping at more than 25%, with the ridges that shadow the valley ranging in height from 300 to 500 metres ASL. The topography of the Shire is illustrated at **Figure 9**.

The major peaks in the Shire include Tulcumba (885 metres ASL), Mount Surprise (674 metres ASL), Blackjack Mountain (670 metres ASL), King Jack Mountain (761 metres ASL) and Tambar Mountain (805 metres ASL).

The main drainage systems in the Shire are the Namoi and Mooki Rivers and Cox's Creek, all of which present considerable constraints in terms of flooding in the area. The rivers run through the northern, south-eastern and western parts of the Shire respectively. The Namoi River rises as the McDonald River on the New England Plateau. The Namoi is one of the main tributaries of the Barwon-Darling system, draining an area of approximately 43,000 square kilometres (Gunnedah Shire 2000).

The Mooki River drains the south-eastern section of Gunnedah Shire, and joins the Namoi some 4 kilometres upstream of the Gunnedah township. Cox's Creek flows through the western part of the Shire and passes through the township of Mullaley eventually joining the Namoi River at Boggabri. These rivers and creeks produce an important visual feature of the floodplain that is mostly a monotonous plain with little topographical features until the side slopes and foothills of both the Pilliga and Great Dividing Range meet the plains.

Using Council's topographic data, exaggerated modelling was done of the Shire to illustrate the extent of the low-lying areas (that are susceptible to flooding) and the drainage catchment patterns. These are illustrated at **Figure 5**.

This clearly shows in blue the extent of the Namoi and Mooki catchments and the proportion of the Shire that would be susceptible to flooding events. The lighter coloured areas show exaggerated hill forms of the Shire and subsequently the drainage patterns that affect the LGA. These drainage patterns need to be taken into

consideration in terms of long-term land use planning for both urban and agricultural areas.

Generally, the terrain in Gunnedah does not provide any significant constraints in terms of topography. The low-lying nature of much of the Shire provides problems during peak-flow events in the river systems. However, the nature and scale of development in the Shire has reflected the nature of the topography, and largely the ridgelines of the hills throughout the floodplains have been conserved from development and remain largely as bushland.

These ridgelines around the western and southern ends of the Gunnedah township provide a visual catchment to development around the town centre. The vegetation of these ridgelines also provides a valuable vegetation linkage, providing a corridor for wildlife around the township and connectivity to the corridors of the Travelling Stock Routes (TSRs).

Overwhelmingly, vegetation occurs around these elevated points, either as State Forests, Crown Reserves or private bushland not suitable for agriculture. The travelling stock routes (TSRs) within the Shire also play an important role in preserving the native vegetation of the Shire.

The TSRs provide a valuable habitat resource for both the native flora and fauna of the Shire, as most vegetation is only disturbed during long periods of dry spells when farmers drove their livestock to feed on the routes after supplies on the farms have been consumed. The TSRs also provide a valuable wildlife corridor for fauna movement, which includes koala habitat, whilst also providing an important visual linkage throughout the Shire between agricultural pursuits and other land uses that often dominate the rural landscape, sometimes making the area barren and devoid of natural landform.

With all of these catchments there are issues in relation to water usage, salinity, environmental flows and flooding. These issues are dealt with in *Section 4.1.9*, *Section 4.1.10* and *Section 4.1.11* of this report.

4.1.3 Geologic Conditions

The 1982 Study identified the regional and more localised geology of Gunnedah. This section of the report explored in detail the conditions of geology, and with the nature of geologic movement and geotechnical stability, it is considered that these conditions would not have changed since this report was undertaken.

The Gunnedah Shire LGA has an interesting and diverse geology. The Shire is located within the Gunnedah Basin of the Sydney-Gunnedah Basin Region. This basin was formed during the Late Carboniferous/Early Permian period during which time the area was covered by a shallow body of water which was filled over time by alluvial deposits and forming the Gunnedah-Sydney basin coal seams.

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It is considered that the geology of the Shire is conducive to the extraction of mineral resources. Overwhelmingly, these resources are based on the large seam of coal that runs through the Shire. Other resources that could be extracted for economic gain could include river gravel. However, it is considered that in terms of economies of scale and factors of production that coal would be, and has been, the major resources of the Shire. However, factors of production such as transportation costs and time severely hamper the extraction of this resource under existing conditions.

There are a number of identified coal resource sites located in Gunnedah Shire (**Figure 6**). There are a number of sites that have mineral resources on them, or have a significant potential to have a considerable mineral resource reserve. There are eleven sites that have been identified by Mineral Resources, of which three are presently operating at an extraction of approximately 507, 000 tonnes of coal and brick clay/shale. These mines and quarry are listed in the table presented below;

| Mine | Operator |
|---------------------|---------------------------------|
| Gunnedah Colliery | Namoi Mining Pty Ltd |
| Wilga Park Quarry | Namoi Valley Brickworks Pty Ltd |
| Whitehaven Colliery | Whitehaven Coal Mining Pty Ltd |

Of the other mineral resources available in the Shire, less than 5, 000 tonnes of river gravel and sand are extracted from the Gunnembene Lane, Carroll site.

Mining has ceased at two of the collieries, being the Preston and Preston Colliery and Vickery Colliery. The remainder of the sites is listed for either exploration or have high petroleum prospectivity. Included in these are Exploration Lease 5183 (held by Namoi Valley Coal), Exploration Licence 5831 (Whitehaven Coal Mining Pty Ltd), Coal Authorisation 216 (Department of Mineral Resources), Exploration Licence 5831 (Department of Mineral Resources) and Warrigundi Igneous Complex (no operator – moderate to high gold and silver prospectivity).

Whilst these areas are believed to contain a significant proportion of coal and other petroleum-based resources, the exact potential of any seam or resource is unknown until exploration and other scientific information gathering has been completed. It is, however, acknowledged that the area is relatively rich in this resource and is likely to expand the operations of mining entities in the area significantly. As discussed earlier however, this may rely on the improvement of the transport connections to major ports and markets, and as such may not be able to happen for some time. Although becoming less labour intensive with modern mining techniques, support industries for the mines can create significant employment generation and spending. Although there has been economic change and globalisation that has seen a decline in the importance of primary production, mining for fossil fuels will continue to be an important industry in Australia. This said, the industry could provide a valuable and stable boost to the local economy and could have a positive effect on the stability of the population in the longer term.

4.1.4 Soils

The soils of Gunnedah have been mapped by the Department of Land and Water Conservation in 1995 on the Curlewis and Boggabri 1:100,000 soil mapping sheets. The map identifies that much of the land on the map covers the Liverpool Plains and the high quality grazing land of the hills in the district. DIPNR consider the land to be some of the highest quality agricultural land in Australia, with high potential for quality cropping.

The report accompanying the Mapping Sheet – Soil Landscapes of the Curlewis and Boggabri Region suggests the land has been productive for quite some time, with the land being prized by the local Aborigines in the area, and often the source of conflict.

Post World War II, when soldier settlements began to proliferate the settlement of much of the area, technology improvements meant that cultivation in the heavy soils was also possible and the area subsequently became an area of cropping and agriculture instead of the mainly sporadic grazing that occurred at the time.

This original land clearing and subsequent cultivation of slopes and plains in the area has led to soil and landscape management problems such as erosion, structural decline and increases in the concentration and frequency of floods in the area. The soil report has suggested that increases in rainfall since the 1940s coupled with the intensity of modern practices of intensive agriculture has resulted in a generalised rise in the saline water tables, and as such incidences of dryland salinity are now being recorded within the Shire.

Salinity has become an increasing problem and economic burden of the national wealth over the last three decades due to the inefficient and unsustainable farming practices of the post-war and subsequent years. The issue of salinity is examined in further detail in **Section 5.1**.

There are three main types of salinity, dryland, irrigation and urban. Dryland salinity is the most common, forming from a build up of salt on the surface brought about by a rising watertable due to changes in the physical nature and drainage of the non-irrigated areas. This form of salinity is posing the greatest threat within the Gunnedah area. Irrigation salinity results from over-irrigation, inefficient water use and poor drainage and occurs only in irrigated areas. Urban salinity is a combination of dryland salinity processes and over watering in urban towns and areas.

Increasingly, the threat of salinity is becoming more apparent. Already there are some reported cases, although minor around the southern and northern ends of Gunnedah Shire, as shown in **Figure 7**, and the problem may escalate with current and continuing practices of land management, which may in turn not only affect the natural environment of the Shire, but also the economic vitality. Measures and ways to counter-act salinity in terms of planning and actions needed are discussed in **Section 5.1.1.3** of this report.

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The technical make-up of the soils in the Gunnedah area, particularly on the plains which dominate the surrounding landscape, are of a consistency and fertility that is highly conducive to agricultural production. Throughout the Liverpool Plains, alluvial clays comprise much of the soil makeup. The plains of the Gunnedah area consist largely of highly fertile deep black earth and eucrozem soils, high in phosphorous. These soils can be up to 20m of fertile depth.

The soils of the ridges and ranges are sedimentary in origin, and are relatively shallow in comparison to that of the plains. These soils generally have a fertile depth less than 1 metre, and are comprised largely of red earths and brown earths. Lithosols are also found on many of the steeper slopes. The Sydney-Gunnedah Basin underlies these areas.

4.1.5 Agricultural Capability

The soils of the Liverpool Plains are widely regarded as exceptionally fertile soils for cropping and grazing. The capability of the land is an important mechanism in land use planning in regional areas. In this sense, land capability refers to the capability of the land for agricultural production. Land use controls and mechanisms to control development need to consider the potential of the land to be suitable for a particular form of development.

NSW Agriculture classifies land according to a system that classes land on a number of different scales, as follows:

| | |
|----------------|--|
| Class 1 | Land capable of regular cultivation for cropping (cereals, oilseeds, fodder, etc.) or intensive horticulture (vegetables, orchards) |
| Class 2 | Land suitable for cultivation for cropping but not suited to continuous cropping or intensive horticulture |
| Class 3 | Land suitable for grazing, well suited to pasture improvement and can be cultivated for occasional cropping or forage crop in conjunction with pasture management. |
| Class 4 | Land suitable for grazing and not suitable for cultivation. |
| Class 5 | Land suitable only for rough grazing or land not suitable for agriculture. |

The aim, in a broad sense, is to protect these lands, through land use zoning, from future subdivision. NSW Agriculture advocates that development within areas such as the Gunnedah Shire occurs in a way so as to promote continued opportunities for the practice of sustained agricultural land uses. It has also designed a policy to achieve this aim, the *Policy for the Protection of Prime Agricultural Land*. The issues, directions and

implications of this Policy will be discussed further in **Section 5.1.3.2- Agricultural Lands**.

Much of Gunnedah is classed as **Class 2** Agricultural Land, being of land that is well suited to the cultivation and grazing afforded by the rich soils of the area. This has significant economic implications, making the soils and land in the LGA one of the most valuable long-term resources within the Shire. Gunnedah is one of NSW's major production areas for crops such as cotton, wheat and sorghum. It is also responsible for the production of large quantities of beef, cattle, sheep and pig products.

It is therefore considered that agricultural lands are worth protecting in terms of small-lot subdivisions, concessional allotments (no longer an issue in Gunnedah) and rural workers' dwellings on the fringe of towns. The protection of agricultural lands, whilst having a preliminary cost in terms of lost development and rate base potential, is considered to be more valuable in areas like Gunnedah in the longer term. It is desirable to promote the viability of agricultural pursuits through minimising conflicts with surrounding land uses, suitably locating intensive agricultural uses away from areas where they could generate negative environmental impacts, and preventing the fragmentation of productive agricultural land.

The present LEP and land-use patterns recognise this, with those lands that are not as agriculturally productive as others being used either for scenic protection on ridge tops or for less-intensive agricultural pursuits. This land is primarily zoned 1(b) and protects the agricultural landscape.

4.1.6 Aboriginal Heritage

Gunnedah has a long history of Aboriginal settlement. Prior to the area's occupation by white settlers it was home to the Gunn-e-darr people of the Kamilaroi tribe, who inhabited much of north western NSW as far north as the Queensland border. The Gunnedah name itself means 'white stones', and relates to an outcrop of white stones that occupied the present site of the Gunnedah Public School in Bloomfield Street.

There are a number of sites within Gunnedah which have been listed by the National Parks and Wildlife Service as sites of Aboriginal significance.

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4.1.7 Climate

The climate of the Gunnedah region could generally be described as one of extremes. Climatic data has shown that Gunnedah, like much of land west of the Great Dividing Range, has experienced extended periods of little or no rainfall (drought, as is the case during the writing of this report) and other periods of extended rainfall leading to flood events.

Gunnedah has a temperature climate that remains stable throughout the year, with defined seasons. Winters are cold, crisp and generally dry, summers are generally hot and experience more rainfall (volume) than the winter months. These definitive seasons allow for a number of different types of crop and pasture and allow for a comfortable lifestyle climate. The climate information below has been supplied by the Bureau of Meteorology and is current to 2001, based upon records dating back more than 120 years. The records have been taken from the Gunnedah Weather Station (No. 055023), commenced recording data in 1876 (Latitude (deg S): -30.9841; Longitude (deg E): 150.2540).

The average annual maximum temperature is 25.9°C, whilst the mean daily minimum rests at 10.8°C. The hottest month on average is January, whilst the coolest is August. The coolest minimum temperature occurs in July with an average of 3°C. The warmest nights occur in January with an average of 18.3°C. The below graph illustrates the maximum and minimum temperatures for Gunnedah.

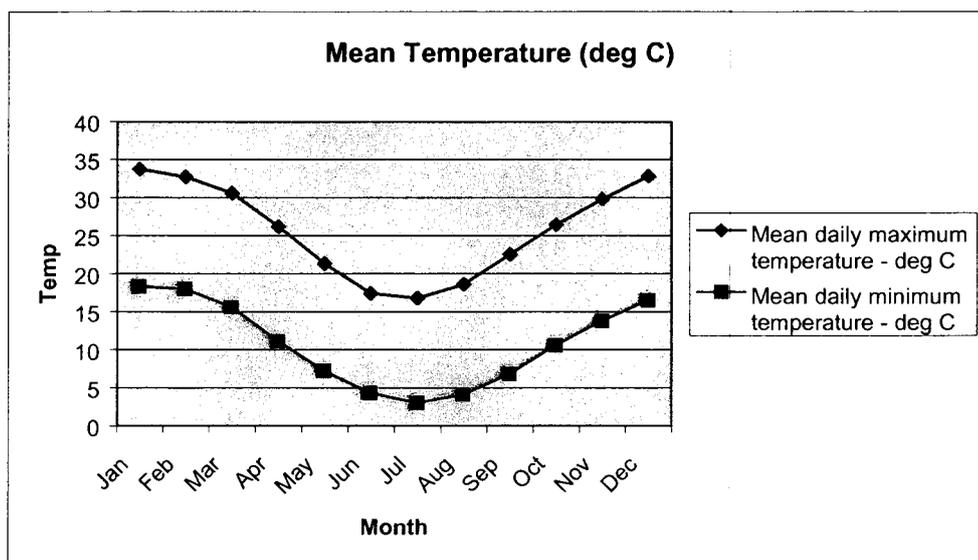


Table 1- Mean Temperature within Gunnedah

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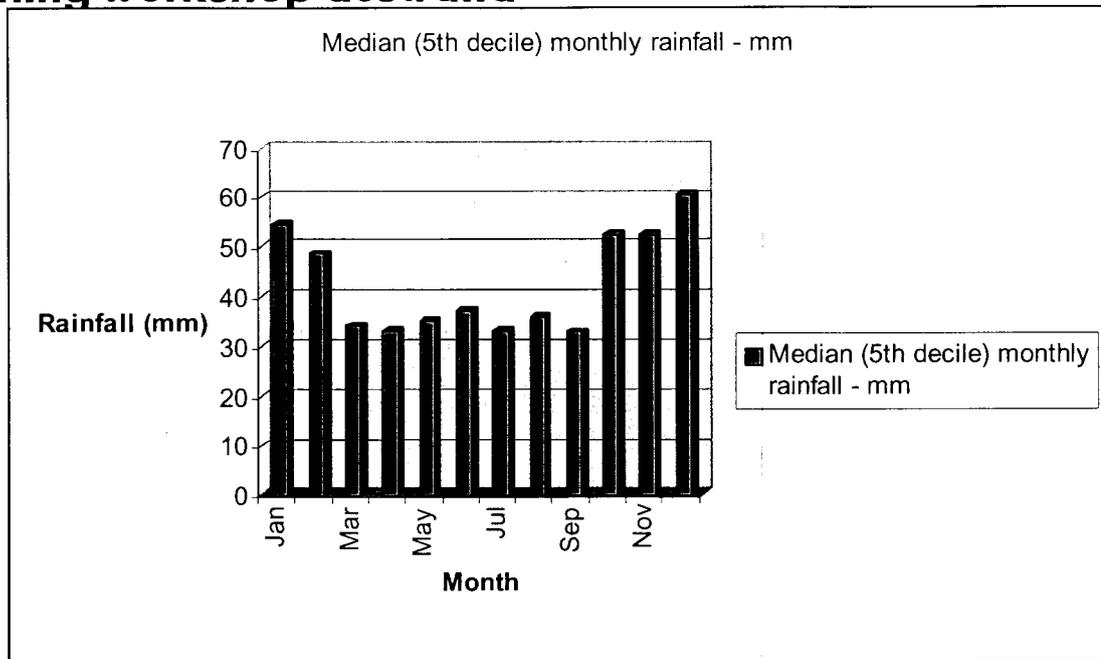
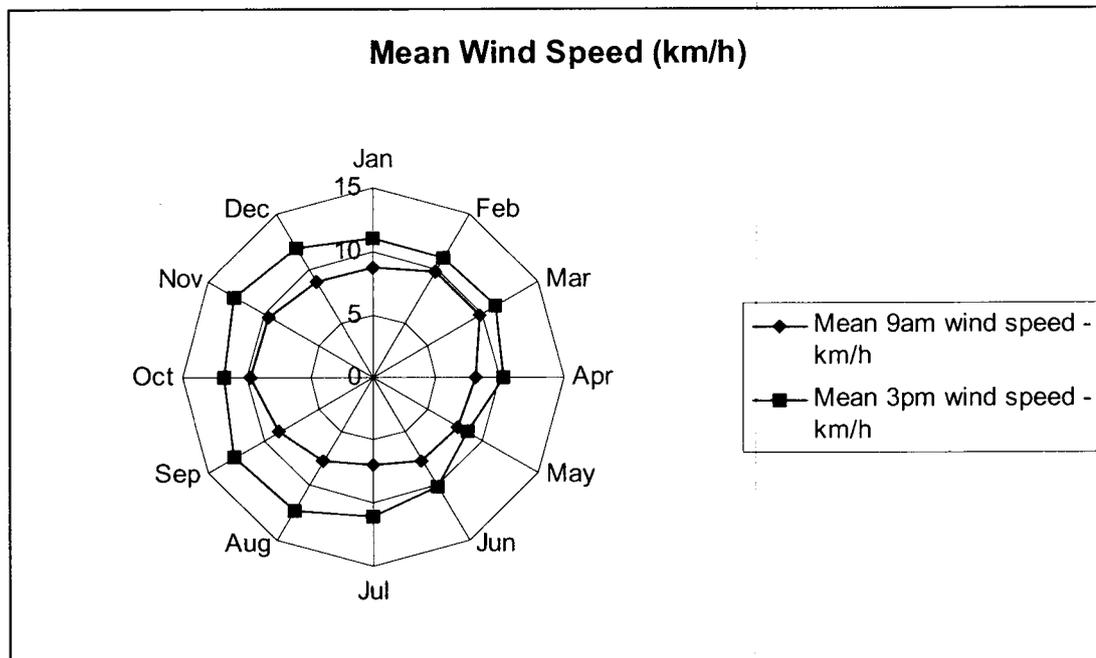


Table 2- Median Rainfall within Gunnedah

Median (to the 5th Decile) temperatures have been used to give an accurate representation of rainfall over a 12-month period, this is primarily due to mathematical mean figures being susceptible to major fluctuations after one particularly heavy rainfall day or month. The above graph shows a clear representation of median rainfall trends over time. This shows that the median annual rainfall is 622.9mm per year. The wettest month is December, with a median 60.5mm and the driest month, September with 32.8mm. On average, there are 71.5 rain days per year, with October and December being the months with the most rain days, on average, with 6.9 days. April is the month with the least amount of rain days.

On average, there are 145.1 clear days a year in Gunnedah and an average of 79.5 cloudy days a year. The sunniest month is March with an average of 14.1 clear days, whilst the darkest month is October, with an average of 7.8 cloudy days.

Table 3- Mean Wind Speed within Gunnedah



Gunnedah has an average wind speed of 8.5km/h at 9am and 11.2 at 3pm. The months where wind speed is at its greatest in the morning is March with an average of 9.7km/h and in the afternoon gusts of 12.6km/h, on average, can be experienced in September. The below graph gives a graphical representation of the mean wind speed at 9am and 3pm at Gunnedah Pool Weather Station.

4.1.8 Flora and Fauna

The flora and fauna of the Gunnedah region remains diverse despite the intensive nature of the clearing and continued use as an area of high agricultural production. Within the Shire, there are 6 state forests, under the control of NSW State Forests, within which logging is carried out intermittently on a relatively small scale. It should be noted that any land under the control of State Forests may be logged or used for such commercial activities, pursuant to relevant provisions under the Forestry Act 1916. The areas of the Gunnedah Shire LGA that could be considered to have significant habitat are shown at **Figure 8**. These areas largely comprise of State Forests, Nature Reserves, Crown Lands, Riparian Corridors and private bushland.

As the State Government Agency in control of the conservation and preservation of natural environments, the National Parks and Wildlife Service has the primary responsibility to identify suitable areas of natural significance and manage these areas to ensure the long-term protection of the natural environment.

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NPWS operates under legislation from a number of different sources to protect native flora and fauna. The major forms of legal protection for these species are the Threatened Species Conservation Act 1995 and National Parks and Wildlife Act 1974.

Under the Threatened Species Conservation Act 1995, a species can be defined as Vulnerable, Endangered or Presumed Extinct. Under the National Parks and Wildlife Act 1974 a species can be Protected. This then gives a statutory context to the protection of the flora and fauna in an area.

A search of the NSW National Parks and Wildlife Service 'Atlas of NSW Wildlife' for Gunnedah Shire has produced information relating to the flora and fauna of the region, and the need for the furthered protection of habitats.

In terms of Fauna, no species in the atlas that have been in the area since records were taken have been declared to be Presumed Extinct. There are a number of Endangered Species that have been identified in the Gunnedah LGA. Identified in the Wildlife Atlas are also a number of species considered to be vulnerable under the Threatened Species Conservation Act 1995. A determination of vulnerability means that a species is on the decline and is at extreme risk of becoming extinct. The species identified as being and Endangered in the Gunnedah Shire LGA include:

| Species: | Vulnerable | Endangered |
|--|------------|------------|
| <i>Burhinus grallarius</i> – Bush Stone-curlew | | ✓ |
| <i>Calyptorhynchus lathami</i> – Glossy Black Cockatoo | ✓ | |
| <i>Chalinolobus dwyeri</i> – Large-eared Pied Bat | ✓ | |
| <i>Dasyurus maculatus</i> – Spotted-tailed Quoll | ✓ | |
| <i>Grantiella picta</i> – Painted Honeyeater | ✓ | |
| <i>Hoplocephalus bitorquatus</i> – Pale-headed Snake | ✓ | |
| <i>Leipoa ocellata</i> – Malleefowl | | ✓ |
| <i>Lophoictinia isura</i> – Square-tailed Kite | ✓ | |
| <i>Mormopterus norfolkensis</i> – East Coast Freetail Bat | ✓ | |
| <i>Neophema pulchella</i> – Turquoise Parrot | ✓ | |
| <i>Nyctophilus timoriensis</i> – Greater Long-eared Bat | ✓ | |
| <i>Phascolarctos cinereus</i> – Koala | ✓ | |
| <i>Pomatostomus temporalis</i> – Grey-crowned Babbler | ✓ | |
| <i>Pseudomys pilligaensis</i> – Pilliga Mouse | ✓ | |
| <i>Pyrholaemus sagittatus</i> – Speckled Warbler | ✓ | |
| <i>Saccolaimus flaviventris</i> – Yellow-bellied Sheath-tailed | ✓ | |

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| | | |
|---|---|---|
| Bat | | |
| <i>Stagonopleura guttata</i> – Diamond Firetail | ✓ | |
| <i>Stictonetta naevosa</i> – Freckled Duck | ✓ | |
| <i>Tyto novaehollandiae</i> – Masked Owl | ✓ | |
| <i>Underwoodisaurus sphrurus</i> | ✓ | |
| <i>Xanthomyza phrygia</i> – Regent Honeyeater | | ✓ |

Overwhelmingly, these creatures are birds or flying mammals, which suggests either the habitats that are in Gunnedah are suitable for these species or that habitats for these species are declining. In any case, protection of these habitats is essential in ensuring the long-term sustainability of the species listed above.

It is also noted that Gunnedah has one of the most significant koala populations in Australia. The habitats of koalas vary, however, the species only tend to feed on a small number of species of the Eucalypti family. In recent years, Gunnedah has used the significant koala population for marketing and tourism encouragement for the Shire. The habitats of these koalas are therefore not only a valuable natural resource, they have an economic value as well.

Of the piscatorial species that have been identified by NSW Fisheries in the Namoi River Catchment, only one is considered to be vulnerable, that of the Silver Perch. This species is in rapid decline due to both decreasing water quality and increased numbers of pest predator fish that eat the Perch's typical prey such as the European Carp. Also found in the catchment are numbers of River Blackfish, Murray Cod, awaiting information.

In addition to the above, there are more than 170 species that are protected under National Parks and Wildlife legislation in Gunnedah Shire LGA.

Also identified are a number of plant species that have been identified as 'Protected', 'Vulnerable' or 'Endangered' under the Threatened Species legislation. These are:

| Species: | Protected | Vulnerable | Endangered |
|--|-----------|------------|------------|
| <i>Boronia glabra</i> | ✓ | | |
| <i>Bothriochloa biloba</i> (Native Grass) | | ✓ | |
| <i>Casuarina cunninghamiana</i> ssp <i>cunninghamiana</i> – River Oak, River Sheoak | ✓ | | |

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| | | | |
|---|---|---|---|
| <i>Cymbidium canaliculatum</i> – Tiger Orchid | ✓ | | |
| <i>Goodenia macbarronii</i> | | ✓ | |
| <i>Hakea pulvinifera</i> (<i>Grevillea</i> family) | | | ✓ |

The existence of these species within the Shire indicates that the natural areas of the Shire have some significant conservation value. The presence of both flora and fauna that is endangered or protected under legislation is significant in the context of the dominant land uses of the Shire and the regional context of land use.

Preservation of habitats is the key to maintaining a healthy native flora and fauna population. Whilst the problems of introduced species competing for food sources and hunting native species is a significant one, habitat protection can ensure an adequate food sources. The Travelling Stock Routes (TSRs) throughout the Shire provide important linkages for native fauna and flora. The width of the TSRs are sufficient to allow for the movement of fauna without interference and the vegetation is largely undisturbed during a significant proportion of the time, except during climatic events when droving livestock is necessary, as is the case in late 2002.

These stock routes are intrinsically important to not only the economic sustainability of farming during drought events but are of high importance to the sustainability of the flora and fauna species of the Shire. These stock routes and vegetation corridors are shown at **Figure 9** and are discussed further at **Section 5.1.3.1**.

Overall, it is considered that the habitats which exist in the Gunnedah Shire LGA are significant to a number of species and the protection of these habitats should be a primary concern of Council over the next 10 years to ensure that a sustainable level of habitat remains whilst co-existing with agricultural pursuits. Ways in which this can be achieved are set out in **Section 5.1.1**.

4.1.9 Flooding and Drainage

The Namoi River is one of the major tributaries of the Barwon River, a major tributary of the Murray-Darling System. As identified in the 1982 Study, the Namoi catchment drains an area of approximately 43, 000 square kilometres from Walcha in the east and extending to Walgett in the west. This is illustrated at **Figure 5**.

Also as identified in the 1982 study, the Mooki River is a main headwater of the Namoi River and drains the south-eastern sections above the Gunnedah township, through the Shire with its' origins from the Liverpool Range near Quirindi Shire. Peak flows emanating from the Mooki River are a major contributor to the flooding that occurs in the Gunnedah township, especially when mixed with high flows in the Namoi River.

Figure 10 shows the extent of flooding in the Namoi and Mooki Rivers in Gunnedah. The control-flow dams of Lake Keepit and Split Rock Dam mitigate the flood events to a

certain extent. These water storage facilities are used to regulate the flows of the Namoi and Peel Rivers, ensuring those downstream properties and towns (including Gunnedah and Boggabri) are protected to some extent from peak flows during peak flow events. Lake Keepit is currently being assessed for upgrade works, in order to improve its capacity to mitigate flood events and improve dam safety. Options for the upgrade works are currently being investigated, and these are expected to be carried out over the course of a five year upgrade program.

The construction of Split Rock Dam recently and the continuing operation of Lake Keepit have served to protect these assets, including agricultural assets, to a certain extent over time. However, as discussed earlier the nature of the soils and the topography of the area means that the area is easily flooded.

Lake Goran to the south is an ephemeral lake within the Shire. The lake has an extensive catchment in the locality and is surrounded by agricultural pursuits.

The Gunnedah town centre obtains its town water from bores sunk into the earth around the Namoi River. The bores are sunk at depths of 20-130 metres and yield between 10-140 litres per second. The locations of the water supply bores are located at **Figure 11**.

The 1982 study identifies influences on the drainage pattern of the Namoi, including primarily the geomorphology of the basin. A major fault zone divides the basin into three zones, running from Quirindi to Carroll to the west of Barraba. Further downstream of this fault zone, as far as Narrabri, the alluvium is deeper and more extensive, the gradient of the river is mild and the topography is flat. This is the area where Gunnedah is located.

Gunnedah is subject to a number of flood events, generally occurring as short duration localised flooding. Flooding occurs within the town due to flows of the Namoi River and the Peel and Mooki sub-catchments. Local flooding can also occur as a result of two local creeks; Ashfords Watercourse and Blackjack Creek.

Over the last 100 years Gunnedah has faced a number of peak flow events. These events have the effect of inundating the shallow floodplains along the Namoi for a short period of time. The worst recorded flood event took place in 1955, reaching a height of 9.6 metres as measured from flooding gauge readings at Cohen's Bridge on Chandos Street.

Reliable flooding records have been available for Gunnedah since 1892. From this time until 1982, when the previous Study was completed, there were 119 occasions where the river exceeded a height of 5.8m, whereby land owners in flood liable lands would require notification. On 68 occasions over the same period the flood level exceeded 7 metres, the level at which minor flooding of urban areas commences.

Events between 1982 and 2002 have occurred in 1984, 1989, 1990, 1992, 1996, 1997, 1998 and 2000, of which the most major events occurred in 1984, 1998 and 2000. These each reached height of close to 8.9 metres. The following flood indicators

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for Gunnedah were established by Council relative to gauge readings at Cohen's Bridge:

| Height: | Indicator: |
|-------------|---|
| 6.6 metres | river breaks it bank in the vicinity of Cohen's Bridge |
| 6.9 metres | water crosses O'Keefe Avenue; |
| 7.4 metres- | water crosses Maitland Street between Marquis and Chandos Street's |
| 7.9 metres | considered a major flood, very little housing affected below this level |
| 9.6 metres | highest recorded flood (February 1955) |

Based on the figures above, Gunnedah has undergone major flooding events on 25 occasions between 1892 and 2002 at an average of once every 4 years. **Table 1** below identifies the distribution of flooding events at or above the danger height of 5.8 metres throughout months of the year between 1892-2002.

Table 4: Monthly Distribution of Flooding Events At or Above Danger Height of 5.8 metres from 1892-2002 (10 years)

| MONTH | NUMBER OF EVENTS |
|---------------|------------------|
| January | 14 |
| February | 15 |
| March | 8 |
| April | 4 |
| May | 5 |
| June | 17 |
| July | 19 |
| August | 10 |
| September | 9 |
| October | 14 |
| November | 13 |
| December | 9 |
| Total: | 137 |

As demonstrated in the table above, the greatest concentration of flood events throughout the year occurred in the months of June and July, with 17 and 19 respectively. January, February and October demonstrated the next highest amount of flood events, with 14, 15 and 14 respectively. The months in which the least number of events occurred were April and May, accounting for 4 and 5 events respectively. Since the 1982 Study, the greatest number of flood events occurred in November, with 5, raising the total from 8 to 13 in total.

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A Floodplain Management Plan was prepared by SM&EC Australia Pty Ltd in 1999 for the townships of Gunnedah and Carroll. The current effectiveness of this plan will be examined in further detail under **Section 5.1.2** of this report.

Options which have been investigated over the years to deal with flooding events within Gunnedah, aside from the construction of Split Rock Dam, include:

- **Levee Banks:** The possibility of erecting a levee bank around the northern perimeter of the town was investigated, however the idea was dismissed due to the relatively small number of properties which would be affected and the cost effectiveness of implementing such a measure. There are also concerns surrounding the raised water levels across the basin.
- **Non-Structural Measures:** Gunnedah is the farthest town upstream in the Namoi valley where the four major rivers can be gauged as a single entity, and as such plays an important role in the flood warning system. The SES is currently responsible for translating flood warnings into likely effects and disseminating this information to the local community and other towns in danger of affectations.

4.1.10 Water Quality

With the intensive nature of farming, including the extensive use of chemicals for fertilising crops and pastures and controlling pests, water quality in agricultural rural areas can sometimes be a significant problem, especially in areas of high consumption due to irrigated pasture and crop improvements.

Water quality also has a bearing upon the health of the species that rely on it, as well as the agricultural productivity of those further downstream who depend on the resource, for both economic and environmental gain.

Gunnedah has one sewage treatment facility, located some 2 kilometres to the north of the town and is a 100% re-use facility. This significantly decreases the potential for groundwater pollution and effluent-only flow problems in local streams and rivers.

The availability of water for urban purposes is a concern in Gunnedah. During periods of drought, the impacts on Gunnedah's water supply are marked, having implications for both urban uses as well as agriculture. Particularly within urban areas, water supply is a critical issue for both existing users and potential future development. To date, water restrictions have not been enforced during drought periods, including the current drought. Treated effluent water, which has been recycled, can provide for many water uses and relieves strain on reserves of town water. Council is currently investigating options for utilising treated effluent water diverted from the sewerage treatment plant (STP), particularly for industrial uses. The potential applications of this water source need to be examined in further detail in the future.

The major source of water quality management problems arises from agricultural land practices. Chemicals used for fertilising and pest control that are not administered properly or during adverse climatic conditions are a major source of water quality problems in rural areas. Often, during a rain event or the release of irrigation water these chemicals enter local water streams, increasing oxygen levels, phosphates and

nutrients, making algal blooms more common and the creation of an environment that favours introduced fish species. Soil erosion and the carrying of sedimentation into watercourses also provides for significant increases in the nutrient load of rivers and watercourses within the Shire.

Agricultural land practices that are located close to watercourses need to be aware of the implications of land practices on water quality. Farms and landholdings on the banks of Lake Goran typify as an example. Environment Australia have identified potential threats to the lakes future preservation as salinity, land clearing within the surrounding catchment and soil erosion. The proximity of these farms to the lake, including the farming of the land that is intermittently below water during periods of extended rains, have the potential to significantly contribute towards these threats; adversely affect water quality and reduce the sustainability of this important water resource.

This has potential implications for the future use of the area for irrigation purposes and the agricultural productivity of the land in the immediate vicinity of the Lake. Ways to achieve a better outcome for both agriculture and environment in the Shire generally, and at Lake Goran, are addressed in **Section 5.1.1.1** and **Section 5.1.3.2**.

4.1.11 Natural Features

Gunnedah Shire LGA, although relatively flat, has some distinguishing natural features. The main one of which is the Namoi River itself, as well as its tributary the Mooki River. Another distinguishing feature of the landscape is the man-made Lake Keepit on the Namoi River, designed to regulate flow along the river and assist in flood management impacts on downstream properties. The lake also provides a valuable recreational resource, with a facility owned and run by the NSW Department of Sport and Recreation located on the shores of the river.

Another natural feature of the area is Lake Goran to the south of the Shire. The lake is ephemeral in nature and fills and empties to variable depths depending on climatic conditions. This lake is valuable in terms of providing an important water resource for agriculture in the area. Land use practices and land degradation need to be managed so as to prevent adverse impacts on the way in which the lake and its' ecosystem operate. This has been discussed in greater detail in **Section 5.1.1.1**.

The natural setting of the Shire is also one of its greatest natural attributes. The setting of the plains of the Shire against the Great Dividing Range in the east and the Pilliga Mountains and Nature Reserve to the west, along with the aforementioned ridge top vegetative links and agricultural land uses provides a landscape that is distinctive to the inland region. This setting of the Shire also produces a habitat that is the right food source for Koalas, which is not only an important natural asset, but also for tourism in the Shire. It is recognised that the ramifications of making decisions regarding environmental areas, such as the Pilliga, are often significant for the local population in terms of economic and employment opportunities. This issue must form a careful consideration of any new proposals for the natural environment.

4.2 Built Environment

4.2.1 Existing Structure

The 1982 report identified that mainly geographic and topographical features contribute to the urban context of Gunnedah and the satellite towns that surround it throughout the Shire.

The 1982 study also gave a history of the settlement of the area, and of the town of Gunnedah itself. Whilst this report has the aim of updating the previous report, it is not considered that the history of the settlement of Gunnedah is relevant in the context of this report. Therefore, an examination of the settlement of Gunnedah post-1982 will be instead the focus of this report.

Gunnedah itself has been severely limited by the geographical constraints of the Namoi River and the Liverpool Floodplain. The town itself has not changed significantly in structure since the 1982 study, with more industrial development present around the northern section of the town and more residential development to the west of the town. Largely, however, this has remained unchanged.

The environment in which the 1982 study was prepared is quite different to that of 2002, when the town had strong growth and stronger prospects for the future. However, over time with the changing nature of the economy and new agricultural methods that have made significant impacts in terms of rural labour demand on rural areas, there has been a steady decline in the population. This has placed less pressure on demand for the release and subdivision of more land, and has also provided an opportunity for infill development. The town has grown in a controlled way, and there is little evidence of sprawl. Other outlying towns such as Curlewis, Carroll, Breeza and Tambar Springs have also displayed similar characteristics. Whilst Curlewis is the biggest of these towns, the town has confined expansion to the western side of the railway line that traverses it.

The town has a primary support function to its hinterland, this includes the other secondary towns of the Shire and the hinterland of these towns, dominated by the agricultural landscape. This function ensures that the town will always have some form of importance in terms of servicing the requirements of these areas, but to what extent seems to invariably depend on the prosperity of the local economy.

4.2.2 Land-Use

As discussed earlier in this report, the Shire has an overwhelmingly large proportion of agricultural land uses. Well over 90% of the landmass in Gunnedah is used for a primary production purposes. Overwhelmingly, the towns within the Shire provide a hinterland support function to the agricultural lands surrounding the towns, with Gunnedah township providing the primary support function of the Shire. These towns therefore are dominated by dwellings that have traditionally been based upon being rural workers' dwellings for surrounding farms. The typical commercial operations of

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the town are usually general stores and agricultural support industries such as farm machinery repairs or stock feeds.

Table 5, below gives the approximate area of land for each zone in the Shire, without the inclusion of roads, and based upon the existing LEP.

| ZONE | AREA (HA) | APPROX. % |
|---|-----------|-----------|
| 1(a) Rural (Agricultural Protection) | 426400 | 87 |
| 1(b) Rural (General) | 33110 | 6.78 |
| 1(f) Forests | 20820 | 4.26 |
| 1(c) Rural Residential | 1066 | 0.22 |
| 1(d) Future Urban | 184.4 | 0.04 |
| 2(a) Residential | 333.1 | 0.07 |
| 2(b) Residential (Higher Density) | 53.74 | 0.01 |
| 2(v) Village | 59.78 | 0.01 |
| 3(a) Central Business | 30.12 | 0 |
| 3(b) General Business | 21.89 | 0 |
| 4(a) General Industry | 185.7 | 0.04 |
| 4(b) Offensive Industry | 63.94 | 0.01 |
| 5(a) Special Uses (not calculated) | 0 | 0 |
| 5(b) Special Uses (Railway) | 185.5 | 0.04 |
| 6(a) Recreation | 980 | 0.2 |
| 7(d) Environment Protection | 666.1 | 0.14 |
| 8(a) National Parks and Nature Reserves | 4330 | 0.9 |
| 9(c) Proposed Open Space | 17.12 | 0 |

As displayed in this table, approximately 98% of the Shire is zoned for an agricultural use. Whilst this may not be entirely indicative of the actual uses of the land, it is indicative that a significant proportion of the Shire is set aside for non-residential or commercial land-uses. These areas vary from the Agriculture 1(a) zone through to the Forestry 1(f) zone and are generally areas of primary production (including coal mining, agriculture and forestry).

This 98% is an important figure when assessing the importance of the agricultural lands and hinterland of the Shire. Whilst also dominating the actual land-mass of the Shire, the land is also the most productive in terms of economic gain and wealth for both the Shire and the residents.

Of the 2% that is not mentioned above, there is some interesting breakdowns of the land use patterns throughout the Shire. **Table 6** and accompanying graph, **Figure 12**, both show the distribution of non-urban land use.

