LOCKHART SHIRE COUNCIL

RURAL LANDS STUDY

Booth Associates

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ABBREVIATIONS AND ACRONYMS

BoM	Bureau of Meteorology
CSG	Coal Seam Gas
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DPI	Department of Primary Industries
DoPI	Department of Planning & Infrastructure
DSE	Dry Sheep Equivalents
LEP	Local Environmental Plan

ANNEXURES

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1.0 EXECUTIVE SUMMARY

The Lockhart Shire is located in the Riverina within South West New South Wales, in a highly productive agricultural region. The predominant agricultural enterprises are annual winter crops including wheat and canola, sheep for wool and meat and cattle. The Shire is 2,893km^2 in size and includes the towns and villages of Lockhart, The Rock, Yerong Creek and Pleasant Hills.

This report has assessed rural land in the Lockhart Shire zoned RU1 (primary production), under the 2012 Local Environmental Plan (LEP). The RU1 zone occupies 286,551ha which is 95% of the Shire. In 2010/11 the value of agricultural production in the Shire was $119M. Over 90% of the Shire is considered to be prime agricultural land. Given the importance of agriculture to the Shire, its protection under the LEP is warranted.

This report provides evidence that the existing minimum lot size of 650ha for a dwelling entitlement on rural land (RU1) in the Lockhart Shire (under the 2012 LEP) is having a negative impact on young farmers who wish to build a house on the family property. Council records show only one dwelling entitlement has been approved having met the minimum lot size of 650ha since the previous LEP was gazetted in 2004.

This report has reviewed in detail current agricultural practises and land use. Given the need to balance the protection of prime agricultural land with the need to encourage people to live in rural areas in the Lockhart Shire, this report has recommended the minimum lot size for a dwelling entitlement in the Lockhart Shire to be reduced from 650ha to 250ha.

Analysis in this report demonstrates a 250ha minimum lot size will not create unwanted impacts on the agricultural productivity of the Lockhart Shire. This report has also recommended Council include a clause in their LEP permitting a minimum lot size of 40ha for intensive plant agriculture (horticulture) subject to the applicant demonstrating their *bona fides* as a horticultural producer.

The basis for these recommendations is provided in the body of the report.

2.0 INTRODUCTION

In November 2012 Booth Associates were engaged by the Department of Planning and Infrastructure (DoPI) to prepare a Rural Lands Study for Lockhart Shire Council. A map of the Lockhart Shire is included as Annexure 1.

2.1 Objectives

The objective of this project is to quantify the importance of agriculture to the Lockhart Shire including an assessment of land use and land capacity and to review the current minimum lot size for a dwelling and subdivision of rural land for a dwelling associated with primary production.

This Strategy is focussed on land zoned RU1 (rural) in the Lockhart Shire Council Local Environmental Plan (LEP) 2012. A map showing all zones in the Shire under the 2012 LEP is included as Annexure 2.

Concurrent with the preparation of this report, Rural Settlement and Industrial Land Rezoning Studies were also undertaken by Booth Associates into large lot residential (R5) and industrial lands (IN1) at Lockhart and the Rock. These two studies are addressed in a separate report.

2.2 Report Author

This report was prepared by Booth Associates, agribusiness and environmental consultants based in Griffith.

2.3 Report Structure

This report is structured as follows:

- Section 3 – Review of government policy in relation to rural land use planning;
- Section 4 – Rural Lands Analysis of the Lockhart Shire;
- Section 5 – Review of Landholdings in the Lockhart Shire;
- Section 6 – Consultation undertaken in the preparation of this report; and
- Section 7 – Recommendations arising from this report.

3.0 RURAL PLANNING POLICY

In this section of the report relevant government policies in relation to rural planning have been reviewed. The NSW government Agricultural Policies of direct relevance to rural lands are:

- Policy for Sustainable Agriculture in NSW, (NSW Government, 1998);
- Policy for the Protection of Agricultural Land (NSW DPI, 2004);
- State Environmental Planning Policy (Rural Lands) 2008;
- Maintaining Land for Agricultural Industries (NSW DPI 2011);
- Strategic Regional Land Use Policy (NSW DoPI 2012); and
- Section 117 Directions.

The primary intent of these policies is to protect agricultural land. This policy position has been consistent since 1998.

A summary of relevant sections of these policies is provided in the following sub-sections.

3.1 Policy for Sustainable Agriculture in New South Wales 1998 (NSW Government 1998)

This document was produced by the then NSW Department of Agriculture in 1998. Within the forward of this document signed by Bob Carr MP, Premier of NSW is the following quote:

> *"Over the past two decades, farming and associated industries have suffered declining terms of trade to an extent where many agricultural businesses are no longer viable. This situation has often led to short term decision making for survival rather than strategic decision making for long term sustainability, despite widespread recognition of the need to address the causes of natural resource degradation in agricultural environments. A sustainable rural economy and healthy environment go hand in hand."*

Despite this quote being 15 years old, the comments are still relevant to agriculture in the Lockhart Shire. In particular, the key point from the above quote with broad application is:

> *"Short term decision making for survival rather than strategic decision making for long term sustainability."*

Survival based decision making has for many years been forced upon many agricultural businesses by declining terms of trade. The prolonged drought last decade compounded the issue of survival, stretching business resources and preventing strategic decision making and implementation.

The following objective is listed within Section 7.6 (*Integrated Management*) of the Policy:

> *"Agricultural industries, communities and governments working together to achieve positive economic, environmental and social outcomes."*

Some of the strategies listed to achieve this objective, that are relevant to the Lockhart Shire include:

> *"Ensure the equitable and efficient allocation of land and other natural resources between agriculture and other sectors of the community.*
>
> *Ensure land use planning is undertaken, where appropriate, in association with agriculture to avoid conflict that may jeopardise agriculture's sustainability.*
>
> *Develop and adopt appropriate planning mechanisms to avoid future conflict over land use (eg competing demands for land for agricultural, residential and recreational uses)."*

These strategies highlight particular challenges for Council in best servicing the needs of the community and local industry, including agriculture. The recommendations, in relation to rural land planning provided in this report, consider the need to minimise land use conflict, whilst also recognising the need to facilitate new opportunities.

3.2 Policy for the Protection of Agricultural Land (DPI, 2004)

The *Policy for the Protection of Agricultural Land (DPI, 2004)* states:

> *"The planning system should provide certainty and security for agricultural enterprises and enable agricultural enterprises to maintain efficiency by responding to future market, policy, technology and environmental changes."*

The ability of agricultural businesses to grow, adapt and respond to trends is a key business driver.

Section 2 of the Policy titled "*Conservation of Land*" and includes the following:

> *"Evaluation of the economic returns from an area of land should be based on good agricultural practice, not on potentially sub-optimal practices that may currently be utilised."*

The prolonged drought last decade has potentially blurred the lines between best business practice and sub-optimal practices.

Section 3 of the Policy "*Minimum size of holdings for dwelling entitlements*" states:

> *"Criteria in environmental planning instruments to determine the minimum size of holdings necessary for a dwelling entitlement should be developed to suit local needs and conditions.*
>
> *Explanation: Setting the minimum area necessary for a building entitlement is a commonly used tool to influence residential land uses in agricultural zones. The objective is to reduce opportunities for conflict with commercial agricultural enterprises by minimising residential uses that are not directly associated with commercial farms. Setting a large minimum is a disincentive to life style purchasers but the size also needs to allow for entry by young farmers and the criteria should also allow for more intensive forms of agriculture where appropriate.*
>
> *While specifying a minimum area for a dwelling entitlement has been an effective strategy that is easily understood and is efficiently implemented, Councils should also consider other approaches to achieving the goal of minimising conflict in agricultural production zones so that farms can operate without unnecessary restrictions."*

The key issues arising from the above quote are:

Minimum lot size needs to not only consider what constitutes a commercial business, but also allow for entry of young farmers and more intensive forms of agriculture with the ultimate goal of:

- *Protecting the land resource;*
- *Minimising conflict in agricultural production zones;*
- *Facilitating new opportunities; and*
- *Allowing farmers to operate without unnecessary restrictions.*

Since the policy was released in 2004 "other approaches" referred to above, that councils should consider in rural planning, do not appear to have developed to a point of being a practical rural planning tool for councils.

3.3 State Environmental Planning Policy (Rural Lands) 2008

The *State Environmental Planning Policy (Rural Lands) 2008 (Rural Lands SEPP)* contains the following aims:

> *"Aims of Policy*
>
> *The aims of this Policy are as follows:*
>
> *a. To facilitate the orderly and economic use and development of rural lands for rural and related purposes;*
>
> *b. To identify the Rural Planning Principles and the Rural Subdivision Principles so as to assist in the proper management, development and protection of rural lands for the purpose of promoting the social, economic and environmental welfare of the State;*
>
> *c. To implement measures designed to reduce land use conflicts;*
>
> *d. To identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations;*
>
> *e. To amend provisions of other environmental planning instruments relating to concessional lots in rural subdivisions."*

3.3.1 Rural Planning Principles

Part 2 of the *Rural Lands SEPP* (2008) establishes the "*Rural Planning Principles*". These Principles and their relevance to the Lockhart Rural Land Study are:

(a) The promotion of protection of opportunities for current and potential productive and sustainable economic activities in rural areas

Rural resources in the Lockhart Shire and existing agricultural production has been identified through desktop assessment, constraints analysis, tours of the Shire by the Project Team and stakeholder consultation. This includes agricultural land uses which contribute to the local, regional and state economy. Due to planning controls highlighting the need to be flexible and provide opportunities for changes in agriculture, existing industries and potential economic activities, this report includes a Rural Lands Analysis in Section 4.0 which outlines the changes and trends impacting agriculture including those likely to impact in the future. An Agricultural Holdings and Farm Size Analysis in Section 5.0 has provided further information on land sizing requirements to sustain viable economic activities.

b) Recognition of the importance of rural lands and agriculture, and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or state

Agricultural economic activities in rural areas contribute significantly to the local, regional and state economy. In 2010/11 it was estimated by ABS that agriculture contributed $7.1B to the economy of NSW, and the value of the agricultural commodities produced in 2010/11 in Lockhart Shire was $119M. This Strategy has identified agriculture as one of the most significant contributing factors to the local economy and one of the key drivers of economic prosperity to the community. Agriculture is the largest industry in the Lockhart Shire by value of production, land use and employment.

In Lockhart Shire key trends impacting agriculture include:

- Increasing business scale;
- Drought;
- Declining terms of trade;
- Declining livestock numbers;
- Increasing crop production; and
- Growth of off-farm income with average off-farm income in the Riverina estimated by ABARES (2011) at $31,613.00.

Planning for rural areas should recognise these trends and changes to agriculture and their impact on farm sizes, sector restructuring, changing farm practices and productivity and provide appropriate controls through planning to facilitate future agricultural development.

The Lockhart Rural Land Study has considered the changing nature of agriculture and the trends, demands and issues impacting it. The Strategy recognises social, economic and environmental aspects which affect how agricultural operations are currently conducted and land use activities managed. While some of the aspects impacting agriculture in the Lockhart Shire are unique, many aspects are similar to those impacting agriculture in other areas. This includes greater reliance on off-farm income, greater accessibility and mobility, diversity and best farm management practices including land stewardship. This Strategy recognises planning for rural land use activity needs to be flexible and farm adjustment facilitated to enable rural producers to cope in changing cyclic conditions including different seasonal and global conditions.

(c) Recognition of the significance of rural land uses to the State and rural communities including the social and economic benefits of rural land use development

The proper management and economic development of rural areas has social and economic benefits to the local and wider community. The Strategy recognises the significance of rural land uses to Lockhart Shire and recommends the protection of agricultural resources through an appropriate minimum lot size. The Strategy identifies the need for dwellings to support viable farm businesses and to advance rural businesses and facilitate investment, and also for housing opportunities that do not conflict or undermine rural land use activities. Land use planning should facilitate and assist those engaged in agriculture to adapt their farming practices to cope with changing conditions. The Strategy recognises that for agricultural industries to grow and

prosper into the future there needs to be economies of scale and opportunities to diversify. The Strategy recommendations in respect to rural planning, minimum lot size and rural dwellings attempt to facilitate and provide opportunities for the development of agriculture and for entry of young people into farming.

(d) In planning for rural lands to balance the social, economic and environmental interests of the community

Rural lands have a range of social, economic and environmental values, including agriculture, extractive resources, water resources, environmental services including forestry, tourism, energy generation, conservation and landscape values. The Study identifies key rural resources and socio-economic aspects and recommends protection and strategic management of all rural based assets for the continued productive agricultural development whilst also balancing long term community sustainability.

(e) The identification and protection of natural resources, having regard to maintaining biodiversity, the protection of nature vegetation, the importance of water resources and avoiding constrained land

This Rural Land Study has identified key rural resources and environmentally sensitive lands within the rural landscape including the natural assets and significant water resources of the Lockhart Shire. Constraints mapping has identified significant environmental values including surface water resources (including wetlands), vegetation systems and habitats. Through the identification of these resources, the Strategy recommends the protection of biotic and abiotic resources (soil, water and biological) through appropriate land use planning including zoning of key resources to protect their natural values, maintain biodiversity and promote sustainable rural production.

(f) The provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities

This Rural Land Study recognises that productive agricultural land use and continuing investment relies on protection of agricultural resources and provision of sensible rural settlement opportunities that do not jeopardise or conflict with rural land uses. Opportunities for rural settlement at Lockhart and The Rock have been considered in a separate report.

(g) The consideration of impacts of services and infrastructure and appropriate location when providing for rural housing

The Rural Land Study does not provide recommendations that impact on existing settlement areas. The recommendations within this report are not expected to create increased demand for infrastructure or services.

(h) Ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General

There are no known such strategies applicable to this project.

More analysis on this report's recommendations alignment with the Rural Planning Principles is provided in Section 7.0.

3.3.2 Rural Subdivision Principles

Part 3 of the *Rural Lands SEPP* (2008) establishes the "Rural Subdivision Principles". These principles and their relevance to the Lockhart Rural Land Study and the recommended minimum lot size are:

- **"The minimisation of rural land fragmentation"**. The recommended minimum lot size of 250ha is large enough, to minimise the risk of fragmentation of the agricultural base;
- **"The minimisation of rural land use conflicts, particularly between residential land uses and other land uses"**. The recommended minimum lot size is sufficiently large enough to minimise the potential for speculative development that might conflict with rural land use.
- **"The consideration of the nature of existing agricultural holdings and the existing and planned future supply of rural residential land when considering lot sizes for rural lands".** The recommended minimum lot size is based on consultation with landholders, existing agricultural production, an Agricultural Holdings Analysis and constraints analysis. The recommended minimum lot size takes into account the abiotic and biotic resources available that underpin agricultural production; and
- **"The consideration of the natural and physical constraints and opportunity of land", and "Ensuring that planning for dwelling opportunities takes account of these constraints".** The opportunities for new dwellings have been considered in the derivation of the recommended minimum lot size. Environmental factors consider and relate to biotic and abiotic resources underpinning agricultural production. Economic aspects relate to findings from the Holdings Analysis as well as predominant agricultural land uses derived from the Land Use Survey.

The Rural Lands SEPP includes allowance for a subdivision of any size for the purpose of primary production where no dwellings are located or proposed. The Rural Lands SEPP does not require Council to review or change their current minimum lot sizes, but does provide voluntary options to review the same. This report has assessed land use in the Lockhart Shire and reviewed minimum lot sizes.

More analysis of this report's recommendations alignment with the Rural Subdivision Principles in included in Section 7.0.

3.4 Maintaining Land for Agricultural Industries

The Maintaining Land for Agricultural Industries Policy was released by NSW DPI in 2011 and updates the Policy for the Protection of Agricultural Land 2004. The purpose of the Policy is:

> *"To guide the planning system in providing certainty and security for agricultural enterprises over the long term and to enable those enterprises to respond to future market, policy, technology and environmental changes."*

The key elements note that:

- Productive agricultural land is a limited resource in NSW;
- Agricultural land should not be alienated; and
- Agricultural industries are a fundamental asset to NSW.

These three key elements all apply directly to the Lockhart Shire.

The Policy includes four components relating to:

- The structure of environmental planning instruments to protect agricultural land;
- Conversion of agricultural land;
- Minimum size of holdings for dwelling entitlement; and
- Minimising land use conflict.

Section 3 of the Policy is "*Minimum size of holdings for a dwelling entitlement*" which states:

> *"Criteria in environmental planning instruments to determine the minimum size of holdings necessary for a dwelling entitlement in rural areas needs to be based on sustainable productive agriculture.*
>
> *Setting the minimum area necessary for a building entitlement is a commonly used tool to influence residential land uses in agricultural zones. The objective is to reduce opportunities for conflict between residential development and commercial agricultural enterprises by minimising residential uses that are not directly associated with commercial farms.*
>
> *The minimum area for a dwelling entitlement and other provisions in Environmental Planning Instruments to regulate subdivisions should take into account:*
>
> *a. the agricultural productivity and suitability of the land in question;*
>
> *b. the nature and requirements of agricultural industries in the area being considered;*
>
> *c. the risk of creating land use conflict;*

d. the current distribution of property sizes and the agricultural industry they support;

e. the trends in the size of properties engaged in agriculture; and

f. cumulative impacts eg gradual subdivision of agriculture becomes rural residential zone."

This Section is almost identical to Section 2 of the Policy for the Protection of Agricultural Land 2004 described in Section 3.2, but the reference to allowing entry by young farmers has been removed. The recommendations provided in Section 7.0 of this report take into account points "a" to "f" above.

Some comments in relation to these aims are:

- Aims (a), (b) and (c) encapsulate the policies detailed in Sections 3.1, 3.2 and 3.3 of this report;
- With regards to land considered State significant agricultural land as defined in (d), no such land has been identified in the Riverina of NSW including the Lockhart Shire. Strategic regional agricultural land has been identified in the Hunter and Liverpool Plains areas, and the DoPI has indicated mapping of strategic regional agricultural land in the Murrumbidgee (including Lockhart Shire) will commence in 2013; and
- All concessional allotment provisions in LEPs including Lockhart's have been removed as a result of (e).

3.5 Strategic Regional Land Use Policy

In September 2012 DoPI released the Strategic Regional Land Use Policy, which states:

> *"better growth in mining and coal seam gas (CSG) industries with the need to protect important agricultural land and water resources"*

The policy provides "upfront protection of agricultural land and water" with new initiatives including the creation of land and water commissioner and the requirement for agricultural impact assessment of the exploration stage.

As part of the Strategic Regional Land Use Policy, Strategic Agricultural land across NSW is being mapped. The mapping will be incorporated into new Strategic Regional Use Plans to be commenced for the Murrumbidgee in 2013. Land developed as Strategic Agricultural land will trigger (via a gateway process) the development of an upfront strategic assessment of the impacts of the proposed State significant mining and CSG proposals.

The Aquifers Interference Policy was introduced to protect water resources through the assessment of potential impacts by mining and CSG activities. The Policy sets out minimum impact considerations including the threshold of impact on water tables and water pressure levels and water quality.

Strategic Agricultural Land is based on:

- Biophysical criteria including soil fertility, access to water and holding sizes; and
- Critical industry clusters (concentrations of highly productive industries) such as winemaking and horse breeding in the Hunter Valley.

Known mineral resources in the Lockhart Shire are addressed in Section 4.10.2. The data indicates there are a known, few scattered resources. Aside from quarries used to extract road base, the only other known extractive activity in the Shire is clay for brick making. The identification of strategic agricultural land in the Lockhart Shire will provide protection of prime agricultural land, so the Strategic Regional Land Use Plan is essential for the future protection of the agricultural resource in the Lockhart Shire.

3.6 Section 117 – Directions

A range of local planning Directions are required to be followed by Councils when preparing planning proposals for new LEPs. The Directions cover the following broad categories:

- Employment and resources;
- Environment and heritage;
- Housing infrastructure and urban development;
- Hazard and risk;
- Regional planning; and
- Local plan making.

The Directions vary slightly and depend on whether the proposal relates to a pending LEP or for a Planning Proposal under the new Gateway process.

Relevant Section 117 Directions for the Lockhart Rural Land Study are:

Direction 1.2 – Rural Zones

(i) *"The objective of this Direction is to protect the agricultural production value of rural land".*

The Direction requires that a planning proposal must:

4(a) *"Not rezone land from a rural zone to a residential, business, industrial, village or tourist zone".*

4(b) Not contain provisions that will increase the permissible density of land within a rural zone".

This Strategy does not recommend the rezoning of any rural lands, but does recommend a reduction in minimum lot sizes for RU1 land which will increase the density of houses in the RU1 zone. The justification for this change is provided in the body of this report summarised in Section 7.0. The recommendation for a reduction in the minimum lot size from 650ha to 250ha for RU1 land, could potentially allow up to 300 new dwellings on 286,500ha of land which is equivalent to one dwelling per $10km^2$ and so is of minor significance in terms of the additional development potential it will create.

Direction 1.3 – Mining, Petroleum Production and Extractive Industries

"The objective of this Direction is to ensure that the future extraction of State or regionally significant reserves of coal, other minerals, petroleum and extractive materials are not compromised by inappropriate development".

This Direction applies when a Council prepares a planning proposal that would have the effect of prohibiting mining or restricting the potential development of resources "*which are of State or regional significance by permitting a land use that is likely to be incompatible with such development*".

The Lockhart Rural Land Study is consistent with this Direction. The Strategy does not contain any provisions that will put at risk the future extraction of State or regionally significant reserves of coal, other minerals, petroleum or extractive materials that may exist now or be found in the future.

Direction 1.5 – Rural Lands

"The objectives of this Direction are to:

- *Protect the agricultural production value of rural land;*
- *Facilitate the orderly and economic development of rural lands for rural and related purposes."*

This Primary Production Strategy recommends a reduction in the minimum lot size for all land zoned RU1 in the Lockhart Shire from 650ha to 250ha. The Strategy recommendations are consistent with:

- Rural Planning Principles; and
- Rural Subdivision Principles.

of the Rural Land SEPP 2008, which is addressed in Section 3.3 of this report.