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| NON-RURAL/COMMERCIAL ZONE | AREA (HA) | APPROX. % NON-RURAL |
|------------------------------------|-----------|---------------------|
| 1(c) Rural Residential | 1066 | 26 |
| 1(d) Future Urban | 184.4 | 4.80 |
| 2(a) Residential | 333.1 | 8.7 |
| 2(b) Residential (Higher Density) | 53.74 | 1.4 |
| 2(v) Village | 59.78 | 1.6 |
| 3(a) Central Business | 30.12 | 0.8 |
| 3(b) General Business | 21.89 | 0.6 |
| 4(a) General Industry | 185.7 | 4.8 |
| 4(b) Offensive Industry | 63.94 | 1.7 |
| 5(a) Special Uses (not calculated) | 0 | 0 |
| 5(b) Special Uses (Railway) | 185.5 | 4.9 |
| 6(a) Recreation | 980 | 25 |
| 7(d) Environment Protection | 666.1 | 17 |
| 9(c) Proposed Open Space | 17.12 | 0.4 |

This table, and graph, show the percentage of remaining land that is not urban and is not special uses (some 3%). Larger allotments for rural residential development would be a primary factor in this particular land uses' consumption of the greatest proportion of land. However, to have almost three times as much rural residential land as ordinary residential or industrial land may be considered, with market factors and a restructuring economy, a little excessive. Approximately 5% of the land has been earmarked for future urban, adding to the 10% of existing housing stock. It is considered that this total 36% of non-rural land as residential housing allotments may be in excess of both immediate and long-term goals. Principles of urban consolidation and 'smart growth', actions explored further in **Section 5.2.3**, can be employed.

It is estimated that approximately up to 200 hectares of rural residential land could if desired be 'back-zoned', of that which is unlikely to be required in the foreseeable future. It is considered that the supply of residential land is currently adequate when considering the outstanding 184.4 hectares of land zoned as 1(d) Future Urban. However it should also be acknowledged that 'back zoning' will reduce the value of these lands and will affect the viability of the land for current owners.

In addition, it is desirable to promote infill development within existing towns to accommodate existing housing demand within the Shire's settlements as opposed to continued rural residential development and subdivision on the fringe, particularly Gunnedah township. This is examined in further detail under **Section 5.2.3**.

Approximately 7.9% of the land is devoted to commercial uses (industry, business and other commercial activities), and is primarily located around and within Gunnedah,

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with a small pocket of industrial land at Curlewis. It is considered that the supply of commercial and industrial land is sufficient for the short and long-term requirements of Gunnedah.

Approximately 42% of the remaining land is for a non-active land use. The most significant of this is around 25% for recreation purposes, a significant proportion of land for this purpose. A further 17 hectares, or 0.4%, is zoned for proposed open space, adding significantly to the amount of open space available in the Shire.

Perhaps more importantly is the 660-odd hectares set aside for Environment Protection in and around the Gunnedah township. This significantly protects the ridgelines around the township and creates a 'visual catchment' to development in and around the area. It also provides valuable habitat protection and vegetation corridors around and within the town.

The lands zoned for Forestry and National Parks and Nature Reserves, approximately 25,150 hectares, are considered to have a significant conservation value. These areas are not presently used for forestry or any other significant land use, and provide valuable habitats for native wildlife.

On a more micro scale, the Gunnedah Central Business District (CBD) is a core activity area of the Shire. The town of Gunnedah has an important function and role within the Shire, and also provides services to visitors.

As part of a review of the Gunnedah Shire Business Zone and Car Parking, Planning Overload Pty Ltd undertook a detailed assessment of land use and patterns throughout the Gunnedah town centre in July 2000. An integral part of this study was a land use assessment of the town centre, showing the nature and extent of land use patterns throughout the centre, showing the effectiveness of the dual zoning controls in the Shire for the CBD.

In 2002, Planning Workshop Australia undertook a review of the land use study, with the results at **Figure 16**. The land use study has some interesting findings. Out of all business-oriented land uses in the CBD, Residential had the highest proportion of land used, some 26% of the total area of the CBD, or 18.26 hectares out of a possible 70.02. This represents some significant implications for planning the future of the CBD, including achieving a consistent land-use pattern that sees core business close to the centre of zones, secondary businesses on the periphery of the core and residential living on the fringe, or as close to the residential zones as practicable.

Commercial land uses make up a further 23%, or 16.21 hectares, of all land uses within the CBD. Most of these occur towards the 3(a) Central Business zone, and are achieving a highest and best use for the economy and scale of commercial activity in the core. Industrial-based land uses are then the third most common form of land use activity in the CBD, with 12%, or 8.49 hectares. This type of land use is typically located in the 3(b) General Business zone and is consistent with the objectives of this type of zoning, offering support services to the core business area.

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A dominant land-use in the CBD are community-based land uses, with a total land area of 5.32 hectares, or 8% of the land in the area. The services provided by these land use include the Council Chambers, Community Centre, Civic Hall, Library etc. The community based land uses are prolific around and within the 3(a) Central Business Zone.

The next most common land use in the CBD is Mixed Uses, with 5%, or 3.71 hectares. This type of land-use should be encouraged to allow for more versatility in the main street. It is considered that although not necessarily required due to the availability of housing stock in the area mixed uses such as commercial offices should be mixed with retailing to ensure diversity in the main street.

4.2.3 Opportunities for Urban Consolidation

Vacant land accounts for approximately 2.02 hectares (around 3%) of the total land mass in the Central Business area of Gunnedah. This represents some significant opportunities for urban consolidation in this zone. The location of these allotments, whilst not strategic for any kind of core retailing, could be considered to be attractive to other businesses that Council is trying to encourage to locate on the periphery of the core business zone. Opportunity also exists to utilise the vacant properties by consolidating them with surrounding properties to encourage larger site areas with higher densities.

Overall, land use and structure in Gunnedah is varied with many different facets to the land-uses, both within and across zone boundaries. The structure of zoning in Gunnedah is such that land uses that may be incompatible with surrounding land uses in the area do not necessarily pose a major problem. This brief land use assessment has found that the dominant land use is agriculture, and in providing the Shire with much of its economic and employment base, should be protected in a sustainable and economic way. Of the non-agricultural zones, the land mass that the 1(c) occupies is significant in terms of the housing demand for Gunnedah and the amount of land set aside for future urban expansion in the 1(d) land.

4.2.4 Urban and Rural Infrastructure

The urban and rural infrastructure of Gunnedah can be described as ranging from excellent in some locations to poor in other areas of the Shire. Generally, however, the public infrastructure is of an adequate quality and age to sustain present population levels.

4.2.4.1 Transportation Infrastructure

4.2.4.1.1 Rail Infrastructure

The Shire also has linkages through north and south via the North Western railway line that has a daily passenger service operating along the line (**Figure 13**), from Sydney to Moree. The railway extends southwards towards Newcastle and Sydney. The railway

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also carries much of the Shire's freight including grains, cereals and coal to Newcastle Port. This rail is an important trade link to the Shire, and the upgrading of the rail line may attract further investment into the Shire.

The main section of rail line that traverses the Gunnedah Shire LGA spans from Werris Creek to just south of Boggabri. The line is part of the greater Werris Creek to Moree branch line, which extends from the Main Northern Railway, connecting the region with Newcastle and Sydney. The rail line carries both freight and passenger services, with a daily service from Moree to Sydney and return. The main types of freight that are carried on the line include grains, coal and containers. The Rail Infrastructure Corporation (RIC), the owner and maintainer of the NSW rail network, has stated that rail freight will continue to play an important role in the region.

Specifically, the rail line currently operates under some pressure of time constraints in crossing the Liverpool Range. This, to some extent, means that the freight transport via rail is not as efficient as it might be due to the time taken to transport materials to the closest port.

To an extent, the proposed Murrurundi Rail Tunnel (also known as the Ardglen Rail Tunnel) is expected to alleviate this problem significantly and allowing for possible future expansion of the Gunnedah Coal Fields. RIC have advised that the tunnel, a private sector proposal that would facilitate the transportation of coal and other materials through the Liverpool Ranges through a new deviation and avoiding the steep gradients that currently are a feature of the existing line. The project cost was estimated at \$100 million, and subsequently RIC requested a substantial business case be put forward to justify the construction of the tunnel. At the time of writing, there has been no commitment from either RIC, the NSW Premier's Department and the Department of State and Regional Development as to the progress of the tunnel and whether the project has a definitive timeframe.

Other rail infrastructure projects that have been raised by RIC include the construction of a grain consolidation facility at Werris Creek to be built by Pacific National (formerly FreightCorp and National Rail Corporation) to allow for grain to be hauled by small trains from the branch lines in the region to the facility at Werris Creek where larger trains will be able to transport the grains to the port at Newcastle. This facility is planned to be built by the AWB Pty Ltd (formerly the Australian Wheat Board). This will allow for greater efficiency in terms of economies of scale of the transportation of the goods, lowering the costs and therefore margins for primary producers.

Interestingly, the Australian Transport and Energy Corridor Ltd (ATEC) are the proponents of the Australian Inland Rail Expressway. ATEC's plan is to build a rail link between Melbourne and northern Australia (via Werris Creek), with links to major ports along the way. This may have a potentially positive impact upon the Shire, indirectly through the better provision of freight and passenger linkages to other ports, as well as increasing the number of potential visitors to the area.

Overall, the rail infrastructure of the Gunnedah LGA (shown at **Figure 13**) could be considered as excellent, with linkages to major ports and cities. However, there is

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considerable scope for the improvement of the deviation through the Liverpool Range, which would make the mass transit of primary products feasible, in turn having a significant positive impact upon the attraction of new enterprises to the area and therefore would create significant employment opportunities.

4.2.4.1.2 Aerodrome

Gunnedah has one aerodrome located on the eastern side of the Namoi River, some 2 kilometres from the outskirts of the eastern side of the town, owned and operated by Gunnedah Shire Council. Whilst at the time of writing the aerodrome is currently operational, ongoing negotiations will be held with a view to opening the aerodrome. The closest airport with a regular regional service is Tamworth, providing regular Q Link services to Sydney. The location of the airport is shown at **Figure 14**. The airport, although not presently serviced by a commercial passenger aircraft operator, provides a valuable link to the town. Charter flights, small cargo planes and private civil aircraft also utilise the facility.

In the case of significant increases in airport activity into the future, a number of additional environmental issues may arise, in relation to noise and vegetation within the Obstacle Limitation Surface (OLS) of the airports runway. This is a significant issue discussed further in **Section 5.2.3**. The aerodrome is subject to closure by floodwaters, and an alternate authorised landing area is provided on Pullaming Road, some 5km south of Gunnedah for emergency landing during such closures.

4.2.4.1.3 Roads

Gunnedah is well linked in terms of transport to surrounding areas. The Gunnedah Shire road network (illustrated at **Figure 14**) creates extensive linkages to the surrounding districts and beyond. This network of local roads, main roads and state highways is an important linkage for not only intra-LGA travel, but for travel to the surrounding regions and major Sydney centres.

As identified in the 1982 study, the road network of Gunnedah, along with the rail line axis and watercourses, has played a major role in shaping the physical development of the Shire over time. The road network in Gunnedah Shire links all parts of the Shire relatively directly to the township of Gunnedah. This road network extends to Tamworth and the New England Highway on the Oxley Highway in the east, Coonabarabran and the Newell Highway (to Dubbo) on the Oxley Highway in the west, to Narrabri on the Kamilaroi Highway linking to Moree and Walgett to the north and north-west and Inverell in the north-east. The Kamilaroi Highway also links Gunnedah to Quirindi in the south and linking to the New England Highway at Willow Tree. This road network is extensive, and is generally well-located to smaller towns within the Shire, or to the rural lands that form most of the Shire. The major road network of the Shire is shown at **Figure 14**.

Such roads include the Oxley Highway, linking Gunnedah to Coonabarabran in the west and Tamworth and Port Macquarie in the east. The Kamilaroi Highway links

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Gunnedah to Narrabri and the Newell Highway in the north, whilst to the South it links to Quirindi and the New England Highway.

The proposed extension of the F3 Freeway to Cessnock/Black Creek would have the effect of reducing the travel distance between Sydney and Gunnedah to 400 kilometres. This would have positive impacts through increasing accessibility of the Shire to potential tourism markets in Sydney and the Hunter area.

Locally, the development of the town has occurred in an orderly way, with a grid pattern and wide streets the predominant road features of the area. New developments and subdivisions during the 1980's and 1990's have seen a more modern, curved, approach to road construction and lot layouts, and has produced a different pattern of development on the southern fringes of the Gunnedah township.

The linkages that the roads afford Gunnedah are important and vital links to the economy and social well-being of the locality. As the dominant industry in Gunnedah is agriculture, the roads and transport infrastructure in Gunnedah performs the function of a transport hub and support-services centre for the agricultural and livestock industries. The agricultural support industries in turn generate a need for a range of additional support services from the wider community such as retailing, banking, education, building maintenance, entertainment and others.

In the Gunnedah Traffic Study prepared by Project Planning Associates in October 2001, it addresses the main street improvement program and its implications. The program was developed by John Carr Architects to improve the urban design and amenity of Conadilly Street, particularly within the commercial and retail areas located between Abbott Street and Chandos Street.

The program encourages the development of a cohesive urban design scheme for Gunnedah involving paving treatments, landscaping and signposting. The program recommends that the width of Conadilly Street be reduced at a number of locations, and that roundabouts be installed to moderate the speed of vehicular traffic. The program is expected to result in lower vehicle speeds in Conadilly Street rather than any diversions of traffic into adjacent streets.

4.2.4.1.4 Servicing Infrastructure

Water and Sewerage

Gunnedah has a good and reliable water supply that has enabled the continued expansion of the township without any considerable pressure on the available water supply. The water holding aquifers that supply the water range in depth from 10 metres to 118 metres below the surface. To extract the water from these aquifers, eleven bores ranging in depth from 20 metres to 130 metres are used. A significant number of bores are also used throughout the Shire for the extraction of water for agricultural purposes.

The bores extrapolate a total of 1, 596, 249 litres an hour (source: Gunnedah Shire Council 2001) to supply the reticulated water supply pipes that service the Gunnedah

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township. Above the surface, some 17.9Ml of water may be stored in the 5 reservoirs, the largest of which holds 9.08Ml. Approximately 120 kilometres of water mains infrastructure exist in the Gunnedah Shire.

Electricity and Energy

Gunnedah Shire is serviced by electricity by Country Energy. All infrastructure throughout the Shire is owned and maintained by the aforementioned Energy Corporation. At present development and population levels, the amount of electricity supplied to the Shire is sufficient for some time, and infrastructure age and quality is described as good to excellent.

Gunnedah Shire is not serviced by natural gas. The Australian Gas Light Company (AGL) is planning on building a gas pipeline link from the western gas fields to Gunnedah to primarily service a proposed ethanol production facility. This gas pipeline is proposed to run along a 300km route from Dubbo in the west through to Gunnedah, this would also have the effect of linking the area to natural gas.

Tendering documents for this facility have been issued by the Association (Central Ranges Natural Gas and Telecommunications Association Incorporated) for the pipeline, which will service numerous towns throughout the Central Ranges. The Association consists of 8 local councils, Mudgee Region Business Enterprise Centre and the Tamworth Development Corporation. The Association believes that providing natural gas within the area will offer an important and viable alternative energy choice within the region.

Extension of the natural gas pipeline is critical in ensuring the Primary Energy \$90 million ethanol plant in Gunnedah. Tenders for the proposal will close in September 2003 and construction is approximately 6 months away.

4.2.5 *European and Rural Heritage*

The Gunnedah Shire has significant items of heritage that are worthy preserving and maintaining for the benefit of future generations. These include a number of items as listed within the existing LEP.

Council is currently in the process of undertaking a comprehensive Shire-wide heritage study to assess the significance of heritage items throughout the Shire in time for the preparation of the new LEP. It is expected that this work when completed will become incorporated into the new LEP.

4.3 Social Environment

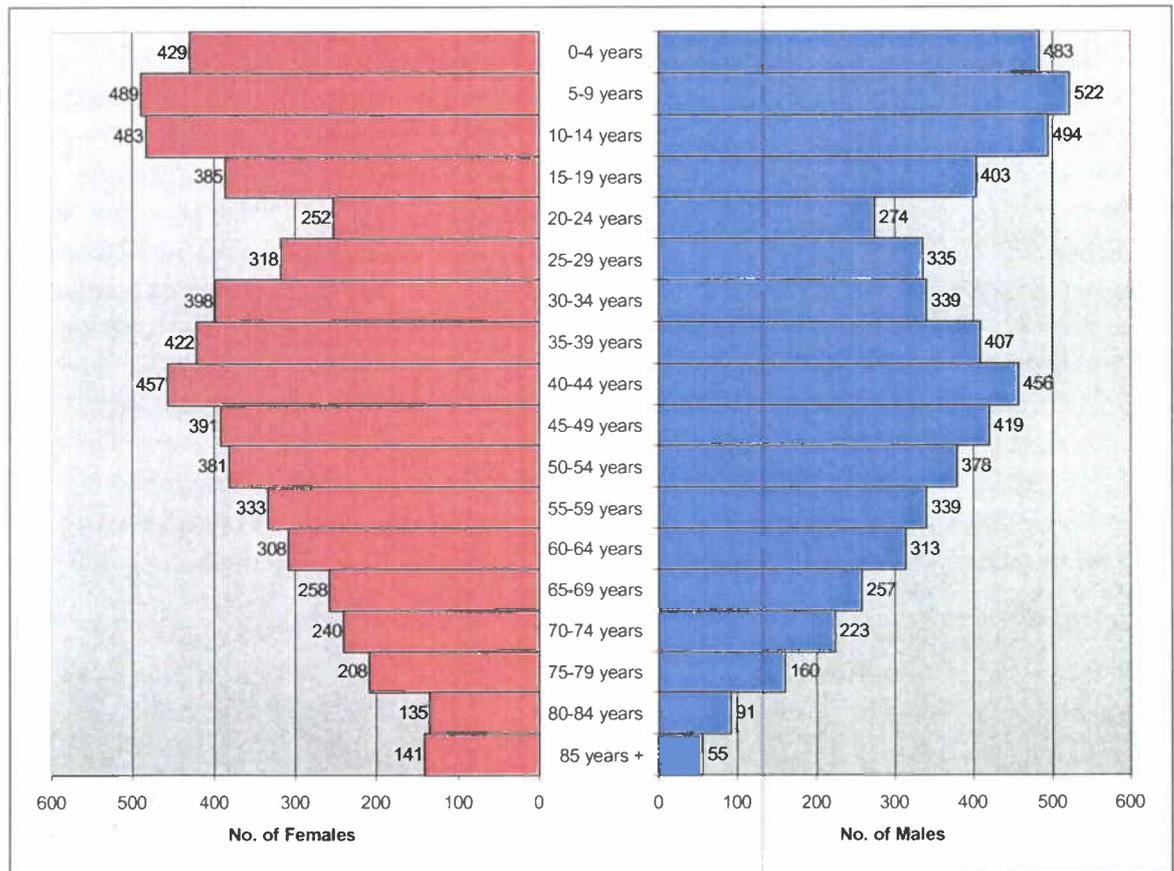
4.3.1 *Population Distribution and Age Structure*

The population count of the Gunnedah Local Government Area (LGA) in 2001 was 11,993 persons (ABS Census 2001). This population had decreased by 6.44% from the 1996 census of 12,819 people. In 2001, there are 5,953 males and 6,040 females, compared with 6354 males and 6465 females recorded in the 1996 census.

The population of the Shire, through many reasons including the changing nature of the economy and inter-migration patterns of younger people, has decreased since the 1982 Environmental Study when the population of the Shire was 13,173. The population was 11,993 at the 2001 Census. This represents a decrease of around 9% of the total population over 20 years. Similarly, the 1982 study identified that the Shire had a population density of less than 2.6 per square kilometre. Using the 2001 Census data, the population density is now 2.36 per square kilometre. The Shire is largely agricultural, however, these uses are fairly intensive (although little 'intensive agriculture' as defined in the Environmental Planning and Assessment Regulation 2000 is in the Shire) and as such the Shire is not as sparsely populated as one may expect in a predominantly rural setting. Adding to this is the ageing nature of the population, and the steady youth out-migration. **Section 4.3** examines the demographic and social environment of the Shire.

Figure 15 shows the distribution and age structure of the population of Gunnedah Shire in 2001.

Figure 15: Age Profile of the Population, 2001



Source: ABS Census 2001

As shown in **Figure 15**, the largest age group in 2001 was the 5-9 years old group. This represents approximately 8.43% of the total population in the Gunnedah LGA. It is followed by the age groups of 10-14 years old and 40-44 years old, which represent 8.15% and 7.61% of the total population respectively.

Figure 15 indicates that the Shire had a relatively young population, consisting of mainly of families with school age children. In 1996, 25.3 percent of the population was under the age of 15 years and in 2001, 24.2 percent of the population was under the age of 15 years. This slight decrease in the proportion reflects a state-wide decrease in the population in that age group.

Table 4 compares the age structure and distribution of Gunnedah LGA with NSW as a whole.

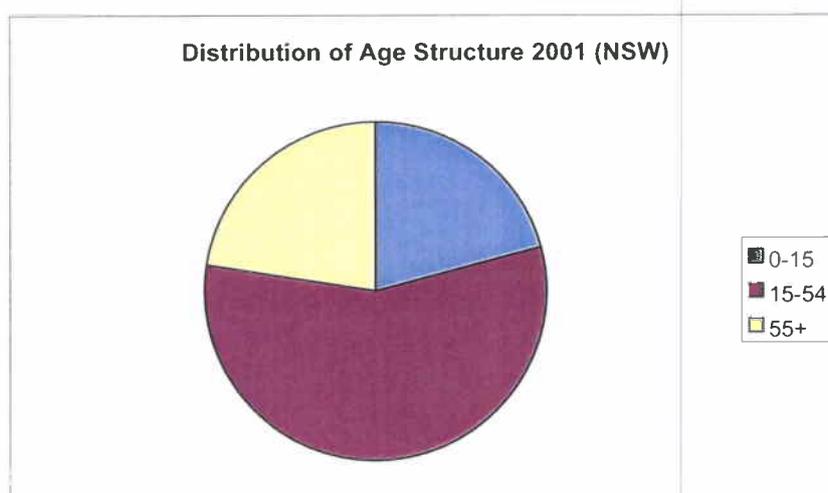
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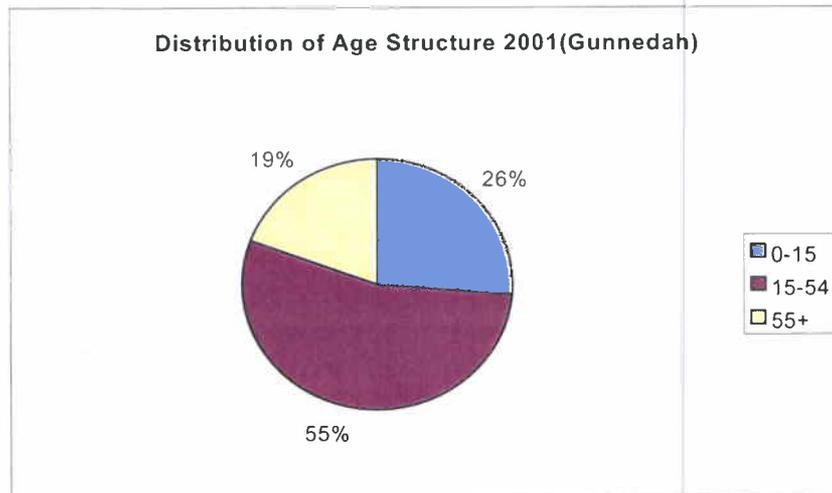
Table 7 - Comparison of the Age Distribution Structure between Gunnedah and NSW, 2001

| | Number | | Percentage | | |
|-------------------|----------|-----------|------------|--------|------------|
| | Gunnedah | NSW | Gunnedah | NSW | Difference |
| 0-4 years | 912 | 422,341 | 7.6% | 6.6% | 1.0% |
| 5-9 years | 1,011 | 445,983 | 8.4% | 7.0% | 1.4% |
| 10-14 years | 977 | 445,026 | 8.1% | 7.0% | 1.2% |
| 15-19 years | 788 | 436,626 | 6.6% | 6.9% | -0.3% |
| 20-24 years | 526 | 408,719 | 4.4% | 6.4% | -2.0% |
| 25-29 years | 653 | 446,515 | 5.4% | 7.0% | -1.6% |
| 30-34 years | 737 | 468,524 | 6.1% | 7.4% | -1.2% |
| 35-39 years | 829 | 483,003 | 6.9% | 7.6% | -0.7% |
| 40-44 years | 913 | 482,318 | 7.6% | 7.6% | 0.0% |
| 45-49 years | 810 | 438,277 | 6.8% | 6.9% | -0.1% |
| 50-54 years | 759 | 412,967 | 6.3% | 6.5% | -0.2% |
| 55-59 years | 672 | 325,330 | 5.6% | 5.1% | 0.5% |
| 60-64 years | 621 | 267,064 | 5.2% | 4.2% | 1.0% |
| 65-69 years | 515 | 228,029 | 4.3% | 3.6% | 0.7% |
| 70-74 years | 463 | 217,237 | 3.9% | 3.4% | 0.4% |
| 75-79 years | 368 | 177,684 | 3.1% | 2.8% | 0.3% |
| 80-84 years | 226 | 114,764 | 1.9% | 1.8% | 0.1% |
| 85 years and over | 196 | 90,761 | 1.6% | 1.4% | 0.2% |
| Overseas visitors | 16 | 54,429 | 0.1% | 0.9% | -0.7% |
| Total | 11,992 | 6,365,597 | 100.0% | 100.0% | |

Source: 2001 ABS Census

Compared with the NSW as a whole, Gunnedah LGA has a higher proportion of the population in the age groups 0-14 and age groups 55 and over and a lower proportion in the age groups between 15 and 54, as illustrated within the following charts:





4.3.2 Employment

The statistics available for the analysis are from the 2001 Census.

Table 8 below shows the distribution of the labour force in Gunnedah LGA in 2001.

Table 8 Workforce and Employment, 2001

| | Male | Female | Total |
|----------------------------------|------|--------|-------|
| Employed | 2048 | 943 | 2991 |
| Unemployed | 291 | 191 | 482 |
| Labour Force | 2919 | 2238 | 5157 |
| Population over 15 | 4455 | 4637 | 9092 |
| Workforce Participation Rate (%) | 68% | 50.4% | 59.1% |

Source: 2001 ABS Census

Table 8 indicates that the workforce participation rate, comprising the labour force over the age over the age of 15 years, was in the middle range, with approximately 59.1 percent of working age adults (over 15 years) in the labour force in 2001. This compares with 62.2 percent for NSW. The male workforce participation rate in the Shire (68 percent) was lower than that for NSW (70.2 percent), and the female participation rate (50.4 percent) was also lower than that for NSW (54.5 percent).

Table 9 shows a breakdown of employment by industry in Gunnedah Shire and NSW in 1996.

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Table 9 - Employment by Industry - Gunnedah and NSW, 2001

| Employment Groups | Gunnedah | | NSW | | Difference (%) |
|---------------------------------------|--------------|------------|------------------|------------|----------------|
| | Number | Percentage | Number | Percentage | |
| Agriculture, Forestry and Fishing | 981 | 21.04% | 92,358 | 3.36% | 17.68% |
| Mining | 43 | 0.92% | 14,823 | 0.54% | 0.38% |
| Manufacturing | 382 | 8.19% | 316,113 | 11.50% | -3.31% |
| Electricity, Gas and Water Supply | 20 | 0.43% | 20,389 | 0.74% | -0.31% |
| Construction | 193 | 4.14% | 189,740 | 6.90% | -2.76% |
| Wholesale Trade | 242 | 5.19% | 152,790 | 5.56% | -0.37% |
| Retail Trade | 712 | 15.27% | 390,914 | 14.22% | 1.05% |
| Accommodation, Cafes and Restaurants | 181 | 3.88% | 141,927 | 5.16% | -1.28% |
| Transport and Storage | 182 | 3.90% | 125,752 | 4.58% | -0.67% |
| Communication Services | 50 | 1.07% | 54,958 | 2.00% | -0.93% |
| Finance and Insurance | 83 | 1.78% | 131,955 | 4.80% | -3.02% |
| Property and Business Services | 288 | 6.18% | 334,299 | 12.16% | -5.99% |
| Government Administration and Defence | 166 | 3.56% | 105,380 | 3.83% | -0.27% |
| Education | 350 | 7.51% | 187,168 | 6.81% | 0.70% |
| Health and Community Services | 461 | 9.89% | 258,522 | 9.41% | 0.48% |
| Cultural and Recreational Services | 38 | 0.81% | 67,595 | 2.46% | -1.64% |
| Personal and Other Services | 158 | 3.39% | 98,321 | 3.58% | -0.19% |
| Non-classifiable economic units | 11 | 0.24% | 14,884 | 0.54% | -0.31% |
| Not stated | 122 | 2.62% | 50,508 | 1.84% | 0.78% |
| Total | 4,663 | | 2,748,396 | | |

Source: 2001 ABS Census

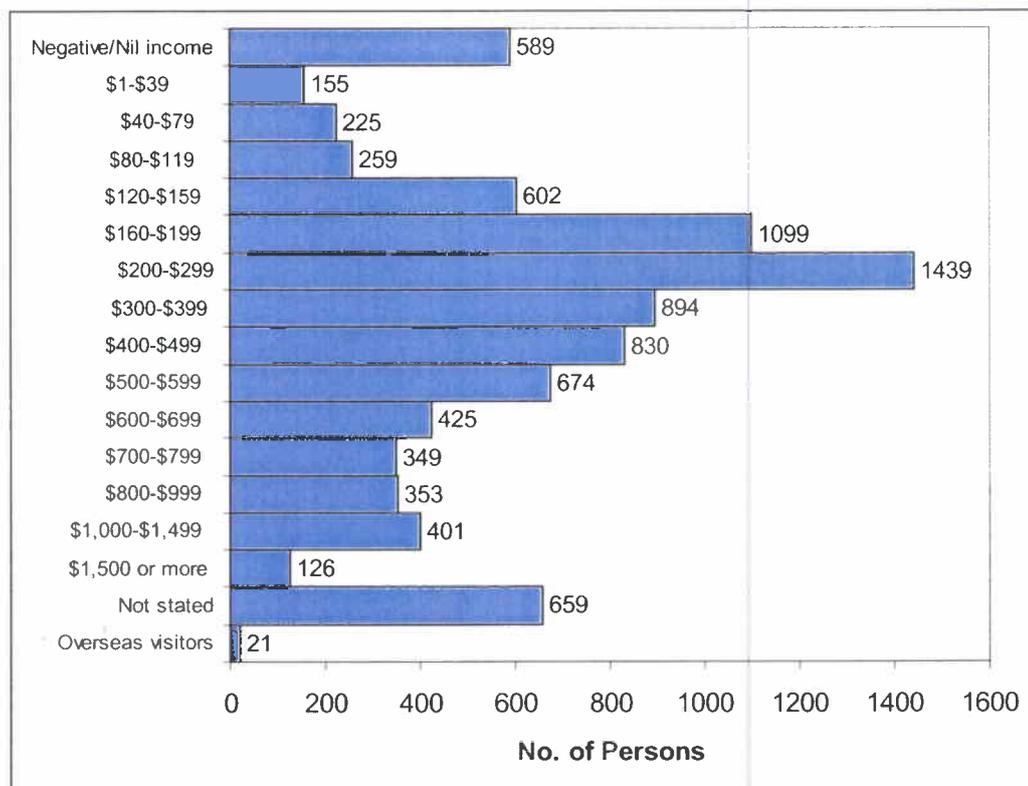
Table 5 shows the importance of the agricultural (primary) industry, employment 21.04 percent of the employed population and the retail trade (tertiary) sector, employment 15.27 percent of the employed population. These compare with 3.36 percent and 14.22 percent for NSW respectively. The dominant industries within the Shire are primary industries, retail trade, health and community services and education.

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4.3.3 Individual Income

Figure 16 below shows the distribution of weekly individual income for the LGA.

Figure 16: Weekly Individual (Gross) Income, 2001



Source: ABS Census 2001

Figure 16 indicates that income group \$200-\$299 forms the largest income group within the LGA in 2001. This income group accounts for 15.8% of the LGA's population. The majority of the population (90.9%) in the LGA earned between \$120 and \$599 per week, gross income.

Individual income earned by the population in Gunnedah was relatively lower when compared with the NSW as a whole in 2001. In Gunnedah, there were 52 percent of the population earning more than \$300 per week; while NSW had 61.6 percent earning the same amount.

4.3.4 Education

Gunnedah Shire is serviced by seven government primary schools, a special needs school and one high school. The Department of Education and Training has indicated that all of these schools have permanent accommodation; that is they are consistent with their anticipated longer term enrolment patterns. The Shire also features a Catholic

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high school (St Mary's College), a Catholic primary school (St Xaviers) and a Christian primary school (Gunnedah Christian Community School).

Since 1995, the Department has indicated that a number of minor capital works improvements have been undertaken at some of the schools, including the recent air-cooling of Mullaley, Tambar Springs and Walhallow public schools, joint-funded shade/shelter projects at Gunnedah and Tambar Springs public schools and upgrading of shower facilities at G S Kidd Memorial School (special needs school). The Department has also indicated that a project to upgrade the facilities at Gunnedah South Public School is currently being planned and will continue to be considered for funding in future capital works programmes.

Gunnedah TAFE is also located within the Gunnedah township. It has an enrolment of approximately 1300 mainly part-time students. Since 1995 there have been a number of upgrades to the educational infrastructure of the TAFE and the surrounds, including works to improve Block D, the library and the car park. The TAFE offers numerous courses, within the fields of business and public administration, health and community services, information technology, manufacturing and engineering; and primary industries. There is a special focus on agricultural and health care courses, and courses designed to meet the needs of small business.

Apprenticeships being offered in the Shire in combination with TAFE courses cover a wide range of trades, and the following unique traineeships are offered:

- Aeroskills
- Clerical
- Retail
- Community service (aged care)
- Rural
- Forestry
- Food processing
- Automotive
- Water industry operations
- Australian land conservation and restoration
- Tourism and hospitality
- Horticulture
- Sport and recreation
- Veterinary nursing
- Metals and engineering
- Construction

In February 2003, Gunnedah Council awarded eight Community Scholarships, to the value of between \$1,000 and \$2,500 for local students to enhance their studies. The scholarship fund was initiated by Council, and a series of contributions were subsequently from business and community groups. Council also initiated the project and managed the fund through a specifically established committee. Two of the scholarships offered were in the field of agriculture, one for special achievement, one each for secondary and primary teaching, two for health and one for medical studies.

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Table 6 below shows the highest level of school completed by person who are aged 15 and over and a comparison of percentages with the Sydney SD and NSW as a whole in 2001.

Table 10: Highest Level of School Completed by Persons Aged 15 and Over, 2001

| | Persons | | Percentage | |
|----------------------------|----------|----------|------------|--------|
| | Gunnedah | Gunnedah | Sydney SD | NSW |
| Year 8 or below | 1166 | 12.8% | 7.2% | 8.6% |
| Year 9 or equivalent | 1253 | 13.8% | 6.5% | 8.4% |
| Year 10 or equivalent | 3196 | 35.2% | 23.2% | 26.8% |
| Year 11 or equivalent | 484 | 5.3% | 5.0% | 5.3% |
| Year 12 or equivalent | 2007 | 22.1% | 44.4% | 38.0% |
| Still at school | 310 | 3.4% | 3.2% | 3.3% |
| Did not go to school | 54 | 0.6% | 1.6% | 1.2% |
| Not stated | 606 | 6.7% | 8.8% | 8.4% |
| Completed year 10 or above | 5687 | 62.7% | 72.6% | 70.1% |
| Total | 9076 | 100.0% | 100.0% | 100.0% |

Source: ABS Census 2001

Table 10 shows that in 2001, 62.7% of the population in Gunnedah completed year 10 or above in school. This figure is relatively lower than the Sydney SD and NSW averages, being 72.6% and 70.1% respectively. Similar to Sydney SD and NSW as a whole, Gunnedah LGA had 3.4% of the population still at school. The reasons for the LGA's below average figures for school education is probably linked to the agricultural nature of the local community and also to the limited opportunities that would have existed for employment within the LGA for people with a higher qualification.

4.3.5 Crime and Community Safety

With regard to the environment, there are a number of crime and community safety considerations that relate to police organisation, crime prevention infrastructure, precincts, environment protection practices and criminal activity itself.

4.3.5.1 Police

Within the Gunnedah LGA, there is the main police station at Gunnedah and two one-man police stations, one at Curlewis and one at Tambar Springs. The Gunnedah station has an authorised complement of 12 General Duties Police Officers and two Detectives in the Criminal Investigation Unit.

A Crime Prevention Officer located in Tamworth has a general responsibility for coordination with Councils, public and private organizations to further Crime Prevention across the Oxley Local Area Command (LAC). While the officers at the Gunnedah station are on general duties, each officer has a portfolio that corresponds to a specialist function and liaises with appropriate specialist officers in the Crime

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Management Division of the Oxley LAC, located at the headquarters in Tamworth. Specialist functions within this Division are:

- Youth Liaison Officer
- Domestic Violence Liaison Officer
- Aboriginal Community Liaison Officer
- Licensing
- Community Safety Officer
- Rural Crime Investigators
- Highway Patrol
- Forensic Services
- Target Action Group

4.3.5.2 Crime Prevention Infrastructure

The major facilities directly engaged in Crime Prevention are the Gunnedah Police Station on Abbott Street and the Gunnedah Court House located in the corner of Conadilly Street and Abbott Street. The Police Station is programmed to be upgraded during 2003, encompassing refurbishment of the station's custody area, public areas within the station and Police work areas. The Court House is not programmed for refurbishment at this time but is now somewhat outdated in its facilities.

The major non-government facilities are the Police and Community Youth Club (PCYC) on View Street, the theatre and cinema within the Cultural Precinct facilities, and the large number of outdoor sports and recreational facilities throughout the town. The Skate Park, recently constructed on the west side of Wandobah Road, is planned to be part of a larger Wandobah Ecological Reserve straddling Blackjack Creek, which is designed to be an important area for family recreation. The Ecological Reserve has a provisional completion date of 2006.

The Crime Prevention Plan which is due to be submitted to the Council in early 2003, includes a Precinct System designed to assist Crime Prevention linking Safer by Design and Safety Audit procedures with the economic, social and cultural dynamics of residential neighbourhoods and business areas of Gunnedah. This Precinct System divides the Gunnedah township into seven distinct areas for the purposes of dealing with crime prevention. With regard to the defining The borders of each precinct have been defined by elements which determine where an area changes its character, such as a wide road like Stock Road, the railway line or a series of non-residential buildings such as those on Hunter Street. The seven precincts are:

1. Western Industrial Area– West of Blackjack Creek
2. South West Residential Area– Predominantly the Housing Estate
3. Central Residential Area– South of the Rlwy Line & north of Stock Road
4. The Showground and Public– South of the Railway Line Areas including Swimming Pools
5. Gunnedah CBD– Bounded by Tempest, Bloomfield, Henry and Railway Line
6. Northern Residential Area– North of the Railway Line excluding CBD

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4.3.5.3 *Gunnedah CBD*

The Gunnedah CBD is essentially determined by the Gunnedah CBD Improvement Program, which focuses on Conadilly Street between Tempest and Henry Street. This Program is being implemented over the next few years and is encompassing a widening of pedestrian areas, more street furniture, better presented off street parking and improvements in trees and shrubbery. The CBD has certain Crime Prevention characteristics, particularly involving hotels and clubs and alcohol related behaviour. The CBD is also defined by the presence of parking restriction notices although the enforcement of those time limits is sporadic.

4.3.5.4 *Safer by Design*

Crime Prevention Through Environment Design (CPTED) has been accepted by DIPNR as an important principle of environmental planning and essentially embraces:

- Increasing the perception of risk to criminals by increasing the possibility of detection, challenge and capture
- Increasing the effect required to commit crime by increasing the time energy or resources which need to be expended
- Reducing the potential rewards of crime by minimising, removing & concealing "crime benefits"
- Removing conditions that create confusion about required norms of behaviour

Before a decision can be made on a Development Application (DA) a consent authority (the Gunnedah Shire Council) must consider the application under Section 79C of the Environmental Planning and Assessment Act 1979. Included in Section 79C are subsections requiring the consent authority to consider:

- The linking impacts if that development, including the environmental impacts on the natural and built environment, and social and economic impacts on the locality
- The public interests

Crime Prevention falls under these subsections of 79C. Councils have an obligation to ensure that a development provides safety and security to users and the community. Guidelines to the Act have been provided to the Council and contain two parts. Part A details the need for a crime risk assessment in association with trained police when considering Development Applications (DA's). Part B outlines basic design principles, which minimise crime risk. It is suggested that the Gunnedah Shire Council and the Oxley LAC identify the types of development which will require a crime risk assessment and undertake a consultation protocol to formalise the assessment process. A crime risk assessment is a systematic evaluation of the potential for crime in an area. It provides an indication of both the likely magnitude of crime and crime type. The consideration of these dimensions will determine the choice and appropriate mix of CPTED strategies.

There are four principles that are advised to be used in the assessment of DA's to minimise the opportunity for crime:

- Surveillance – People can see what others are doing

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- Access Control – Barriers both physical and symbolic can be used to control the movement of people
- Territorial Reinforcement – Community Ownership of public places sends positive signals
- Space Management – space, both public & private needs to be appropriately utilised & well cared for

The implementation of these assessments in the DA process will contribute to the overall goals of Crime Prevention but are reliant on the frequency of such assessments to yield a wider perspective across Gunnedah & the Gunnedah LGA.

4.3.5.5 *Safety Audits*

The Oxley LAC, as part of the NSW Police, has been conducting Safety Audits on priority locations across the LAC for the last five years. Community Safety Audits identify areas likely to stimulate fear and criminal opportunity. Through an audit of public areas or hot spots, they are designed to provide public and private agencies with information as to how areas can be made safer. Through changes to the built and natural environment and operational procedures, opportunities for crime and anti-social behaviour can be reduced and fear of crime allayed.