4.0 RURAL LAND ANALYSIS

4.1 Climate Context

4.1.1 Long Term Averages

Within the Lockhart Shire the Bureau of Meteorology weather stations only collect rainfall data. However, within 10km of western boundary of the Shire the town of Urana has a complete weather station. Near the north eastern corner of the Shire is the Wagga Wagga Research Station complete weather station at the junction of the Sturt Highway and Olympic Way. Table 1 depicts the long term rainfall data for the Urana Post Office, Lockhart Bowling Club and the Yerong Creek (Fertiliser Depot) BoM weather sites.

Table 1: Long term average rainfall

Parameter	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Urana Post Office													
Mean rainfall mm	31.8	34.1	34.6	32.3	41.3	44.7	39.1	39.9	38.3	41.5	32.5	32.6	442.7
Median rainfall mm	21.6	23.0	25.8	23.5	33.3	39.0	33.5	37.8	35.0	34.2	26.4	22.5	355.6
Mean ETo	275.0	230.0	200.0	120.0	70.0	30.0	35.0	75.0	115.0	160.0	225.0	250.0	1,785.0
Moisture excess/deficit mm	-253.4	-207.0	-174.2	-96.5	-36.7	9.0	-1.5	-37.2	-80.0	-125.8	-198.6	-227.5	-1,429.4
Lockhart Bowling Club													
Mean rainfall mm	34.9	34.5	35.1	36.5	41.0	46.2	44.6	46.6	43.2	48.8	35.0	34.9	481.3
Median rainfall mm	22.0	20.1	23.8	27.1	31.2	38.8	41.1	46.4	36.2	41.4	29.9	26.6	384.6
Mean ETo	273.0	225.0	197.5	117.5	67.5	30.0	35.0	72.5	112.5	157.5	220.0	247.0	1,755.0
Moisture excess/deficit mm	-251.0	-204.9	-173.7	-90.4	-36.3	8.8	6.1	-26.1	-76.3	-116.1	-190.1	-220.4	-1,370.4
Yerong Creek (Fertiliser Depot)													
Mean rainfall mm	35.2	38.1	42.6	37.7	44.2	58.6	54.3	50.3	42.1	52.2	39.1	37.8	532.2
Median rainfall mm	23.2	26.9	25.9	29.6	35.2	54.9	52.1	51.5	38.3	50.2	33.2	30.7	451.7
Mean ETo	270.0	220.0	195.0	115.0	65.0	30.0	35.0	70.0	110.0	155.0	215.0	240.0	1,720.0
Moisture excess/deficit mm	-246.8	-193.1	-169.1	-85.4	-29.8	24.9	17.1	-18.5	-71.7	-104.8	-181.8	-209.3	-1,268.3

Source: Bureau of Meteorology – climate data on-line
Mean ETo is the best estimate of reference crop evapotranspiration taken from the Bureau of Meteorology map depicting point source evapotranspiration across Australia

From Table 1 the follow observations arise:

- Rainfall varies from a low of 443mm near the western boundary of the Shire to 481mm at Lockhart and 532mm at Yerong Creek. Mean rainfall at each station is higher through the months of May to October and the difference is highest towards the eastern side of the Shire;
- Median rainfall data provides an indication of a 50% chance of receiving the indicated amount of rain. The median rainfall at Urana is 356mm, 385mm at Lockhart and 450mm at Yerong Creek. In the summer months at each of the locations the chances of receiving 50% of this median rainfall is substantially less than the mean rainfall data. In winter however, the median rainfalls are much closer to the long term mean or average rainfalls;
- The mean evapotranspiration data (sum of evaporation and transpiration from a standardised reference crop) was determined from a broad scale map of Australia on the BoM website. As expected the level of evapotranspiration is highest on the western side of the Shire at 1,785mm and 1,720mm in the east to a high of 1,785mm; and
- Of particular note is the surplus or deficit of median rainfall over the average evapotranspiration. In all months other than June evapotranspiration exceeds rainfall at Urana whereas at Lockhart and Yerong Creek the rainfall exceeds evapotranspiration in July and August.

The difference between the mean and median rainfalls by month affirm as the dominance of storm based rainfall from cumuliform clouds in summer and thus the summer rains are compromised more of averages of extreme events rather than reliable events. Conversely winter rains tend to be from strataform clouds and as a consequence are more reliable and effective.

Table 2 provides the temperature and other climatic data for Urana and Wagga Wagga Research Station.

Table 2: Long term average climate data Wagga Wagga Research Station

Parameter	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Urana Post Office													
Mean max °C	32.9	32.4	29.2	23.6	18.7	14.8	14.2	16.0	19.8	23.5	27.7	31.1	23.7
Mean min °C	16.3	16.3	14.0	9.4	6.1	3.6	3.2	4.1	6.3	8.8	11.8	14.6	9.5
Mean Daily °C	24.6	24.4	21.6	16.5	12.4	9.2	8.7	10.1	13.1	16.2	19.8	22.9	16.6
Mean cloud cover (okta)	1.8	2.0	2.1	2.5	3.4	3.6	3.9	3.1	2.6	2.6	2.4	2.4	2.7
Mean 9am wind speed (kph)	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean solar exposure (MJ/m^2)	864.9	669.2	635.5	441.0	319.3	237.0	266.6	372.0	489.0	678.9	762.0	871.1	6,606.5
Wagga Wagga Research Station													
Mean max °C	31.1	30.5	27.2	22.2	17.0	13.7	12.5	14.4	17.4	21.1	25.2	29.2	21.8
Mean min °C	16.4	16.9	14.1	10.1	6.8	4.3	3.3	4.3	6.0	8.5	11.1	14.2	9.7
Mean Daily °C	23.8	23.7	20.7	16.2	11.9	9.0	7.9	9.4	11.7	14.8	18.2	21.7	15.8
Mean cloud cover (okta)	2.9	2.8	2.8	3.2	4.6	5.2	5.3	4.8	4.2	3.8	3.6	3.0	3.8
Mean 9am wind speed (kph)	12.9	12.0	11.7	9.9	8.1	6.7	7.1	9.1	10.5	11.6	13.3	12.8	10.5
Mean solar exposure (MJ/m^2)	868.0	669.2	632.4	438.0	316.2	225.0	257.3	359.6	483.0	672.7	759.0	861.8	6,542.2

Points arising from Table 2 are:

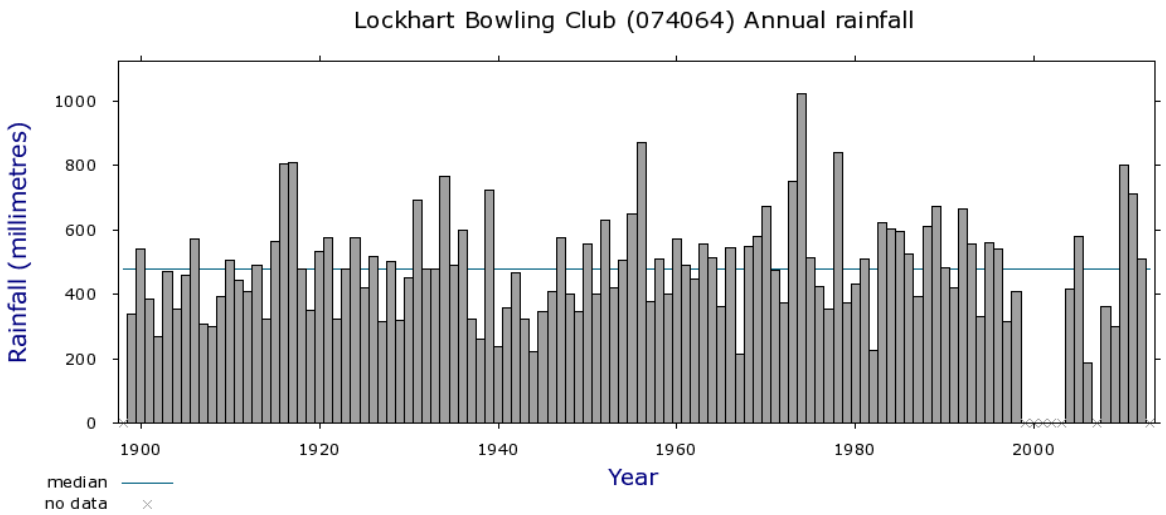
- Daily maxima at the western end of the Shire is generally higher for all months of the year;
- Mean daily minima tends to be higher at the eastern end of the Shire, by month but overall the mean average temperature is higher to the west;
- Cloud cover is significantly less at the western end of the Shire, than at the eastern end;
- Mean solar exposure is slightly higher in the west, but with the increased cloud cover towards the east the potential to capture the radiated solar energy would be significantly less than at the eastern end; and
- Wind speeds tend to be higher from September through to February/March and lesser through the winter period. The increased wind in the summer period and the relative dryness of the summers provides a significant opportunity for advected energy to substantially increase actual evapotranspiration from crops being grown in the summer period.

Overall the climatic data indicates that cropping and other agricultural pursuits throughout the Lockhart Shire are supported by relatively reliable climatic conditions and support the view that the Shire is well known for its capacity to reliably produce a diverse range of winter crops and pastures.

4.1.2 Long Term Rainfall

Graph 1 demonstrates the extent and depth of the recent 10 year drought, notwithstanding the missing data from 1999 to 2003. In Graph 1 the straight line represents the long term mean rainfall at the Lockhart Bowling Club.

Graph 1: Lockhart Rainfall



Observations of rainfall trends over the past 115 years are:

- Lockhart has significant variability in annual rainfall with a trend to more reliable rainfall from around 1950 through to 2000; and
- Droughts do not occur for extended periods on a regular basis, although there was an extreme drought from 1898 through to approximately 1930, another in the 1940s and the more recent drought from late 1990s to almost 2010.

The primary information derived from Graph 1 plus professional experiences within the area, is that the Shire's farm businesses have been able to survive most climatic conditions expected under the projected climatic change scenarios. This does not infer that continued business will be easy under the predicted climate change. It does however emphasise that those businesses that have the appropriate commercial and managerial critical mass should be able to do more than survive, and in fact grow into the future. However, for those businesses without critical mass there will be a need to consider their longer term options.

4.1.3 Climate Change

CSIRO (2008) has forecast for future rainfall to decline on average with the evaporation likewise increasing. No specific data is available for the Lockhart Shire other than that the total Murrumbidgee Catchment which suggests that the valley catchment yield is expected to reduce by an average of 9% under the most likely scenario to almost 31% and in the worst case scenario by 2030. The consequences of climate change are most likely to be:

- Increased reliance of off farm income to supplement varying agricultural returns;
- Widespread adoption of zero tillage with correspondence of optimisation of crop water use efficiency;
- Increased adoption of stubble retention practices to minimise evapotranspiration; and
- Increase in use of specialised machinery to optimise timeliness of operations and efficiency of conversion of limited rainfall into marketable crop produce.

These trends will occur as an additional response to the normal decline in terms of trade also known as the "cost price squeeze". The decline in terms of trade will be accelerated by climate change.

4.2 Landscape Context

Attached as Annexure 1 is an aerial image of the Lockhart Shire. The primary landscapes within the Lockhart Shire are:

- Small line of hills known as "The Rock" to the south west of the township of The Rock on the eastern fringes of the Shire. The majority of this land is a national park and the surrounding rocky area is largely non-arable and covered in native vegetation;
- On the northern fringes of the Shire to the north of the town of Lockhart is the rocky area known as the "Galore Hill" which is covered in native vegetation;
- The remainder of the Shire is a mix of undulating lands in the east, becoming less undulating towards the centre of the Shire and then becoming largely flat towards the western boundary; and
- Throughout the Shire, particularly in the north eastern, central and western areas are some extensive areas of floodplains which may become inundated in extreme rain events.

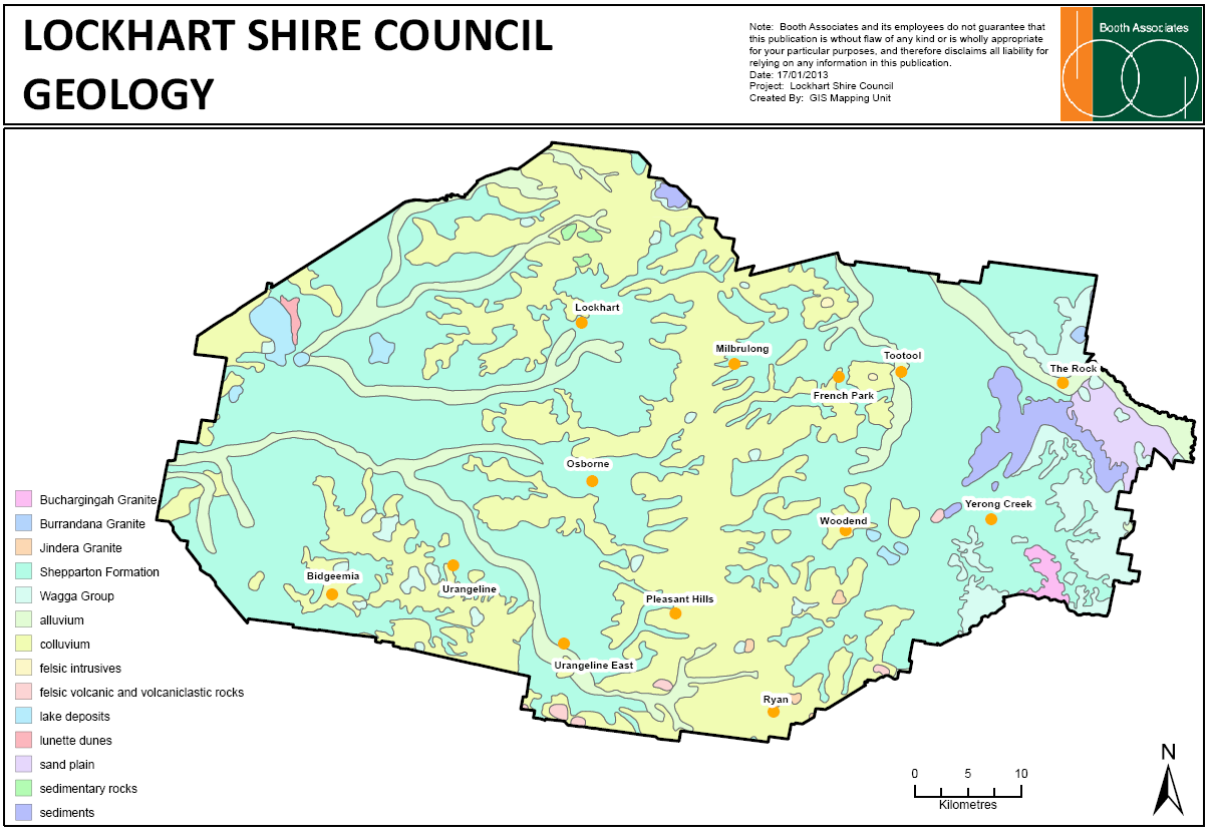
Overall Lockhart Shire is more than 95% arable.

The broad landscape defines the nature of the local area farming practices. With the exception of a few isolated patches of small irrigation layout, irrigated agriculture is not practiced in the Shire due to a lack of access to water.

Extractive industries (quarrying) tend to be centred around the more elevated landscapes and their surrounds where easy access to materials for, largely road base is able to be found.

Figure 1 depicts the geology of the Shire. Figure 1 is also provided as Annexure 3 to this report.

Figure 1: Geology



There are three main land types depicted in Figure 1 being:

- Shepparton Formation covering 145,700ha or 50% of the Shire. The Shepparton Formation forms extensive flat alluvial floodplains of clay and silty clay interspersed with coarse to fine sand and gravel;
- Colluvium covering 94,400ha or 33% of the Shire. Colluvium can be described as aged floodplain soils of clay with minor alluvial and sand deposits; and
- Alluvium covering 23,500ha or 8% of the Shire. Alluvium can be described as channel and floodplain soils or sand, silt, clay and gravel.

Collectively these three landscapes cover 91% of the Shire.

4.3 Trends and Drivers of Change

All industries, households and businesses are subject to constant change. Even governments are unable to avoid inevitable change. Agriculture is no different to the secondary, tertiary and service sectors of our economy. The drivers of change are many and varied in social, environmental, political, cultural and commercial contexts. There are trends in industries which provide an insight as to the future direction of those industries and component businesses which may be experienced throughout our communities and agriculture.

Agriculturally, these trends include but are not limited to:

- The need to increase scale and intensity of operations to respond to the declining terms of trade;
- Declining numbers of livestock and increase in intensity of cropping on farms;
- Increasing prevalence of off-farm income;
- Reduced availability of labour and the substitution with machinery and use of contractors; and
- Reduction in the number of farming businesses and an increase in the adoption of commercial management techniques within agribusiness and the supply chain.

Each of these trends is described in the following sub-sections.

4.3.1 Increase in Business Scale

Over the first 100 years of settlement in mainland Australia, there had been political and social pressure to reduce farm size. As early as 1861 the *Robinson Land Act* paved the way for people to "*squat*" on small parcels of land within the larger "settler" aggregations. The "squatter" could own up to 1 square mile or 640 acres (or 259ha) in the western parts of the State reducing to 320 acres (or 130ha) in the central and eastern sections of the State. The trend to closer settlement continued until at the least the 1970s in NSW with the development of the Coleambally Irrigation Area (CIA).

The more recent trends in increasing scale and intensity of operations is well exampled within the Lockhart Shire. Corporate businesses have been purchasing substantial parcels of land, particularly in the western sections of the Shire and local owner operators have been increasing scale and intensity in the central and eastern parts of the Shire. Machinery has been constantly used as a substitution for previously employed labour as well as the wider use of contractors who provide both machinery and labour services as well as a supporting resource management service.

Dryland farming businesses have increased their intensity of operations with a growing trend to minimum tillage farming and stubble retention to optimise the capture and use of rain water and any other water that may be available. This trend requires specialised farming equipment and management practices to enable the needed management changes to occur. The purchase of neighbouring or nearby farms has further enabled the scale of businesses to increase.

Intensification in the livestock industries has been limited, although the higher lamb prices has led to some leading producers to value add by intensively finishing lambs to meet special market needs. The ongoing drought accelerated the intensification of finishing prime livestock as producers were unable to do so using pastures without feed supplementation. Periods of low grain prices also facilitated the adoption of intensive livestock feeding.

4.3.2 Increasing Intensity of Cropping

Table 3 provides a summary of the changes in land use between 2001and 2011 in the Lockhart Shire based on ABS data.

Table 3: Land use changes in the Lockhart Shire from 2000/01 to 2010/11

Land Use	Area (ha)			Number of Farms/Sites		
	2000/01	**2005/06**	**2010/11**	**2000/01**	**2005/06**	**2010/11**
Pastures - improved	90,956	128,582	74,186	275	306	216
- other	-	-	-	-	-	-
Crops and fallows	122,859	147,972	128,214	324	309	217
Horticulture	-	-	-	-	-	-
Vegeculture	-	-	-	-	-	-
Viticulture	-	2	2	-	1	1
Specialised Crops	-	-	-	-	-	-
Commercial forestry	-	299	25	-	4	2
Environmentally sensitive	-	3,613	-	-	67	-
Buildings & infrastructure	-	2,394	-	-	338	-
Other lands	-	-	-	-	-	-
Total		**283,567**	**226,420**			**275**

Source: Australian Bureau of Statistics

Despite the variability in the way in which ABS collects and presents data between successive censuses the broad and key observations arising from Table 3 include:

- Cropped area within the Lockhart Shire has varied between 43% to over 50% of the total arable area within the total land area of the Shire;
- Pasture areas vary between 25% and 30% with in excess of 40% in 2005/06, though it is most likely native and approved, pastures would occupy nearly all of the land not cropped in the RU1 zone;
- Virtually every rural business within the Shire is a cropping business with the majority of those having some level of pasture production within their farming system rotation; and
- All other agricultural industry forms within the Shire are minor.

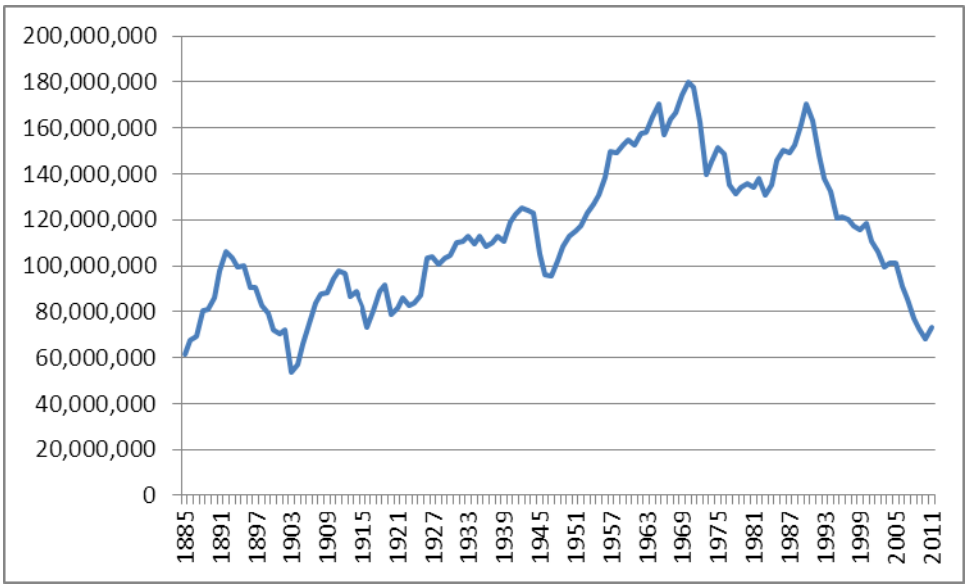
The land usage data affirms the dominance of cropping rotations within many businesses. There does appear to be a small but increasing incidence of cropping focussed businesses without livestock.