This Safety Audit can be undertaken by private organisations or police trained in the techniques, but it differs from the Safer by Design process in that it is initiated by a concern for a particular area and is not instigated by the location of a particular Development Application. Essentially the Safety Audit Assessment identifies the following:

- General Impression of Personal Safety
- Main use of the Location (e.g. Residential, Retail, Commercial, Industrial, Educational, Recreational, Transport)
- Adequacy of the lighting and is it well maintained?
- Clear Visibility and Sightlines
- Quality of Transport Facilities
- Sufficient telephones, toilets, rubbish bins & are they well maintained?
- Does the area feel cared for?
- Are there many people in the vicinity and would they provide assistance?

The aim of the Safety Audit is to focus on crime hot spots and endeavour to use CPTED principles to increase people's confidence in the use of that place. Another aspect of Environment Protection Practices are Alcohol Free Zones (AFZ). AFZ's primarily should be adjacent to outlets supplying alcohol where drinkers congregate. Public places that are public roads or car parks can be included in an AFZ and the aim is to promote the use of these places in safety and without interference from irresponsible street drinkers. In Gunnedah the AFZ is focussed on the CBD. The AFZ is periodically renewed by Council and the present date proposed for renewal of the AFZ within the Gunnedah CBD is 30th June 2004.

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4.3.5.6 Criminal Activity

In terms of criminal activity, over the last six months the following is a breakdown of crime in the five most significant reporting areas:

| TYPE OF CRIME | C.C AVE. INCIDENTS | MONTH OF LAST ADJ. | DIRECTION | OCT 02 INCIDENTS |
|----------------------------|--------------------|--------------------|-----------|------------------|
| Assault | 12 | 12/01 | Up | 16 |
| Break, Enter & Steal | 20 | 7/01 | Up | 51 |
| Malicious Damage | 14 | 8/00 | Down | 16 |
| Stealing | 24 | 6/00 | Up | 26 |
| Traffic Offence | 78 | 11/01 | Up | 88 |
| Major Stolen Motor Vehicle | 5 | Pre 1999 | N/A | 8 |

Approximately 50% of Break & Enter activity is directed at residential premises and 50% is directed at commercial premises. One of the primary goals of the Crime Prevention Plan is to reduce Break & Enter activity down below 10 incidents per month, a level that existed prior to 1997. The geographical concentration of Break & Enter activity is on the three residential precincts south of the Railway Line.

As in most communities criminal offenders and victims are also drawn more from the 15 to 25 year age group. Crime Prevention planning is directed at this segment, particularly in providing opportunities for education, employment, sport, recreation and family gatherings as an alternative to crime and mischief. The Police Service have indicated that there have been significant rises in the reported incidence of Break, Enter and Steal and general stealing offences during similar periods over past years.

In particular Gunnedah Police are of the opinion that the closure of major industrial employers in the township, including the abattoir and local mines, has led to a number of increased vacancies in public housing accommodation within Gunnedah. This has allowed for the Department of Housing to accommodate families from outside the Gunnedah Community. The Police have indicated that it has been noted that a number of persons relocated to Gunnedah in these circumstances have been apprehended in relation to criminal activity.

Community concerns about crime are largely centred around break and enter in residential property, drug and alcohol abuse and the possibility of domestic violence. Overall, however, it is considered that crime is isolated to only a distinct minority of the community. In particular the Gunnedah police station are of the opinion that the majority of break and enters are being committed by a small group of young people between 10 and 20 years of age. Notably assault has increased significantly, and it is believed that an increasing component of assault comprises domestic violence, and is significantly more prevalent during school holiday periods.

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Drug and alcohol related incidents have traditionally centred around alcohol related incidents and cannabis use. However there have been some heroin incidents which have arisen over recent times. Again, incidents occur at a higher frequency during school holiday periods, and have seemingly stabilised at around 180 incidents per year. Stealing; which comprises theft from motor vehicles, shoplifting, and stealing from open residences; has remained at a stable level of 280 incidents per year, whilst street offences have declined significantly since 2000. Traffic offences account for 1200 incidents per annum, of which approximately 85% are ticketed. Actions need to be addressed in through community based crime prevention initiatives, which are already taking place in terms of Council's Crime Prevention Committee, including a Crime Prevention Plan that has been prepared for Council.

4.3.6 Family Types

Coupled with the changing age profile, Gunnedah LGA is experiencing a transition in the character of its predominant family types. The traditional family type, couple family, declined from 51.2% in 1996 to 44.7% of total family types by 2001, as shown in **Table 11**.

Table 11: Trends in Family Types, 1996 and 2001

| Family Type | Persons | | Percentage | | | |
|-------------------|----------|------|------------|-------|-----------|-------|
| | Gunnedah | | Gunnedah | | Sydney SD | NSW |
| | 1996 | 2001 | 1996 | 2001 | 2001 | 2001 |
| Couple Family | 1753 | 1445 | 51.2% | 44.7% | 50.5% | 47.8% |
| Couple Only | 1170 | 1225 | 34.1% | 37.9% | 32.4% | 34.9% |
| One Parent Family | 454 | 512 | 13.2% | 15.8% | 15.0% | 15.5% |
| Other Family | 50 | 49 | 1.5% | 1.5% | 2.1% | 1.8% |
| Total | 3427 | 3231 | 100% | 100% | 100% | 100% |

Source: ABS Census 2001

Couple only families increased from 34.1% to 37.9% between 1996 and 2001. Single parent families also experienced growth as a proportion of all family types between 1996 and 2001.

Compared with Sydney SD and NSW averages for year 2001, Gunnedah LGA had relatively fewer couple families and more couple only families. The proportion of one parent families and other families in Gunnedah were similar to the Sydney SD and NSW averages.

4.3.7 Housing Characteristics

At the 2001 Census, there were 4,546 occupied private dwellings in Gunnedah LGA. **Table 12** below shows the types of different dwelling structures in the local government area since the 1996 census.

Table 12: Trends in Housing, 1996 and 2001

| Gunnedah - Numbers of Occupied Private Dwellings | | | | |
|--|--------------|--------------|------------------|----------|
| Structure of Dwellings | | | Change 1996-2001 | |
| | 1996 | 2001 | No. | % change |
| Separate house | 4018 (86.3%) | 4015 (88.3%) | 3 | -2.0% |
| Semi-det, Row/Terrace, etc * | 44 (0.9%) | 90 (2.0%) | -46 | -1.1% |
| Flat, unit or apartment | 382 (8.2%) | 305 (6.7%) | -77 | 1.5% |
| Other dwellings** | 117 (2.5%) | 97 (2.1%) | -20 | 0.4% |
| Not stated | 95 (2.1%) | 39 (0.9%) | 56 | 1.2% |
| TOTAL | 4656 | 4546 | 110 | |

*:Semi-detached, row/terrace, villas, townhouses, etc
 **: Flats attached to a house, caravan, cabin, house attached to shop, not stated.

Source: ABS Census 1996 and 2001

As shown in **Table 12**, the majority of residents live in separate/detached dwellings. This remains steady during the last inter-census period. In 1996, 4,018 dwellings (86.3%) were detached dwellings (compared with 4,015 dwellings (88.3%) in 2001). Semi-detached dwellings experienced a growth from 44 dwellings to 90 dwellings between 1996 and 2001. On the other hand, flats, units or apartments and other dwellings had experienced a decrease.

Table 13 illustrates the dwelling occupancy structure in 2001.

Table 13 Dwelling Occupancy Structure, 2001 (Gunnedah, Sydney and NSW)

| | Gunnedah | | Sydney SD | | NSW | |
|-------------------|----------|-------|-----------|-------|---------|-------|
| | No. | % | No. | % | No. | % |
| Fully owned | 2091 | 46.0% | 561232 | 39.0% | 963231 | 41.1% |
| Being purchased | 912 | 20.1% | 340538 | 23.7% | 546195 | 23.3% |
| Rented | 1131 | 24.9% | 416463 | 29.0% | 645319 | 27.5% |
| Other tenure type | 195 | 4.3% | 34119 | 2.4% | 65053 | 2.8% |
| Not stated | 217 | 4.8% | 86042 | 6.0% | 123879 | 5.3% |
| Total | 4546 | 100% | 1438394 | 100% | 2343677 | 100% |

Dwelling Occupancy Structure, 2001 (Gunnedah, Moree, Narrabri)

| | Gunnedah | | Moree Plains | | Narrabri | |
|-------------------|----------|-------|--------------|-------|----------|-------|
| | No. | % | No. | % | No. | % |
| Fully owned | 2091 | 46.0% | 1888 | 33.3% | 2161 | 41.7% |
| Being purchased | 912 | 20.1% | 911 | 16.1% | 996 | 19.2% |
| Rented | 1131 | 24.9% | 1976 | 34.8% | 1443 | 27.8% |
| Other tenure type | 195 | 4.3% | 500 | 8.2% | 357 | 6.9% |
| Not stated | 217 | 4.8% | 356 | 6.3% | 196 | 3.8% |
| Total | 4546 | 100% | 5668 | 100% | 5185 | 100% |

Source: ABS Census 2001

As at 2001, 66.1% of all dwellings were either fully owned or being purchased. The level of home ownership was relatively higher than the averages of both the Sydney Region and across NSW, at 62.7% and 64.4% respectively. A further 24.9% of occupied private dwellings were being rented in the LGA.

In comparison to rural LGA's such as Moree Plains and Narrabri, Gunnedah features notably higher rates of home ownership; with 66% of homes being fully owned or purchased as opposed to 60% and 48% for Moree Plains and Narrabri respectively. Both LGA's also featured higher proportions of rental property, with Gunnedah's figure of 25% rented properties compared to 35% and 28% for Moree Plains and Narrabri respectively.

4.3.8 Travel Pattern

Figure 17 illustrates the mode of travel to work for employed persons in 2001.

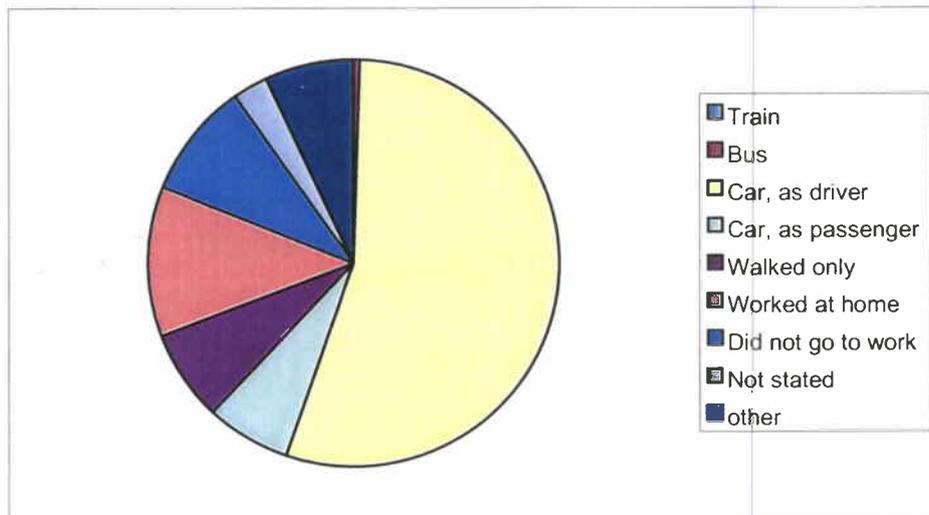


Figure 19: Method of Travel to Work, Gunnedah LGA, 2001

Source: ABS Census 2001

As indicated in Figure 17, car was by far the most popular mode of travel to work. The 1996 census indicates that 2,527 (54%) and 311 (6.8%) persons out of the working population, travel to work by car as driver or as passenger respectively. Bus and train uses for trips to work accounted only for 0.4% and 0.1% respectively (Table 14).

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Table 14: Comparison of Travel Statistics for Gunnedah and NSW

| Travel Method | Gunnedah | | NSW | |
|------------------|----------|------------|---------|------------|
| | Number | Percentage | Number | Percentage |
| Car as Driver | 2527 | 54% | 1487981 | 54.1% |
| Car as Passenger | 311 | 6.6% | 168862 | 6.1% |
| Train | 3 | 0.1% | 150787 | 5.5% |
| Bus | 20 | 0.4% | 91850 | 3.4% |
| Walked only | 331 | 7% | 114927 | 4.2% |
| Worked at Home | 545 | 11.6% | 142076 | 9.4% |
| Others | 320 | 6.8% | 59191 | 2.2% |

Source: ABS Census 2001

4.3.9 Population Projections

The 2001 population count of the Gunnedah Local Government Area in 2001 was 11,993 people (ABS Census 2001). This population had decreased by 6.4% from the 1996 census of 12,819 people (i.e. the population decreased by 1.3% per annum between 1996 and 2001).

The Department of Urban Affairs and Planning (now Department of Infrastructure, Planning and Natural Resources) recently published draft population projections for all NSW local government areas up to 2026. These figures are estimates of the expected residential population (ERP) living in the LGA, which is an adjustment to the actual census figures and includes an estimated number of Australian residents who were temporarily overseas on the census night. In 2026, it is projected that there will be 11,622 persons resident in the area. These figures currently represent the only estimated projection of population for the LGA beyond 2001; **Table 15** below shows the forecast ERP.

Table 15: Population and Population Growth for Gunnedah LGA

| | 1996 | 2001 | 2006 | 2011 | 2016 | 2021 | 2026 |
|------------|--------|--------|--------|--------|--------|--------|--------|
| Census | 12,819 | 11,993 | | | | | |
| DUAP ERP | 13,085 | 13,033 | 12,894 | 12,685 | 12,444 | 12,101 | 11,622 |
| % increase | | -0.4% | -1.1% | -1.6% | -1.9% | -2.8% | -4.0% |

Sources: ABS Census 1996,2001; DUAP Draft Population Projections for New South Wales SLAs (27/02/02).

As shown in **Table 15** above, the period between 2021 and 2026 is predicted to be the period of most rapid decline. The ERP estimation indicates a decrease from 13,033 to 11,622 persons in 2026. This is an extremely important issue, and one of critical

importance to the continued viability and long-term survival of rural LGAs like Gunnedah.

There are some significant factors that are causing this downward population trend, many of which relate directly to economic reasoning. Firstly, the issue of the rural decline is not an uncommon one in Australia, as urban centres become more populous and the economic focus moves towards these centres.

Secondly, the advent of the 'world economy' has seen much focus in terms of value of the economy move away from traditional primary industries towards secondary and tertiary industries in Australia. This has placed less emphasis on the value of rural commodities and therefore has resulted in less demand for primary products worldwide, and lower prices as supply exceeds demand. Although primary production is important for consumer driven societies, transportation and information technology advancements now mean that lower cost producing nations are favoured over those with higher production costs. This has contributed to the rural decline as more and more farmers have moved out or away due to the diminishing returns on their investments.

Thirdly, another factor of rural decline is the local restructuring of the economy. Like many other industries, agriculture is becoming more technology-based and is requiring far less labour than previously was the case. This has resulted in many people who work on these farms living and working in the urban centres surrounding the hinterland agricultural production areas.

Another factor in the rural decline of population numbers is the increasing prominence of agribusiness, whereby large scale corporations, with more capital and ability to produce at larger scales, and therefore able to make bigger margins on their land. Due to the scale of these operations, and the high levels of capital invested, they require less human capital, further diminishing the need for rural workers.

These factors combine to create a 'shift' away from the focus on rural areas to those of the metropolitan areas, extending to investments and population. Arresting this growth in decline is an important issue, to be discussed in **Section 5.2.1**.

4.4 Economic Environment

The changing nature of the economy in rural Australia is such that careful and considered decisions need to be made in terms of the direction that the local economies of these regions can take over time to ensure their long-term survival.

Demographic change throughout the rural regions of Australia is placing enormous pressure on the economic and demographic development of inland Australia, and in turn is creating less opportunities to develop these areas to adapt to an adequate level of change to ensure the long-term viability of rural centres. The following is a brief background to the economic issues that are important in formulating and assessing shortfalls in the economic base of Gunnedah to be used in later stages of this report.

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4.4.1 Industries

Gunnedah LGA is a rich and important agricultural region within NSW, and is well located to its major markets for the sale and transportation of the agricultural goods produced. The diverse nature of the agricultural pursuits in the area means that during market depressions in one commodity, the region is able to depend upon alternative industries during such times.

Agriculture is the largest employer and occupies the most amount of land for business in the Shire. Approximately 80% of all business sites in the Shire are involved directly in agricultural production (Street Ryan & Associates 2001). This industry is generally typified as being a low employer of people, with most businesses employing less than 5 people as a factor of production.

Agriculture also contributes much more to local industry, through the need for support services such as plant mechanics, stock feed and agricultural supply stores and other service stores. Apart from being a dominant land use and mass, agriculture also shapes other development of the Shire, and is an important economic boost when the 'AgQuip' field days are held, adding many tourism dollars and financial throughput to the Shire.

Other industries play an important and intrinsic part of the economic make up of Gunnedah besides agriculture. Another important industry that contributes to the economic environment of Gunnedah is the retailing sector. This industry has some 17% of land that are businesses (excluding agricultural lands) and contributes some 19% of total employment in Gunnedah (ABS 1996). Much of the retailing sector within Gunnedah is located in the Gunnedah township, and this may reflect the support role that much of the retailing in this core area has in terms of agricultural support. Brick production and olive growing also comprise some of the other industries that are in operation throughout the Shire.

Other important industries to the Shire include the property and finance sector (accounting for approximately 15% of all business sites in the Shire and approximately 7% of the total employment in the Shire), public service (10% of employment in the Shire) and the other major significant employer is the manufacturing industry, of which approximately accounts for 11% of the total labour force in Gunnedah.

4.4.2 Output

Of the major industries in Gunnedah, agriculture contributes the most to the local economy. The gross value of production is approximately \$220 million. Of this figure approximately \$171 million (78%) came from crop production, \$39 million (18%) from livestock and livestock products contributed around \$6.5 million (4%). These figures are based upon the 1997 Census of Agriculture, the most recent details due to be available (on a local scale) by the end of 2002/beginning of 2003. The region of the Northern Statistical District had a total production worth of approximately \$1891.1 million (in 1997 AUD), or approximately 22.9% of the total agricultural commodities

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produced in the State, the greatest percentage of any statistical region as defined by the ABS.

Whilst no specific figures for the value of mining in the area are available from either the ABS, Australian Bureau of Agricultural and Resource Economics nor the NSW Department of Mineral Resources, estimates, based on current market costing and commodity prices, that this industry is worth between \$15-\$35 million (net profit figures), if not more than this.

Industries in the Shire excluding the agriculture or mining sectors are approximately \$60 million gross worth to the region, including parts of the Quirindi and Narrabri local government areas. The turnover for the total of the private sector is approximately \$250 million, making the other industries in the Shire well worth protecting in terms of economic throughput.

Therefore, the approximate total economic output of the Shire (including the statistic about non-primary production in the Region) totals \$295 million. Of this figure, approximately \$235 million (80%) of this figure comes from land-based activity (both subterranean and on the surface). This is a significant amount of value in both the land and capital invested into the land, certainly an asset that must be protected to ensure the long-term viability of this valuable resource to Gunnedah.

As indicators to economic growth, new motor vehicle registrations in the Northern Statistical District were 7,369 in 1999 (latest figures available), some 2.5% of the total registrations in the State.

4.4.3 Tourist Accommodation

The State of New South Wales is separated into a number of regional tourism regions. Gunnedah is part of 'Big Sky Country'; an identified tourist region as defined by NSW Tourism. Encouraging and catering for tourism is essential at a regional scale to ensure that the scale of tourist advertising is large, and there is not a 'flood' of tourist information from many local government areas.

In this context, there are approximately 98 tourist accommodation establishments in the region, with Gunnedah accounting for approximately 23 (23.5%) of these establishments. Of these some 14 are either a motel or hotel with accommodation, and the remaining 6 establishments range from 'farmstay' accommodation, caravan park and the Lake Keepit State Recreation Park and 3 Hotels in Villages.

In the region, there are 927 people employed in the tourist sector, which equals, on average, approximately 9.5 persons employed per establishment, and in Gunnedah this equates to 218 people employed in the tourist accommodation sector (including cleaners, cooks, managers and employees). Whilst the number may not be entirely accurate given that owner-operated motels employ less people than hotel/pub establishments, it is considered that Shire-wide, this number would be accurate (ABS 2001).

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The average room occupancy rate per night over the 2000 year was 51.0%. This figure indicates that the accommodation establishments were at 51% at capacity, on average, every night. Prior to the closure of mines within the area, this figure was estimated to be around 75%. It is expected that following the opening of new mines that the occupancy rate would rise again. The total takings from the region in 2000 were \$36,005,400. Using this statistic, the proportion (assuming an even spread of takings) for Gunnedah would equal \$8,450,246.90, or \$367,402.03 per establishment. This equals approximately \$7,065.40 per week, or assuming that a 25-room motel was completely booked for 5 nights a week, would equal a room rate of \$56.52 per night. These figures are indicative only of the importance of the tourist sector to the economy, and figures have been derived from regional statistics provided by the ABS based upon a number of assumptions. The regional figure of \$36,005,400 accounts for only 2.3% of the total income for NSW. Using the assumptions made above, this would mean that Gunnedah would account for 0.5% of the total takings for NSW.

These figures are important as Gunnedah moves towards a sustainable economy, and that this industry is being encouraged to grow both within the region and within the LGA.

5 IDENTIFICATION OF ISSUES

There are a number of issues that have been identified through the consultation process with Government agencies and the community, Council's consultant brief, the 1982 Environmental Study and observations made about the physical environment.

Many of these issues can be found to be not only issues for Gunnedah, but also issues for much of regional New South Wales. For the purposes of both simplicity and the review of the 1982 Study, the issues that have been identified have been broken into three major headings; Natural Environment Issues, Built Environment Issues and Economic Issues. Under these three major headings, the issues have been further broken up to allow for easy to follow and simplified analysis.

5.1 Natural Environment Issues

5.1.1 Shire-Wide Issues

Establishing a link between vegetation throughout the Shire is an important and vital link to maintain biodiversity and encourage sustainable environmental practices for land use. This need not necessarily impact upon private property. It is considered that adequate infrastructure exists within the Shire to have a vegetative link towards significant natural areas.

This infrastructure includes road reserves, travelling stock routes, open space and State Forests land (**Figure 8**). Travelling Stock Routes provide a valuable and important linkage for flora and fauna in many locations throughout the Shire (**Figure 9**). These areas remain generally unused, excepting times of drought, when the network is used extensively for the droving of cattle and livestock. The TSRs are biodiversity rich, with many containing species that are significant in terms of the natural and physical environment of Gunnedah.

The stock routes provide an important linkage throughout the Shire, and work well with possible linkages throughout the Shire. Further linkages can be achieved through existing zoning controls (such as the Environment Protection zone), as well as existing natural areas that are contained within road reserves. A preliminary environmental vegetation linkage plan is shown at **Figure 8**. This plan shows a linkage pattern to maintain current levels of vegetation and promote the maintenance of these linkages throughout the Shire to achieve principles of ESD and biodiversity conservation.

Much of the Shire falls within the Brigalow Belt South Bioregion, and a number of reserve options for significant lands have been suggested by the NSW Government. Generally these options have relatively minor impact within the Shire and suggest few variations from the existing network of environmental reserves throughout the Shire. A draft Regional Vegetation Management Plan has also been prepared in accordance with the Native Conservation Management Act 1997 in order to appropriately manage vegetation clearing and conservation within vegetated areas.

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5.1.1.1 *Natural Area – Lake Goran*

Lake Goran (**Figure 3**) is an extensive level to slightly concave plain formed by the deposition of alluvial soils around the time that those soils in the Liverpool Plain were formed. The water tables are high, and prone to be saline (Environment Australia 2002) and is part of a significant saline aquifer recharge zone (where water in the aquifer that is saline 'rests' before being transported further through the water table and subterranean flow networks). Environment Australia has also noted that the soils in the area are prone to wind erosion and waterlogging aside from the salinity issue. The lake consumes over 6000 hectares when full, and is situated on a number of freehold lots used primarily for agricultural pursuits (Environment Australia 2002). Less than 10% of the total site area is permanently waterlogged.

The significance of the lake lies within the birds that inhabit the area. The lake provides a substantial habitat for birds when filled (acting much like a wetland), and has been identified by Environment Australia as acting as a drought refuge for migratory species from drought areas further west. Research suggests that the lake would be highly productive when filled after a dry season, providing an excellent supply of food for wetland biota. There are a large number of water bird species that inhabit the wetland when full.

The long-term environmental health of these areas is at risk from the intensive agricultural land practices in the area. The agricultural land practices, including the irrigation of these areas could have the potential to exacerbate the likelihood of salinity problems in Gunnedah. Although this could be contained to this area, it could have a disastrous effect on the biodiversity quality of the lake and the future productivity of the surrounding area. Careful farmland management will address these issues; however, Council needs to be aware of monitoring farmland practices in this area.

This includes the use of fertilisers and chemicals on the slopes that form the immediate catchment of the Lake Goran area. These hills are important in terms of ground water flow and natural filtration into the catchment. Extensive grazing of cattle or cultivation could cause serious erosion problems into the lake, encourage algae blooms and decrease available oxygen to the water through increases in the amount of fertiliser runoff entering the waterways.

The major threats to this wetland, as identified by Environment Australia, include; salinity, waterlogging, flooding, soil erosion and clearing in the surrounding catchment. These are problems which will not simply go away, and a persistent educational campaign relating to the significance of the site should commence as a matter of urgency to ensure the long-term sustainability of this biodiversity-rich wetland.

5.1.1.2 *Water Sharing Agreements*

Water is a finite and valuable resource within the Shire, as it is throughout New South Wales, particularly given the current climate of drought and water restrictions. Groundwater in particular supplies much of the Shires water supply including for town water, agricultural pursuits, and industry. This supply has been under increased

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pressure over the last three decades or so, and as such there have been a number of policy mechanisms implemented over time to manage the usage of groundwater resources.

During the 1980's, a controlled depletion approach to water use was adopted, whereby up to a third of the storage of the aquifers would be depleted in accordance with maximum annual allocations of groundwater to users. Significant growth in groundwater usage resulted in a lack of opportunities for the aquifers to recharge as expected during wetter periods. During the 1990's a framework was established for more sustainable water sharing practices to take place, with the Water Management Act 2000 providing for the implementation of new water sharing agreements, designed to sustainably manage access to sources of water throughout areas of New South Wales.

The Department of Land and Water Conservation is now responsible for the preparation and implementation of Water Sharing Plans (WSPs), which are to be effective over a period of ten years. The objectives of the WSPs are to ensure the sustainability of the resource and equitable sharing of long term water users. They are also designed to maintain critical flows of rivers, thus protecting and enhancing their environmental condition, improve the flexibility and market access to water for higher value water users, and in the case of groundwater, to maintain water availability for groundwater dependent ecosystems.

DIPNR has advised that there are currently three WSPs within the final stages of preparation that are of relevance to the Gunnedah Shire. It has also advised that the Plans currently in draft form are expected to be gazetted under the provisions of the Water Management Act, 2000 by the end of 2002. These WSPs are:

- **Namoi Unregulated WSP:** This applies to the water sources of Phillips Creek, Mooki River, Quirindi Creek, and Warrah Creek, some of which are in the Gunnedah Shire.
- **Namoi Regulated WSP:** This plan is applicable to the Namoi River within the Shire.
- **Upper and Lower Namoi Groundwater WSP:** This plan is also applicable to groundwater reserves within the Shire.

Once implemented, it is anticipated that the impacts of these WSPs will be relatively minor on existing regulated and unregulated river systems, however, the impacts upon groundwater systems could be fairly significant. The Upper and Lower Namoi Groundwater WSP is aimed at decreasing current levels of stress exerted upon the aquifers of the groundwater supply throughout the catchment.

This WSP may have implications for the cost and value of water supply, through actively promoting a framework for equitable sharing of groundwater supplies between industry, agriculture, businesses and residents. Lands with good access to or within close proximity to groundwater sources may be an important consideration in terms of rural land use zoning and land use suitability.

The WSP may also have ramifications for agricultural practices throughout the Shire, whose current patterns of water usage will be modified by reducing the amount of water allocations for farmers, particularly in regards to irrigation throughout summer

periods. Throughout Gunnedah, irrigation from groundwater sources has comprised a substantial proportion of total groundwater usage and historically has contributed significantly towards the depletion of groundwater sources under previous water management schemes. It is intended that this will be averted through widespread reductions in water allocations to the majority of licence holders.

The Federal Government has also unveiled plans for a National Water Initiative, which comprises a national plan to implement water sharing on a national scale. The Initiative comprises of improved access entitlements for water users, guarantees of compensation for users adversely affected by changes to government policy, changes to the water market structure and the establishment of a water manager in the Murray-Darling Basin to buy and sell water to users in accordance with desired environmental outcomes.

5.1.1.3 Salinity

Salinity is the single biggest land-use issue facing regional Australia at the moment. As alluded to earlier in this report (**Section 4.1.4 – Soils**) dryland salinity problems have already arisen in certain parts of Gunnedah Shire (**Figure 7**), and within the Namoi Catchment, the predicted annual stream salinity is expected to almost double by 2100. This would mean that the long-term viability of the catchment in terms of agricultural viability will be severely compromised. Already, the Namoi catchment contains some of the highest salt concentrations of any river within the Murray-Darling Basin. In some rivers and creeks there are higher salt concentrations than seawater. The effects of salinity limit the productivity of agricultural lands, and in addition saline runoff also has the potential to affect irrigation and settlements further downstream.

There are three main types of salinity – dryland, irrigation and urban. Dryland salinity is the build up of salt in the soil surface and is usually the result of a rising watertable, due to the lower water use of crops in comparison to native vegetation, and the types of geological strata present. Over-irrigation, inefficient water use and poor drainage cause irrigation salinity. Urban salinity occurs as a result of a combination of dryland salinity processes and over-watering in towns and urban areas.

NSW contains 50% of the land that could potentially be affected by salinity in Australia, a significant number that is seeing more land falling to salinity every day, especially in the Dubbo-Orange-Mudgee triangle. Across the state, dryland salinity impacts are expected to effect between 120,000 and 174,000 hectares of land, with irrigation salinity accounting for approximately a further 320,000 hectares; roughly 15% of irrigated land.

At a more localised scale, the Namoi catchment is expected to fall to the same fate over time, without careful land management practices being employed to avoid potential hazards. The current estimated loss of agricultural production on the Namoi catchment as a result of dryland salinity is \$11 million per annum. The value of further reduction in production over the next 10 years could rise above \$70 million if no action is taken.

Dryland salinity is estimated to currently impact on approximately 47,000ha of the Liverpool Plains, with this increasing to 175,000ha over the next 25 years, under the

status-quo methods. Further, it is predicted that 50,000 ha of the 750,000 ha basin will become non-productive land within the next ten years. This area could double over the following ten years if no action is taken.

In order to effectively halt the rise in water tables, it is estimated that between 10-30mm of rainfall per annum would need to be transpired through plants throughout the plains. This may require the planting of deep rooted pasture species, such as phalaris and lucerne, in combination with the retention of existing tree species throughout the plain. It may also require increased numbers and a more diverse array of crops, in order to utilise fallow moisture more efficiently.

There has been an increasing interest from farmers and researchers into the application of agro-forestry systems in an attempt to curb salinity problems arising from water leakage through to the subterranean water network. The principle of such systems is that a relatively minor area of planted trees can stop leakage over a wider area through transpiration of water excess to the crops requirements, before it leaks through. This can be achieved through a scattering of trees throughout paddocks, clustered stands of trees, and lineal tree belts.

Other key actions to reducing salinity include improvements in water management techniques within farms, through reducing pipe leakages and minimising areas of vegetation to be cleared and watered. Agricultural practice within the Gunnedah area will require such modifications in order to reduce recharge to groundwater. In 2002, the NSW Government adopted its \$52 million *NSW Salinity Strategy*, aimed at managing and alleviating salinity issues throughout the state. The Strategy involves farmers, government agencies, researchers and the community in creating an integrated framework to tackle the problem on a statewide basis.

Under the provisions of this Strategy, interim salinity targets set by the NSW Government are to be reviewed by individual Catchment Management Boards in consultation with farmers and communities. The Namoi Catchment Blueprint, currently in draft form, sets the following targets in relation to reducing dryland salinity within the catchment:

'By 2010, to reduce the mobilisation of salt across the whole catchment by ensuring the area of land affected by watertables of less than 2 metres below the surface does not exceed the current level of 2869 hectares'.

Key actions of the blueprint are subject to change due to the current draft status of the document. It is anticipated that the key actions of this Policy, encompassing recommendations for not only dryland and river salinity but also conservation, biodiversity, land management and riverine health improvements, will involve a significant participation from Gunnedah Shire Council and other Councils throughout the Namoi catchment area in association with farmers, the community and government agencies.

5.1.2 Urban Issues

- The impact of flooding and the effect of the Gunnedah and Carroll floodplain management plan on land uses

The impacts of flooding throughout the Shire are quite prominent. As discussed in **Section 4.1.9**, significant flood events have been recorded within Gunnedah on average once every four years between 1892 and 2002. This has considerable implications for development, particularly on the northern and north eastern fringes of the town near the Namoi River.

In 1999, a Flood Plain Management Plan for the townships of Gunnedah and Carroll was undertaken for Council by SMEC Australia Pty Ltd. This Plan identifies a number of measures to manage development on lands within flood affected areas of Gunnedah and Carroll; including house raising, improvements to flood alert and measurement systems, voluntary purchase of affected properties, suggested building measures and planning measures.

As a result of this Study, Council has prepared a Development Control Plan for Gunnedah and Carroll Floodprone Lands. This instrument implements many of the recommendations and findings of the Study and is the primary mechanism by which land uses within floodprone areas are influenced. The DCP has the effect of prohibiting further development within the floodway of Gunnedah, as well as imposing substantial development controls relating to floor height, building components and flood flow management around the fringe of the floodway. Similar development controls are applied to both the floodway and the flood fringe of Carroll.

Clause 26 of the GLEP also controls development within flood liable lands, making provision for Council to take consideration of the impacts of the development on the flow of flood waters, flood proofing measures, the availability of evacuation routes and the structural capability of the development. It is considered that this provision is adequate in managing development within flood prone areas.

Areas within Gunnedah that are substantially affected by flooding include the majority of residential properties to the north of Conadilly Street, and commercial properties along Conadilly Street from Chandos Street west. These lands are within the 1%AEP flood level, and as such are covered under specific provisions of the GLEP 1998 and the Floodplain Management Plan. Within Carroll, the vast majority of the township falls under the 1% AEP flood level.

These land uses need to be managed in order to ensure they are compatible with flooding events. To this end, the provisions of DCP No. 12- Gunnedah and Carroll Flood Prone Land and Clause 26 of the GLEP 1998 provide for the management of these land uses. It is considered that the current DCP is at this stage an effective method of managing flood issues related to land use, and adequately controls development within flood prone areas. The corresponding provisions of the GLEP 1998 lend statutory weight land use management within floodprone lands, and it is

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recommended that specific provisions relating to development within floodprone lands are retained within the new instrument.

Given financial constraints on Council's behalf, it may be prudent to investigate the rate of assistance to allow owners of dwellings within floodprone areas to raise their dwellings. Community concerns have indicated that the present rate of owner contribution to house raising is in excess of what many owners will be willing to pay, in comparison to the previous rate of \$15,000 which was considered more reasonable.

- Analysis of urban stormwater management and mechanisms to improve discharge qualities and linkages to reducing the impacts of urban salinity.

Stormwater management throughout the urban areas of Gunnedah is managed and controlled by Council; however users of water throughout these areas contribute significantly to the volume and quality of water discharged. Urban drainage within Gunnedah flows into a stormwater drainage system with pipes located throughout the Gunnedah urban area. This has the effect of diverting stormwater which may otherwise seep into the groundwater system, thus leading to rises in the water table and an increase in the incidence of urban salinity.

Effective stormwater management is intrinsically linked to water conservation and responsible water usage. To this end, Council can take a proactive approach in discouraging practices that result in the flow of detergents, chemicals and other pollutants into urban drainage systems. Urban runoff comprises a significant source of reductions in the quality of stormwater, and is difficult to monitor and regulate due to the range of impacts which accumulate from a variety of sources. Reducing the amount of hard surfaces within urban areas may contribute to lower levels of stormwater runoff and thus improve the quality of these flows. However this is not desirable as it also has the negative impact of increasing water seepage into groundwater, thus increasing the pollution of groundwater sources as discussed in **Section 5.1.3.4** and increasing the instance and likelihood of urban salinity. Measures to manage urban salinity are discussed further in the following section.

In townships where there are no stormwater systems, the effects of stormwater runoff can be more pronounced and difficult to manage. Stormwater discharge into these areas is conducive to urban salinity, as water that would otherwise be removed into stormwater systems enters the groundwater system and contributes to a rise in water tables.

Other measures to improve the quality of stormwater including adopting a stormwater management plan, as has been done throughout some rural and regional councils within NSW. Key actions of such plans include providing detailed measures for sedimentation and erosion control during building and construction, community education involvement in the monitoring and measurement of water quality, identification and treatment of problematic point sources of pollution and stormwater efficiency through design and water retention systems in new urban areas.

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- The extent and impact of Urban Salinity and mechanisms to manage the problem

Urban salinity within Gunnedah is becoming an increasing issue in addition to dryland salinity throughout the Liverpool Plains. It is exhibited prominently within locations such as the playing fields of Gunnedah High School. Urban salinity has the effect of corroding water and sewer pipes, damaging buildings and reducing the fertility of soils and open space areas. It also has detrimental visual effects, through removing the vegetation of open space areas and rendering them unusable.

Similarly to dryland salinity, urban salinity arises largely as a result of development in saline areas, removing vegetation which naturally keeps water tables and salt within these reserves at low levels. The subsequent rise in water tables leads to salt poisoning of grasses, trees and vegetation, in addition to the aforementioned effects. It is also promulgated through over-watering of areas such as gardens and other open spaces, resulting in excess amounts of water which drain through the soil and effect a rise in saline water tables.

Mechanisms to combat this problem include a reduction in the amount of watering of such areas and improvements in stormwater and water runoff management techniques within urban areas. This has the effect of minimising the amount of leakage through to underlying water tables. Urban drainage processes must also be monitored in relation to their impact on water runoff into public areas. Leakage from pipes can have an adverse effect on the level of groundwater reserves, exacerbating urban salinity.

Re-planting of vegetation, particularly native perennial species, increases the transpiration of water and helps to arrest rising water tables and salinisation. Such species could be planted around the perimeters of affected areas. 'Patch' planting or perimeter planting would have an effect on the overall affected area, not just the immediate planted area thus reducing the extent of the problem.

Planting trees also helps to address the problem of urban salinity. Species such as the River Red Gum are particularly resilient to saline soils and can contribute significantly to transpiration of groundwater, thus preventing salt from rising to the surface. Well mulched and raised garden beds can also prevent water seepage into the water table below the surface. In combination with efficient watering, these actions can reduce the impact of urban salinity within Gunnedah. These measures could potentially be incorporated into proposed future landscaping works and upgrades to the Gunnedah CBD.

Currently, DIPNR is in the process of devising a draft model LEP for urban salinity, which is due for completion at some time around the end of 2002. This model LEP is being drafted on a statewide basis, and as such does not address specific urban salinity issues unique to the north west region and Gunnedah. However the model LEP will contain a series of recommendations for managing urban salinity processes exclusively, and will not address rural or dryland salinity issues. DIPNR has indicated at the time of writing this report that the model LEP is currently not available. Urban salinity is recognised as an important statewide issue, and is acknowledged at a Government

level by both DIPNR and the Local Government Association as a key environmental issue for co-operation and action at both the state and local level.

Managing urban salinity within salt affected towns such as Gunnedah is a difficult proposition due to the inherent saline nature of the groundwater reserves. The extent of the problem can be managed and minimised but the effectiveness of these measures is difficult to judge.

5.1.3 Rural Issues

5.1.3.1 Travelling Stock Routes (TSRs)

Travelling Stock Routes (TSRs) are an important linkage within the rural landscape, providing important linkages for both travelling stock and vegetation throughout the Shire. These routes are under the care and control of the Tamworth Rural Lands Protection Board and are usually only required during severe drought conditions where private pastures are exhausted and fresh feed needs to be sought by travelling stock throughout the pastures towards open grazing lands. The lands under the control of the Tamworth Rural Lands Protection Board are shown at **Figure 9**.

Some issues relating to the importance of these TSRs relate directly to the significance of these sites as important vegetative links within the Shire for native flora and fauna to thrive during periods of favourable climatic conditions through the wide reserves that the TSRs create.

Most of these TSRs are located within the 1(a) zoning and therefore are adequately protected from incompatible or conflicting land uses. However, TSRs along the Namoi River south of the Gunnedah Saleyards have proven to be difficult areas for walking stock over the last two decades. Conflicts have arisen between travelling stock movements and playing fields established within this area, which have resulted in the provision of infrastructure that is incompatible with the movement of stock. These lands are under the control of the RLPB and as such even if they are not currently used as TSRs the current zoning may not be the most appropriate for these lands. Accordingly it may be appropriate to rezone the TSR's in accordance with the zoning of adjoining lands.

5.1.3.2 Agricultural Land

Agricultural land practices in rural areas have often led to land degradation that has rendered the soils almost unusable. Whilst this has not been a significant problem in Gunnedah, salinity problems are on the increase and this is having a significant negative effect on natural resources in the area. It has been discussed previously in this report, at **Section 5.1.1.3**, that salt loads in the Namoi River are on the increase and this will have serious consequences over time as loads in the river increase and native wildlife struggles to compete with decreased oxygen levels and the increasing saline nature of the water stream.

These impacts may also spread to other natural watercourses in the area, as saline soils become more prevalent. Such watercourses may include the Mooki River and Lake Goran, and the immediate surrounding drainage lines that supply these watercourses. The effect on salinity then may carry over to changed irrigation patterns that would require decreased usage of salinated waters.