The elasticity of cropping can be high for those with croppable lands and the flexibiltiy capacity to adjust cropping systems according to seasonal and market dictates.

4.3.3 Livestock Numbers

The changes in sheep numbers in Australia for approximately the past 120 years are depicted in Graph 2.

Graph 2: Australian Sheep Flock



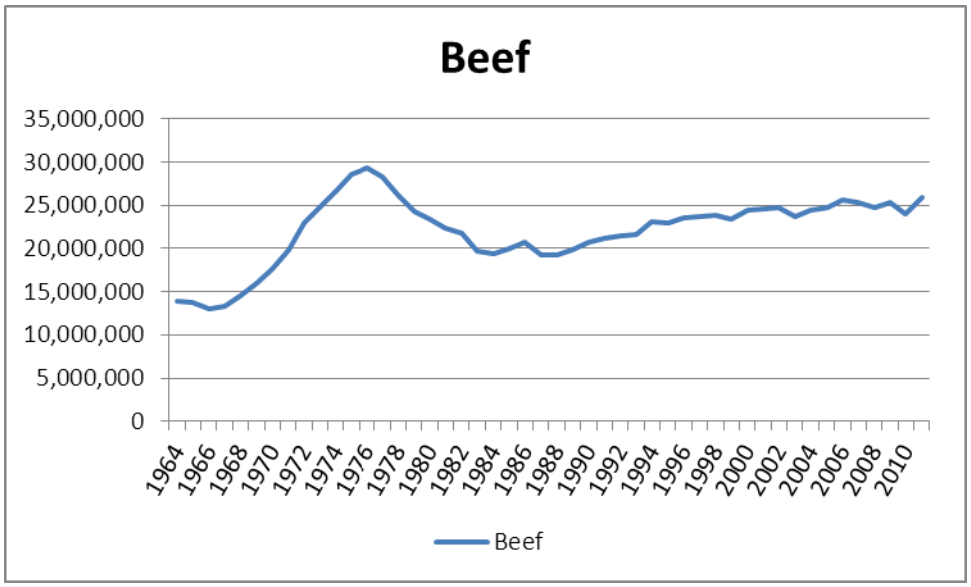
Source: ABS 7124 Historical Selected Agricultural Commodities 2011

Sheep numbers in Australia peaked at 180M in 1969, fell to 135M by the mid 1980s and then quickly rose to another peak of 174M in 1990 as sheep could not be easily sold following a protracted and extreme wool market crash. After 1990 numbers fell quickly on the back of a government sponsored flock reduction program reaching a total flock of around 120M by 1995. Since 1995 the national flock declined to 68M by 2010 with a sharp rise post drought to >73M in 2011.

Without the favourable lamb prices from the late 1990s the depressed wool market and the long and severe drought would have driven the national flock to significantly lower levels than that which actually occurred. The recent decline in sheep meat prices does not appear to have created another decline in the national flock and at the date of writing the indications are the re-build in the flock will continue but at a subdued rate.

The number of cattle in Australia over the past 45 years is depicted in Graph 3.

Graph 3: Australian Cattle Herd



Source: ABS 7124 Historical Selected Agricultural Commodities 2011

Some observations of the trend in cattle numbers depicted in Graph 3 include:

- Beef cattle numbers peaked at 29M in 1976 following sheep numbers crashing and had then fallen to 19M by 1987. Numbers have grown slowly since the 1980s peaking at 25.6M in 2006 before falling again to 24.4M in 2009. The fall in recent years is most likely due to drought as numbers rose again to 25.9M in 2011; and
- Because cattle are unable to cope with drought as well as sheep, it is likely the fall in cattle numbers was in part driven by the drought.

Table 7 in Section 4.9 provides greater detail on the changes in livestock numbers within the Lockhart Shire. In summary the reported changes for the ABS statistics from 2001 to 2011 in the Lockhart Shire are:

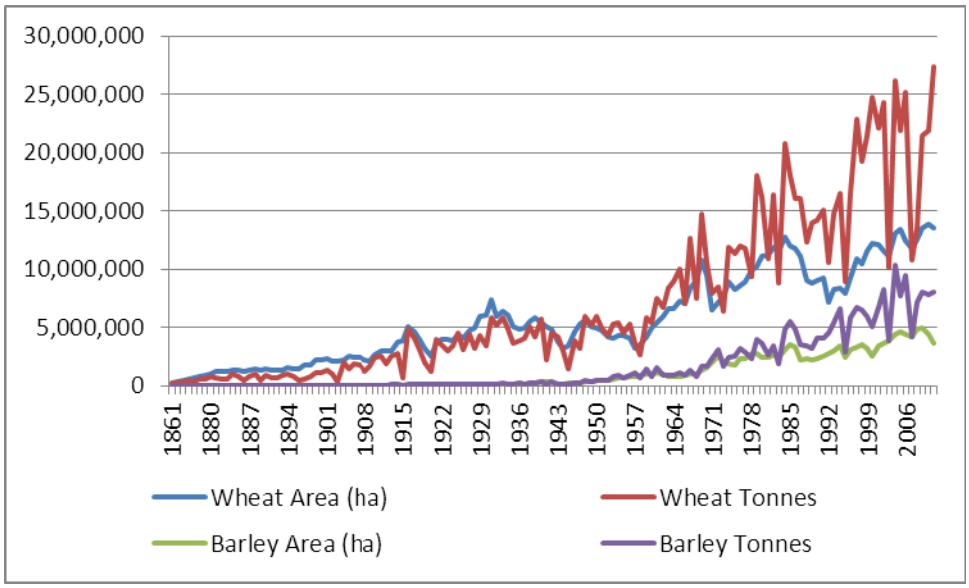
- Total sheep numbers declined from 450,000 to 288,000;
- Dairy cattle declined from 233 to 1 head;
- Beef cattle declined from 14,000 to 8,800 head; and
- Pig numbers declined from 3,000 to 1,900 head.

The decline in livestock numbers would be due to the drought as well as a response to increase intensity of farming operations and reduced access to labour.

4.3.4 Increase in Crop Production

The main winter cereals of wheat and barley across Australia since 1861 are depicted in Graph 4.

Graph 4: Australian Crop Production



Source: ABS 7124 Historical Selected Agricultural Commodities 2011

Some observations of the data in Graph 4 are:

- The national area of wheat and barley has constantly grown over time with annual variations being driven by market prices and comparative values of competing crops such as winter oil seeds;
- Tonnage of grain produced grew faster than crop area but was also more volatile than the area of crop grown. The rate of increase in production being greater than the rate of increase in area grown affirms the history of ongoing productivity improvements and the ability of farmers to produce grain more efficiently under more modern farming techniques; and
- From around 2004 to 2011 winter cereal areas levelled out at 17.5Mha with production varying over this period from 15.0M tonnes to 36.5M tonnes largely in response to subdued terms of trade and difficult seasonal conditions. Production in 2011 was 35.4M tonnes from 17.2Mha indicating stability of areas and high yields from favourable seasonal conditions.

It is generally believed the increased profitability of crops over livestock, as well as the national capacity to grow increased areas of crop by substituting machinery for labour, has also helped drive the increased cropping areas.

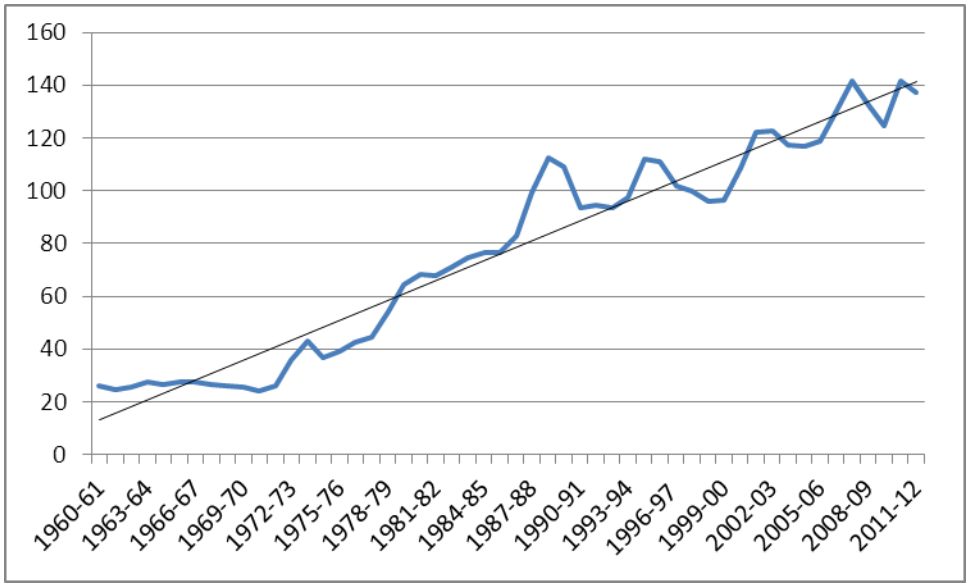
The ABS data in Table 3 in Section 4.3.2 would strongly suggest that a swing to cropping is not occurring in the Lockhart Shire to the same extent as the swing is occurring nationally. The core reason appears to be the already dominance of cropping within Lockhart Shire.

4.3.5 Terms of Trade

In the real world, long term trend values for output product pricing are only encountered in passing. Prices generally fluctuate substantially around the long term trend value, hence the term "boom/bust" cycles.

Graph 5 is an indexed representation of prices received by an Australian farmer from 1960/61 to 2011/12.

Graph 5: Australian Index of Prices Received



Sources: ABARES 2012 Agricultural Commodity Statistics 2012, CC BY 3.0

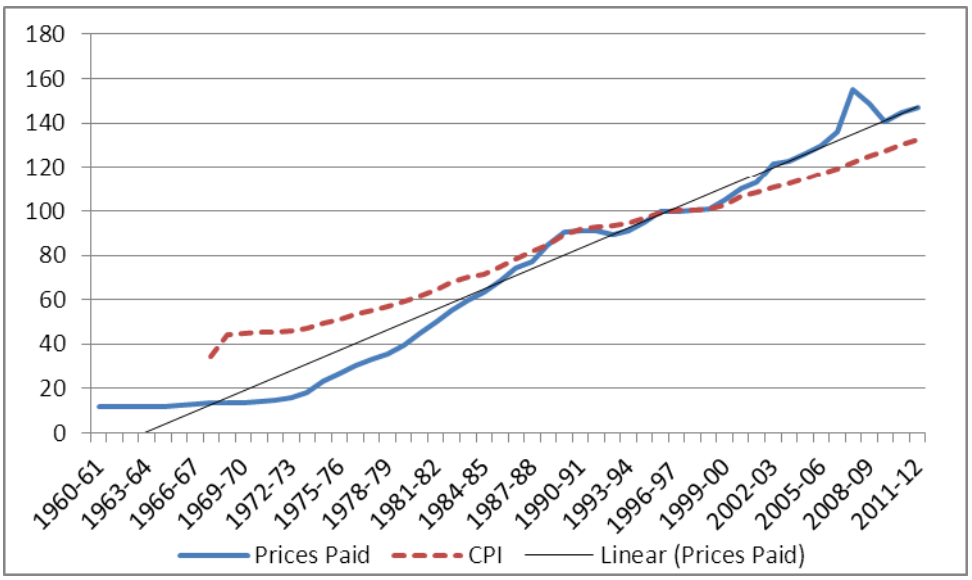
The data in Graph 5 shows how prices received by farmers for their range of commodities produced have fluctuated over the past 40 years. The long term trend value is the straight line which captures the average change in prices received over time. This line indicates the overall trend in prices to be increasing over time in actual but not necessarily in real dollar terms.

For the most of the 40 years depicted in Graph 5, the prices received by farmers fluctuated generally:

- From initially above and to then below the average in the 1960s;
- Below the average in the 1970s;
- Above the average in the 1980s and 1990s; and
- Has been generally below average in the past decade, with the exception of a recent peak due to local drought influences and global supply and demand.

An indexed representation of farm costs (prices paid by farmers for farm inputs) covering the same period as the data in Graph 5 is depicted in Graph 6. To provide a reference line for context the Consumer Price Index (CPI) over the same timeframe (using 1997/98 as a reference year = 100) has also been included in the graph.

Graph 6: Australian Index of Price Paid



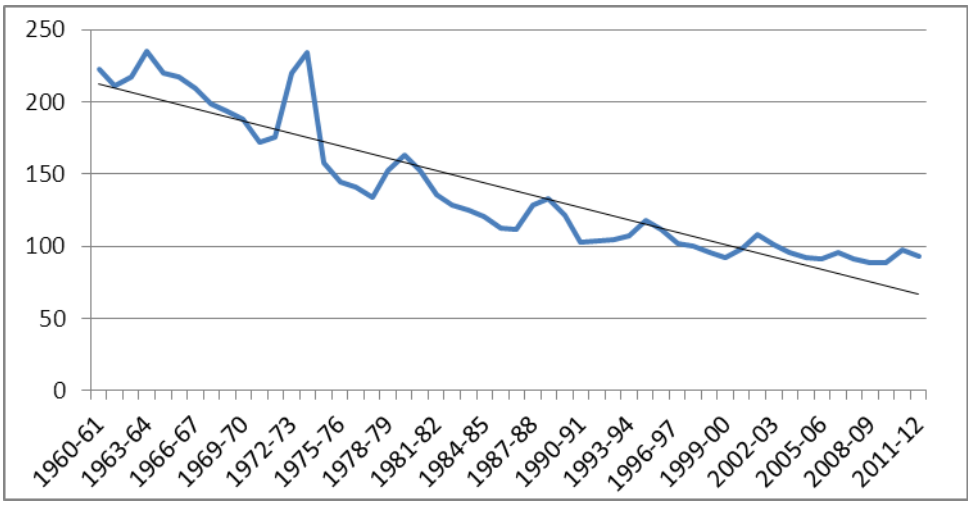
Sources: ABARES 2012 Agricultural Commodity Statistics 2012, CC BY 3.0

Graph 6 indicates farm costs have risen at a similar rate broadly equal to or even slightly faster than the wider public CPI cost increases over the same period.

As indicated in Graph 6 prices paid by farmers generally aligns with the same upward trend as the CPI. However there is most typically a slightly elevated rate of rise in the prices paid compared to the CPI, largely due to the relative capacity of the wider public to keep pressures on costs politically, socially and commercially. Recent times have again seen farmers pay an elevated price increase compared to CPI levels.

To determine the relative status of income and cost changes, the ratio of the index of prices received and the index of prices paid is used. This is called “the terms of trade” or the ratio of Prices Received/Price Paid and is depicted in Graph 7.

Graph 7: Australian Farmer Indexed Terms of Trade



Sources: ABARES 2012 Agricultural Commodity Statistics 2012, CC BY 3.0

It is a normal trend for the terms of trade to be in overall decline with periods of relative boom/bust experienced in the process. The decline is relentlessly ongoing and highlights the need to constantly grow a business and constantly improve business performance. Whether the terms of trade are depicted for the last 40 years or for the last 1,000 years, and whether it is for big or small businesses, governments or even the person in the street, the trend is the same.

Agricultural businesses respond to the declining terms of trade by:

- Increasing the intensity of operations;
- Becoming more efficient with operations;
- Growing the scale of their business; and
- Combinations of the above.

Farms, like all other businesses, are utilising new technology, fine-tuning operations, pushing productivity improvements, improving management skills and adopting new operational systems such as environmental management systems to meet the challenges of an inevitable decline in terms of trade.

Not only agriculture is affected by the declining terms of trade. It does not matter whether we are individuals in the street, a steel mill, winery, retailer, bank, government or even the World Bank or International Monetary Fund, all entities are subjected to the cost/price squeeze or declining terms of trade. At its basic level, $100 today will not buy what it did 10 years ago and it will buy more today than it will in 10 years from now.

The harsh reality of the declining terms of trade cannot be ignored by any (agri) business owner and it can be deduced from the long term trends described above that a business content to maintain the *status quo* will inevitably struggle in future years. For complacent businesses it will be a matter of time before the struggle, and for others a matter of which generation. To survive and thrive, a policy of business growth and best practice management must be adopted.

4.3.6 Agricultural Business Critical Mass

Simply put, Business Critical Mass (BCM) is a measure of the capacity of a business to "shock absorb" adverse seasons and markets, to be able to grow the business base ahead of the declining terms of trade, to adopt new technology and to provide a "standard" of remuneration and education commensurate with that required for a similar sized business in any other industry.

BCM criteria will change across the full spectrum of industries. Thus the needs of the corner store owner will be distinctly different from a large industrial firm and both will be different to the criteria for a major mining business.

Agriculture is a very capital intensive and long-haul industry which needs scale to better manage fluctuations in markets and seasons, and more recently, changes in policy. In its broadest context the indicative "rules of thumb" for successful agribusinesses (farms), when assuming average returns on capital, the guideline BCM's are based on gross assets agricultural under management as follows:

- $2.0M – can survive with minimal debt, tight cost control, reduced living standards and *"capital rundown*" between successive "*booms*";
- $4.0M – better than the $2.0M business but with significantly constrained resources;
- $6.0M – has a measure of scale but will need to be very efficient in order to grow without excessive risk;
- $8.0M – a business at the bottom end of the desirable BCM scale; and
- >$10.0M – a business with good BCM.

The above support the view that agriculture is a capital intensive industry and in order to grow, each growth step will usually require a major capital outlay with associated risks.

A high proportion of Australian agribusinesses are in the $2.0M to $4.0M category, often as a direct or indirect consequence of past government closer settlement policies. The recent policy trend to facilitate re-amalgamation will take time to materialise but it needs to be recognised the trend must be facilitated for agriculture to be a viable, stand-alone industry.

4.3.7 Other Farm Trends

The *Review of Land Use Planning in the Central West Report* (NSW Government, 2007) made several comments in relation to current trends in agriculture, including:

> *"Significant changes in agriculture have occurred over recent decades. These include large farms generally reducing in number and increasing in size, small farms, increasing in number and generally getting smaller, a reduction in the area of land in agricultural production and an increased reliance on off-farm income particularly in times of drought. The increase in the size of large farms and concurrent reduction in the size of small farms is understood to be a worldwide trend.*
>
> *In terms of off-farm income the Productivity Commission report (ibid) notes that off-farm income has become increasingly important to maintaining family farm incomes. Since 1990, the proportion of families, deriving income from off-farm wages and salaries increased from 30% to 45% with average earnings rising from $15,000 to approximately $33,500 per year (NSW farms) in 2005 – 2006 (ABARE, Australian Commodities 2007 March Quarter). This increase in reliance on off-farm income has occurred consistent with the wider trend within the Australian community toward two income families. This has now become the norm rather than the exception and it would appear rural communities are no different to the rest of Australia in this regard.*
>
> *In terms of productivity the Productivity Commission report notes that agricultural productivity has exhibited strong growth over the last three decades – more than twice the rate achieved in Australia's market sector as a whole. It further notes that productivity has accounted for the entire increase in output by the agriculture sector over the last 30 years. This has occurred while big farms have become bigger and small farms smaller."*

As the report notes, the trend towards increasing levels of off-farm income may be a result of and accelerated by the drought, driving the need for alternative sources of income. It is expected farming families will continue to access off-farm income in order to continue to manage rising costs and on-going climate risk. Off-farm income is available for farming families located away from towns, with known examples including contract fencing; mustering; shearing; bookkeeping; child care and many other activities in their immediate area.

In relation to farm size, the *Review of Land Use Planning in the Central West* states:

> *"… large farms generally reducing in number and increasing in size, small farms increasing in number and generally getting smaller."*

Such comments are relevant to the Lockhart Shire. "Small farms getting smaller" may be as a result of the increasing trends of intensification and/or family succession strategies. In line with changing farm size, the total population of people living on farms is understood to be declining over time.

The Central West Rural Lands Inquiry Report also stated:

> *"…… agricultural productivity has exhibited strong growth over the last three decades."*

The decline in terms of trade is driving the need for farmers to be increasingly skilled at improving efficiencies and controlling their costs to enable low unit cost commodity production. Farmers are also taking control of the prices they receive by a range of means, such as:

- Selling direct to processors rather than sending livestock to the regional saleyards;
- Forward marketing of grain;
- On-farm grain storage reducing the proportion of grain delivered at harvest; and
- A greater emphasis placed on relationships direct with wholesalers.

4.4 Historical Land Use

The following text is a succinct summary of the development of the Lockhart Shire region obtained principally from the book "*Land Galore – History of Lockhart Shire*" prepared by William A Bailey, printed in 1979.

The original inhabitants of the area were the Wiradguri Aboriginals as part of the wider Wiradguri Group inhabiting most of south east NSW. Capital Charles Sturt passed through the region in 1830 in his travels down the Murrumbidgee River and by the late 1830s some pastoral holdings had been taken up principally along the river frontages and to the more eastern parts as what is now known as the Riverina district of NSW. By the early 1940s many settlers were beginning to take up large sections of land along creeks, billabongs and other likely watercourse areas between these two major rivers.

The site as what is now the town of Urana was discovered in 1842 by Morris, Gwynne and Walker in passing through to discover the Edward River near what is now known as Deniliquin. Urana Station was taken up in the 1840s by Henry Osborne. By 1848 the Government Gazette noted, amongst other stations, the ownership of Brookong Statio, Tootool and Bullenbong all part of landholdings within what is now known as Lockhart Shire. By 1850 other records noted Urangline Station at 106,000 acres and Boree Creek of almost 20,000 acres. Bullenbong Station grew the first wheat crop in the area on 8 acres.

Reports are that settlers began ringbarking trees to kill them in the 1860s and 1870s after which the 1881 Ringbarking Act prohibited the practice on Crown leases without permit but did not apply to private property.

Bushranging was reported throughout the 1860s and 1870s. Daniel Morgan is reported as riding through the Brookong area in the late 1850s and reportedly had a hide-out in the caves on the side of Mt Galore to the north of the township of Lockhart.