This in turn would require increased capital expenditure to irrigate crops with non-saline soils. Therefore, in the context of the catchment, it is not considered that existing agricultural land uses can sustain present levels of intensity without any serious ramifications in some years of these actions through decreased soil stability and increased salinity of soils.

In terms of natural resource management, it is expected that the agricultural land use practices are not considering the potential long-term impacts of their activities and more sustainable approach is required to ensure that long-term yields are reserved and are not jeopardised by prior land-use practice. Further, natural resource management relies on conservation as a primary medium to allow for sufficient maintenance of current levels.

- Impacts on viability and sustainability of agricultural land due to soil erosion, salinity and water management.

The viability and sustainability of agricultural land uses in the future is at risk due to soil erosion, salinity and water management. Salinity and its impacts throughout the Shire are covered in detail under **Section 5.1.1.3**. Erosion affects almost half of the Namoi catchment area, and is exacerbated by cases of salinity as are found in parts of the Gunnedah area.

Either through water or wind transportation the loss of soils through erosion is a significant cost of, and to, production in rural areas. As the topsoil is removed, so too is the productive capability of the soil. The land then requires more intervention to make it productive, placing further strains on ecosystems with increased levels of nutrients and chemicals in the waterways.

The types of erosion found in the area are primarily sheet and rill erosion, which create turbidity and adversely affect water quality within waterways into which they flow. This results in a subsequent reduction in the sustainability of agricultural pursuits in the longer term, and decreases agricultural productivity and soil fertility through soil structure decline. These factors both have serious impacts for the long term viability of agriculture throughout the Shire.

The impacts that could face agricultural land could be disastrous in terms of the long-term viability of agriculture if production levels within the basin were to decrease due to poor on-farm land management techniques. The major issue with this is the lost productivity of the land, which in turn would mean lower production values and then creates a point at which the yield from the land does not warrant further agriculture due to increased production costs and lower outputs.

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The above scenario would be particularly prevalent with the onset of salinity. This form of land degradation makes more land non-arable than any other kind of degradation process, as discussed in detail under **Section 5.1.1.3**. The viability of agricultural pursuits that were affected by the onset of salinity would significantly decrease, if not permanently, destroy the cost-benefit of farming the land.

Water management techniques may also decrease the viability of farm industries as costs rise as a consequence of upgrading technology and machinery to comply with regulations and to ensure sustainability of water supplies. However, this would have a positive effect of increasing the long-term sustainability of farming by ensuring that scarce water resources are maintained for future use.

One of the key factors affecting the range of land degradation issues currently facing farmers include the removal of perennial vegetation throughout the Liverpool Plains. There is an emerging need for farms to engage in crop and pasture planning which aims to utilise perennial crops, employ responsive cropping in relation to natural conditions and crop rotations, and re-establish areas of native vegetation which can help transpire water and reduce water logging.

The climate of the Gunnedah LGA and the north west area of NSW, as discussed in **Section 4.1.7**, allows for a great variety of crop and pasture options than elsewhere in NSW. Irrigation throughout the Gunnedah area is carried out for cotton production which has increased over recent times. Other irrigated crops include maize, grain sorghum, soybeans, wheat and other cereals. Surface or furrow irrigation is carried out as the primary irrigation method throughout the Gunnedah area, similarly to other areas of the north west (DIPNR).

Crop rotation is currently employed throughout irrigated areas, with deep rooted species such as lucerne comprising a significant species within most rotations. This improves the efficiency of water usage within such crops. The crop rotation process also serves to maintain the high fertility of crops and pastures, which otherwise may have their productivity diminished over time. Currently irrigation processes such as 'skip-row' systems are being carried out elsewhere in the state, in order to provide more sustainable water usage. Generally irrigated crops are not considered to pose a major problem throughout the Shire in terms of water management.

A series of Water Sharing Plans (WSPs) are soon to be implemented which will affect the amounts of water which can be used throughout the Namoi catchments, inclusive of regulated and unregulated water supplies and groundwater reserves. This has significant impacts for both irrigated and non-irrigated agricultural pursuits, who rely heavily on groundwater for their domestic and irrigation water needs. The framework of these WSP's and the effects of their implementation are discussed under **Section 5.1.1.2**.

- Environmental impacts on biodiversity, endangered species and water quality as a consequence of rural development and mechanisms to mitigate these problems.

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The environmental impacts of rural development can extend far greater than those only noticed on-farm. Flow-on effects of development include decreases in the population of some species, increases in the population of other 'non-desirable' species, and poor water quality. Rural development issues, such as the use of on-farm chemicals and fertilisers, can rapidly affect local waterways in terms of the biota and quality of water in the streams.

Other impacts from rural development include soil runoff through erosion, which increases turbidity and siltation of the rivers and streams in the area. This can have serious effects on the quality of biota on the watercourse and within the catchment, making water quality decrease and causing serious flow-on effects further downstream in the Namoi catchment. Soil erosion and sedimentation have historically been responsible for high nutrient loads within the Namoi River as opposed to fertiliser runoff.

Urban development of rural areas, including increased dwelling numbers (rural worker's dwellings) and rural small-lot subdivisions decrease land stability and cause movement of agriculture from good quality pasture to pasture located further away from the new development, often land which is not classified as prime crop and pasture land. This decreased capability also means that the total amount of farmland is decreased making the viability of the farmland difficult to maintain due to the decreased amount of productive land.

NSW Agriculture have prepared a policy document which sets a forward direction for the development of rural areas such as Gunnedah, *"Policy for the Protection of Prime Agricultural Land"*. This policy highlights the importance of maintaining the most productive lands available for agricultural uses, through minimising fragmentation of rural areas for urban development and curtailing the provision of rural residential living opportunities. Such developments increase the likelihood of conflicts between agricultural and residential land uses, in turn compromising the future viability of agricultural industries, and causing detrimental impacts in terms of economic and employment growth within the Shire.

"NSW Agriculture and the Environment – Providing Profitable Solutions to Environmental Problems", also published by Agriculture NSW, discusses the pressures facing rural-urban interfaces across NSW. It examines how the high value of this land is being diminished by the often quick returns of real estate (comparatively) compared to the long-term and often 'quick' returns of selling land for development purposes. To an extent, this is not a problem in Gunnedah as existing land stock and zoning prevents further fringe, ribbon or rural development from occurring. However, should many of the economic opportunities proceed, further pressure for development may see pressure for this type of development.

The effects of this may stretch further than those of the on-farm economic impacts. Increased impervious areas in flood prone lands increases the velocity of peak flows so as to prevent permeable surfaces being able to absorb water through natural aquifers during these events. This also decreases water quality in the area by increasing the

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amount of pollutants entering into water streams (such as phosphates, nitrates and nutrients).

The expansion of both on-farm (machinery sheds, cultivation and fencing) and residential development in rural areas has an effect on the natural environment of the surrounding areas and therefore the biodiversity and endangered species (both flora and fauna) by reducing the amount of available habitat that these communities have, making them further vulnerable to extinction.

There are some important and expansive issues that come with agricultural land within the Gunnedah LGA. These issues will affect the long-term viability of agriculture in the region. Issues relating to soils, rural development and farming practices are all issues that will need to be dealt with in active co-operation with not only the community, but a range of stakeholders, including government agencies, agricultural enterprises and other statutory government authorities.

5.1.3.3 Regional, Catchment and Sub-Catchment Strategies

- The incorporation of regional, catchment and sub-catchment strategies and plans in the assessment of the rural land use zoning

Regional planning throughout the North West region of New South Wales is undergoing significant changes at present, particularly in regard to the incorporation of PlanFIRST into planning at a regional level. The area is one of the first to be subject to the PlanFIRST reform process, and as such a new Regional Strategy is being prepared over a three year timeframe to guide development throughout the north west; with initial consultations to commence in December of 2002.

Planning at the regional level has significant implications for rural land use controls, in light of not only the PlanFIRST process but also the current development by many Councils throughout the area of new consolidating LEP's. The opportunity exists for Gunnedah to co-ordinate its rural land use planning with regional goals as they are being developed, as well as rural land use zoning techniques being implemented by other Councils throughout the North West. DIPNR has advised that as the North West of NSW is a pilot area for the PlanFIRST scheme, it is expected that the findings of this Study should identify a number of issues of regional significance which will form important considerations of the regional planning process. The assessment of rural land use zoning will also take into consideration the provisions the PlanFIRST regional framework, as discussed in further detail in **Section 3.2.8** and **Section 3.2.12**.

Integrated catchment management is becoming an increasingly important component of land use planning throughout rural areas. The Gunnedah Shire falls within a number of local and regional catchments; the largest of which is the Murray Darling Basin. The Basin spans the states of South Australia, Victoria, New South Wales and Queensland, as well as the ACT. Management of the Murray-Darling Basin is carried out by the Murray-Darling Basin Ministerial Council, whose planning document *Integrated Catchment Management in the Murray-Darling Basin 2001-2010* sets a framework for

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integrated catchment management across each of its 19 catchment management regions.

The plan sets targets for establishing planning responses to the catchment wide issues of surface and ground water quality, water sharing arrangements, riverine ecosystem health, biodiversity and overall catchment health. These issues have been covered at a local scale throughout this report, and will form a critical consideration of rural land uses assessment and the subsequent formulation of a draft LEP.

At a State level, the NSW Government has in recent times gazetted the new Water Management Act 2000, which outlines provisions for the establishment of Water Sharing Plans (WSPs) throughout the State. Three WSPs affecting the Gunnedah region are currently in the final stages of preparation, as discussed further in **Section 5.1.1.2**. The WSP for the Namoi groundwater system in particular will impact upon the land use suitability of rural holdings within close proximity to groundwater sources, as well as affecting the suitability of rural lands for irrigation without good access to such systems. The extent of the impact of WSPs on rural lands will be known following the release of the finalised plans at the end of 2002 or early 2003.

The Shire also falls within the Namoi River Catchment, a sub-region of the Murray-Darling Basin. This catchment falls under the jurisdiction of the North West Catchment Management Committee (NWCMC). The catchment planning process has commenced for the Namoi, and to date there has been the production of a current situation paper which discusses the issues facing the catchment as a whole. These include salinity, soil erosion, native vegetation clearing, groundwater management, flooding and biodiversity conservation. These issues have been discussed throughout this Study and will form important considerations in the assessment of rural land use zones, examined further in **Section 5.2.2**.

5.1.3.4 Pollutants

- Examination of pollution or hazard issues within the rural environment having regard to conflicting land uses particularly involving agricultural chemical usage.

As discussed briefly above, rural enterprises can have a serious effect on the health of local ecosystems from the application and continued use of chemicals around agricultural pursuits. As mentioned in **Section 5.1.3.2** rivers and waterways can 'choke' on lack of oxygen through increased levels of nitrates, phosphates and other nutrients. This can have a marked effect on native flora and fauna that depend on the ecosystems.

Also discussed previously was the fact that agricultural chemicals can have serious effects on the quality and arable nature of the soils on which they are applied. However, some more serious effects of pesticides and fertilisers exist that have not been previously discussed. These effects can range from polluting of both atmosphere and aquifers, posing a threat to human and animal life.

Pesticide residues have been frequently identified within areas of the Namoi River downstream of Gunnedah, and water quality has been identified as a serious issue within the River. This affects a number of town water supplies along the River, and has implications for existing agricultural practice in relation to on-farm water management.

There is also the possibility that these chemicals could work their way into the food chain through processes of bio-accumulation. This in essence has the effect of contaminating a number of organisms in a 'chain reaction' effect right up the food chain. Seepage of pollutants into the aquifer could also have potential impacts on groundwater, integral to the water supplies of the Shire, as discussed below.

Groundwater contamination within the Liverpool Plains has been a growing concern over the past two decades (UNSW Groundwater Centre 2002), particularly as the majority of agricultural pursuits within the Shire take place in areas where groundwater is the primary source of drinking water. It has been suggested that a significant percentage of the agrochemical contamination of groundwater has occurred due to leakages at the bore head. This can be averted through proper sealing of bore heads, along with cement and bentonite casing and ensuring bore heads remain slightly elevated.

Another prominent issue is water runoff into flooding areas. Management of flooding between adjacent properties has long been a source of conflict throughout the Liverpool Plains. In terms of chemical and fertiliser usage, this also has the effect of re-distributing pollutants from one farm to one or a number of others as runoff drains into its natural catchment. In this regard environmental issues associated with chemical and fertiliser use on one property are not necessarily contained within a limited area, but can be distributed throughout the surrounding properties.

5.2 Built Environment Issues

5.2.1 Shire-Wide Issues

- Catering for Growth

Gunnedah Shire LGA is experiencing significant levels of decline in terms of population, as described within **Section 4.3.8**. This projected reduction in population will have an enormous effect on the demand for residential and commercial space within not only the administrative centre of Gunnedah, but also surrounding towns.

When the 1982 study was completed, Gunnedah was facing different circumstances in terms of its growth and long-term prospects. Over time, this positive growth and expansive economic input has declined, like much of regional NSW, to arrive at negative growth figure for the last census period. There are a number of reasons for this, most of which are discussed at **Section 4.3.8**.

However, this section of the report aims to identify the issues relating to catering for growth. As discussed at **Section 4.2** there is an adequate amount of space available based upon current growth patterns to accommodate residential and commercial

demand within Gunnedah. This can be directly attributed to the projected models of growth that went with the projected levels of economic activity. As indicated in the 1982 study, growth can only be expected to occur through the economic advancement of the town and the development of key 'employment generating' industries within the Shire.

- Pressure for rural-residential development

Within many rural/urban interfaces in NSW there is considerable pressure for demand for rural residential development. Allotments ranging from 5ha down to as little as 2000m² are not uncommon throughout rural NSW. In Gunnedah, there is a considerable supply of land zoned for Rural Residential Development, some 1066 hectares, equating to around 1770 6000m² allotments (the standard subdivision size within the 1(c) zone). This is considered to be a large amount of rural residential land supply considering the rate of growth within the Shire, and also in the context of the amount of land available within the urban area of Gunnedah.

However, increased growth within Gunnedah due to possible economic advancements would more than likely place considerable pressure on demand for rural-residential properties than typical residential allotments. This is based upon the 'lifestyle factor' whereby people moving from larger metropolitan areas choose to live in areas unlike their own, in a more rural setting. This is an important emerging trend when considering the possibility of the over-supply of rural-residential land within Gunnedah.

- Preservation of the 'existing character of the town'

The town of Gunnedah has a unique and distinct character within rural NSW. So much so, that tourism is now a new and emerging industry within the Shire. The built form and architectural integrity within Gunnedah town centre has undergone a number of changes over the past century.

According to historic photographs, the town centre provided a backdrop of a number of architecturally significant buildings and a dominant streetscape. Unfortunately, over time a large number of structures have either been demolished, destroyed or concealed, leaving the town without a clear identity as to an architectural style.

This situation has been exacerbated by infill and redevelopment projects which have been undertaken without any direction or guidance, resulting in the combination of buildings that are not sympathetic to the historical architecture of the area nor cohesive with the surroundings.

Development of the Main Street Heritage Study in 1992, has provided an initial framework for assisting in the preservation of Gunnedah's heritage and architecture.

- Consolidation and Improvement of the CBD

Development within the CBD has, over time, been non-uniform in its continuity of both type of use and scale. This has left Conadilly Street with the most primary of commercial activities (including the town's two supermarkets and co-operative store) with secondary commercial activities (including support services such as the Council

administration centre and entertainment) left to the streets intersecting Conadilly Street (Marquis, Elgin, Abbot, Chandos and Tempest).

This has seen many other uses place themselves within the business zone 3(b) General Business as support services or located for consumer conveniences. There is an opportunity to the Business zones 3(a) and 3(b) zones, to create a more flexible statutory environment to encourage businesses to establish in Gunnedah are by adopting a DCP for the Business Zone to guide and control development in the future. As part of this DCP it would be anticipated car parking would become a destination focus with linkages to the retail and commercial centres, improved lighting and safety.

- Heritage Issues

As previously mentioned within this report, heritage assessment work is currently being carried out throughout the Shire. The findings of this work will in turn identify a number of heritage issues to be addressed within the draft LEP.

- The effectiveness and possible simplification of planning controls, including changes to zone boundaries where considered appropriate

The current LEP is based to a large extent on the 1982 Local Environmental Study carried out by Planning Workshop Pty Ltd. The current planning controls remain effective to a degree; however since 1998 there have been thirteen amendments to the LEP. Without a substantial review of land use zones within the Shire it is expected that a number of further amendments could take place. The current effectiveness of the LEP is therefore significantly limited by the ability of its land use zones to cater for the current and future directions of development within the Shire, in addition to the number of controls which are currently present within the LEP.

The current land use zones are to be simplified as part of the preparation of a new draft LEP. It is proposed to adopt a more 'place based' approach to land use controls, in keeping with principles of PlanFIRST. The main element through which this would be achieved is through devising a merit-based approach to development control, as outlined in the following section.

An adjustment of zoning boundaries may also be required where appropriate in order to better facilitate current and future development within the Shire. This is particularly pertinent in regards to the supply of flood prone land around the northern fringes of the town, particularly in the highest risk areas north of Conadilly Street. Such lands, particularly where in Council ownership, could be rezoned as 7(d) Environment Protection Zone or Rural 1(a) zone in order to more effectively manage land uses conflicting with the flood plain. The existing 2(a) zoned land bounded by Chandos St, Bloomfield St and Elgin St may alternatively be rezoned to 2(b) in order to encourage further infill development and consolidation around the CBD.

As mentioned in **Section 4.2.2**, it may be desirable to 'back zone' some areas of rural residential land which may not be required given existing levels of demand, particularly in isolated and difficult to service locations. In the interests of promoting infill development, adjustment of some zone boundaries allowing areas of rural residential

land around the fringe to be 'back zoned' would also provide for these lands to be returned to the 1(c) zoning should it be desirable at some future stage to do so.

- Adequacy of existing traffic and parking situation

The road network of Gunnedah is characterised by 3 arterial routes. The Gunnedah Traffic Study prepared by Project Planning Associates in October 2001 reviewed the existing traffic situation and traffic controls on the Gunnedah road network. It identified several deficiencies in the existing traffic conditions and addressed improvement strategies recommended by the main street improvement program, which include:

- Intersection narrowing but no removal of signals;
- road narrowing in the vicinity of the Conadilly Street/Elgin Street intersection;
- installation of traffic signals at the Conadilly Street/Abbott Street intersection;
- installation of a gateway treatment in Conadilly Street immediately to the east of its intersection with Warrambungle Street;
- road narrowing in Conadilly Street to the west of Henry Street and to the west of Wentworth Street; and
- road narrowing/footpath widening on Bloomfield Street to better define the school precincts.

A review of the parking situation in the Gunnedah Town Centre was prepared by Planning Overload Pty Ltd in 2000. Occupancy and turnover surveys of all Council car parks and three private car parks were carried out. The survey data provided accurate information about the occupancy rate of each car park at various times during the survey period. In summary, the data established poor efficiency in most car parks. It relates to location in two ways: (i) proximity and access/walking distance to major shops; and (ii) the attractiveness of the car park in terms of security and comfort. The private car parks are much more efficient and they are evidence of the importance of proximity, access and attractiveness.

As discussed in the report '*Review of Gunnedah Shire Business Zone and Car Parking*' prepared by Planning Overload in July 2000, it clearly identified that the car parks are seen as inefficient and under-utilised. In addition, it stated that the car parking requires review as a result of contemporary changes and trends to work practices. It has been established the Gunnedah population is significantly car dependent and therefore the traditional approach to car-parking rates should prevail in most cases.

The report recommended that there should be changes to parking rates. Recommendations include:

- It is recommended the Net Usable Floor Area (NUFA) approach be adopted in all these circumstances and a consistent rate applied to all. Further a complimentary

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use discount could be applicable to a restaurant if it utilises parking provided for other activities built used at different times.

- Residential flat buildings should provide on-site parking according to the number of bedrooms. A simple rate of 1 space per two bedrooms should apply.
- For professional consulting rooms, the common practice is to base the standard on the carrying capacity of each consulting room. In this regard 3 spaces per room appears to be an efficient standard.
- A new rate of 2 spaces per service bay is suggested for car repair. This is based on rates of other LGAs of similar size and character and takes into account that the car and its space are the product of the service being provided.

While the RTA suggests individual analysis for any new hotel in respect of floor area. The bar area requirement is a common standard however in respect of lounge and dining/restaurant the standard is inconsistent. It is recommended Council adopt 1/3 sq.m for a lounge area and 1/10 sq.m for a restaurant because of car dependency and use the NUFA method as best practice.

There are significant inconsistencies within comparative policies in the following areas:

- rates for residential flat buildings should relate to the number of bedrooms;
- restaurant rates should be consistent, irrespective of location and relationship to host premises;
- there is no standard for caravan parks;
- Council includes an unlicensed hotel whereas others do not;
- Car tyre retail and motor showroom rates appear comparatively overzealous;
- Plant nurseries have no requirement;
- Professional consulting room rates appear comparatively overzealous;
- There is no requirement for car repair and/or panel beaters;
- No other policy has a rate for junk-yards nor funeral parlours; and
- Golf course rates also appear comparatively overzealous.

5.2.2 Rural Issues

Rural subdivision and dwelling entitlements

Rural subdivision, in some cases, has the effect of fragmenting agricultural land uses and prime crop and pastureland. Often, the land uses that occupy the newly subdivided allotment are not the highest and best use for the quality of the land. This creates not only environmental problems, but as discussed earlier, the changing economy has meant that farms need to have an economy of scale that is large enough to make the enterprise viable. Any loss of land in prime production areas may have a significant effect on the viability of local industry in terms of domestic and international competitiveness.

Possibilities to be considered for rural residential development within the existing rural residential zone and lands zoned for future urban development include community title developments, where the agricultural land falls under the ownership of the community. This type of development has been carried out successfully primarily with wineries, in South Australia, the Hunter Valley and the rural fringe of Sydney. Advantages of such development include the preservation of some productive value of agricultural lands, in comparison to traditional smaller lot rural residential subdivisions. However as with other rural residential developments the issues of conflicting land uses and loss of larger agricultural holdings are still prevalent. Such developments should also be considered as acceptable for prime agricultural lands within the agricultural zones.

As discussed previously, approximately 80% of the Shire is classified as 1(a) Rural (Agricultural Protection), and this land is also the most productive in the Shire, based upon NSW Agriculture Land Classification Maps. It should be noted that **Clause 14** of the LEP enables:

"...(2) Despite clause 11, the Council may consent to the subdivision of land within Zone No. 1(a), 1(b), 1(d) or 7(d) so as to create an allotment having a lesser area than is required by that clause, if it is satisfied that:

- (a) the land is being lawfully used otherwise than for the purpose of agriculture, a dwelling house, home industry, home occupation or forestry, or*
- (b) the land may lawfully be used otherwise than for the purpose of agriculture, a dwelling house, home industry, home occupation or forestry by reason of a development consent granted in respect of that land,*

and the allotment will continue to be so used."

The current provisions for rural subdivision allow for a flexible range of allotment sizes, through Clause 14 as quoted above. DIPNR have indicated concerns that a higher minimum size should be adopted in accordance with the objectives of the NSW Governments Sustainable Agriculture Policy. Increasing the minimum allotment sizes

from 200 hectares within the 1(b) Rural (Agricultural Protection) zone to 400 hectares would bring this provision into line with the Policy, as well as being comparable with the corresponding figure of surrounding local government areas such as Parry, Coonabarabran and Coolah.

The existing 200ha minimum has been relatively effective throughout the Shire since its implementation, and concerns have been raised within the community regarding an increase in the minimum allotment size. DIPNR has noted that the 200 ha minimum may be justified against the objectives of the NSW Policy for Sustainable Agriculture in order to maintain the existing figure.

The objectives of the Policy include:

- **Agricultural Production:** *Profitable agricultural industries producing high quality agricultural land products in an ecologically sustainable manner that meets consumer needs, and based on a better understanding of the relationship between product prices and production costs, including environmental costs.*
- **Land Management:** *Agricultural land protected and managed for sustainable agricultural use with agricultural activity contributing to its protection and enhancement.*
- **Water Use and Quality:** *Agriculture as an efficient and productive user of water contributing to the achievement of water quality and environmental flow objectives.*
- **Nature Conservation on farms:** *Agriculture making a beneficial contribution to the protection and management of the State's natural heritage and biodiversity.*
- **Rural Communities:** *Agriculture making a beneficial contribution to the regional and State economies and contributing to the support of the State's rural people and communities.*

Integrated Management: *Agricultural industries, communities and governments working together to achieve positive economic, environmental and social outcomes.*

Accordingly, Gunnedah may be able to retain the existing 200 hectare minimum should it be demonstrated that the existing figure is consistent with these objectives. The existing situation in Gunnedah suggests that agricultural industries within the region are able to sustainably operate at a profitable level without compromising the surrounding environment and causing degradation through the fragmentation of productive land holdings. Moreover existing patterns of agricultural development are such that the current minimum allotment size is considered highly suitable for the Shire.

Rural residential subdivision sizes are currently limited to minimum area of 6000 m², and that the average area of subdivided allotments under 3 hectares is 1.2 hectares per allotment. Reducing the minimum allotment size for rural residential zones may prevent further fragmentation of productive agricultural lands, in addition to preventing further sprawl at the fringe of townships. However this may also preclude the future urban expansion of towns and villages at the fringe, and reduce the buffer between conflicting residential and agricultural land uses.

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In this regard it is suggested that the minimum allotment size for rural residential allotment sizes be maintained at current levels, which is also in accordance with DIPNR's direction for rural residential development throughout the north west region. Any reduction in the permissible allotment size could occur to a minimum of 4000m², before implications for development would arise with regard to provision of facilities such as town water and connection to reticulated sewerage.

Dwelling entitlements within rural areas are also another issue that has a close relationship to rural subdivision provisions. Under the GLEP 1998, ordinarily the following minimum sizes are required for dwelling entitlements:

| RURAL ZONE | MINIMUM AREA FOR A DWELLING |
|------------------------------|-----------------------------|
| 1(a) Agricultural Protection | 200ha |
| 1(b) Rural (General) | 40ha |
| 1(c) Rural Residential | 6000m ² |
| 1(d) Future Urban | 40ha |
| 7(d) Environment Protection | 40ha |

Clause 15 of the GLEP provides for the erection of a dwelling within the 1(a), 1(b), 1(d) and 7(d) zones. It also provides for the erection of an additional rural workers dwelling on the same lot where it can be demonstrated that there is a requirement for additional labour. Currently these provisions are sufficient in providing for rural workers dwellings, however if the minimum size of subdivision within the 1(b) zone were reduced then it would be considered. Any increase in the minimum allotment size of the 1(a) zone would not incur further increases in dwelling entitlements.

Clause 16 provides for the erection of dwellings in the 1(c) zone; provided the allotment is created in accordance with the provisions for rural subdivision under **Clause 12**. These dwelling entitlements should remain as per the provisions of the current LEP.

There are a number of clauses within the LEP that enable a dwelling to be erected notwithstanding the provisions of **Clause 15**, including dual occupancy developments within the abovementioned zones. These dwelling entitlements are an issue within rural areas for many of the same reasons as those stated above.

Other issues of rural dwelling entitlements include ribbon development along highways and main roads. Provisions in relation to access from a non-arterial road and property frontage onto main roads are currently in place to help address these concerns, and should be maintained as part of the new LEP.

- The preservation, if possible, of rural heritage items including the built and natural environment.

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To date, heritage assessment reports for the Shire have not been completed as mentioned in previous sections of this report. These are currently in the final stages of preparation and will form the basis of recommendations to preserve items of rural heritage.

5.2.3 Urban Issues

- The extent of the business zones in Gunnedah and a review of the CBD Zone Plan with examination of flexible planning controls to perimeter and peripheral areas.

As discussed earlier in this report, Gunnedah has a strong and relatively large Central Business District (CBD) compared to many other regional centres. Some 70.02ha comprise the CBD of Gunnedah, with approximately 16.21ha of land for commercial use.

The extent and size of the Gunnedah CBD can be seen at **Figure 12**. The breakdown of the sizes of areas within the CBD are shown below:

| DEVELOPMENT TYPE | AREA WITHIN CBD (HA) |
|----------------------------|----------------------|
| Residential | 18.26 |
| Commercial | 16.21 |
| Mixed Uses | 3.71 |
| Industrial | 8.49 |
| Community | 5.32 |
| Vacant Land | 2.02 |
| Roadways and Road Reserves | 16.01 |

There is a significant mix of land uses within this area, enabling commercial competitiveness whilst also ensuring viability through co-location of business within a central core.

The structure of the CBD is largely that the core business types (such as primary retail, financial institutions and community services) are located around the area bounded by Abbot Street, Barber Street, Tempest Street and Little Conadilly Street, within the 3(a) Central Business zone.

Gunnedah Shire Council has attempted to control the type of commercial activity around the CBD area by placing the 3(a) Central Business Zone in this area. Surrounding this, to the north, is the 3(b) General Business zone, aimed at encouraging secondary commercial, professional and service business activities in this area, to support the primary function of the 3(a) zone.

An issue for the locations and provisions of these zones is the interface that the surrounding zones have with each other, and the flexibility that this interface may

require to ensure the continued viability of the town centre. This may include provisions to ensure a merit-based approach to development on the periphery of this area that may encourage people into the town centre, rather than detracting from it.

- Analysis of pedestrian access and disability access issues having regard to linkages to car parking, public facilities and community infrastructure.

The town centre of Gunnedah has generally good linkages within the CBD. Much of the available off-street parking in Gunnedah is via the laneways that run parallel to Conadilly Street, namely Little Barber Street and Little Conadilly Street. The only issue with the provision of off-street parking is its linkages to Conadilly Street. These areas are not permeable for pedestrians and those with disabilities or the aged.

In many circumstances, pedestrians would have to make their way from the car park along one of these streets to a permeable section or to the nearest perpendicular street and access Conadilly Street that way. This is also the same for the public/community areas around the town centre (including the Council administration centre, Community Services Centre and other uses such as the Cinema).

There is also support within the community to relocate heavy traffic and transport away from the CBD. This would have the effect of allowing further pedestrian improvements to take place as well as allow for more effective upgrades to the appearance and function of the CBD. This diversion is seen as having a positive effect on lifestyle for those working within and moving around the CBD, and could afford further opportunities for some urban consolidation within the area.

Other disability and community safety issues that relate to these areas include; adequate lighting to increase perception of safety, sufficient width of accessway, adequate rollbacks on kerbing and ramps to footpaths from roads are all issues that must be dealt with to ensure an equitable level of parking is available within the town centre.

- The preservation of the present character of urban areas and the identification and protection of historic or heritage significant sites involving both the built and natural environment.

To date, heritage assessment reports for the Shire have not been completed as mentioned in previous sections of this report. These are currently in the final stages of preparation and will form the basis of recommendations to preserve items of rural heritage.

- Assess the extent to which urban consolidation and redevelopment of existing serviced land can be encouraged and achieved.

Another issue to be raised within this Study is that of the potential for the town of Gunnedah to implement an urban consolidation policy to prevent the premature release of new land on the fringe of the township. The issues with urban consolidation include:

- *consolidation of existing allotments to allow for future expansion of the town without compromising land on the fringe of town*

This can include the use of the vacant land within the business zones to accommodate future commercial growth. In addition a range of higher density forms of residential development can be actively encouraged within close proximity to the CBD. The existing 2(b) Residential (Higher Density) zoning provides for these types of development, and could be applied further in other areas closer to the CBD, such as the existing 2(a) zoned land bounded by Chandos St, Bloomfield St and Elgin St.

This may however, impact upon the existing urban character of the township, and the continuing preservation of the character of the town, as discussed in the previous section. Striking a balance between the realisation of urban consolidation within Gunnedah and maintaining the character of the town centre should be a key focus of land use controls. Under appropriate zoning provisions, increasing populations within proximity to the town centre can have the positive effect of revitalising the town centre and encouraging increased use of the centre.

Further, there may also be an issue arising in finding suitably sized allotments for redevelopment as a higher density residential use. There are constraints with many of the existing allotments that are not large enough to be redeveloped for more than one or two dwellings. In addition, only allotments that have had their existing dwellings placed on them in a way conducive to further redevelopment of individual sites can be targeted for forms of consolidation such as dual occupancy developments.

- *Promoting urban consolidation within the existing area that may not be accepted by the community.*

It has been recognised throughout many communities that attitudes towards urban consolidation from residents are often uncompromising, and have proven to be stumbling blocks for the implementation of consolidation schemes. In recent times this has been exemplified in its most severe form within the northern suburbs of Sydney, where the Minister for Planning has assumed direct control over sites targeted for urban consolidation through medium density residential development.

The key issue in addressing the concerns of residents is often educating and consultation throughout the planning process. In particular the location and extent of urban consolidation has often been misunderstood, whereby residents are of the misinformed view that consolidation policies are to be applied within lower density neighbourhoods, rather than within designated higher density areas.

These factors combine to make urban consolidation a viable option, but one that may be difficult to realise. This is made more so considering the attractiveness of the Shire as a rural lifestyle centre, and the likelihood of new residents moving into the area seeking rural residential dwellings and other lower density 'fringe' housing.

Intrinsically linked with the viability of urban consolidation is building on and improving the existing success of the Gunnedah CBD, making it an attractive and convenient locality in which to shop, work and live. Accompanying this goal is the objective of preserving the existing character of the town centre and allowing for development which is sympathetic and appropriate to these requirements.

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- Assessment of the appropriateness of the Environment Protection (Scenic) Zone in terms of the extent of land use control it provides.

The aims and objectives of the 7(d) zone are:

- (a) to protect hill lands, escarpments and river valleys of scenic significance,*
- (b) to ensure the character of these areas by restricting the uses which are allowed and enforcing greater control in regard to building materials, site positioning, height, scale and the provision of access roads and services, and*
- (c) to allow only development which maintains the rural-scenic setting of the area"*

These objectives make the zone clear in its intention to protect the lands of significant scenic quality within areas so zoned (mainly in the hills located around the Gunnedah town centre). The minimum standard of subdivision for this area is 40ha. This raises a number of issues, including dwelling entitlements in these areas.

Moreover, this leads to concerns regarding the suitability and siting of developments within the zone, which may be in conflict with the intentions of the zone. However, the objectives of the zone allow for greater control and enforcement of design principles in keeping with rural scenic quality of the zone.

The zone currently provides adequate controls to allow for the conditioning of consents to be consistent with the objectives of the zone. However these could be augmented and strengthened through establishing a separate assessment criteria for the zone which could be inserted as a schedule to the LEP or as stand alone DCP if desired.

Of particular concern, given the location of many of these areas within the hills surrounding Gunnedah, is the degree of control provided to limit ridge top and hilltop development. It may be appropriate to extend the application of Clause 17, relating to ridgeline and hilltop development within Zones 1(a) and 1(b), as an alternative or additional measure to further development controls for the 7(d) zone. This would lend further statutory weight to the crucial issue of siting and address developments that may otherwise impinge upon the scenic quality of the area in which they are proposed.

The environmental significance of the area may also be a critical consideration. Sites zoned 7(d) which may be nominated as high priority by Council may be subject to more rigorous controls. Identification of such sites and assessment of their environmental significance would need to be addressed in order to determine what course of action to take, if any, to ensure their future protection.

- Examination of the current Obstacle Limitation Surface (OLS) for the Gunnedah Aerodrome and the potential to control tree planting of a nature that would impinge upon the OLS.

Under civil aviation guidelines, the airspace on the approaches to runways needs to be clear from obstacle at a gradient of 2% from the end of the runway/landing strip as

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defined by the Civil Aviation Safety Authority, and at an incline of 50% immediately surrounding the perimeter of the aerodrome. These OLS areas are shown at **Figure 18b**. The OLS map is attached as **Appendix B**.

Within the Gunnedah LEP 1998, **Clause 39** relates directly to development within the vicinity of the Gunnedah aerodrome. Specifically, this provision relates to the height of buildings and the impact that these buildings may have on the Gunnedah aerodrome. This clause requires any development application within this zone to be referred to Air Services Australia/Civil Aviation Safety Authority, and subsequently consent cannot be given unless these comment have been received.

It is considered that adequate provisions apply in relation to the aerodrome in terms of development. However, Council has some concern in relation to tree plantings within the Obstacle Limitation Surface (OLS) of Gunnedah Aerodrome. Placing such controls within the LEP may not be in the best interests of Council as this may unnecessarily clutter the Plan. A more appropriate solution may be to place an additional sub-clause within **Clause 28**, relating to the removal and protection of trees. Such a sub-clause could refer to no consent being required for removal of trees that impinges on the 2% gradient within the OLS of Gunnedah Aerodrome, as shown on the aerodrome map deposited at the Council's administrative centre.

This would prove an effective mechanism of controlling tree growth within the OLS, whilst not requiring consent for plantings. This would mean that no DCP needs to be prepared and a sub-clause associated that requires any person so directed by Council must remove a tree that is located within 2% of the OLS of Gunnedah Aerodrome. The area of the OLS as it appears on the ground is illustrated in **Figure 18a**.

- Examine the suitability of the current Village Zoning.

Outside of the Gunnedah township, all other urban centres within the Shire, namely Mullaley, Curlewis, Breeza, Tambar Springs and Carroll, are primarily zoned as 2(v) Village. This zone has different objectives to that of the 2(a) and 2(b) zones found within Gunnedah.

Primarily these zones support a number of uses that may be required within a small community, including having agriculture permissible within the zone. This allows greater flexibility within a smaller urban environment that typically has a greater relationship to the rural landscape than that of an urban environment. The Objectives of this zone reflect this relationship to the rural landscape and enable the continuing use and further development of the zone through flexibility in the allowable uses, whilst keeping conflicting land uses away from this environment. It is intended to apply individual DCP's to each of the villages in order to achieve this outcome.

5.3 Economic Issues

5.3.1 Shire-Wide Issues

Financing of Facilities

The 1982 study referred to a number of ways in which Gunnedah Council could finance community services and other facilities as population numbers increased and demand for services followed. This evaluation of contributions was formed when the Environmental Planning and Assessment Act, 1979 had recently been gazetted.

The recommendations and basis of the 1982 study was to guide Council in implementing such a contributions plans for developers and subdivisions in the area. Council has had a Section 94 Contributions Plan in place for some time now, and as such provides an adequate base for the provision of services to the community of Gunnedah Shire. A Contributions Plan acts to require the contribution of funds from new developments, in order to provide funding for community facilities and infrastructure.

However, with population reductions problems arise, primarily that no development has meant that contributions are on the decline. This can severely hamper the provision and maintenance of existing facilities and the upgrade of these services. Whilst developer contributions should relate directly to the provision of new services for new residents, they also can be used to augment current activities.

With a shrinking population, the rate base is also decreasing, presenting a difficult situation for Gunnedah Council in their provision of services. There is an adequate demand for these services to be maintained, and a significant need for services such as community centres and libraries to be constantly evolving and offering services at an excellent standard.

Financing of services is not a major concern with present levels of development, however, any further decline in demand for residential or commercial development may impact on Council's budgetary considerations and forecasts in their management plan.

Ways to alleviate this include;

- Council as developer
- User pays for some provisions
- Maintain and promote Council-held assets (such as the Saleyards, Cinema and Town Hall)

These are some suggestions that will be discussed in further detail later in this document.

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The inherent danger in financing facilities through substantial levels of Section 94 contributions and user pay provisions is that development may be deterred and hence may not go ahead. It has been noted by members of the community within Gunnedah that in some instances Council contribution costs may have contributed towards a sterilisation of developable land. This has occurred through the charging of high upfront contribution costs that have deterred investment within the locality. Managing the level of contributions relative to development potential realised and market expectations should form an important consideration of Council revenue generation; with a view to encouraging development where desirable.

Council will not be pursuing its role as developers. Instead it will be encouraging private enterprise to invest within the Shire and giving assistance through financial aid, grants et al wherever possible. It is therefore vital to ensure that businesses attracted to the area are competitively viable and sustainable over the long term; and moreover are not reliant on the provision of Council assistance vis-à-vis monetary contributions in order to succeed.

- Involvement of Council in Land Conversion

The 1982 Study identified that Council play a role as a steady developer in the area, maintaining a constant development cycle to encourage growth during slow periods of economic growth.

Today, a very different climate exists both in terms of the physical and ownership pattern of Gunnedah and the political background of development by government authorities. In a climate of probity, there needs to be a distinction between developer and consent authority. Appropriate mechanisms for achieving this within Gunnedah include ensuring that the Council officer responsible for preparing development applications is different to the officer responsible for assessing the application, by referring the application to an adjacent council to assess the application on Council's behalf, or referral of the application to bodies such as the Regional Organisation of Councils for comment before determining final approval. These and other processes are described in the NSW Independent Commission Against Corruption (ICAC) local government discussion paper, '*Taking the Devil Out of Development*'.

Historically: Council as Developer

Historically, Council has played a significant role in the ongoing development of the Shire for residential uses, and since the completion of the 1982 Study it has maintained a continuing role in the Shire's development. This has included playing a role in commercial and industrial development in order to promote economic development throughout the Shire.

Industrial proposals for which Council was the proponent include a proposed industrial park at Blackjack Road, for which it acquired during the early 1980's; however a decline in demand for industrial land resulted in the project being shelved. Since this time Council has incrementally sold the land off for various land intensive industrial pursuits, such as a trucking depot, an anhydrous ammonia service facility and a gravel haulage maintenance centre. Other industrial developments which Council has been involved with have occurred on Borthistle Road, where developments have included

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more traditionally sized industrial developments including the SES Regional Facility, Silo and Tank Manufacture, storage facilities and a furniture removals depot. In many instances these developments have been encouraged through sales subsidised by Council.

Council has also responded to community needs through its involvement in the development of two childcare facilities. In the first instance, Council sold the land and provided development concessions to allow a private childcare facility to be established; in the second instance Council provided funding a significant loan to allow a facility proposed by a community group to proceed.