In November 1876 alluvial gold was discovered on Brookong eight miles due east of Urana. Twenty miners' rights were issued, but by April 1870 settlers reported that the diggings were declining with no more than 60 or 70 miners on the field and scarcity in water preventing panning.

During the late 1850s through to the 1880s official roads were surveyed through the countryside and rail lines constructed to Narrandera to the north west and to The Rock on the east by 1881.

The town of Lockhart was previously known as Greens Gunyah which was declared a "place" in the early 1880s. Greens Gunyah became known as the town of Lockhart after CGN Lockhart, Commissioner of Crown Lands after proclamation.

Water was scarce at Lockhart in the early years as it was across most of the lands between the Murray and Murrumbidgee Rivers and water had to be carted into the town by horse and bullock teams.

It was reported that great stacks of bagged wheat were held at the Henty Rail Siding by the end of the 1890s. By 1897 there was reportedly 20,000 acres of wheat being grown within a 15 mile radius of Lockhart and deputations were made seeking railway construction to the town. From the early 1900s through to today there has been an increase in the area of wheat and other crops in rotation as the Shire made its transition from an initial pastoralist industry to smaller settler blocks as governments passed various legislation forms to drive higher and better economic use of land.

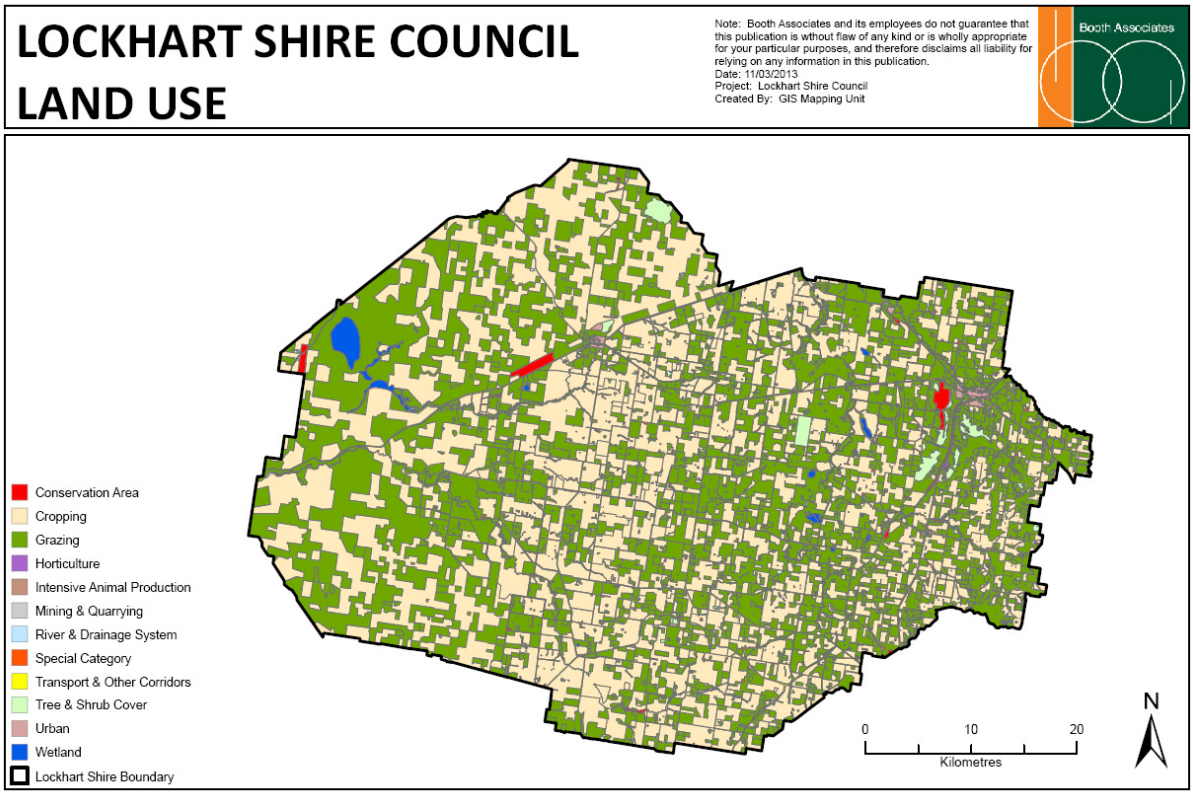
By the mid-1980s and without making open public statements governments were beginning to allow the concept of closer settlement to be overtaken by fostering re-amalgamation of lands as the need for business critical mass drove the need for larger and more efficient operations.

4.5 Current Land Use

Included as Figure 2 is a general land use map depicting the spatial distribution of land usages across Lockhart Shire. Figure 2 is provided as Annexure 4 to this report. Observations from the land use map are:

- The lack of cultivation in and around The Rock;
- The predominance of cropping and pastoral production over the entire Shire;
- Areas of natural resources such as river and drainage systems, tree and shrub cover and wetlands; and
- Urban and local community areas are depicted as well as the major transport corridors.

Figure 2: Land Use



Current land use within Lockhart Shire has been defined by the ABS Agricultural Census Data for 2010/11 is summarised in Table 4.

Table 4: Land Use Summary for Lockhart Shire

Land Use	Hectares	% of Total	Number of farms
Pastures - improved	128,582	45%	308
- other	-	-	-
Crops and fallows	147,972	52%	306
Horticulture	-	-	-
Vegeculture	-	-	-
Viticulture	-	-	-
Specialised crops	-	-	-
Commercial forestry	299	<1%	4
Environmentally sensitive	3,613	1%	123
Building and Infrastructure	2,394	1%	194
Other lands	726	<1%	338
Total	**283,586**		

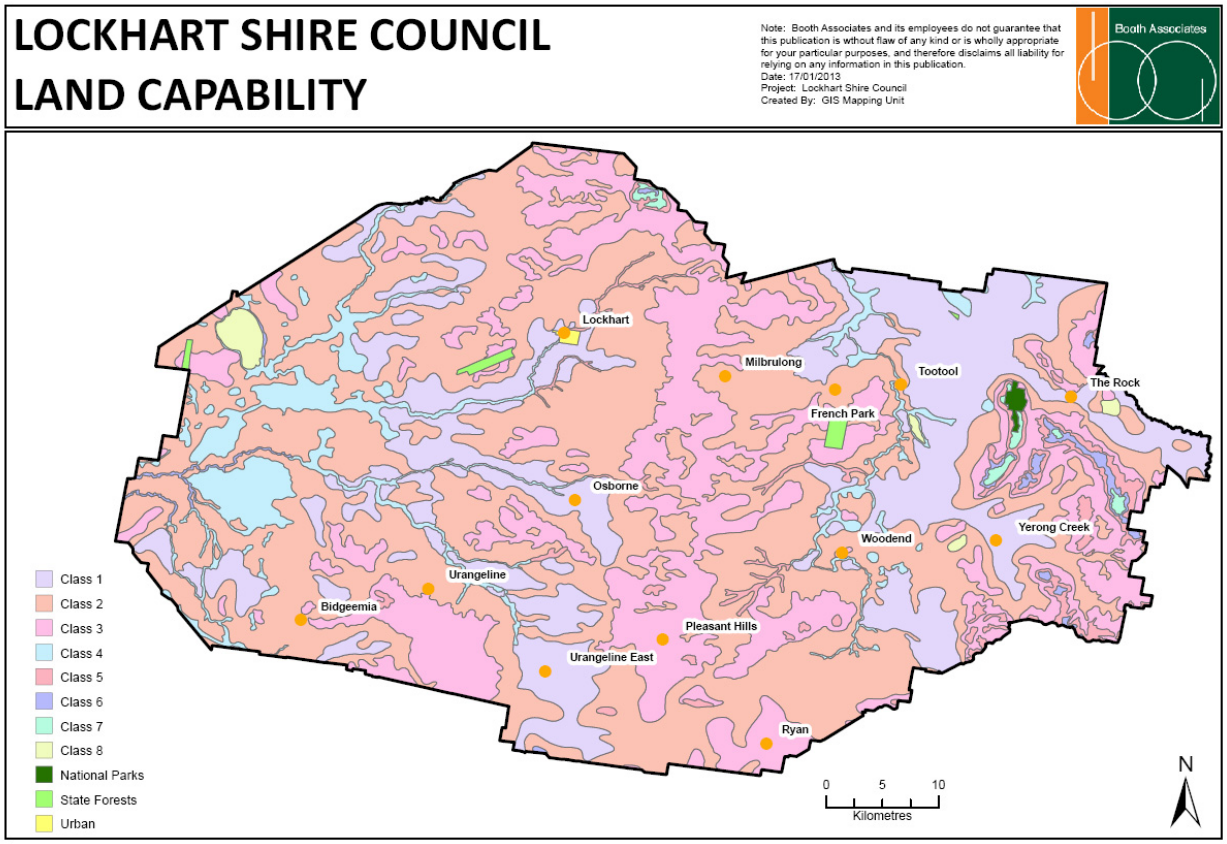
Source: Australian Bureau of Statistics

The data in Table 4 affirms that >95% of the Shire is used for productive agricultural purposes.

4.6 Land Capability

Figure 4 depicts land capability for the Lockhart Shire. Figure 3 is also provided as Annexure 5 to this report.

Figure 3: Land Capability



The land classes can be summarised as:

- Land classified as Classes 1, 2 or 3 are considered suitable for regular cultivation;
- Land classified as Classes 4 and 5 are considered suitable for grazing with occasional cultivation.
- Land classified as Class 6 is considered suitable for grazing only; and
- Land classified as Class 7 or 8 is not considered suitable for agriculture.

Land suitable for regular cultivation can be described as prime agricultural land. This is depicted in Figure 4. Figure 4 is also provided as Annexure 6 to this report.