Council has also had significant involvement in the development of community housing since 1988, through the initiation of three major projects, and provision of funding contributions to the Office of Community Housing to develop the projects. These projects have catered to the needs of youth and disabled people in addition to the general population.

Councils involvement in the aged care sector has also been significant, through involvement with the Gunnedah Nursing Home and the Alkira Hostel facility. Council provided significant financial and other resource allocations to both of these projects, in addition to providing strong financial support to the development of the Gunnedah Village Homes Complex. Councils continued involvement in the development process can set the way forward through providing examples of best practice development.

- 'Right to Farm' Provisions

Increased demand for rural-residential development across NSW has seen rising levels of conflict as those who seek rural residential locations do not, or will not, understand the rural nature of their setting and that land surrounding these areas is often used for productive gain. The nature of development in these locations often places residents who are not used to rural lifestyles close to traditional agricultural land that is now on the margins. This often causes conflict with residents complaining about noise and odour.

This is a problem for many fringe LGA's or those experiencing increasing demand for rural residential development at the rural urban interface of their major urban settlements. Although not a major problem in Gunnedah, there is an issue about rural living that is appearing as a trend across many LGA's in NSW. This is also a concern when considering reductions in the minimum allotment size of 1(c) land, thereby allowing for closer proximity of, and reduced buffer zones between, residential land uses and agricultural pursuits.

A statutory instrument is not the place, under current planning regimes, for such provisions to be contained. However, notations on Section 149(5) Certificates may be an appropriate mechanism to warn potential residents of the agricultural activity occurring next to their respective dwellings.

However, this may only be needed as a last resort, as Gunnedah is not experiencing the levels of growth of rural residential development, and the current land-use zoning has

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kept most of the 1(c) zoned land away from agricultural uses, usually adjoining the 1(b) Rural (General) zone. Accordingly, desired intensification of agriculture within the 1(a) zone (see following point) should not result in significant impacts upon rural residential development, nor pose a long term impediment to the future viability development within the 1(c) zone. Section 149(5) notifications are considered to be an appropriate mechanism for in the short to medium term, It is not considered that any 'right to farm' notions or 'let the farmers farm' clauses or notifications need to be made at any time in the near future. Separation of incompatible uses through suitable land use zoning practice should continue as a course of establishing more permanent and physical measure of delineating agricultural and rural residential land uses.

- Potential impacts and benefits of intensive agriculture development and appropriate locations for such development

Intensive agriculture is an increasingly important and a well-recognised form of development within rural areas as agribusinesses increase and pressure for economies of scale also increase.

However, intensive forms of agriculture usually come at a high environmental cost. The multitude of different forms of intensive agriculture can cause significant environmental problems as well as significant economic gains. These include problems of odour, land use conflicts within the surrounding areas and management of nutrients.

Currently, a draft regional strategy is being prepared for aquaculture, the *North West Sustainable Aquaculture Strategy for Land-Based Aquaculture*. Once completed this will create a framework for identifying different types of aquaculture and their subsequent approval process to be followed.

Some of the types of intensive agriculture and their possible environmental impacts are listed in the table below:

| INTENSIVE AGRICULTURE TYPE | ENVIRONMENTAL IMPACTS |
|---------------------------------|---|
| Cattle Feedlots | Noise, odour, land degradation, river and groundwater contamination, dust emission |
| Poultry Farms | Noise, odour, land degradation, river and groundwater contamination |
| Aquaculture installations | Decreased water quality, eutrophication of watercourses, loss of biodiversity, introduction of exotic species |
| Agricultural produce industries | Removal of native species, soil structure decline, salinity, increased nutrient runoff into waterways |

The benefits of intensive agriculture are mainly economic. With increases in production numbers and throughput, significant positive effects can flow-on to the local economy

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with support industries, including stockfeeds, farm machinery, transport and associated agricultural support being needed to ensure the efficient operation of the agribusiness.

Such an operation may also attract others similar pursuits to the area, or may indeed encourage new and emerging industries to the area that may be complementary to the existing industry.

This would also have some beneficial effect on employment in the area, this would assist in curbing the population decline of the area. However, should any interest arise in terms of intensive agriculture, placement of such facilities is an important issue and one that must be considered carefully.

Such forms of development must be kept away from areas where conflict between land uses is likely. This includes areas adjoining residential communities, land adjoining environmentally or visually significant land and any land that may cause significant conflict between the proposed intensive agriculture development and the existing development.

Therefore, any intensive agriculture land use should not be located within any residential zones (including Village zones) and preferably not within the 1(b) Rural (General) or 7(d) Environment Protection zones. The best land areas for intensive agricultural pursuits would therefore be within the 1(a) Rural (Agricultural Protection) Zone and desirably outside of flood liable lands. The general area best suited for intensive agriculture is located at **Figure 19**, and is considered to be appropriate land for this use.

Considerations such as buffer zones within properties, siting of odour and dust emitting buildings, waste disposal, and access form important matters for consideration. These issues can be managed through a development control plan, as has been implemented within the Parry Shire amongst others, or assessed on an individual case basis.

- Review the extent of marginal agricultural land and assess alternative development potential

Marginal agricultural land is becoming a bigger issue than ever before in regional and rural areas of NSW. The rate of declining population in these areas is a trend that is concerning to governments and residents alike. The declining population of rural areas coupled with changes in the global economy has caused the extent of the marginalisation of rural lands to increase over the last decade.

This has resulted in a number of negative outcomes, including the loss of valuable agricultural land due to the decreasing returns of production, the increase in land degradation reducing the productivity of these lands, and the impingement of development that is incompatible with surrounding land uses on the development fringe.

Lands that could be at the most risk from marginalisation include the areas shown at **Figure 20**. It is not considered that lands within the Shire could be further compromised through the marginalisation of rural lands. There are alternative measures to lands

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where agriculture was once a viable option, with many different land uses available to investigate and understand the feasibility of.

There is an increasing trend towards more intensive forms of agricultural production, both across the world and in Australia. When the economics of production are looked at, economies of scale represent a significant factor of the viability of an operation. Advancements in agricultural technology, cropping techniques and general land management have meant that larger parcels of land can now be farmed with the same or less amount of people to operate them. This creates larger returns on the land and helps in debt servicing.

However, some industries, such as dairy farming and grain industries, with fluctuating prices at the farm gate, are more susceptible to downturns in the market. This has the effect of causing the marginalisation of rural lands. To counteract this, many farmers in other locations are embracing intensive forms of agriculture, broadly categorised as follows:

| INTENSIVE AGRICULTURE TYPE | TYPE OF USE |
|-----------------------------------|---|
| Intensive Animal Husbandry | Breeding, keeping and nurturing of animals (including; cattle, deer, goats, horses, poultry, sheep or other livestock) |
| Intensive Livestock Keeping | Nurturing and feeding of animals by a purpose other than natural grazing (includes piggeries, poultry farms, cattle feedlots and aquacultural industries) |
| Intensive Plant Cultivation | Involves the irrigated cultivation of crops, including cereals, fruit, flowers, nuts, vegetables, mushrooms, or turf, or the use of land for wholesale plant nurseries or the use of hydroponics for commercial purposes. |

Intensive agriculture is one way in which development could occur on marginal agricultural lands. However, due to the conflicting nature of intensive agriculture there are considerable issues to consider before encouraging this form of development on rural lands. Intensive agriculture needs to be positioned away from residential development, significant environmental lands and significant view landscapes. It is considered that intensive agriculture is best suited to prime agricultural land.

There is considerable scope for development to occur outside of these areas for intensive agriculture/horticulture, keeping buffer zones and stringent environmental controls enforced. Ideal locations for this type of development are shown at **Figure 19**.

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Aside from intensifying the agricultural productivity of the land there are limited ways to develop the land other than through increasing the returns to scale of development, in the form of intensive agriculture.

- The effects of government economic policy on agriculture and the impact on land use controls.

Government economic policy can have a marked effect on the communities of rural areas and the ways in which they operate in daily life. The effects of subsidies and tariffs can either be a positive step for rural industry or a negative one. Other economic policies on agriculture that can have a significant effect on rural communities include the fiscal budget, monetary policy (interest rates) and any specific rural policy that the Federal government may have in place, this can include policies such as farm assistance schemes or taxation offsets.

It appears that mostly positive economic policy has the biggest effect on fluctuations in land use. There appears to be little correlation, based on historical demographics that indicate any great changes in population levels (and therefore demand for accommodation), directly attributable to government policy.

This impact on land use controls is quite minimal, unless the government offers taxation or other incentives for farmers to stay on the land, where there may be extra demand for land due to the increased productivity of local services.

However, the only major effect of government economic policy (in the macroeconomic sense) relates directly to fiscal management of the economy (budgetary allocations). Further, outside of the governments control are the mechanisms employed by the Reserve Bank of Australia (RBA) in terms of their macroeconomic policy. The RBA sets interest rates, which can have a major effect on land viability and debt servicing in rural areas, which may place either positive or negative pressure on land supply.

Other macroeconomic policy that the RBA has a role within is currency. This relates directly to the buying and selling of the national currency, and more importantly the cross-rates on the currency. A stronger dollar against the US Dollar, Pound Sterling and the Euro means that Australian commodities are more expensive to overseas markets. A weaker dollar has the converse effect where demand for commodities increases. There is also considerable scope for the RBA to influence markets in this manner.

In terms of microeconomic policy, this can affect rural communities more significantly than macroeconomic policy due its focussed approach. Microeconomic policy is directly related to reform, it relates directly to the efficiency of production and reducing costs whilst increasing returns. Microeconomic policy recently has focussed on removing tariffs and subsidies so that the market determines the competitiveness of industry. Other microeconomic reforms recently include the introduction of a new taxation system, Australian Workplace Agreements (AWAs) and the introduction of government business enterprises (GBE's) and the inherent relationship of this to privatisation. Microeconomic policy can cause significant effects on the rural community, more so in terms of employment opportunities decreasing and farmland efficiency rising.

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However strong microeconomic and macroeconomic policy is at the time, it still does not affect changes in land use significantly. There is considerable 'lag time' between the implementation of economic policy and on-the-ground effects. There is also a considerable amount of structural change needed in the economy for the realisation of 'on the ground' effects (as seen by the trend throughout the 1990's towards globalisation of the economy). This has little effect on landuses, except for typical cyclical movements of transient populations looking and obtaining work, fluctuating small changes in demand upon communities.

- The effects on rural population adjustment as a result of changes in the rural economy and the effects on the physical, social and economic structure of the Gunnedah Local Government Area

Changes in the demographic composition of rural and regional populations throughout regional NSW has significantly influenced rural population adjustment within local government areas such as Gunnedah. Over the past twenty years since the completion of the 1982 Study, there has been a general trend towards rural population decreases in smaller towns and rural settlements, matched with strong growth within larger regional centres throughout New South Wales.

In the Gunnedah context this has been realised through a population decline of 6.44%, from 12,819 to 11,993 over the 1996-2001 period, as discussed in **Section 4.3.1**. The population of the Shire has also decreased since the time of the 1982 Study, when it was 13,173. These population changes can be explained by a number of factors, one of which is the changing nature of the economy in Gunnedah and its subsequent impact on migration from the Shire, particularly of younger people. Factors driving rural population adjustment are described in **Section 4.3.9**.

Changes within the Shire's population composition have a significant impact on the physical, social and economic structure of the Shire as a whole. In terms of physical structure, the potential exists for significant changes to the character and environment of both the primary settlements and rural areas. Although Gunnedah township currently provides a strong and well used service function for the remainder of the Shire, it is conceivable that if population decline continues in the long term to levels of around 7-8,000, there could be significant impacts on the viability and character of the town centre.

In the event of this occurring, diminishing viability of businesses and services within the town centre would result in the loss of many of these businesses, thus reducing the employment base of the Shire and effecting further population decline. Consolidation and infill development, coupled with measures to reverse the current situation of decline on a Shire wide basis, can alleviate this issue.

Agricultural pursuits are also at risk from environmental factors such as increasing salinity and land degradation, resulting in reduced productivity and thus limiting the opportunities for future growth. Of particular concern in relation to population adjustment is the increased trend towards agribusinesses, which require less labour and absorb more agricultural land than traditional agricultural enterprises. This can lead to

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the displacement of the traditional population base for agricultural labour, exacerbating current rates of population decline.

One of the key issues facing the Gunnedah Shire's current shifts in population is the loss of young people to regional centres of New South Wales, metropolitan Sydney and other states. As has been felt throughout the entire state, the out migration of young people is one of the most dramatic impacts of rural population adjustment. The effects of this out migration are numerous and have a number of ramifications on a Shire wide basis.

Of the young people which leave the Shire in search of employment and further education, there are a proportion that return to the Shire, particularly if increase qualifications can lead to employment within the Shire. However, there are many that do not. The current population of the Shire is typified by people aged between 40-49 years, comprising largely of people who have grown up and subsequently raised their own families within the Shire. Within the current climate of young people moving elsewhere, this trend will change as fewer people stay within the Shire to form their own families. It is expected that unless this out migration can be arrested that the current high proportion of children within the Shire will also be lost as they grow into young adults.

Another trend which has occurred throughout New South Wales is the increase in aged population, as a result of 'lifestyle' movers into rural areas. This has yet to be fully realised within the Gunnedah Shire. In the event of increases in Gunnedah's aged population, a different set of planning needs and issues would become apparent. Firstly, increased demand for rural residential and lower density forms of housing would emerge, contradicting pushes for consolidation and causing potential land use conflicts with agricultural pursuits, as described earlier in this report.

This is reflected within demographic changes of the farming population, who are generally becoming older. Some older farmers are squeezed out of the industry, due to marginalisation and 'crowding out' as a result of incoming agribusinesses. Many such farmers decide to relocate into towns such as Gunnedah, or into nearby rural residential housing where a rural lifestyle can be maintained. This has implications for unemployment levels within the Shire, as well as requiring development of new skills. This relocation away from rural areas into more urban localities can also have detrimental impacts on housing availability and affordability as the existing stock of rural residential housing becomes more scarce.

The scenario could arise whereby the Shires population is dominated by older people, as the existing 40-49 year old population becomes aged, and very young people, but is deficient in its numbers of young to middle aged adults. This 'middle' group tends to be the most active within the community and offers significant input in terms of economic activity, labour participation and contributions to the community. This would therefore create a number of planning challenges in terms of reducing the employment base of the Shire and generating additional demand for Council services and facilities. Ways of involving this group within the community and utilising the resources that older generations have to offer would also have to be investigated.

6 PLANNING OPTIONS AND NEEDS

This section of the report specifically examines the planning options, needs and principles over time within the context of the issues that have been examined earlier relating specifically to Environment, Economic and Social factors of the Gunnedah LGA.

These options have been developed through a thorough examination of the issues presented in **Section 4** of this report, the 1982 Environmental Study and information provided by government agencies and other authorities under the required Section 62 Consultations in accordance with the provisions of the Environmental Planning and Assessment Act, 1979 (as amended).

6.1 Constraints

This report has identified a number of constraints that have created significant obstacles to growth within the Shire. There are a number of natural and built constraints that have guided and restricted growth and production within Gunnedah for some time.

Overall, however, Gunnedah has relatively few constraints to the furthered and continuing economic and social development of the Shire. There is considerable scope for different types of development to occur within the landscape.

6.2 Agriculture

Agriculture is an important and emerging industry within the Shire, and is responsible for the greatest majority of landuses within the Shire. This land needs to be maintained as productive agricultural land. This needs to be achieved through a number of mechanisms including protection of productive rural lands through zoning techniques and more efficient land management practices. This enables a certain degree of protection to high quality and efficient agricultural production enterprises.

There is a significant need to protect productive economic assets in the Shire, the major one of which is agriculture. The major risk associated with agricultural production and the economic value that is made from it is salinity and the land degradation processes that this causes. There is a need for agricultural business owners and farm managers to be aware of the cost implications of current land management practices and suggest new methods of treating the land to ensure the sustained benefit of the land is realised and that the land will continue to be able to be productive over time.

The costs associated with such action may be considerable in the short term, however, there is a need for agricultural business people to be educated on the long term economic benefits of the short-term increases in expenditure, especially those who rely on irrigation as a primary method of pasture improvement.

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Also, the reduction of available agricultural land close to townships is a point for consideration in the future. Where possible, there should be a clear delineation between the rural and urban land uses; to an extent this has been achieved in Gunnedah. However, with a clear delineation between the land uses there can be no trouble with new residents complaining about land uses where the residential land use may conflict with the existing agricultural land use (in terms of activity on the agricultural holding). This can be the cause of considerable tension, and the investigation of a warning on a Section 149(5) Certificate of the possibility of noise, odour and other undesirable activities infrequently occurring on agricultural land to those who move into a small holding/rural-residential allotment would be desirable.

In terms of agricultural production, there also needs to be a proactive recognition of the changing nature of the global economy, and as such, there needs to be greater emphasis on the changing nature of the industry and encouragement of expansion of activities to increase yields (economies of scale) and possible intensification of certain agricultural operations in desirable locations.

6.3 Industry

Industry is also an important and significant sector of Gunnedah's economy. There are a number of industries within Gunnedah, however, the overwhelming majority of these industries would serve as agricultural support industries that provide mechanical, engineering, stock feed and supply services to the outlying agricultural pursuits that make up the hinterland of the Gunnedah LGA.

The role of industry has also changed within the new economy, there has been increasing trends towards a more mobile and economically efficient industrial sector. This has rationalised many industries, including agriculture and mining. In agriculture, increases in the technological advancement of farm machinery and land productivity improvements have decreased the amount of labour needed on farms, making the industry less of an employment industry and more capital production focussed. The same can be said for mining techniques, as underground long-wall mining has become more popular and easier to implement; there has been significant job losses as a result of this. This is also the scenario for open-cut mining, which has also benefited from advancements in technology (blasting, extraction and transportation). Technology should be seen as a positive factor of production, encouraging more participation from firms, with the diminishing need for ongoing capital investment and instead a need for start-up capital may be more attractive for industry.

This would have a positive effect on local employment, not so significantly from the mine itself, but from the support industries that would be required to provide engineering, mechanical services and transport for the mining operation.

6.4 Commercial

The main issue with the commercial zone is the fragmentation of the business types throughout the CBD. This has largely occurred as development has spread over time, and relates little to the present structure and climate of the current Gunnedah CBD.

There is a considerable mix of land uses in the CBD, as discussed in earlier sections, and although this creates diversity and good pedestrian flow movements, there are problems associated with undesirable land uses being located within the town centre. To a certain extent, Gunnedah Council has delineated the two uses by placing two zonings over the land to ensure that undesirable and incompatible land uses are kept to the northern end of the town.

Commercial activities within the CBD need to interact more with the surrounding market of both the residential areas of the town, and the hinterland.

6.5 Residential

The residential form of the Gunnedah township is such that growth patterns have largely been contained within the existing structure of the township. The way in which development has occurred has largely been due to the physical constraints of the site including flooding, topography and supply of service infrastructure.

Opportunities for growth should be pursued within the existing area, including the consolidation of land within the existing urban hierarchy of Gunnedah. This would require the encouragement of higher densities, however, this would need to be balanced with maintaining the existing urban character and heritage of residential Gunnedah.

Future growth patterns tend towards rural residential uses, and this has seen the amount of rural-residential zoned land become a significant proportion of land within the urban context. The demand, taking into account demographic influences referred to earlier, would not match the supply, and therefore an over-supply of land could stagnate the market. There is therefore a need to address the existing supply of land zoned for future urban purposes, with a view to 'back zoning' this land and introducing a more appropriate zone to act as a transition between rural and urban land uses.

There is a constant and changing need for different housing types across all areas; there is also a significant need for quality and affordable housing to be provided in and around the town of Gunnedah.

6.6 Settlement Patterns

The settlement patterns of Gunnedah largely, as discussed earlier, have followed constraints and historical subdivision patterns to extend towards the west of the town.

These have remained over time, with the Namoi River floodplain causing the biggest constraint to development on the eastern side of the township.

Further abroad from the town centre, there is a significant pattern of development, in terms of the surrounding towns in the area. Most of the 7 towns within Gunnedah all follow a satellite pattern around the major centre of Gunnedah, this provides Gunnedah with a service role to its hinterland, and sets a clear hierarchy of towns. The benefit of this is that smaller retail uses can be located in smaller towns, such as Carroll, Mullaley, Curlewis and Breeza, and can service the immediate needs of those in surrounding areas.

6.7 Infrastructure

Generally, the provision of infrastructure in the LGA is of a standard that is comparable to many other large regional centres in NSW. This infrastructure is adequate in meeting the current demands of the population.

However, upgrades would need to occur if any proposed development was to proceed or to encourage further development of the Shire in a sustainable and adequate manner. This includes a significant upgrade of transportation infrastructure to ensure that there is adequate quality and ability in the system to cope with extra freight demands of road and rail. Mentioned elsewhere in this report are the Murrurundi Rail Tunnel and other railway grade adjustments to improve speed and scale of rail transportation to the region.

6.8 Conflicting Land Uses

Conflicts in land use are not prevalent to any great extent within the Gunnedah LGA, due to the land use zoning techniques employed by Gunnedah Shire Council over time. The 1(b) zoning around the residential zones of the town has excluded some major conflicting uses (including that of intensive agriculture etc). However, there are considerable issues with rural industries and the proximity of their location to residential areas.

It is desirable to continue to minimise land use conflicts arising from these and other similar uses. This can occur under a planning framework where inappropriate development is allowed to occur throughout rural areas. Examples include ribbon development, typically subdivided along a road backing onto agricultural parcels of land and co-location of intensive agricultural industries with residential developments, as discussed earlier in this report. Towns within the Shire such as Carroll, could act as sources of potential land use conflict between agricultural chemical usage and residential areas if expansion were to take place.

6.9 Growth Scenarios

Some indicative growth scenarios can be identified for the Shire, based on the existing rates of population change, environmental constraints and future economic development opportunities as discussed in **Section 7.1.1**. Given that existing development within the Gunnedah township has occurred largely as a result of topographical and physical constraints, it is unlikely that future development of the town will, or could, expand well beyond the existing settlement.

Assuming that current levels of population change continue to decrease, the population of Gunnedah could reach 10,000 people within the next ten years. If this rate of decrease accelerates, the population of the Shire could conceivably reach 8-9,000 people within the same period of time. This scenario assumes that the development of new industry within the Shire as suggested under **Section 7.1.1** would not take place, affording new opportunities for employment, economic development and population growth.

If population levels were to fall as low as 8-9,000, the viability of existing industries and businesses within the Shire would be compromised, and opportunities for future investment and economic development within the Shire would be precluded. The ability of Council to provide existing level of services would also be diminished, due to a reduced rate base and the inability of Council to allocate desirable levels of funding to its expenditure program.

The existing rate of population decline could potentially be arrested through the development of one or a number of new industries within the Shire as detailed in the following section. The introduction of such industries would provide the Shire with a more diverse employment base, and would allow for the continued consolidation of the CBD as centre of regional importance. In this way the character of the town centre could be preserved and its role as a service provider for residents throughout the Shire could be developed.

Under a scenario of population stabilisation or growth it would appropriate for Council to pursue methods of infill development and 'smart growth' within the existing township rather than continue with further subdivision of agricultural lands for the purposes of rural residential dwellings. The concept of 'smart growth' comprises the co-location of new residential development within accessible distances to existing services, employment opportunities, amenity and transport networks.

Within the townships of Gunnedah in particular, businesses within the town centre comprise a significant proportion of employment within the area. In addition, topographical constraints to the south and east of the township act as physical constraints to future development of the town, further encouraging infill development as a means of catering for residential growth.

7 OPPORTUNITIES

7.1.1 Economic Opportunities

There are a number of opportunities that Gunnedah are seeking in terms of economic development of the Shire to increase stability and promote population diversification and employment in the Shire. In turn this development may help to arrest population outflows from the Shire and create a number of employment opportunities for its residents. These need to be planned for in a sustainable way, so that one industry does not crowd the other out.

Currently there are two major economic development focus areas for employment generation and production in the Gunnedah LGA.

The first focuses on the development of an ethanol production facility on the outskirts of Gunnedah along Quia Road. This facility will have the capacity to employ approximately 20 people and will provide an important and diversified base of industry in the Shire. This facility is dependent on the construction of a major natural gas main line from Dubbo through Gunnedah to link New England and the western gas fields. This environmental impact assessment alone for this pipeline could take from 2-3 years. This facility will have a positive economic effect on the area and would encourage support services and transport providers to place themselves in Gunnedah.

Possible ramifications include the environmental and visual effects of such a development and the likelihood that such development would require a referral to the Minister for Planning, and more than likely, the Minister becoming the consent authority. Although this may not have any ramifications at all, and certainly past experiences suggest that developments of this type are usually granted consent by the Minister, the development may face some form of opposition. The location of the plant should also be positioned with good access to existing water infrastructure in the Shire. Possibilities for water within the plant include the use of 'grey water', an option currently being explored by Council.

The second form of economic development option available to the Shire is in the form of development of the coal mining industry. The availability of natural resources within the Shire, combined with the reduced supply of coal resources in other coal mining areas of the State, make this industry a viable option to pursue. This would see the expanded extraction of the Gunnedah Coal Seam and would have the potential to employ (including extra support services such as engineering and mechanics) approximately a further 200 people, at conservative estimates, based upon large-scale subterranean mining activities.

The economies of scale of such a mine may require the expansion of the transportation system to accommodate mass freight haulage to the nearest port, of which the Newcastle Coal Loader is one option. This in part relies on the completion of a quicker and more efficient deviation near Murrurundi. This in turn would allow more significant trains to climb the deviation rather than the shortened trains that now make that particular trip, at

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a reasonably slow pace. The Rail Infrastructure Corporation has indicated that this is a private sector project, and as such is in the process of some form of negotiation with the Premier's Department and the Department of State and Regional Development.

There is a need within the Shire to identify the actual extent of natural resources available, and the variety of resources available. To date no detailed investigations have been carried out on the availability of mineral resources. There may also be the potential for hard rock quarrying and extraction of other resources.

Other economic development opportunities within Gunnedah include the tourism sector, which is expected to be, and has indicated recently, that it is in a state of increase. There are a number of attractions that Gunnedah has to offer, and not only the renowned 'Ag-Quip' field days in August. These attractions include the significant koala population of the Shire, the facilities at Lake Keepit, agricultural crops, various museums, Gunnedah Saleyards, Namoi Valley and the Waterways Wildlife Park. Recently, Gunnedah has launched a new marketing campaign that is intended to boost the numbers of visitors to the Shire, not only from within the state and 'passers-by' but also the overseas visitor markets with the 'Koala Capital of the World' slogan.

Indeed, the tourism sector needs to be encouraged, as more retirees become the major demographic in Australia, significant potential for increased numbers of motor and bus tourists will become evident. Adequate infrastructure will be needed to ensure that tourists are catered for, including enough of a range of accommodation and a broad range of activities that could attract visitors to stay longer. It is considered that currently there is an adequate provision of motels to service tourism within the Shire, however accommodation such as farm stays and bed and breakfasts, which are more readily identified as unique features of rural areas, can be promoted. In addition, backpacker accommodation can be supported where possible; however this is relatively limited due to factors of transport accessibility, location and distance from larger centres.

Opportunities for economic development need to be recognised and encouraged at the development application stage, so that potential employment opportunities that do not adhere to development controls can be provided for without compromising the underlying planning principles. In this regard a more co-operative approach between Council assessment staff and developers should be encouraged. Business development within the Shire can be actively promoted by Council with a view to cost recovery at some future time.

Gunnedah has a number of possible opportunities for economic development, over and above those suggested above. These may include the promotion of the Shire as a prime location for any number of agricultural produces, building on the existing strong markets for cotton, wheat and sorghum, and beef, cattle, sheep and pig produce. Expansion of existing operations should also be encouraged in order to increase production and employment opportunities. An inherent issue in the development of the Shire's agricultural economy are emerging agribusinesses and globalisation of primary industries in general, which may result in a crowding out of existing agricultural pursuits in the area and actually reduce the employment base due to reduced requirements for labour.

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The Shire's existing soils and pastures are amongst the richest and most fertile found anywhere within NSW. The opportunity exists to capitalise on the existing strength of the Shire's agricultural producers and its existing primary production sector through targeted promotion of one or a number of specific 'niche' production areas in addition to the existing agricultural sector of the Shire's economy.

The Shire may also consider ways of further consolidating of the existing Gunnedah town centre. This centre has remained a viable and healthy commercial district despite its population decline. This is due in part to the location of Gunnedah at the physical centre of the Shire and its continuing prolific role as a key commercial and retail focus for citizens from both within Gunnedah itself as well as other towns and settlements throughout the Shire.

Opportunities may exist for the town centre to build on its existing character and success in an attempt to draw new businesses into the town centre. In doing so, this would afford an opportunity for economic development within the Shire and create limited new employment. Improvements to physical characteristics of the town centre are imperative in promoting the CBD. This may also involve the development and enhancement of a central 'theme' or character for the Gunnedah CBD, in keeping with the Shire's existing tourism character within 'Big Sky' country.

The Shire could also benefit from the establishment of a conference facility as a tool to increase tourism and promote the local economy. These facilities are playing an increasingly important role in the tourism sectors of different areas throughout New South Wales, and a substantial facility of up to 140 people for Gunnedah could serve to attract a diverse range of visitors into the area. Another possibility is the development of call centre, which has generated a number of employment opportunities in regional areas such as Wollongong. This is an option that may need to be explored further.

The average length of stay for people within the Shire is around 3-4 nights. This can be conducive to visitors staying for this period of time at one establishment and undertaking day trips to various parts of the Shire. This should form an important consideration in seeking to promote the Shire as an attractive place for tourists to stay, and in promoting destinations for such day trips.

As previously mentioned, the existing marketing of Gunnedah as the 'Koala Capital of the World' is a key tool for the Shire in capturing the tourism market. Capitalising on the koala theme for the Shire could take place in one of a number of ways. The existing advertising campaign could be extended to billboards along prominent major roads into the town. The development of a 'koala farm' or a similar proposal could provide an important tourist attraction for the area.

Other opportunities for tourism within Gunnedah include promoting the existing villages and settlements as tourist destinations, based on their existing character and charm. The Rural Museum within the Shire is another important centre which can be capitalised on for its tourism potential. Gunnedah is also lacking in professional services, which can be reversed by attracting new professionals into the area. This is particularly

important in regards to health services, which need to be maintained to cater for the existing and future community of the Shire.

Passing trade and 'through' traffic is another important opportunity upon which to capitalise. This trade can be vital to ensuring the economic viability of a number of centres throughout the Shire. Gunnedah is considered to be a good transport stop overall but is lacking twenty four hour food and petrol stops.

Council may also become more proactively involved in economic development through promotion of its existing assets, such as the Saleyards and the cinema as alluded to in **Section 5.3.1**. The Saleyards in particular may have potential for the development of a canteen facility, subject to assessments of passing traffic and demand. The Saleyards could also be targeted as an attraction for tourists within the region, whilst the cinema provides an important entertainment venue for residents and visitors alike. Council has an opportunity to directly capitalise on its ownership of these facilities, as well as promoting economic and tourism opportunities within the Shire.

Council also currently engages a number of trainees; ten commencing in 2002. This scheme needs to gain wider community recognition and its role in providing employment particularly for younger age brackets can be consolidated and possibly improved, if resources allowed.

7.1.2 Environmental Opportunities

The Gunnedah Shire features an array of natural features, as well as a range of private and public bushland which remain undisturbed by the widespread processes of land clearing carried out for agricultural production. There exist a number of opportunities to build upon the strengths of these features and protect these important environmental linkages. Currently significant pressures from urban development are not being exerted onto the natural environment of the Shire.

A major opportunity in this regard is the establishment of biodiversity corridors and preservation of existing linkages. Some of the Shire's most valuable vegetation links are currently found around the elevated ridges and slopes which provide a backdrop and visual catchment for development within the Gunnedah township.

It is possible to link these corridors through the provision of corridors under the 6(a) Environmental Protection zone, roadside reserves and TSRs. Many linkages of this type already exist throughout the Shire. In creating these linkages, a significant network of connected biodiversity corridors can provide for movement of wildlife, and provide for continuous tracts of flora and fauna throughout different areas of the Shire.

Another significant opportunity within the natural environment is the preservation of the Shire's koala population, one of its key tourist attractions into the future. The difficulty lies within the balance of habitats for these animals and competing agricultural land uses across the Shire. Significant land clearing of native vegetation has occurred throughout Gunnedah, resulting in the retention of under a quarter of native trees and grasslands throughout the Liverpool Plains. Koala habitat research should also

be protected and encouraged through partnerships with the scientific research community.

Measures such as agroforestry and proposed koala tree links could actively preserve the koala population of the Shire. Tree species best suited for Koala habitats include the White Box, Bimble Box and Red Gums (Liverpool Plains Management Task Force). Agroforestry allows for the co-habitation of koalas and agricultural industries, through retaining remnant trees within farms and establishing new stands. This has the added effect of helping to alleviate dryland salinity. Species of eucalyptus such as the River Red Gum are known for particularly for their tolerance to salinity.

The establishment of koala tree links allows for the animals to discover new breeding grounds and feeding areas. The potential exists for such links to be incorporated into existing vegetation link and biodiversity corridors throughout the Shire. In doing so this would allow for the effective integration and promotion of koalas throughout the Shire with other biodiversity linkages. Other natural features of the Shire include a diversity of bird life, suitable to promote for bird watching. Species such as the echidna are also prominent throughout the Shire and can be identified and promoted in a similar vein to the koala. Conservation areas such as National Parks provide ideal opportunities for bush walking and camping activities, as well as being valuable natural assets in their own right.

The natural area of Lake Goran presents one of the Shire's most significant natural features. Preservation of the Lake is currently under threat from adjacent agricultural practices, through runoff of fertilisers and chemicals into the Lake. The environmental significance of the Lake is discussed in further detail under **Section 5.1.1.1**.

Measures to reduce the immediate threats to the lake of salinity, waterlogging, flooding, land clearing in the immediate lake catchment area and soil erosion should be implemented in order to ensure that the Lake and its biodiversity value is preserved as a key feature of the natural environment. It is expected that developing farm management techniques will assist in the reduction of environmental impacts to the lake, however if action is not taken within the short term opportunities to preserve the present biodiversity value of the lake may not be possible.

Lake Keepit also has potential as a recreational area, however this is limited to some degree by the intermittent nature of flooding within the area. It is most suitable for recreational use during the pre-irrigation months of September and October.

7.1.3 Social Opportunities

The Shire contains a number of opportunities for social and cultural development. Council implemented its current Social and Community Plan in 1999, which advocated a number of actions for a variety of social groups across the Shire, including children, young people, women, indigenous Australians, the elderly, people with disabilities and people from culturally diverse backgrounds.

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An analysis of the existing age profile of the Shire's population indicates the Shire has highest proportions of children aged 5-9 years old and 10-14 years old, and adults aged 40-44 years old, as detailed in **Section 4.3.1**. This also reveals the significantly lower proportions of older teenagers and young adults. This outward migration of young people is symptomatic of a number of towns and settlements throughout rural and regional New South Wales, and retention of people of this age bracket is imperative in ensuring the future viability of the Shire.

Opportunities to increase the proportion of younger people within the Shire are intrinsically linked to providing reasons for them to remain within the Shire, primarily employment and secondly, amenity, services and recreational facilities. Opportunities for diversifying Gunnedah's base of employment, including the provision of relatively high numbers of employment opportunities for people within this demographic, are discussed in **Section 7.1.1**.

The provision of recreational services and facilities for young people are largely subject to the forces of supply and demand, and as such it is difficult for Council to implement actions to attract such services within the Shire; and cost prohibitive for them to attempt to establish themselves. Opportunities, however, do exist for Council to organise and support community events which provide an attraction for not only young people but also the general population of the Shire.

These could include street fairs, markets, and similar 'community' activities in addition to Council's existing program of events. Promotion of a range of events, even on a weekly basis, would serve to involve not only the community but also present a significant opportunity for tourism. This could also take the form of sporting activities, which are highly popular and serve to involve a broad cross section of the community. However, a key concern for these types of events within the current climate of public liability is insurance coverage. These would need to be handled effectively in order to allow such events to proceed.

Sporting and recreation can be promoted within the Shire to provide a range of activities for residents as well as potential tourists. Sports such as junior tennis are a large attraction and can be advanced through promotion and events. Cycling linkages throughout the Shire can be promoted, and can provide a network which services a range of attractions throughout the area. Horse and walking trails can also be promoted. Within some regions of New South Wales old rail lines have been converted into walking, cycling and horse trails, providing an important recreational resource. The success of existing cycling events between Coonabarabran, Gunnedah and Tamworth can be consolidated.

It should also be recognised that as populations throughout Australia become older, this will present a variety of new challenges and needs for residents in older age brackets. Although older Gunnedah residents currently comprise relatively smaller proportions of the population, it is expected that this may increase, particularly as retirees from metropolitan areas of the state continue to migrate to rural and regional areas of New South Wales due to reasons of improved lifestyles.

The opportunity exists for Gunnedah Shire to position itself to cater for increasing proportions of older residents throughout the coming years, through provision of a number of services and facilities aimed towards the unique needs of this age group. These could include increasing housing stock which is in proximity to the Shire's town centres, providing a higher degree of accessibility to essential services. Such housing would be provided in the form of medium density residential infill development, providing increased accessibility and avoiding the need to release further lands on the settlement fringes.

The opportunity afforded by increased 'lifestyle' movers into the Shire may have a number of ramifications for Council in terms of service provision, particularly when considering the implications of providing services for older people which may involve relatively higher expenditure. Gunnedah Shire's Social/Community Plan 1999 identifies a limited number of vacancies within its existing aged care facilities and programs. In the event that existing were to be occupied these services may require expansion depending on the age and mobility of incoming residents.

Gunnedah has a significant Aboriginal population, featuring strong cultural and heritage value. It may be possible to promote a Cultural Centre for the Shire, with a particular focus on Aboriginal culture and history. As with many areas of both rural and metropolitan New South Wales, the disparity between the indigenous and non-indigenous population is becoming an increasing concern. There have been recent increases in the Aboriginal population of the Shire, particularly within younger generations.

However there has been a lack of employment opportunities for the indigenous community, and in certain areas of Gunnedah there have been associated crime and social problems. There is a need to more effectively recognise and promote Aboriginal culture and heritage, as discussed in **Section 4.1.6**. Service delivery for the Aboriginal community should also be investigated, and in particular an integration of services provided by the different agencies. Council's Aboriginal Consultative Committee is taking positive steps in this direction.

There is also a need for additional emergency housing within the Shire, for the purposes of short term accommodation. Council currently operates an emergency housing unit, but expansion of this in the future needs to be examined. State Government grants in this regard could be sought. In addition a need has been identified for a multi-purpose facility for the aged and disabled, such as day care for dementia patients. Conversely, the existing hostel accommodation provided by Council may require rationalisation or adaptation. Council currently contributes towards public transport provision through supporting a community service. It is considered that in the long term this may need to be upgraded, particularly in light of an increasingly aged population.

A number of community support agencies are not located in Gunnedah, which would provide a valuable resource for the needs of the community. However the feasibility of locating certain agencies within the Shire may need to be investigated. In addition, it also be desirable to establish a shopfront 'one stop shop' for youth community facilities.

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This could be in the form an internet café or similar type of development. Furthermore, Council can also capitalise on its ownership of existing social venues such as the Town Hall, which can provide an important venue for community events and private functions within the Shire.

8 PLANNING RECOMMENDATIONS & PRINCIPLES

There are a number of ways in which Council can consolidate its future and build on current levels of activity and development. Recommendations and principles presented below are representative of the findings of this study, public consultation and consultation with relevant government agencies. These recommendations will form the basis of the draft LEP for Gunnedah Shire and update the findings and recommendations of the 1982 Study. The recommendations are as follows:

8.1 General Planning Provisions:

General planning provisions within the Shire should adopt the following key principles:

8.1.1 Residential Development

It is considered that the current supply of land within the existing settlements is adequate to cater for future housing growth. Infill development and consolidation, particularly within the township of Gunnedah for residential and business development, should be promoted as the desirable form of future development, as opposed to releasing further land on the fringe.

8.1.2 Protection of Agricultural Land

Agriculture is vital to the current and future viability of Gunnedah Shire. It is the dominant land use within the area and provides the bulk of its employment and economic development, in terms of both agricultural pursuits and supporting businesses. It is crucial that the fragmentation of existing agricultural holdings is not promoted, and that these activities are not pushed out to less productive areas through continued rural residential development. It is also necessary to continue to implement measures to minimise land degradation and address salinity throughout the Shire.

8.1.3 Environmental Management

The Shire currently features a substantial network of vegetation linkages and biodiversity corridors. These green corridors and environmental protection areas should be maintained and expanded within the context of suggested areas contained within this report. Impacts on prominent environmental areas such as Lake Goran and the Namoi and Mooki river systems should be monitored and regulated in light of potential impacts, particularly from nearby agricultural industries.

8.1.4 Provision of Employment Opportunities

It is imperative to attract new industry to the Shire in order to diversify the employment base of the area and address problems created by the shrinking population base. This

could come in the form of an ethanol production facility as described within this report, subject to the provision of a new gas pipeline through north western New South Wales. It is considered that the attraction of some new form of industry is imperative to ensure the future viability of the Shire, in addition to consolidating the existing agricultural industries which currently provide the bulk of the Shire's employment and economic output.

8.2 Rural Residential Areas:

Recommendation: No further rural residential land should be released on the fringe of settlements

It is considered that the existing supply of rural residential land within the Shire is sufficient to support future demand for this type of housing. It is recognised that within a setting such as Gunnedah rural residential developments are going to be highly desirable due to improved lifestyle opportunities, perceived or actual, offered by this type of development.

Recommendation: Land use conflicts arising from rural residential development in predominantly agricultural areas should be minimised

It is imperative that there is a clear delineation between land uses, so as to prevent potential conflicts that may arise between residential and agricultural land uses located within close proximity to one another. This should involve some form of recognition from residents that they are living within a rural area, and are subsequently aware of the issues that may act as a source of conflict between residential and agricultural land uses. Council may investigate the possibility of flagging potential land use conflicts on a Section 149(5) Certificate for lands within close proximity to rural areas as discussed earlier in this report; and ensure sufficient buffers between residential and agricultural land uses.

8.3 Residential Development:

Recommendation: There is currently a sufficient supply of residential land to cater for demand without further fringe expansion

The existing supply of land zoned for future urban use is sufficient to cater for current demand. Rezoning of further lands for residential subdivision on the town fringe is discouraged and it is possible to 'back zone' some of the existing areas zoned for future urban use in order to gain the highest and best use of land within the Shire.

Recommendation: Introduce Residential 2(c) Lifestyle zone in place of existing 1(d) Future Urban zone

The existing stock of land zoned for future urban uses is considered excessive given existing housing demand and the desirability of consolidating residential development

within townships around the Shire. The introduction of a transitional rural-residential zone in place of the future urban zone would provide a more appropriate mechanism for managing development at the fringe of townships. The 2(c) zone would introduce a minimum allotment size of 2000m² and a maximum of 6000m².

Recommendation: Residential development should be encouraged through consolidation and infill development

Urban consolidation within existing settlements should be pursued as the primary form of residential development within the Shire. This is of particular relevance to Gunnedah township where scope currently exists for infill development and development on existing vacant land. This may comprise rezoning of small areas of land to higher density residential land uses.

Recommendation: Future residential development should be affordable

There is a need to ensure that future housing stock within the Shire is affordable, and is targeted to the housing needs and of the community. Affordable housing could be provided within the existing Gunnedah township as a means of achieving consolidation.

Recommendation: Future residential development should be of a high standard and of appropriate design

Key issues involved with the consolidation of Gunnedah include promoting good quality residential development, and examination of opportunities that exist within the town for redevelopment of particular blocks and appropriate areas for consolidation to occur. The nature of this development should also be considered in relation to its impact on the surrounding areas, including suitable considerations of the height, bulk, scale and form of surrounding area and the suitability of proposed developments in relation to these features.

8.4 Retail/Commercial Areas:

Recommendation: Existing viability of Gunnedah CBD should be maintained and strengthened

The Gunnedah CBD is a retail and commercial centre of local and regional significance. Its existing function as a key centre of services for the community of the can provide the basis for its continued success and viability. Vacant blocks zoned for business use should be targeted in the first instance for infill development with new businesses.

Recommendation: Build on character and central function of CBD to Shire

The Gunnedah CBD is located in an excellent central position so as to take advantage of proximity to surrounding towns and rural areas throughout the Shire, which are

reliant upon the centre for services and retail needs. Future development should be focused on a more co-ordinated approach to business location within the Shire. The unique character of the CBD should be retained and considered as a key issue when considering future development of the CBD. A merit-based approach to development on the periphery of the CBD could be utilised in order to provide for a range of businesses that encourage people into the town centre.

Recommendation: Improve co-ordination of businesses within the CBD

Better co-ordination of business location and types should be promoted for new development within the CBD. Due to historical patterns of development, this has not always been the case, resulting in a dislocation of some businesses and services relative to others of the same type. Co-ordination of land uses within the CBD should form an important consideration into the future. To date undesirable and incompatible land uses within the CBD have been dealt with through land use controls restricting them to the north of the CBD.

Recommendation: Attract diverse business base to CBD

The CBD is currently focused around service functions and supporting businesses for agricultural pursuits within the area. Attraction of more diverse types of businesses and promotion of the existing retail and commercial base of the CBD would provide a consolidation of its existing uses and promote a range of new businesses and employment opportunities. Such businesses could also be ancillary or support functions to new industry ventures within the Shire.

Recommendation: Maintain local function and character of retail areas within towns

Outside of Gunnedah township, the existing local service function of retail areas and main streets should be encouraged, without detracting from the importance and viability of Gunnedah. Smaller retail uses in these towns should be retained to provide for the immediate needs of these communities. The 'main street' character of retail areas within smaller towns should also be maintained, especially in terms of heritage preservation and rural appearance.

8.5 Industry and Employment:

Recommendation: Attract new industries to shire

To ensure the continued economic development within the Shire, new industries should be attracted into the area. Opportunities for this to occur include the proposed ethanol production facility, on Quia Road, and options for a new coal mining operation. The feasibility of these projects is largely dependent on external factors such as the construction of a new gas pipeline through north western New South Wales and the availability of faster train routes into the area respectively.

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In regards to further mining activity, options for deviations of the rail line through the proposed Murrurundi tunnel can be pursued if a proponent can go forward to government authorities with a feasible business case for the operation to justify government expenditure on infrastructure. Other prospective industries could be attracted to the area on the basis of this infrastructure. In addition, the introduction of new industry would provide for additional support industries which would generate further employment opportunities within the Shire. Opportunities for improved infrastructure within the Shire should be pursued as a means of ensuring long term economic viability.

Recommendation: Identify extent of natural resources

The extraction of natural resources provides a potentially significant source of employment generation and a means of increasing economic activity within the Shire. Further research needs to be undertaken to identify the extent of natural resources within the Shire and the viability of establishing industries to utilise the resources available.

Recommendation: Diversify Gunnedah's industry base

Diversifying the Shire's industry base is one of the key factors to reversing decline and cornerstone to allowing a number of other recommendations to proceed. This can be achieved through capitalising on new markets such as tourism, particularly in light of natural resources such as its prolific koala population, and attraction of additional tourism into the area.

Recommendation: Manage the environmental and community impacts of new and existing industry

A key consideration with the provision and facilitation of existing and new industry is the mitigation of impacts upon the local community. Impacts which require management include the presence of additional heavy traffic, noise, odour and visual pollution. Community opposition to new developments or expansion of existing industries within the Shire should be dealt with appropriately and responsibly.

Recommendation: Maintain economic value of property within the Shire

Value of existing property should be retained or strengthened notwithstanding changes in zone boundaries and adjustments to planning provisions and other recommendations of this study. Resale value of housing and agricultural land in particular should be maintained.

Recommendation: Promote employment opportunities throughout the Shire

Providing additional employment throughout the Shire is a key imperative in ensuring the Shire's viability into the future. This can be achieved through the attraction of new industries into the Shire, and promoting Gunnedah as a location for businesses and

agricultural operations to establish themselves. These range from professional businesses to agriculture, industries and commercial operations.

8.6 Agricultural Lands:

Recommendation: Existing productive agricultural lands should be preserved

Agriculture is a key component of Gunnedah's economy and its largest provider of employment and economic output. The preservation of productive agricultural lands, particularly in the Class 1 and Class 2 ranges, will ensure the future viability of this industry. Fragmentation of agricultural lands through residential subdivision should not be carried out, and the pressures of growth on the fringes of towns on agriculture should be minimised through pursuing more sustainable forms of development such as consolidation within the existing towns.

Recommendation: Incorporate measures to reduce salinity

Dryland salinity within the Gunnedah Shire is recognised as the most important land degradation issue facing agricultural land. Measures to reduce salinity should be encouraged, including conservation of remnant vegetation and tree stands on farms, incorporating other 'agroforestry' methods such as planting areas of native trees and shrubs, and continuing to work with Government agencies, the community and with regional and state programs such as Salt Action to incorporate measures that prevent salinity.

Recommendation: Incorporate more sustainable farming measures

There has been an increasing awareness of improving land management techniques within agricultural areas. This is of particular relevance within Gunnedah due to the high reliance on groundwater reserves, one of the water sources readily affected through unsustainable farming techniques. Farmers, Council, government authorities and researchers should be involved in investigating methods to improve farming sustainability through new techniques and emerging technologies.

Recommendation: Promote existing range of agricultural industries

The Shire has a strong economy within a number of agricultural industries, including cotton, crop farming, livestock and animal produce. These markets should be encouraged and promoted in order to build on their existing strength and provision of employment and economic output for the Shire as a whole. Opportunities exist for the development of agriculture within the Shire ensuring the future viability of the industry, through expansion of existing. It may be possible for the identification of a 'niche' agricultural production industry to focus on for promotion purposes, in order to identify the region with a particular product and attract new, specialised agricultural businesses into the area, without detracting from the viability of other industries within the Shire.

Recommendation: Provide for intensification of agriculture within desirable areas

Intensive agriculture can be promoted within desirable locations as a means of increasing yields and generating additional production and economic outputs within the Shire. Intensive agriculture should be promoted within the areas identified in **Figure 22**. These pursuits should be promoted within the 1(a) Agriculture (General) zone outside of flood liable land, and discouraged from the 1(b) Agriculture (General) zones and the 7(d) Environment Protection zone.

Recommendation: Pursue institutional actions for land management as posited within the Liverpool Plains Catchment Investment Strategy

The Liverpool Plains Catchment Management Committee should adopt the key role in implementing the strategies and actions of the Catchment Investment Strategy, and will need to also take the lead in diverting funding into areas that will provide the maximum incentive for land holders. Council should negotiated to negotiations with the Committee and DIPNR to establish an REP consistent with the objectives of the Plan.

8.7 Community and Social Issues:

Recommendation: Maintain existing level of community services

The existing facilities provided within the Shire such as libraries, health, aged and disabled services should be maintained at their current level of service, in order to provide for the existing needs of the community. Maintaining current services at their existing levels is imperative if the Shire is to remain robust and able to respond to current needs, and any changes in population size and structure that may occur.

Recommendation: Recognise future demand on services for the aged

The impact of an aging population across New South Wales and within Gunnedah could have serious implications on demand for community services provided for the elderly. Currently there is sufficient capacity within the Shires nursing homes to cater for increases in the aged population; however a recognition of the increasing pressure an aging population could place on aged services should form an important consideration for future planning within the Shire. Opportunities for co-location of these services should be explored.

Recommendation: Prevention of Crime

Design of areas throughout the Shire should not be conducive to criminal activity. This Study is intended to support the findings of Councils current Crime Prevention Plan and provide strategic linkages between urban design and crime prevention. Crime issues such as drug and alcohol abuse, domestic violence and break and enter need to be addressed on a Shire wide basis. Moreover the principles of 'Crime Prevention Through Design' (CPTED) should be adopted as a key consideration of Gunnedah planning regime.

8.8 Sporting/Leisure/Cultural Functions:

Recommendation: Promote opportunities for cultural and community activities

Activities such as community events, festivals and opportunities for cultural development should be encouraged within the Shire. Such activities should be targeted at involving the community as a whole, with the aim of fostering a sense of community and identity within the Shire. Activities should also be focused on the important youth age group, with the aim of making the Shire a more desirable place in which to live and recreate, contributing towards curbing the out migration of the youth age group.

Recommendation: Promote and enhance sporting activities

It is recognised that sport and recreation activities provide one of the major pastimes within the Shire and an important interface for community interaction and development. The variety of sport and recreation activities within the Shire should be maintained and enhanced as a key component of social and community development and promoting healthy lifestyles.

8.9 Traffic and Parking:

Recommendation: Ensure traffic efficiency and safety for Gunnedah CBD

The main street improvement program and its improvement strategies have been described in **Section 5.2.1** of this report. The Gunnedah Traffic Study prepared by Project Planning Associates in October 2001 also considered a number of alternative improvement treatments, which include retaining the existing traffic signals under a narrowed intersection arrangement at the Conadilly Street/Marquis Street intersection; incorporating the road narrowing/footpath widening proposals into a roundabout arrangement at the Conadilly Street/Elgin Street intersection; the construction of 'gateway' treatments in Conadilly Street near the intersection of Warrabungle Street; and the construction of a new roundabout arrangement at the Bloomfield Street/Conadilly Street intersection. In this regard findings from Council's intersection should be considered.

Recommendation: Ensure sufficient supply of car parking for Gunnedah CBD

As discussed in the report '*Review of Gunnedah Shire Business Zone and Car Parking*' prepared by Planning Overload in July 2000, it clearly identified that the car parks are seen as inefficient and under-utilised. In addition, it stated that the car parking requires review as a result of contemporary changes and trends to work practices. The report provides recommendations to the situation with several variations to the parking rates. The recommendations have been discussed in **Section 5.2.1** of this report.

Recommendation: Improve pedestrian accessibility and permeability from off street parking within the CBD

Currently, off street parking areas such as primarily those in Little Barber Street and Little Conadilly Street are not accessible to the core of the CBD, particularly for aged and disabled people. Improving pedestrian linkages to and from these parking areas should form a consideration of future development within the CBD.

8.10 Historical/Architectural Features:

Recommendation: Preservation of existing town character

The towns within Gunnedah possess a rural town character and visual appearance which is unique and should be preserved as the Shire develops over time. This involves a careful balance of competing objectives such as consolidation of towns and economic development within the Gunnedah CBD.

Recommendation: Preservation and promotion of heritage character of Gunnedah

There are a number of heritage items within Gunnedah, which should be promoted as key features of the heritage character of the Shire. Heritage assessment work to be completed in early 2003 will identify specific items of concern and establish a framework for future directions in heritage development.

Recommendation: Promote a more attractive and accessible town centre for Gunnedah

The Gunnedah town centre could be made more attractive through town centre improvements, including a review of street lighting and a possible relocation of traffic from Conadilly Street. Such improvements to the town centre will upgrade the amenity and visual attractiveness of the precinct, in addition to improving access for the aged and people with disabilities. This will make the town centre a more attractive place for businesses to locate as well as a more attractive place for residents to shop. It will also make consolidation more viable if Gunnedah becomes a more attractive place and more conducive to pedestrian usage.

Recommendation: Pursue opportunities for development of Aboriginal culture

Opportunities for the development of Aboriginal culture within the Shire should also be identified and explored. The Shire features a significant Aboriginal, and a cultural and social focus for Aboriginal culture within Gunnedah would provide for engagement and further development of Aboriginal culture.

8.11 Natural Environment:

Recommendation: Preservation of scenic and rural landscape

Gunnedah is typified by its open, rural landscape which dominates much of the natural environment. The scenic quality and amenity of this environment is currently well protected under land use controls and should be preserved as one of the Shires key natural assets. Future development within the Shire should take into account the preservation of the scenic and rural landscape as a key consideration of the planning process. Processes which compromise the quality and integrity of scenic areas, including construction impacts, should be carefully considered.

Recommendation: Preservation and increased awareness of Lake Goran

Lake Goran is one of the Shire's primary natural assets and is regarded as one its most biodiversity-rich natural areas. As such it should be preserved, necessitating a greater awareness of surrounding land uses and their impacts upon the lake. Farming techniques and drainage within the vicinity of the Lake should be monitored closely and mitigated in light of particularly practices which are partially submerged at certain times of the year.

Recommendation: Maintain and expand existing vegetation linkages

The Shires existing network of vegetation linkages, comprising national parks and protected lands, travelling stock routes, open space and lands zoned for scenic and environmental protection should be retained and expanded with regard to the suggestions outlined in **Figure 13**. The provision of these linkages provides a key mechanism for wildlife and vegetation to move throughout different parts of the Shire.

Recommendation: Promote koala habitats and movements within the Shire

Koalas are one of the Shire's key assets, in terms of the natural environment and its potential as a tourist destination. As part of the Shire wide network of vegetation linkages, trees suited as koala habitats should be included to allow for the movement of koalas throughout the Shire. These could be incorporated into a proposed Shire-wide Environmental Embellishment Plan. Should it prove feasible, a 'koala sanctuary' could also be established to encourage tourism to Gunnedah and provide a dedicated environment for koalas to live in natural surrounds. Other options include the development of a koala research centre.

Recommendation: Increase vegetation and planting within urban areas

Providing a vegetation cover within the urban environment can achieve two goals. The first is to improve the aesthetic quality and appearance of the streetscape; secondly and more importantly strategic planting can help address problems of urban salinity. Deep rooted and perennial plantings, particularly natives, can significantly reduce the effects

of urban salinity through transpiring additional groundwater, thus lowering the water table and reducing the extent to which salt can affect the surface.

Recommendation: Incorporate measures within planning instruments to reduce salinity

The Central West Local Government Salinity Action Alliance has identified measures to mitigate the impacts of salinity at the development application stage, a measure which could be similarly implemented by Gunnedah. This includes creating a 'salinity checklist' for developments. This would identify the extent of salinity on the land which it is proposed through detailed salinity mapping, whether the development removes any vegetation or tree cover and to what extent, drainage and water management systems and identifying whether the proposal is in a discharge area. Such measures could be supported by the proposed urban salinity LEP, which is currently being prepared by DIPNR.

Recommendation: Implement the actions of the Liverpool Plains Catchment Investment Strategy

Consideration should also be made of the natural environment recommendations made in Appendix 3 of the Catchment Investment Strategy, particularly in relation to biodiversity conservation, native vegetation protection and management, revegetation, grazing, flooding and salinity.

8.12 Hydrology:

Recommendation: Obtain further information on hydrology within the Shire

There is currently a lack of detailed information on flooding and hydrology within the Shire. DIPNR has indicated that more detailed hydrology and flooding surveys will be taken over the next twelve months. It is suggested that Council obtain access to this information when it becomes available and incorporate this data into future planning for the Shire, with a view to creating a Shire-wide flood management plan at some point in time.

Recommendation: Future residential development should not be located within flood liable areas

Residential development should be located away from floodplain areas, as identified earlier in this report. Floods within the Gunnedah and Carroll townships are already managed through a flood management plan, and appropriately managing flooding in regards to residential development should be a key concern for future planning. The extent of flooding should also be considered by way of appropriate zoning, mechanisms to manage existing land uses within the floodplains and continued monitoring of planning controls used to manage floodprone lands to ensure their continued effectiveness. It is anticipated that a DCP will be developed specifically to address this issue.

Recommendation: Promote a catchment wide planning approach

Planning within the Shire should have particular regard to the environment of the Namoi catchment as a whole, particularly in terms of the potential impacts of residential, agricultural and industrial development on the groundwater reserves of the Liverpool Plains and the Mooki and Namoi river systems, and the implementation of Water Sharing Plans. An integrated approach to planning within the catchment should be encouraged in association with relevant agencies such as DIPNR, the Namoi Catchment Management Board, the North West Catchment Management Committee, agricultural business owners and residents.

Recommendation: Investigate more sustainable uses of water

Agricultural practices should investigate more sustainable uses of water, particularly in light of the Water Sharing Plans about to come into effect throughout the Gunnedah region. These will have a significant impact for many groundwater users in particular. The use of treated effluent water and should also continue to be investigated by Council, particularly in relation to industrial uses. Moreover, there are currently a significant number of bores which are used to extract water within the Shire. It is recognised that the number of bore holes throughout the Shire needs to be limited in the future.

Recommendation: Continuing management of flood liable lands through Flood Liable Lands DCP

It is considered at this stage that the existing Flood Liable Lands DCP for Gunnedah and Carroll is sufficient in managing development within flood liable areas within these townships.

8.13 Policy/Statutory Matters:

Recommendation: Provide more flexible 'place based' zoning provisions

Generally it is considered that the current zonings are largely effective categories in managing land use, however the format and objectives of the development control table can be modified to allow for more merit based assessment, better catering for future requirements and expectations for development.

Within the new draft LEP, it is intended to reduce the existing high number of prohibited uses under each zone, and devise a category based development control table which would accompany a statement of desired character for each zone. In this regard a more merit-based approach to development assessment can be introduced without compromising the effectiveness of the existing zonings.

A category based development control system would operate as follows:

- Permissible without consent- uses that do not require Council's consent;

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- Category 1- uses generally presumed to be consistent with the desired character statement of the zone;
- Category 2- uses that may, or may not, be consistent with the desired character statement of the zone;
- Category 3 –uses generally presumed to be inconsistent with the desired character statement of the zone; and
- Prohibited Uses- uses that are prohibited within the zone.

A schedule of the LEP will be established in order to expressly define the parameters of the Category 3 uses and the procedures required to lodge a development application for a Category 3 use. In this regard any ambiguity surrounding the legitimacy of any proposed Category 3 use can be avoided.

This merit-based system of development assessment allows land use zones to incorporate a greater degree of flexibility and adaptability to emerging patterns of development and demand. Such a system would also greatly simplify current planning controls and allow for DCP's and other non-statutory planning instruments to contain more detailed provisions which give effect to the objectives and provisions of the LEP.

It is expected that changes to the plan will be made in accordance with the proposed changes to legislation in NSW, *PlanFirst*, and will also take into account local factors to enable a plan to be made that will be adequate to guide future development within Gunnedah Shire LGA for some time to come. This involves the introduction of a new development control table format which employs a category-based system as outlined in **Section 5.2.1** of this study.

Recommendation: Pursue a range of rezonings within the Shire

A number of rezoning opportunities should be pursued within the Shire, in accordance with the schedule attached as **Appendix A**. These rezonings would provide for more appropriate land use management given emerging development trends within the Shire and the new LEP.

Recommendation: Council provides for removal of trees within the OLS area

Council can provide for the removal of trees within the 5% gradient OLS area through adding to Clause 28, relating to the removal of trees. This clause would allow for the removal of trees within the 5% OLS area as marked on **Figures 18a** and **b**, without development consent, whilst preventing the need to create an additional clause within the LEP.

Recommendation: Incorporation of 'user pays' provisions

Council may utilise 'user pays' mechanisms for infrastructure directly impacted by proposed developments, by determining that developers deliver or contribute towards infrastructure such as new roads, water and sewerage piping, and street lighting. This relieves some financial burden from Councils rate base, particularly in light of potential reductions in the rate base as a result of continued population decline.

Recommendation: Combine the 3(a) and 3(b) business zones into a single zone

In order to attract a broader base of industries into the Shire, and particularly the town centre, it is recommended to consolidate the existing 3(a) and 3(b) zones into a single business zone. Accordingly the new zone would be strongly linked to the provisions of a forthcoming development control plan for the town centre.

Recommendation: Need to include flexible rate provisions for changes of use

A need has been identified to incorporate more flexible rate provisions within the CBD relating to changes of use between residential and business uses. This would encourage a greater flexibility of uses within the CBD area, and would complement more merit based development controls to be introduced.

Recommendation: Maintain existing minimum rural allotment sizes

The existing minimum allotment sizes within the 1(a), 1(b), 1(c) and 7(d) rural zones should be retained, as these are considered to be suitable to manage current and future rural development within the Shire. Existing minimum allotment sizes are illustrated in the following table:

| Zone | Minimum Allotment Size |
|------------------------------|-------------------------------|
| 1(a) Agricultural Protection | 200ha |
| 1(b) Rural (General) | 40ha |
| 1(c) Rural Residential | 6000m ² |
| 2(c) Residential Lifestyle | 2000m ² |
| 7(d) Environment Protection | 40ha |

Recommendation: Maintain and strengthen the 7(d) Environment Protection Zone

It is considered that the existing 7(d) Environment Protection Zone is adequate in its development controls, however the provisions of the zone could be strengthened in accordance with the approaches suggested in **Section 5.2.2** of this report.

Recommendation: Improve access to planning controls and increase public knowledge of planning process

The LEP making process should be promoted throughout the community, as well as making the planning and development process more well known throughout the Shire and 'demystified' for Shire residents. This could include provisions such as making development application forms and planning controls available on Councils website, in addition to open public consultation sessions with Council planners and engineers.

Recommendation: Rationalise existing exempt and complying development schedules

The current Exempt and Complying Development schedules are generally considered to be appropriate and provide for a wide range of uses to be carried out in accordance with the specific provisions of the schedules. Some amendments may be implemented in order to better 'streamline' the approvals process. These include increasing the minimum sizes of some ancillary rural developments and other components of development. Such alterations to the schedules will comprise part of the preparation of the draft LEP.

APPENDIX A
SCHEDULE OF PROPOSED REZONINGS

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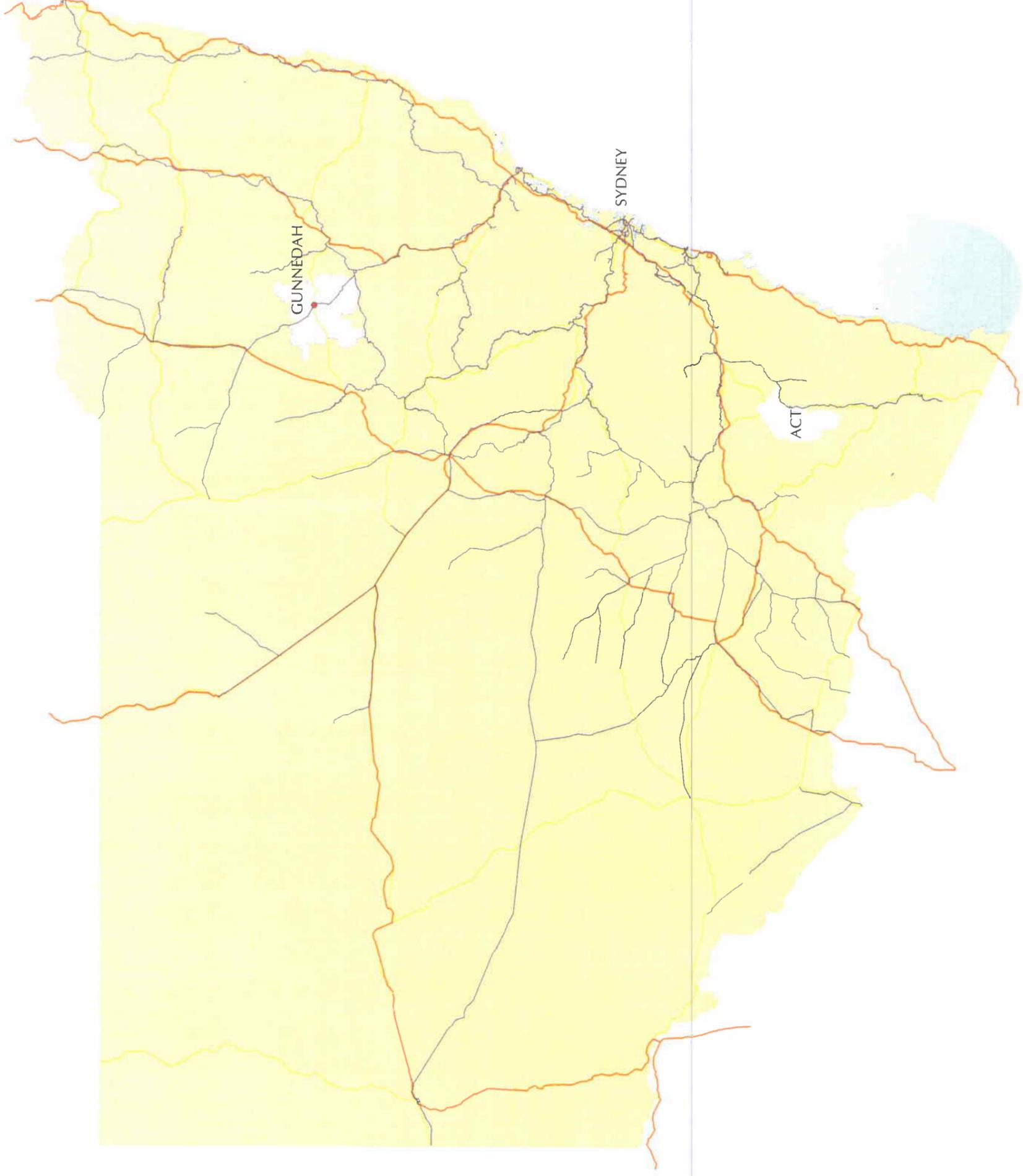
| A. | VILLAGES | PROPOSAL | COMMENTS | REC |
|----|---------------|--|---|---|
| | Carroll | Nil | Subject to flooding; however, evaluation of village boundary should be undertaken. | No Change at this stage |
| | Cullewis | Change 9(C) & 4(a) zone to village zone. Rural 1(c) on perimeter of village zone. | The 9(C) zone is now irrelevant and 4(a) could just as easily be incorporated into village zone. Insufficient information available as to water supply | The 9(c) & 4(2) zones be incorporated into village zone. No change |
| | Breeza | No proposals | Nil | No change |
| | Mullally | No Proposals | Nil | No change |
| | Tamba Springs | No proposals | Nil | No change |
| B. | LOT & DP No. | PROPOSAL | COMMENT | RECOMMENDATION |
| | | Rezone land east Blaxjack Rd and North of McCalls Rd, from Rural 1(b) to Rural 1(c) | Land has several road accesses and can be easily serviced with water. | Agree |
| | | Rezone land east of Hunts Rd from Rural 1(b) to Rural 1(c) | Land can be easily serviced and is more likely to be developed than other lands zoned 1(c) | Agree |
| | | Rezone land west of Blaxjack Rd to Rural 1(b) | There is an oversupply of Rural 1(c) land. This land is not currently capable of being serviced, compared with other available lands | Agree |
| | | Rezone land east of Boundary Rd from Rural 1(d) to Residential 2(c) (lifestyle) minimum subdivision size 2000 m ² | There is sufficient land already zoned Residential and not required for the foreseeable future. Rezoning of most of 1(d) will provide for a variety and choice of housing types, and facilitate the economic development of land. | Agree |
| | | Rezone land north of Stock Rd., from Rural 1(d) to Residential 2(c) | There is sufficient land already zoned Residential and not required for the foreseeable future. Rezoning of most of 1(d) will provide for a variety and choice of housing types, and facilitate the economic development of land. | Agree |
| | | Rezone land south of Stock Rd from Rural | There is sufficient land already zoned Residential and not required for the foreseeable | Agree |

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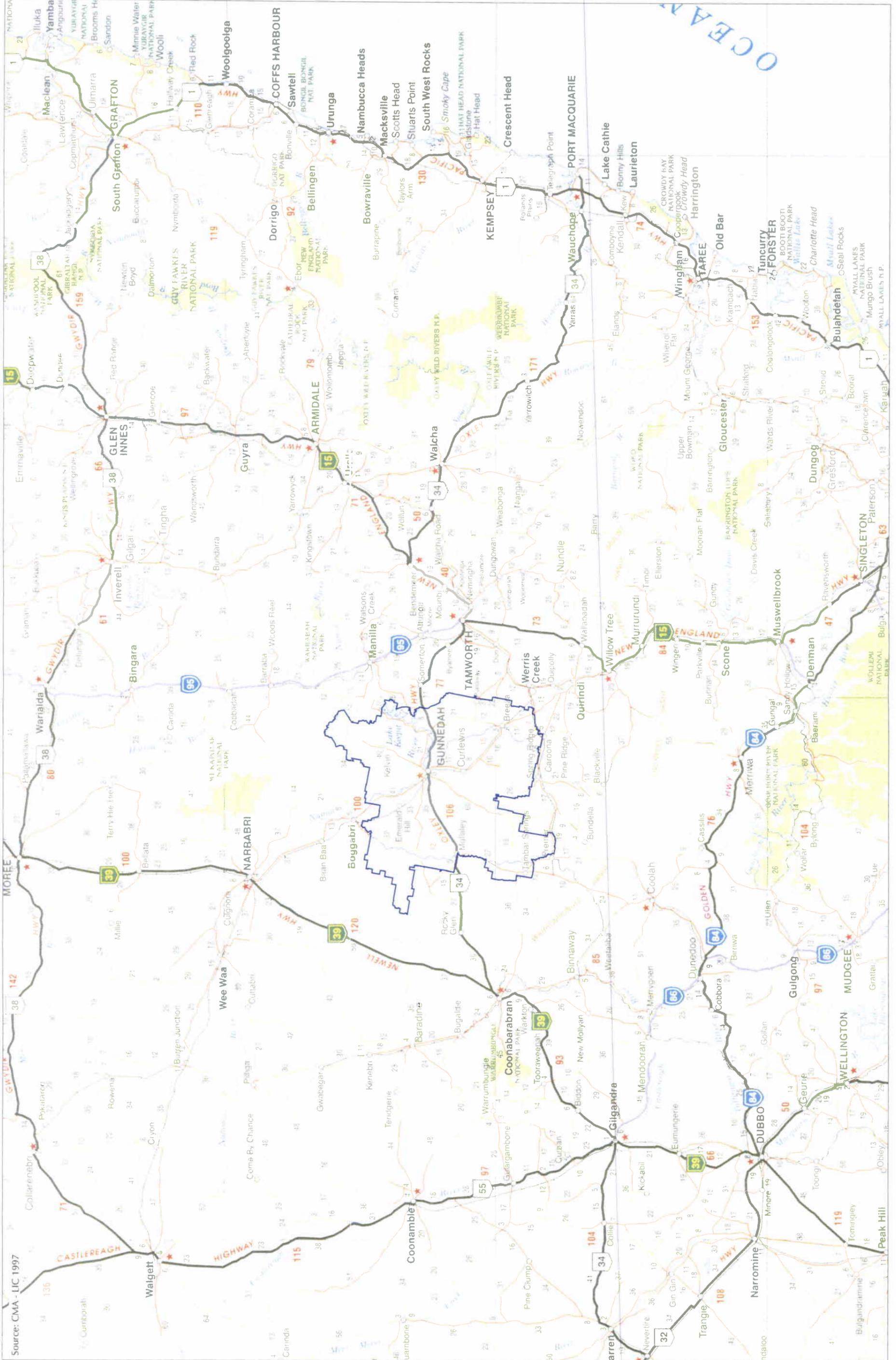
| | | | | |
|--|--|---|---|-------|
| | | 1(d) to Residential 2(c) | future. Rezoning of most of 1(d) will provide for a variety and choice of housing types, and facilitate the economic development of land. | |
| | | Rezone lot 476 east of boundary road Residential 2(c) | There is sufficient land already zoned Residential and not required for the foreseeable future. Rezoning of most of 1(d) will provide for a variety and choice of housing types, and facilitate the economic development of land. | Agree |
| | | Rezone GALLEN LAND south of Mannin Easement from Rural 1(d) to Rural 1(a) | There is sufficient land zoned 1(d) land for future Residential which can be more easily serviced. Existing zoned residential land should be developed before rezoning of this land is commercial. | Agree |
| | | Rezone land Environmental Protection (scenic) | Min. subdivision size is retained but provides connectivity with scenic protected zones to north and south. | Agree |
| | | Rezone Rural 1(a) land at Wandobah Rd, Sth, Gunnedah to Rural 1(b) | Land is not good agricultural land, and there are already a number of smaller holdings | Agree |
| | | Rezone land to Rural 1(b) | There is an oversupply of Rural 1(d). This land is not currently capable of being serviced compared with other available land. | Agree |

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| | | | | |
|--|--|--|---|-------|
| | | Consolidate 3(a) & 3(b) zoned lands | It is proposed that the two zones be combined and that a DCP be prepared which differentiates uses between the two existing commercial zones. | Agree |
| | | Rezone land from Business 3(b) to Rural 1(a) | Land is flood prone. There is already an adequate supply of commercially zoned land. | Agree |
| | | Rezone to Residential 2(a) | Area consists of a Uniting church & existing residential dwellings. Unlikely that land would be required for commercial. | Agree |
| | | Maintain 3(a) zone at corner, remainder of land should be rezoned Rural | Land is Flood prone. Corner site and has opportunity for commercial improvement and strong visibility on main road access. | Agree |
| | | Extend existing industrial zone to Oxley Highway | Consolidation of existing industrial zone with alt. access to Hwy and ability to develop master plan for development of site with access to Hwy prohibited; and provision of increased building setback to the Highway and landscaping. | Agree |
| | | Rezone Sanitary Depot to Scenic Protection. | Rezoning of land would facilitate connectivity with 7(d) land to the west and potentially to the east. | Agree |
| | | Rezone Scenic Protection 7(d) land to part Scenic Protection and part Rural 1(c). | Rezoning Part Scenic Protection and Part Rural 1(c) to maintain and promote connectivity with existing and future Scenic Protection zone to east and west would facilitate connectivity. | Agree |
| | | Rezone Part 4(a) zone to Scenic Protection 7(d) | Will indicate Council's objectives of promoting connectivity of existing future Scenic Protection zones. | Agree |
| | | Rezone 9(a) proposed road to Residential 2(a) | Land no longer required for that purpose. Should be consolidated with existing residential zone. | Agree |
| | | Travelling Stock Routes to be rezoned | These roads are currently uncoloured. It is proposed that they be zoned consistent with existing adjoining zones. | Agree |



- Main Highways
- Secondary Highways
- Railways



Source: CMA - LIC 1997

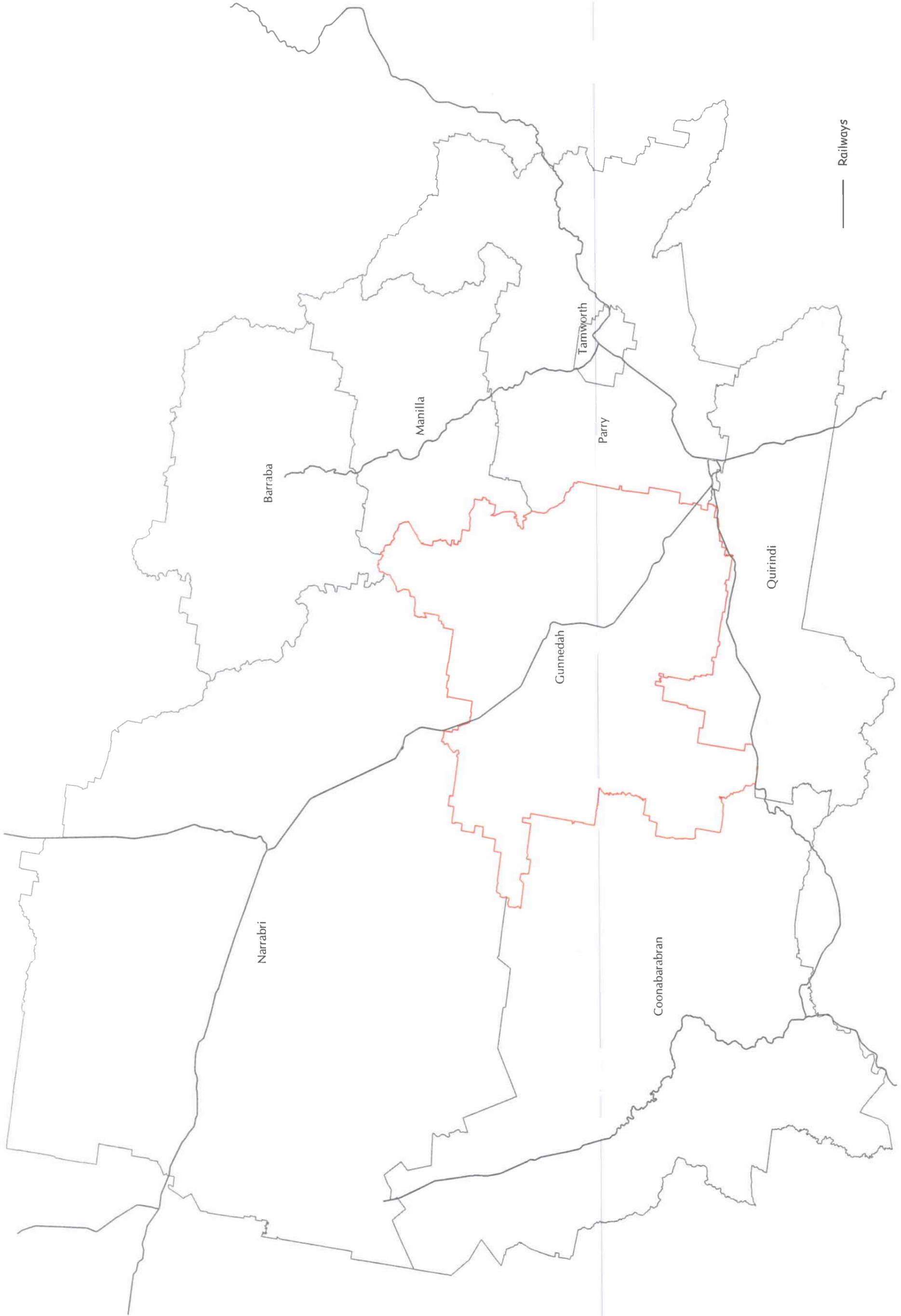
Gunnedah Environmental Study

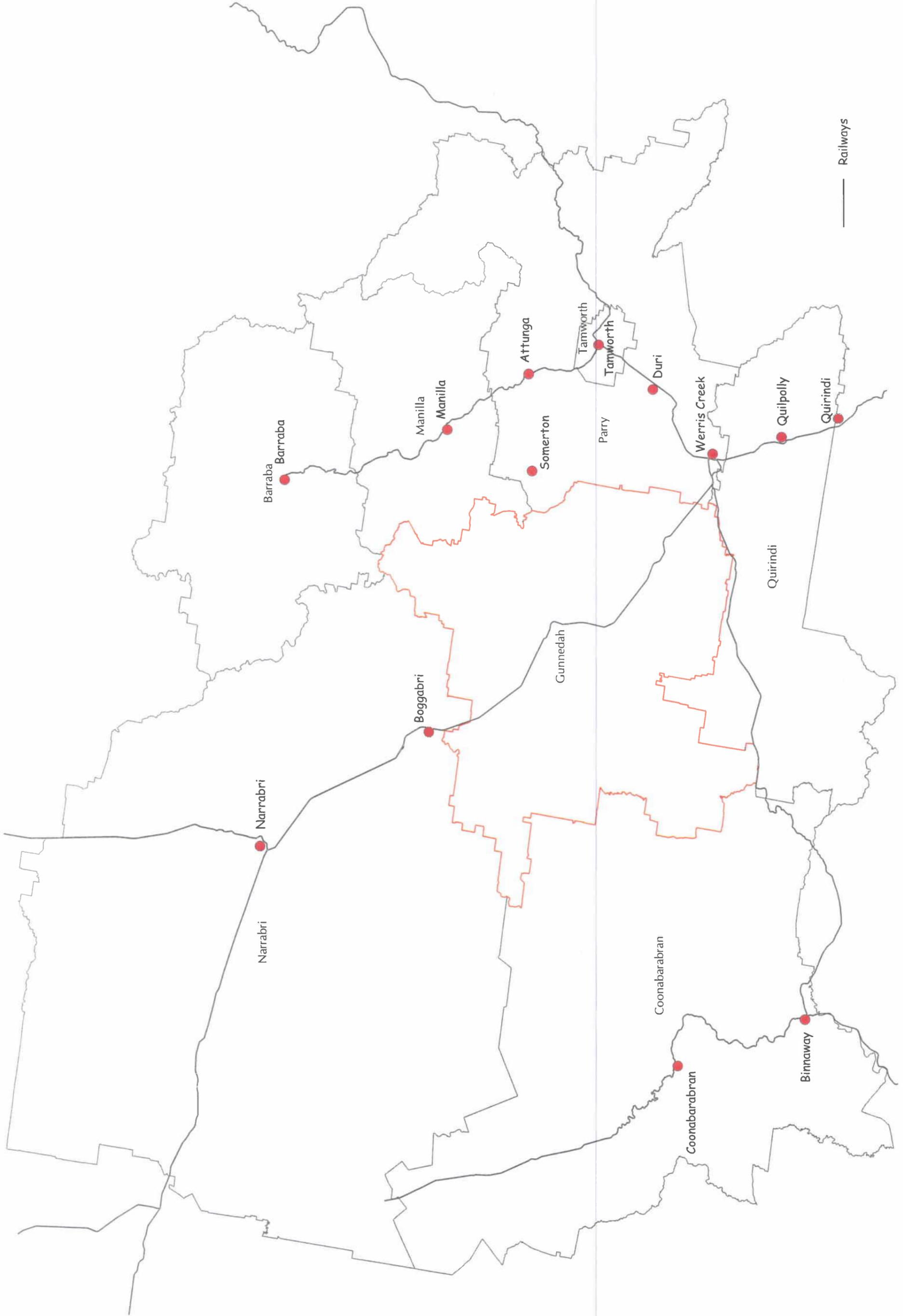
SITE LOCATION - Regional Context

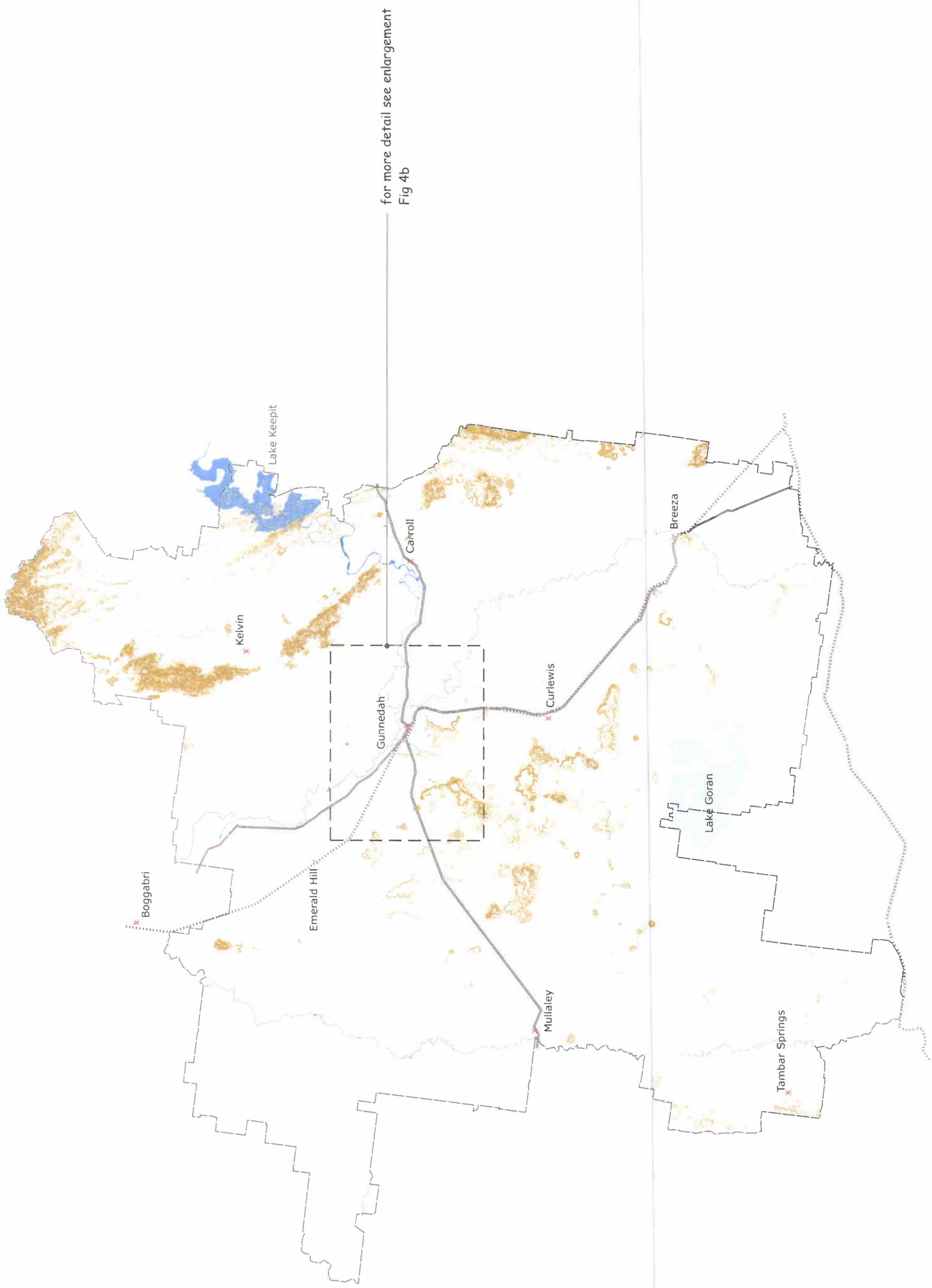


Fig 1b

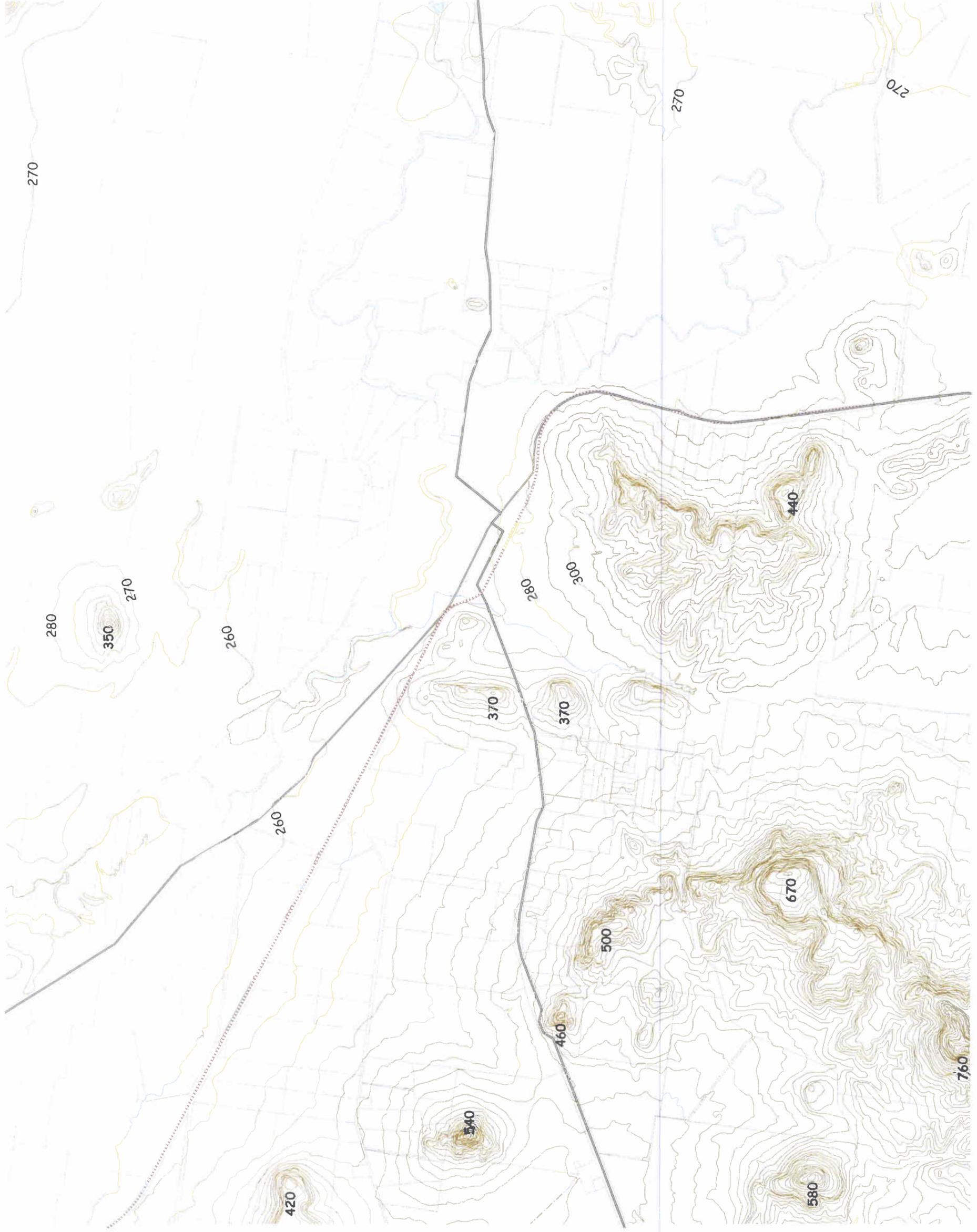
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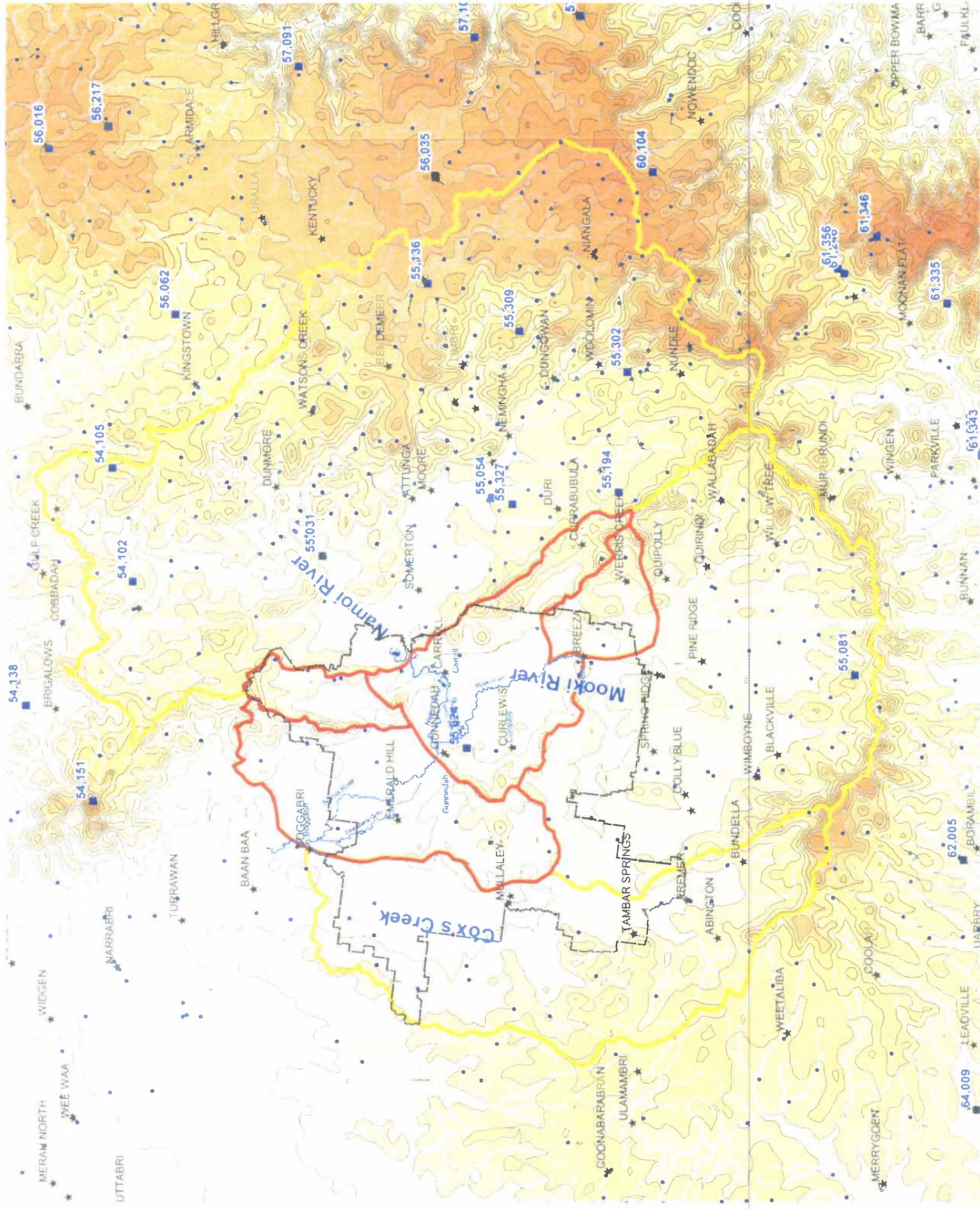






for more detail see enlargement
Fig 4b





Legend

- Ungauged Subcatchment
- Gauged Catchment Boundary
- River
- Daily Read Rainfall Station
- Pluviograph Station (Station Number)
- ★ Town

Elevation (m AHD)



Source: SMEC Jan 2003 - Carroll to Boggabri Flood Study
 This map's projection is MGA Zone 56 (GDA 94)
 and incorporates data which is © AUSLIC 2001

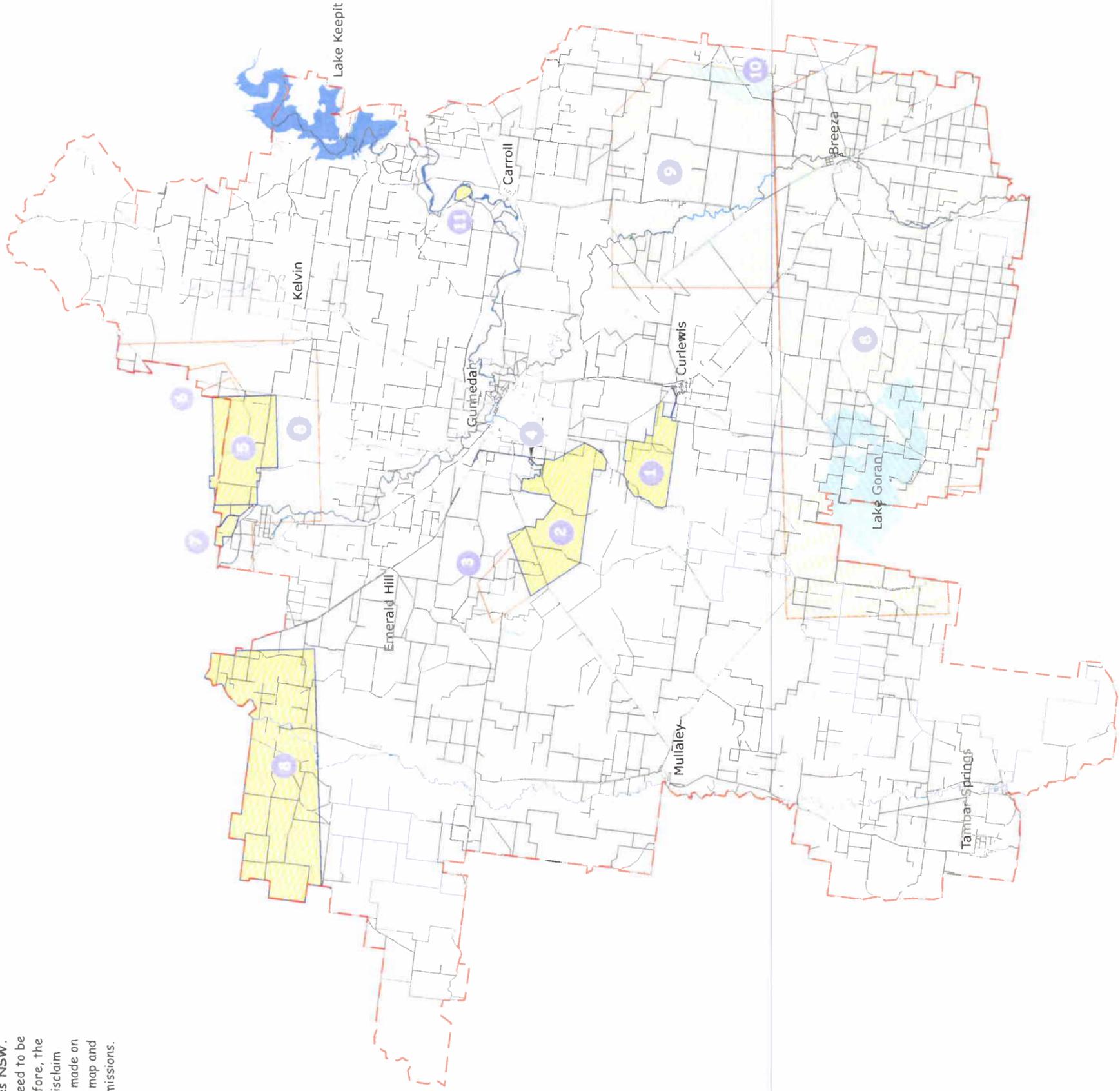
Source: Dept of Mineral Resources NSW.
 Disclaimer: This map is not guaranteed to be free from error or omission. Therefore, the State of NSW and its employees disclaim liability of any act done or omission made on the basis of the information in this map and any consequences of such acts or omissions.

- ① Preston and Preston Colliery
- Preston Coal Co Pty Ltd - Coal
- ② Gunnedah Colliery
- Namoi Mining Pty Ltd - Coal
- ③ Exploration Licence 5183
- Namoi Mining Pty Ltd - Coal
- ④ Wilga Park
- Namoi Valley Brickworks P/L - Clay/shale
- ⑤ Vickery Colliery
- Namoi Valley Coal Pty Ltd - Coal
- ⑥ Exploration Licence 5831
- Whitehaven Coal Mining P/L - Coal
- ⑦ Whitehaven Colliery
- Whitehaven Coal Mining P/L - Coal
- ⑧ Coal Authorisation 216
- Department of Mineral Resources - Coal
- ⑨ Exploration Licence 5833
- Department of Mineral Resources - Coal
- ⑩ Warrigundi Igneous Complex
- inactive - Gold, silver
- ⑪ Gunnedah Colliery
- RM & DJ Palmer - River gravel/sand

Existing quarries/mines and /or identified mineral resources
 The Department of Mineral Resources would object to any proposed change in zoning which may prohibit mining or quarrying in these areas.

Potential mineral resources
 Development in these areas could adversely affect or be affected by future quarrying/mining operations. Any proposed LEP which proposes a change in zoning which may restrict or prohibit mining or quarrying should be referred to the Department of Mineral Resources for comment.

High Petroleum Prospectivity
 Development in these areas could adversely affect or be affected by future petroleum exploration activity. Any proposed LEP which proposes a change in zoning which may restrict or prohibit mining or quarrying should be referred to the Department of Mineral Resources for comment.

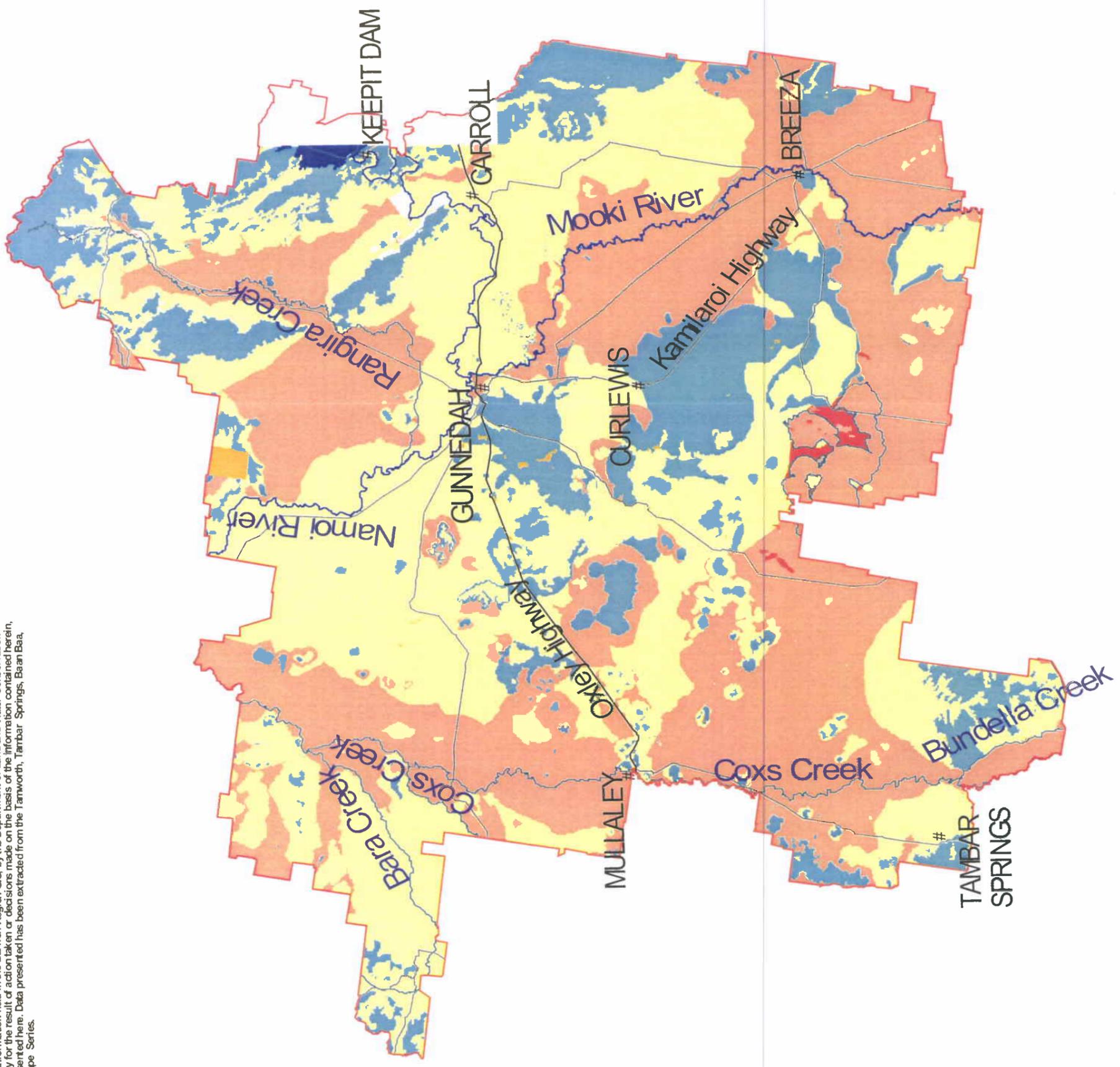


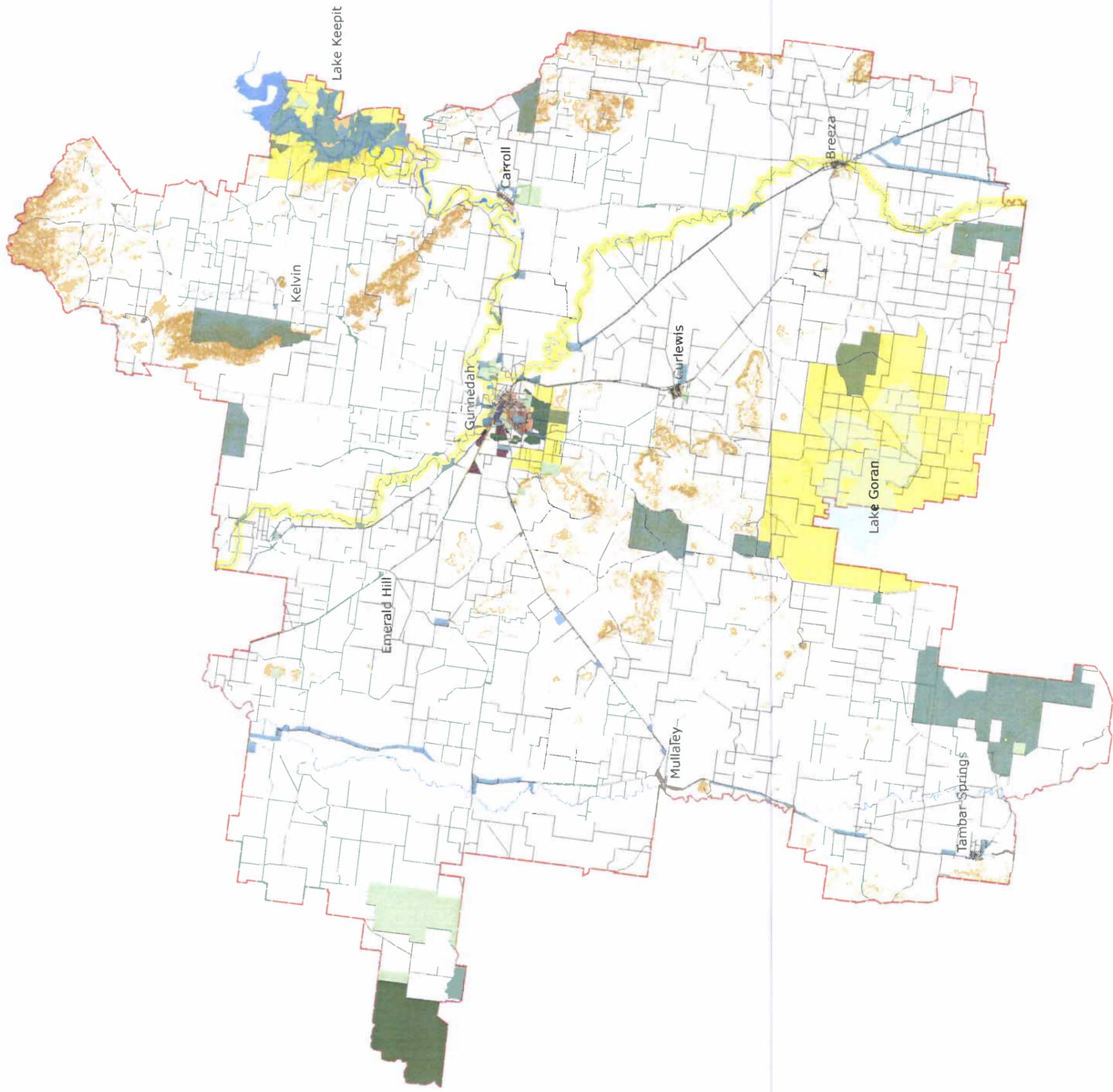
Data has been extracted from digitised field information held in the Barwon Region GIS, by the Department of Land and Water Conservation (DLWC). The DLWC accepts no responsibility for the result of action taken or decisions made on the basis of the information contained herein, or for errors, omissions or inaccuracies presented here. Data presented has been extracted from the Tamworth, Tambar Springs, Baan Baa, Curlewis & Boggabri 1:100 000 Soil-Landscape Series.



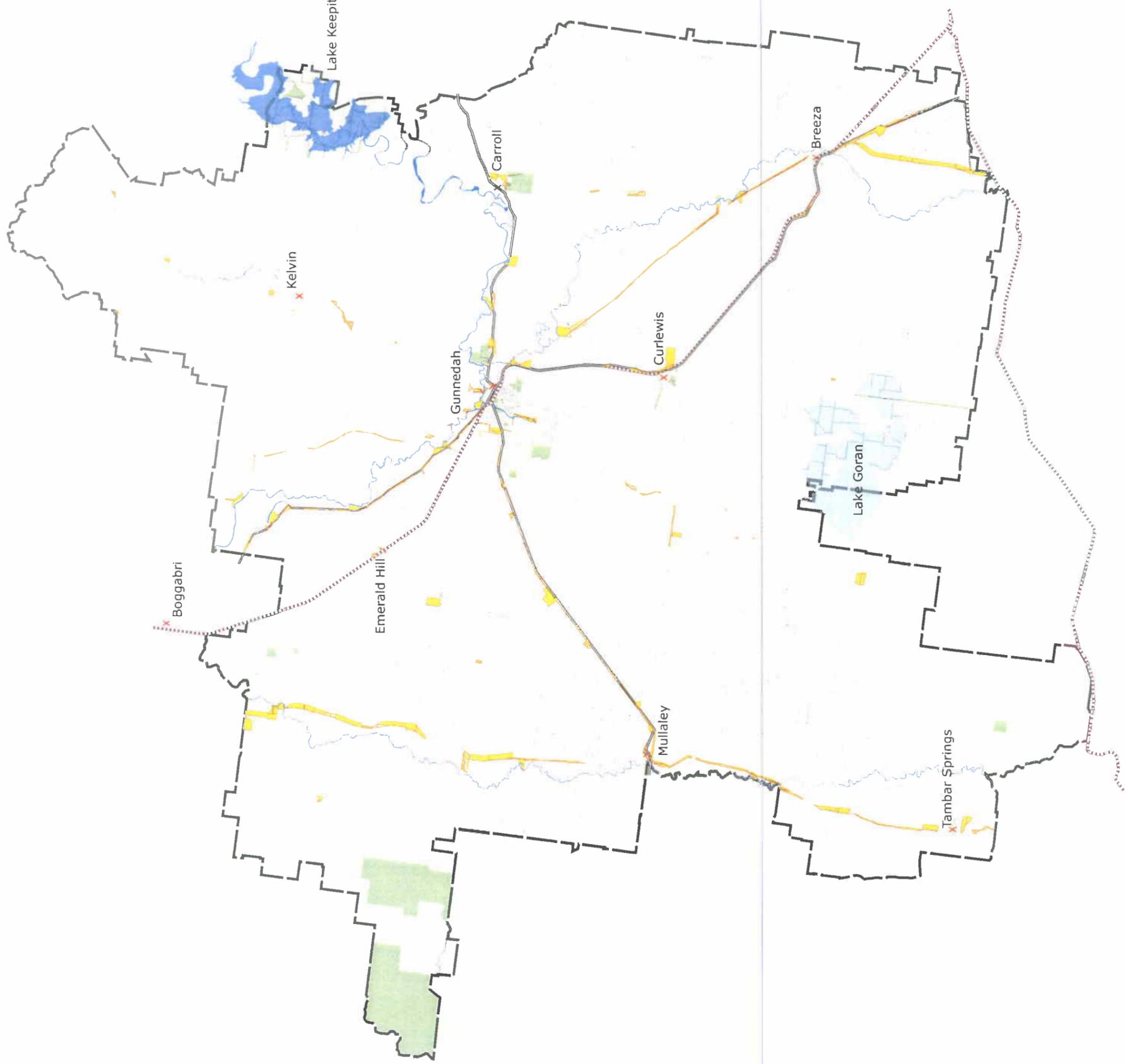
LEGEND

- | | | | | | | | |
|-----------------|-----------------------|------------|---------|-------------|--------|---------------|----------------|
| Soil Salt Loads | | Main Roads | | Main Rivers | | Water Storage | |
| | Negligible Salt Store | | Highway | | Creeks | | Shire Boundary |
| | Moderate Salt Store | | Roads | | Rivers | | |
| | High Salt Store | | | | | | |
| | Very High Salt Store | | | | | | |
| | Highly Variable | | | | | | |





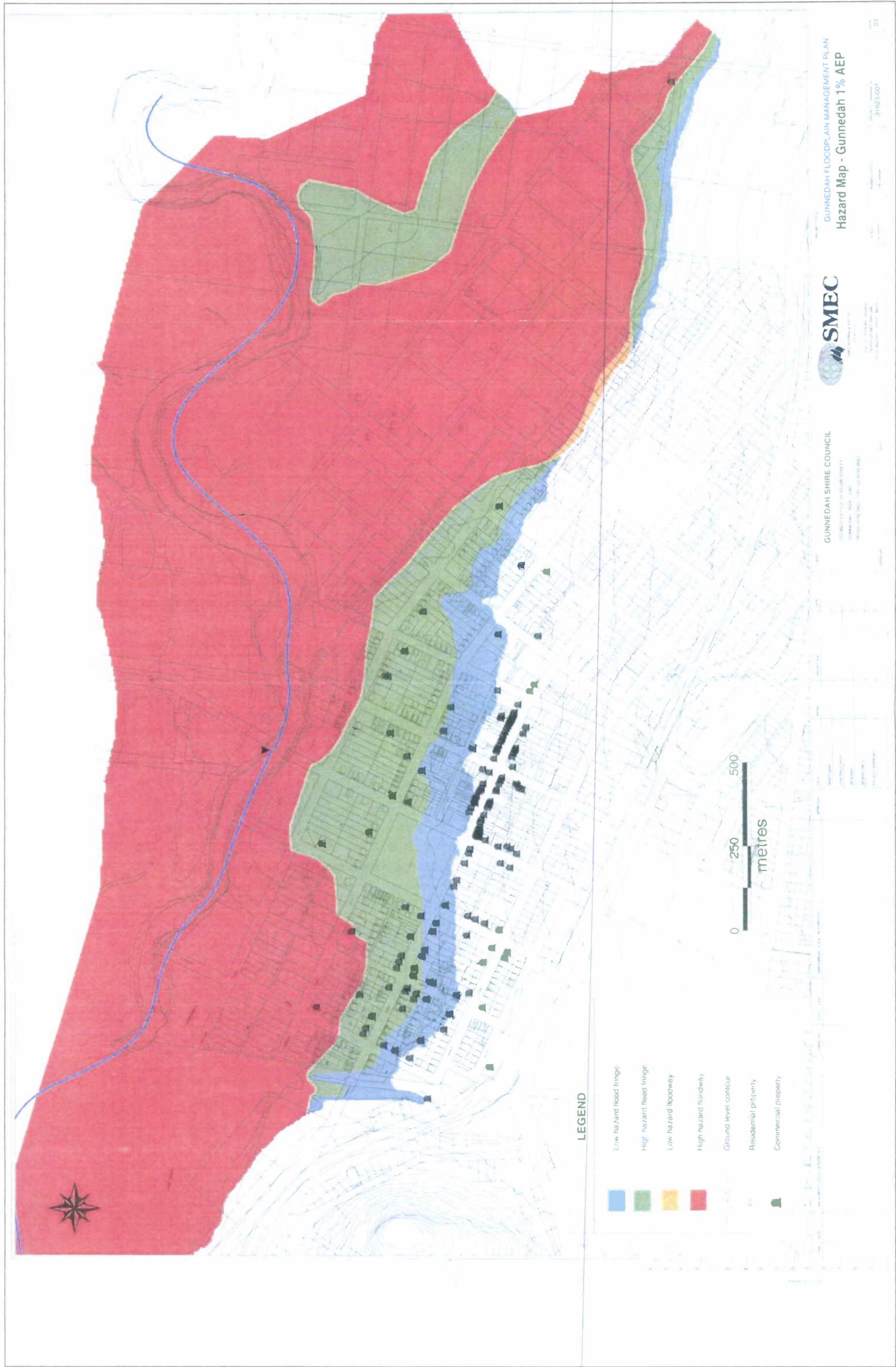
- Waterways and Lakes
- RLPB Controlled Lands
- National Park
- State Forests
- Reserves
- Environmental Protection
- Open Space Zone
- Buffer to Significant Environmental Lands

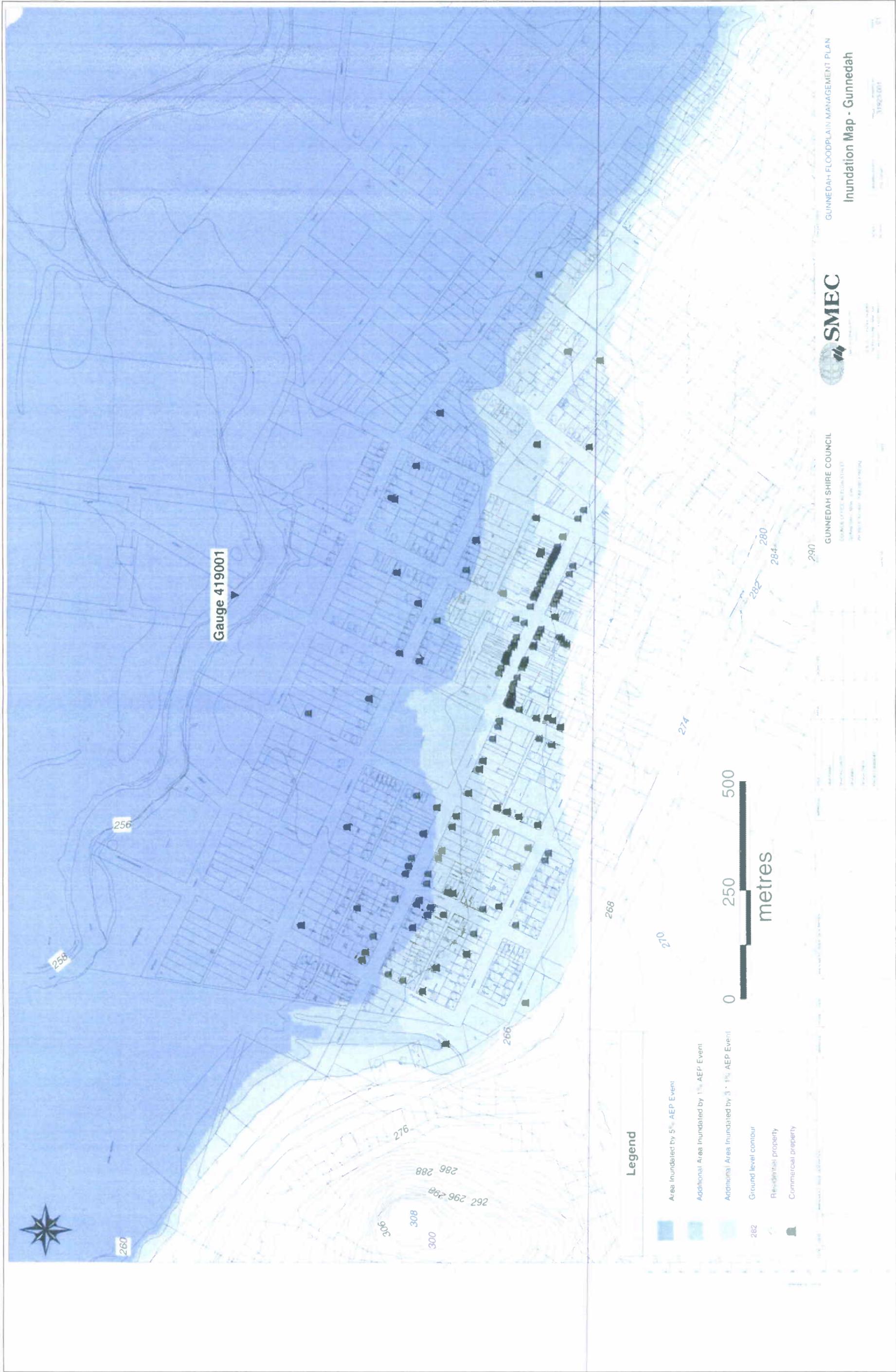


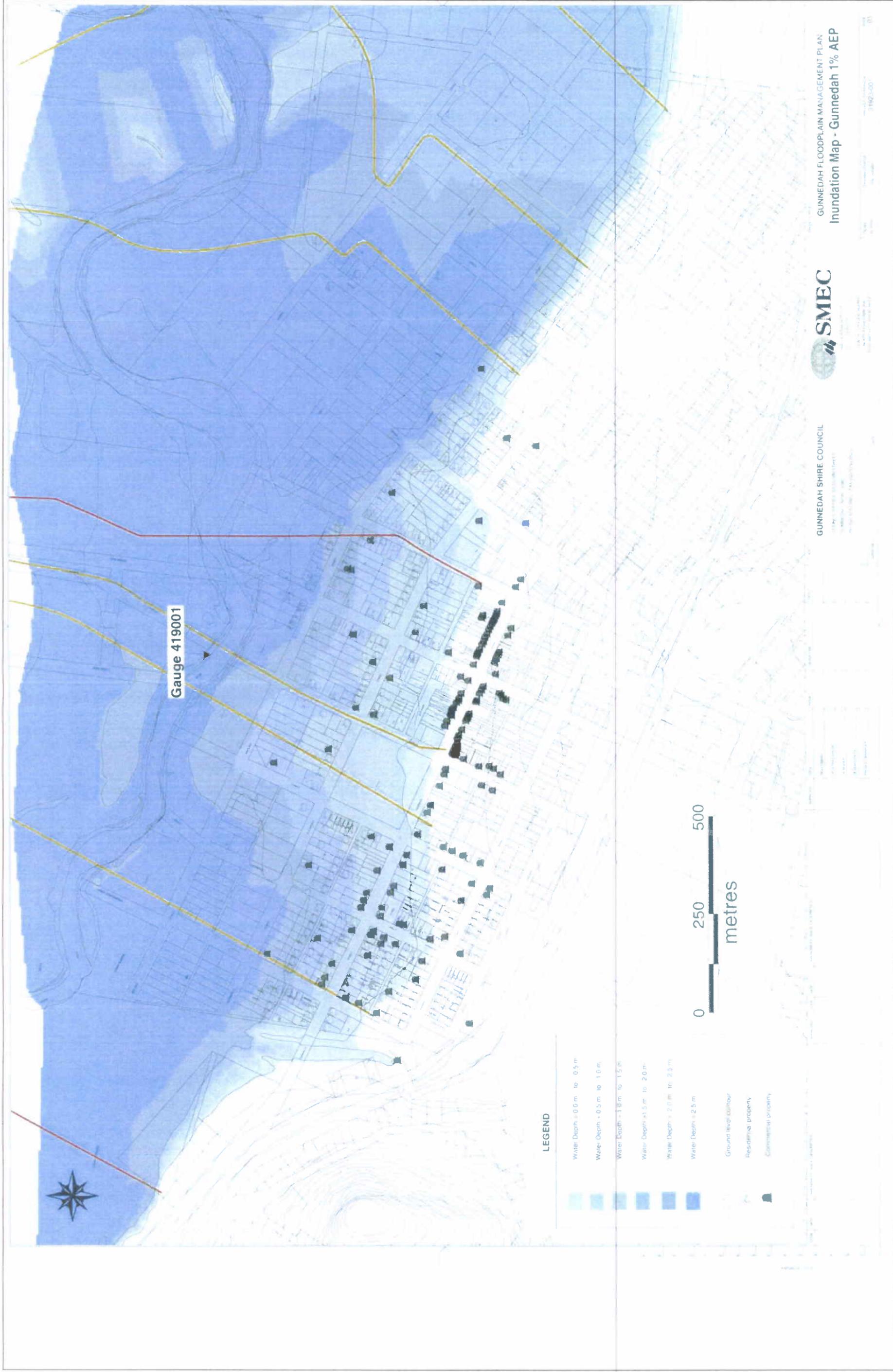
Stock Routes and
land in the control of the
Rural Lands Protection Board

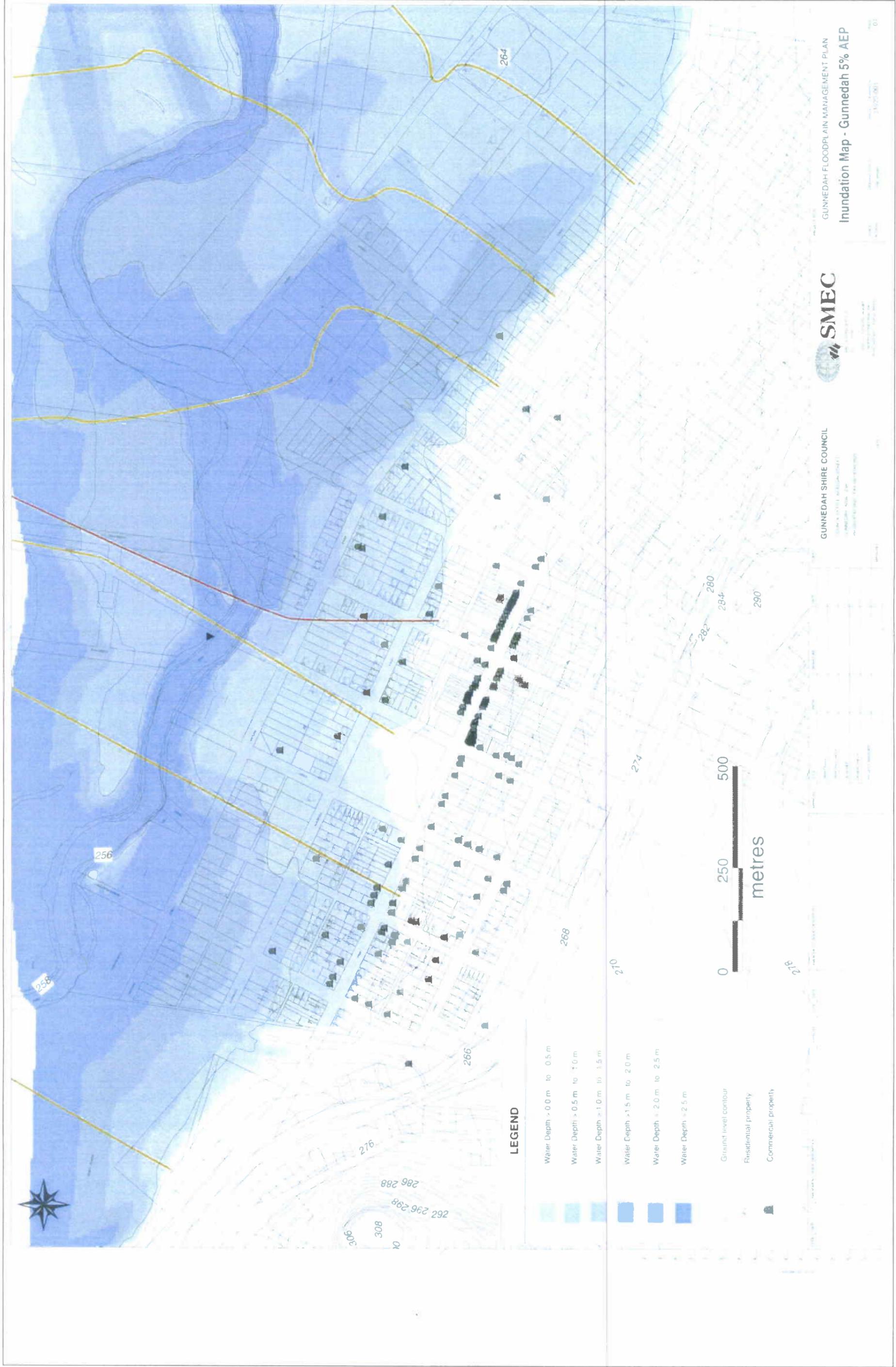


1:40'000 @ A3









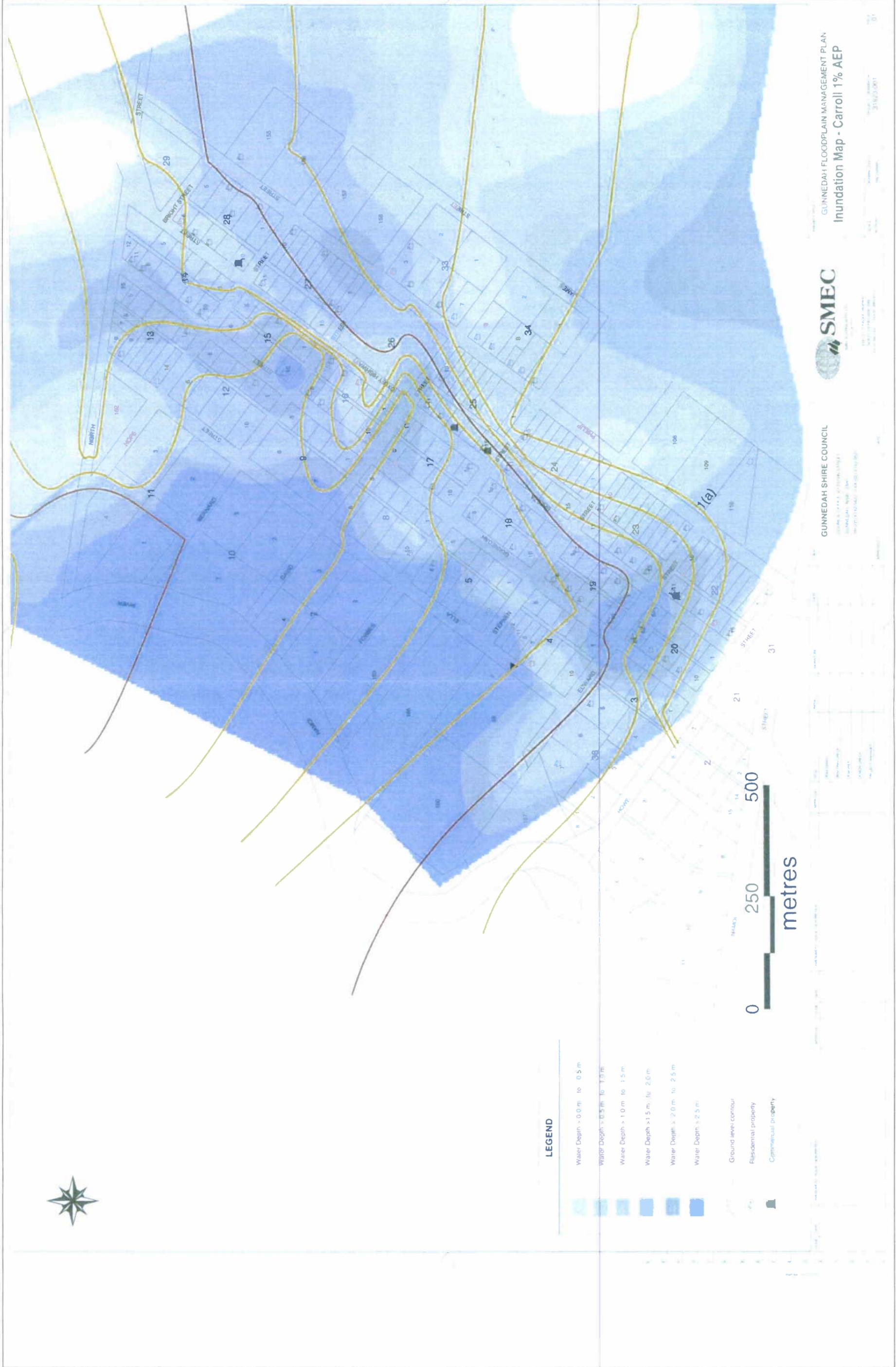
Gunnedah Environmental Study

Source: SMEC Australia P/L

EXTENT OF FLOODING - GUNNEDAH INUNDATION MAP - 5% AEP

Prepared by: **planning workshop australia**
 202109a-Graphic-Figure 10.cdr

Fig 10d

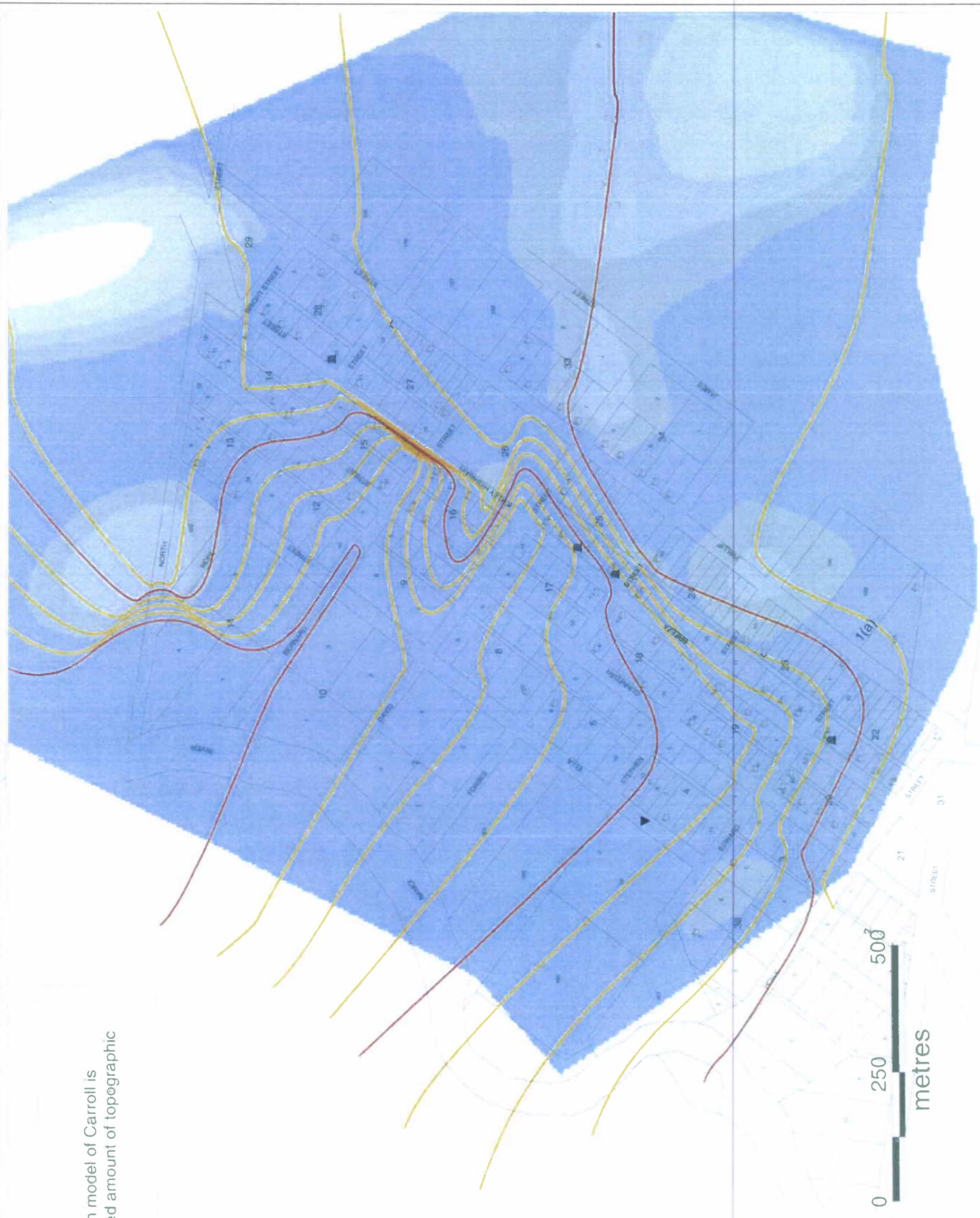




Note:
The digital terrain model of Carroll is based on a limited amount of topographic data.

LEGEND

- Water Depth < 0.5 m to 0.5 m
- Water Depth > 0.5 m to 1.0 m
- Water Depth > 1.0 m to 1.5 m
- Water Depth > 1.5 m to 2.0 m
- Water Depth > 2.0 m to 2.5 m
- Water Depth > 2.5 m
- Ground level (contour)
- Residential property
- Commercial property



GUNNEDAH SHIRE COUNCIL
COUNCIL CHAMBERS, GUNNEDAH STREET
GUNNEDAH NSW 2340
PH: 08 9371 1000 FAX: 08 9371 1001



GUNNEDAH FLOODPLAIN MANAGEMENT PLAN
Inundation Map - Carroll 3 x 1% AEP

31923-001
01

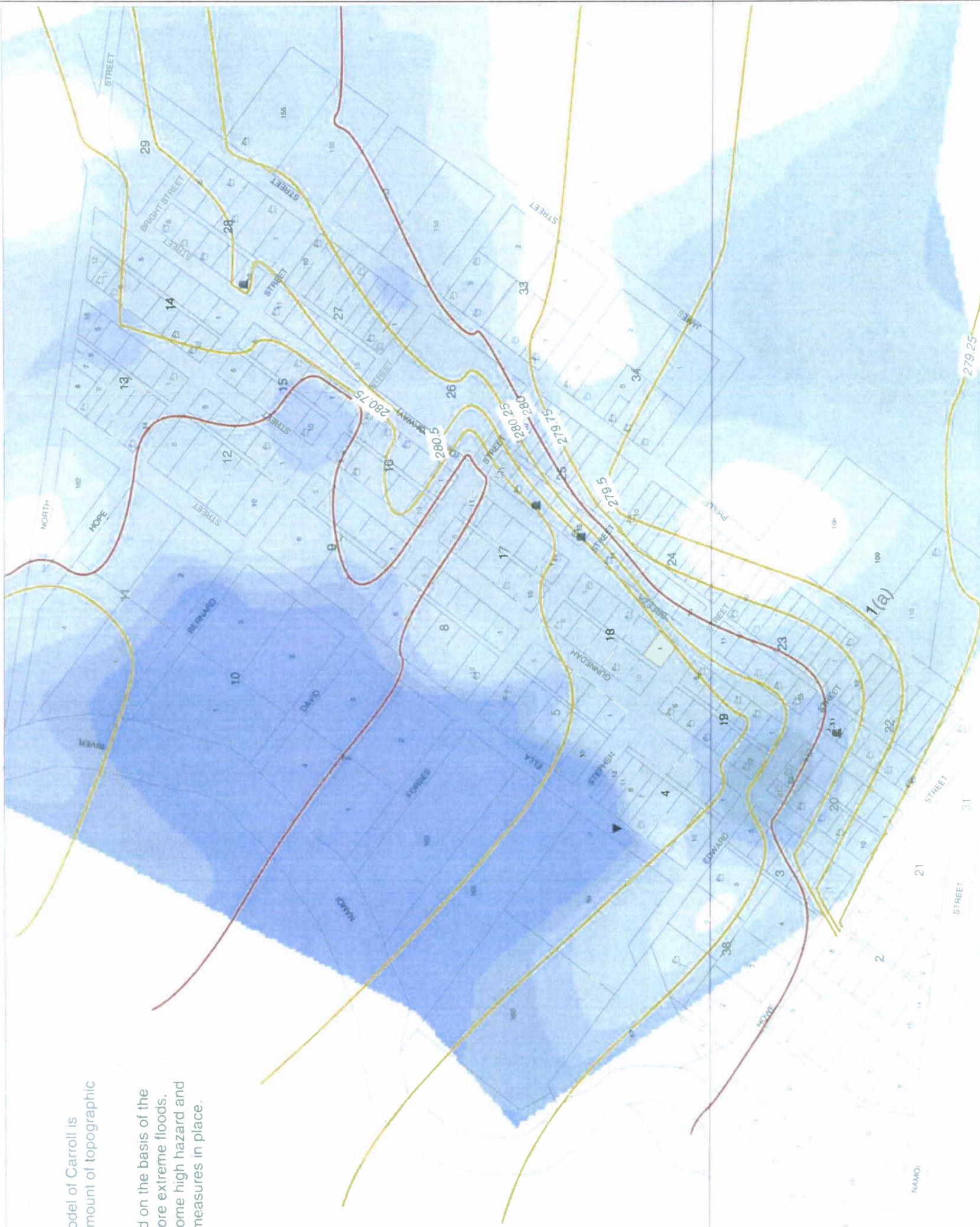




Note:

The digital terrain model of Carroll is based on a limited amount of topographic data.

This map is prepared on the basis of the 1% AEP flood. In more extreme floods, additional areas become high hazard and will need floodplain measures in place.



LEGEND

- Water Depth > 0.0 m to 0.5 m
- Water Depth > 0.5 m to 1.0 m
- Water Depth > 1.0 m to 1.5 m
- Water Depth > 1.5 m to 2.0 m
- Water Depth > 2.0 m to 2.5 m
- Water Depth > 2.5 m
- Ground level contour
- Residential property
- Commercial property

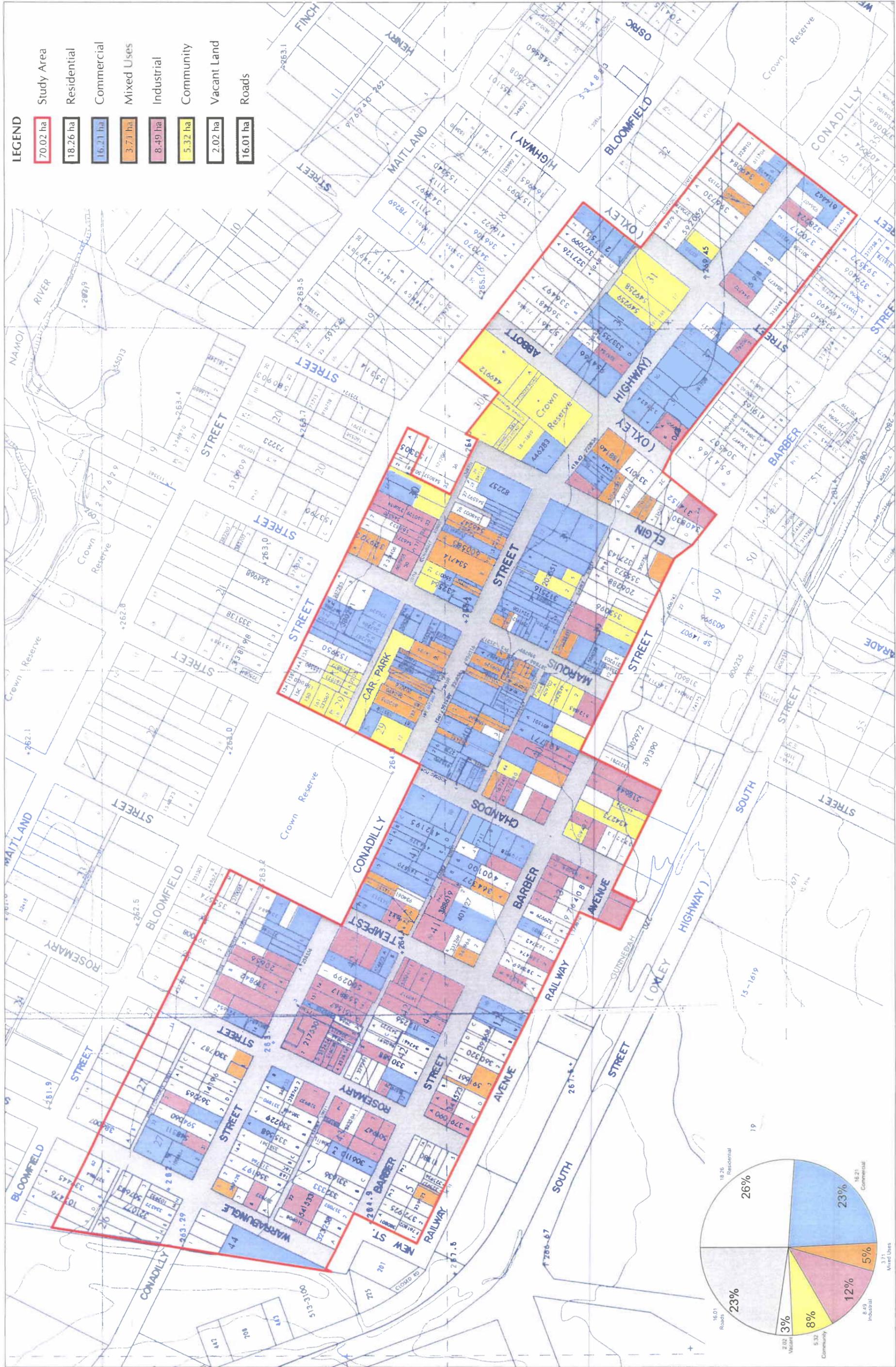


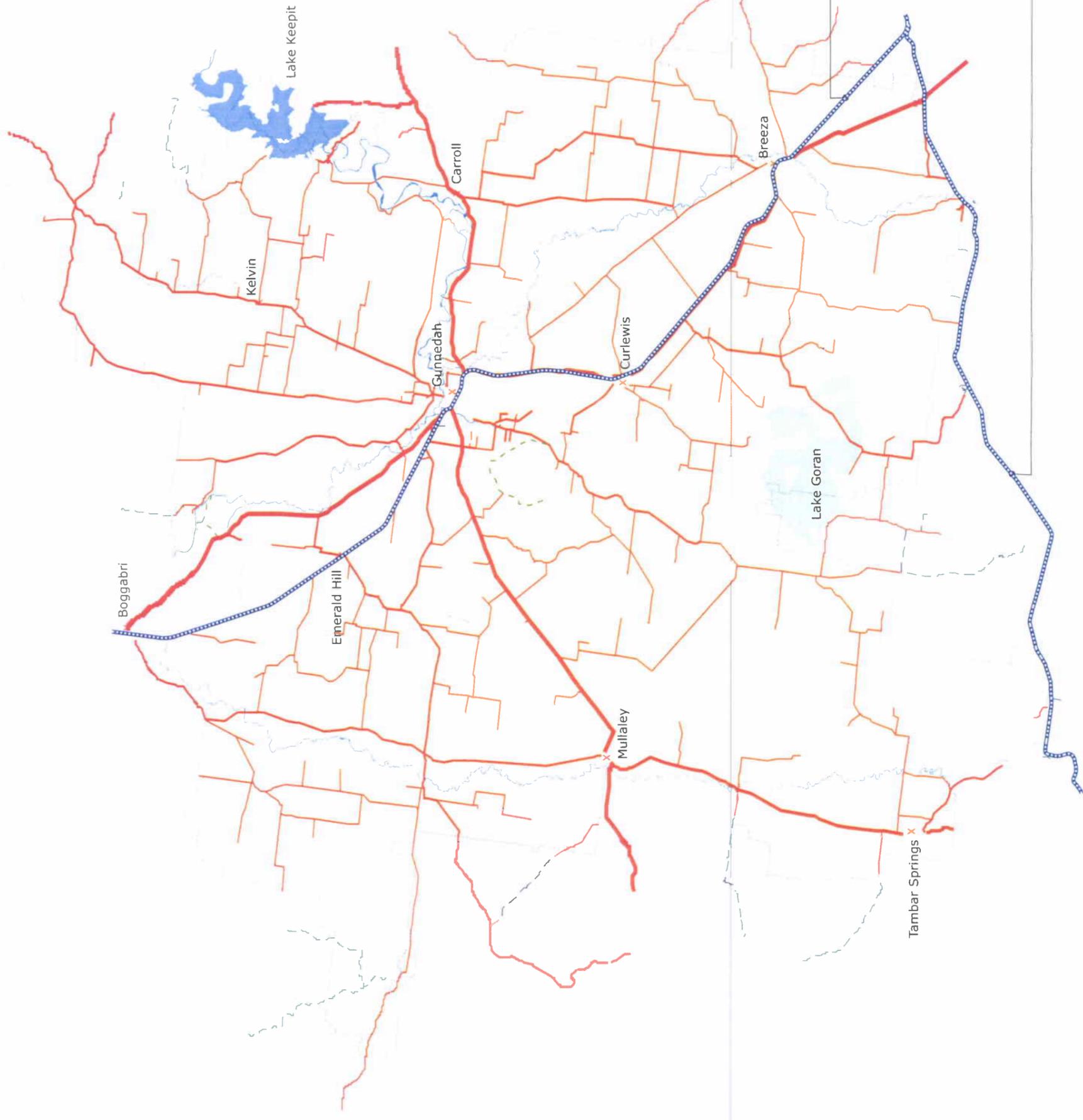
GUNNEDAH SHIRE COUNCIL
100000 100000 100000 100000
100000 100000 100000 100000
100000 100000 100000 100000

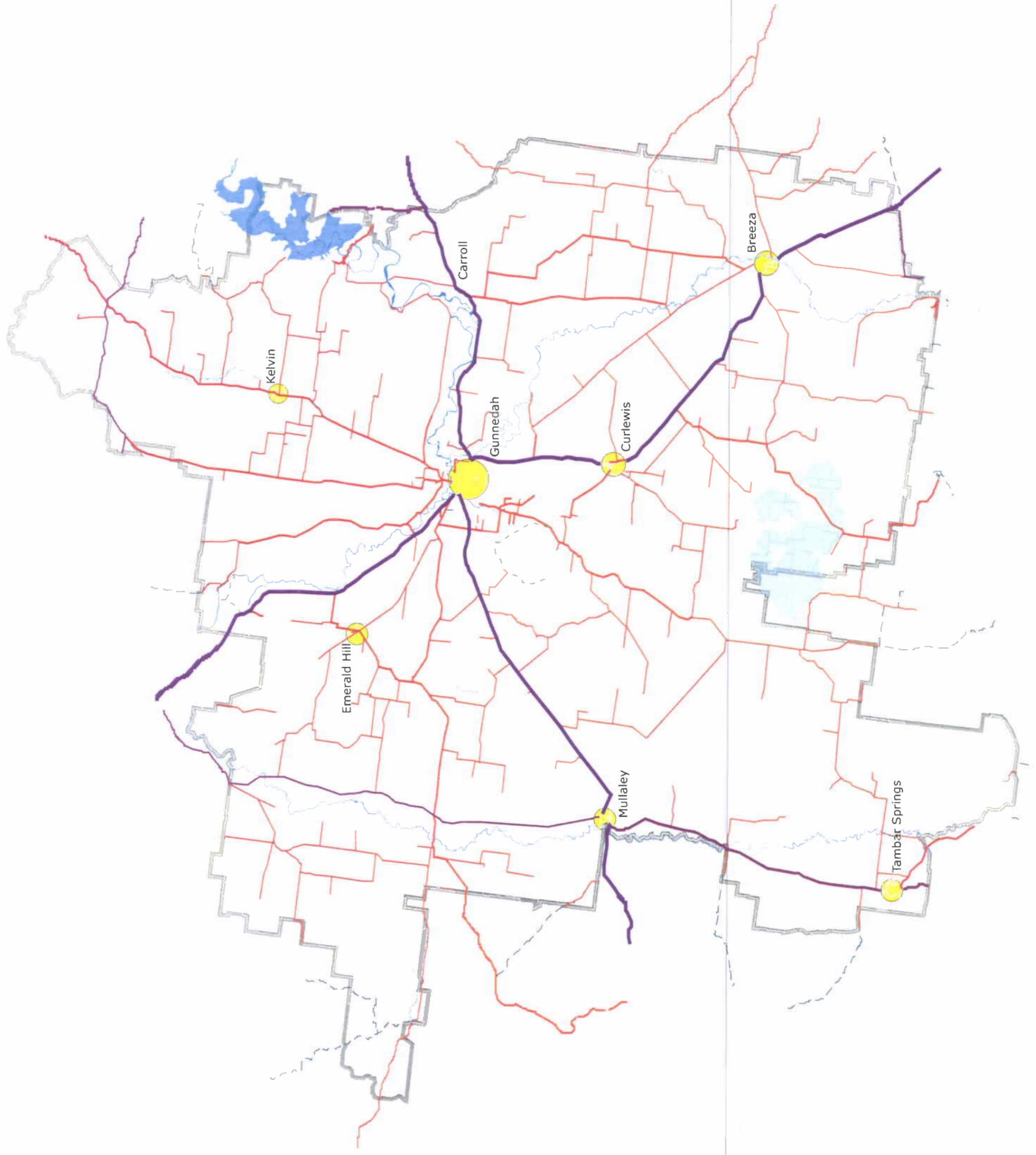
GUNNEDAH FLOODPLAIN MANAGEMENT PLAN
Inundation Map - Carroll 5% AEP

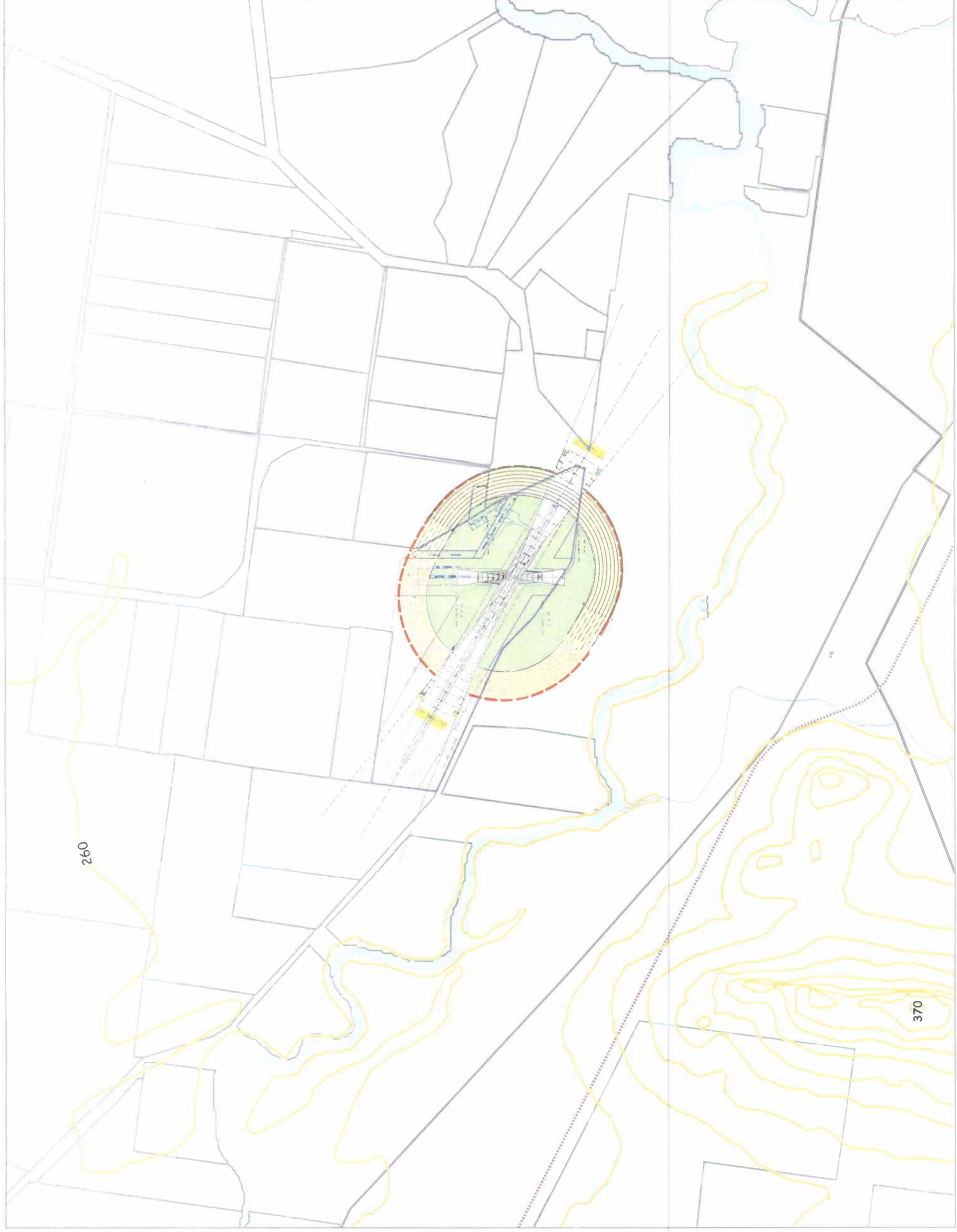


- 1 GDH Bores 1 to 10
- 1&2 Mullaley Bore 1& 2
- 2 Tambar Springs Old Bore & 2
- 1&2 Curlewis Bores 1 & 2



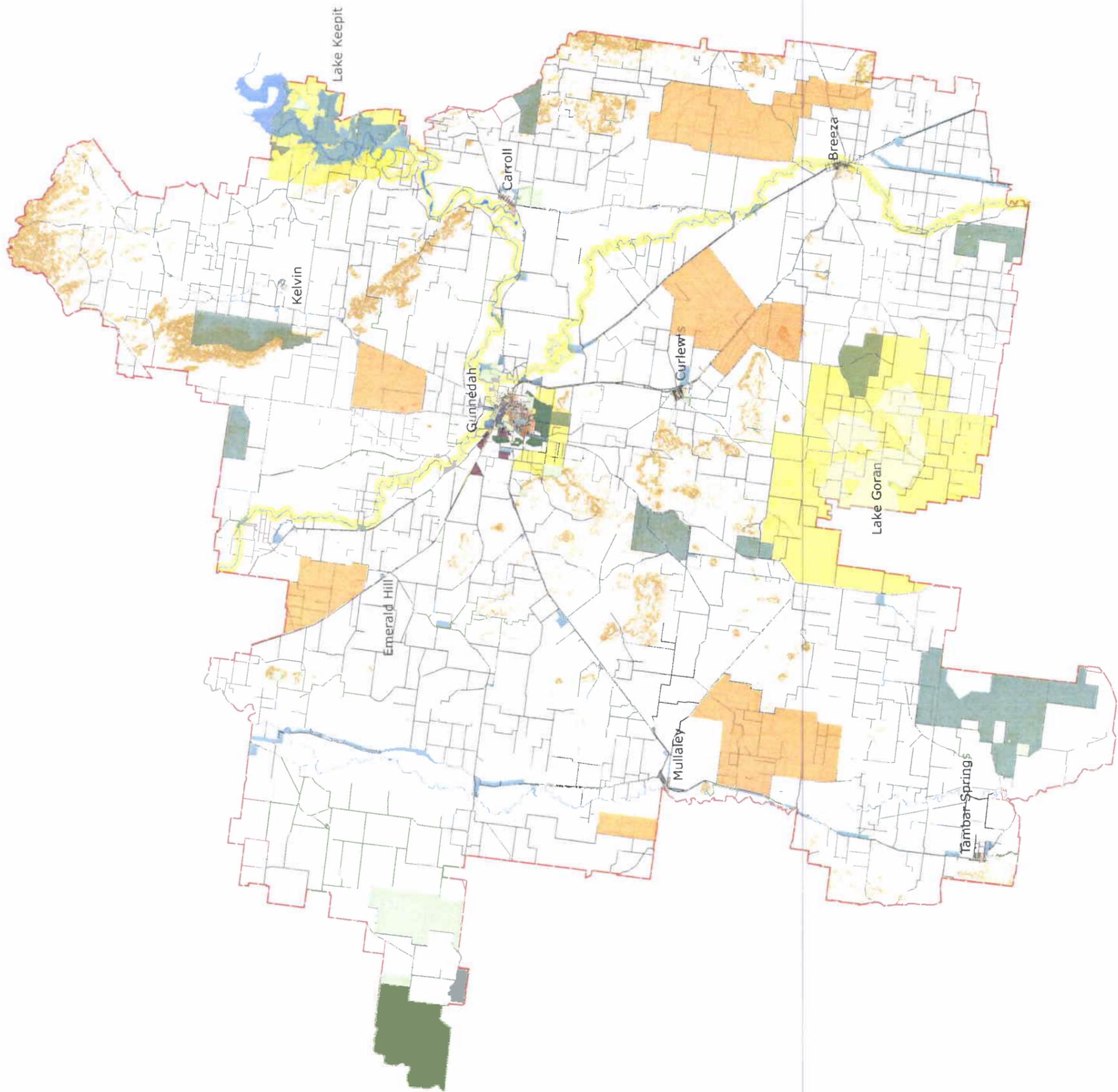




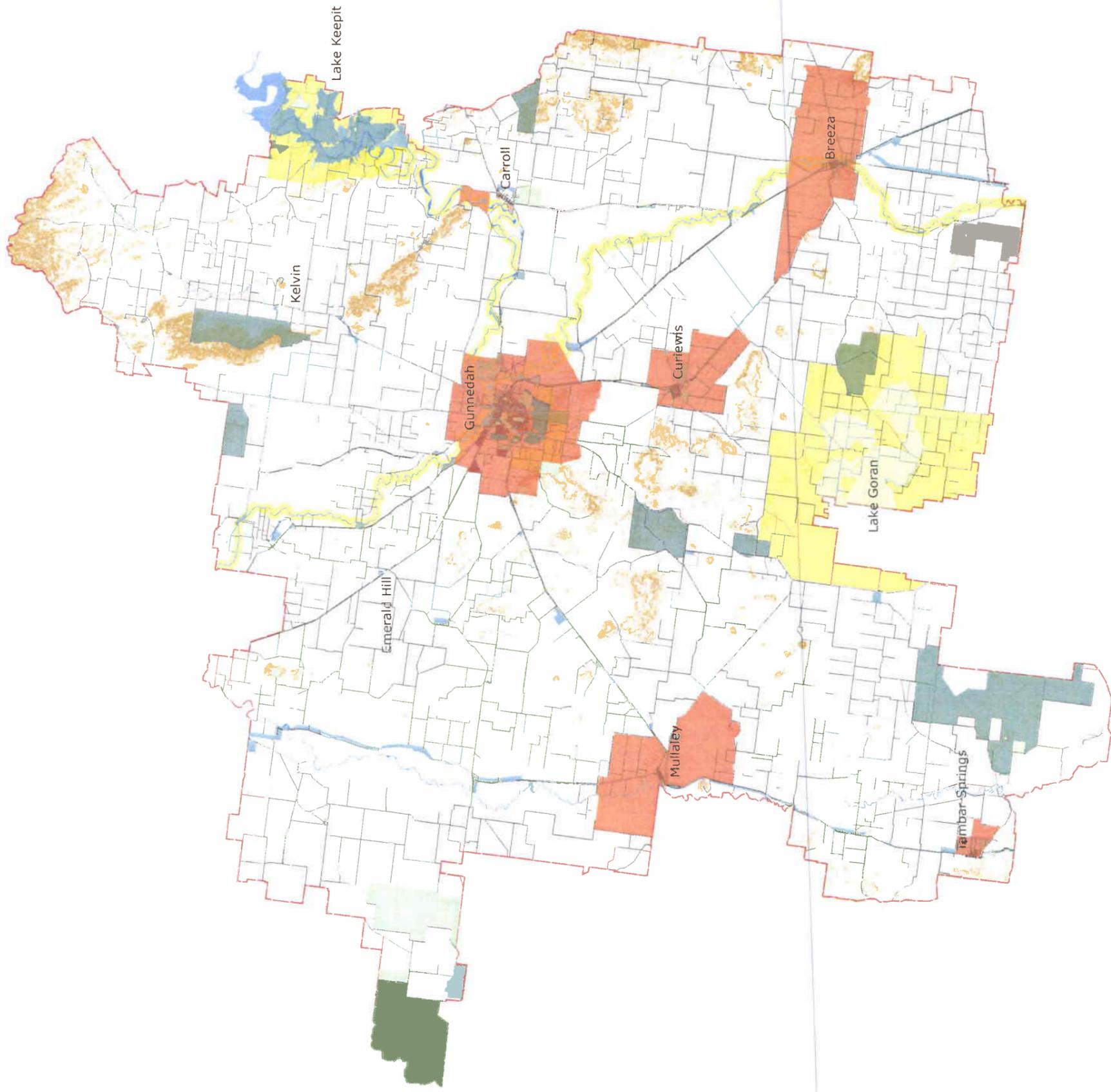


10 metre contours

- Extent of Inner Horizontal Surface at 307.2 m AHD
- Extent of 50 % incline from Horizontal Surface to 382.2 m AHD
- Extent of 2.5 % incline along Runway to 413.45 m AHD
- Extent of 2.0 % incline along Runway to 413.45 m AHD



- Appropriate Locations for Intensive Agricultural Development
- Waterways and Lakes
- RLPB Controlled Lands
- National Park
- State Forests
- Reserves
- Environmental Protection
- Open Space Zone
- Buffer to Significant Environmental Lands



- Agricultural Lands susceptible to Marginalisation
- Waterways and Lakes
- RLPB Controlled Lands
- National Park
- State Forests
- Reserves
- Environmental Protection
- Open Space Zone
- Buffer to Significant Environmental Lands