Figure 4: Prime Agricultural Land

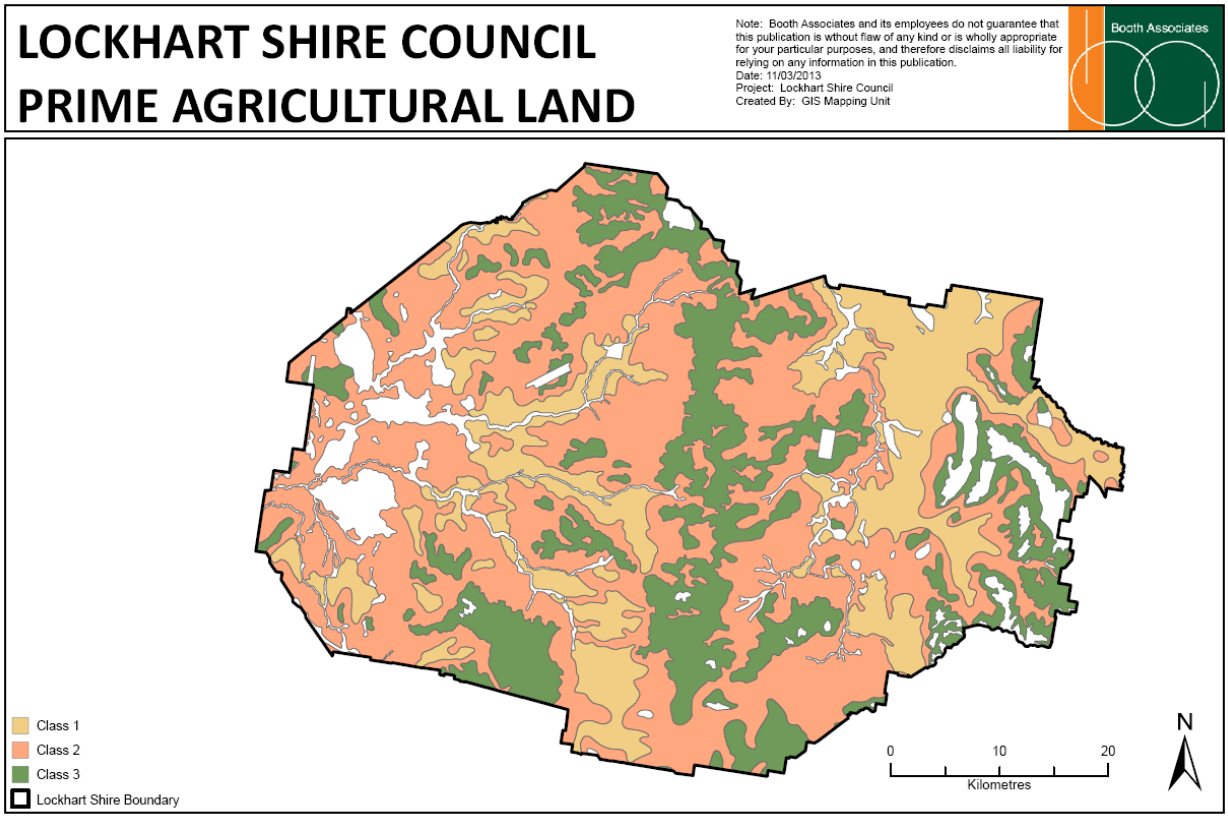


Figure 4 indicates that prime agricultural land covers more than 90% of the Shire. The main areas that are not prime agricultural land are rocky timbered outcrops in the eastern side of the Shire, and low lying flood prone areas on the western side of the Shire.

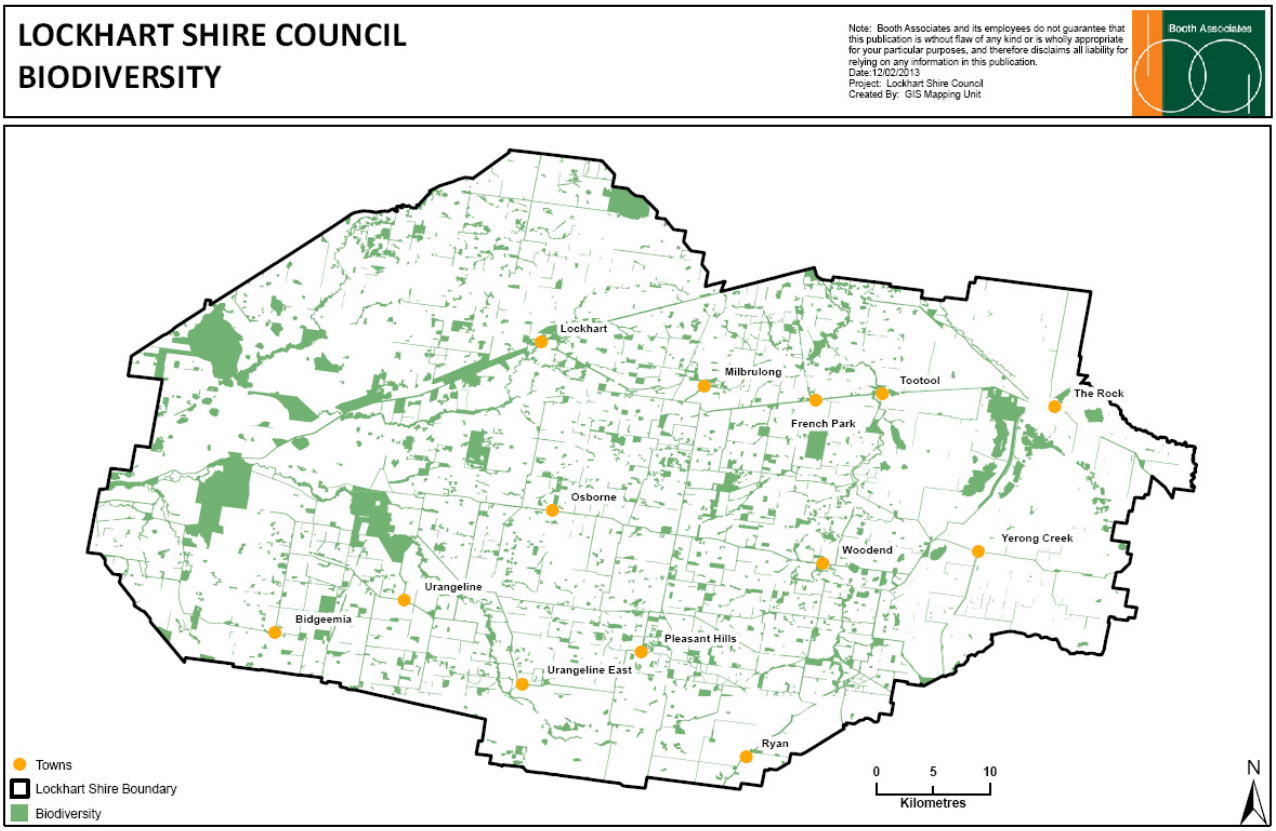
The main drivers of productivity within Lockhart Shire is thus climatic conditions with the higher yields and productivity being achieved in the east of the Shire declining in productivity to the west. Productivity changes are reflected in values of land which also vary across the Shire from highest in the east to lowest in the west.

The lower land values found in the more western properties is generally reflected in the same capital sum being invested over more area to have similar sized businesses in terms of overall productivity.

4.7 Sensitive Natural Resources

Figure 5 and Figure 6 show the spatial distribution of areas of significant biodiversity and sensitive natural resources in particular water. Figure 5 and Figure 6 are provided as Annexure 7 and Annexure 8 to this report.

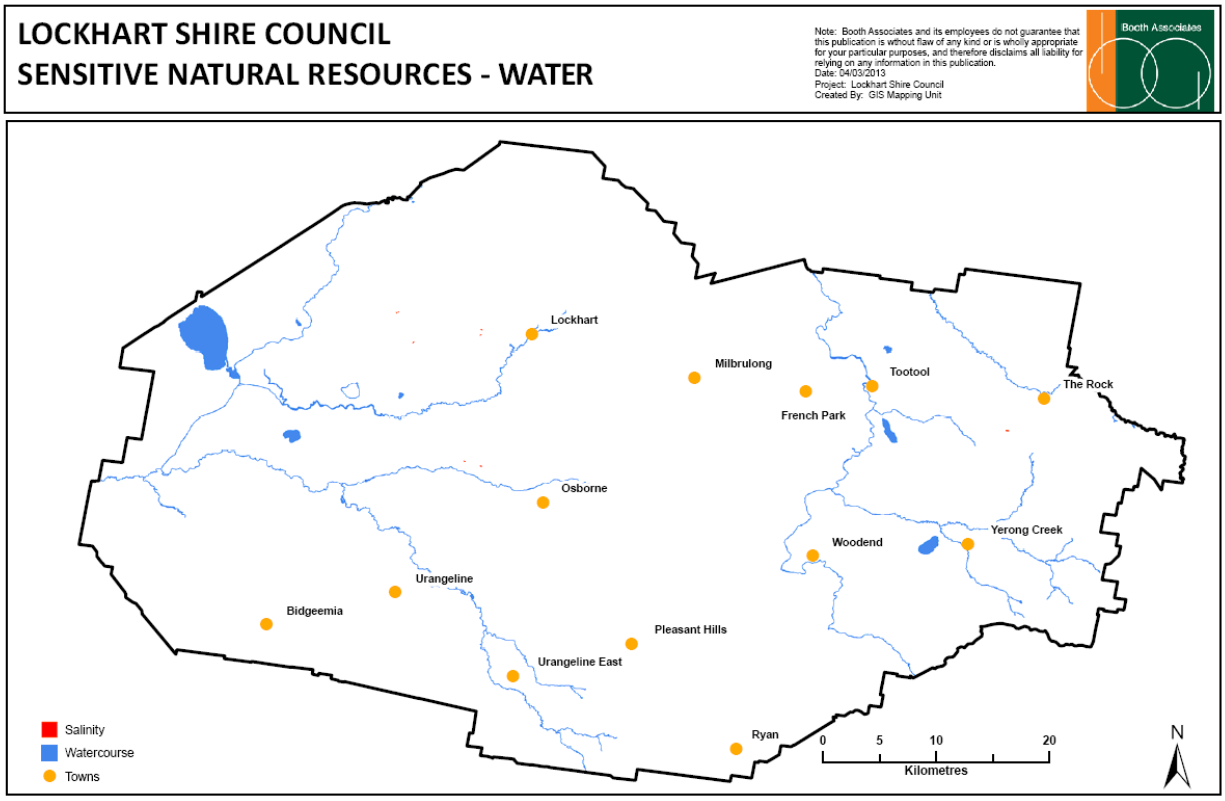
Figure 5: Biodiversity



The standout features of these natural resources are:

- Biodiversity (Figure 5) is spatially well spread across the region with the modest exception of the eastern sections, which appears to not have been mapped in full detail;
- Other than the presence of a large wetland in the north western section of the Shire, the location of sensitive watercourses is relatively minimal (Figure 6); and
- There are small isolated areas of salinity identified (Figure 6).

Figure 6: Sensitive Natural Resources



4.8 Agricultural Land Suitability

Sustainable dryland agricultural practices, commensurate with the landscape constraints and climate conditions, have been conducted successfully through the Lockhart Shire for nearly 175 years. This demonstrates the land suitability for a range of dryland agricultural cropping systems and the capacity of land managers to adjust to changing circumstances in a responsible and sustainable manner.

The land use assessment in Section 4.5 has indicated that over 95% of the agricultural land within the Shire is used for either grazing or annual winter cropping. There is effectively no irrigation within the Shire due to the lack of available water sources. The majority of cropping businesses within the Lockhart Shire carry out both grazing and cropping conjunctively with a few specialist livestock businesses and a growing number of specialist cropping businesses which are driving towards cropping only using zero and/or minimum tillage practices.

The Lockhart Shire does not have a history of intensive animal production and the primary reason for this is the lack of reliable access to water. Notwithstanding there is a measure of intensive finishing of lambs and/or beef in small, low capital feedlots and/or under supplementary feeding circumstances in paddocks. There is an axiom within the large scale intensive animal industries which states that animals should be taken to the primary sources of feed rather than *vice versa.* The axiom for Lockhart Shire does not stand up in commercial practice due to the lack of reliability and access to assured large volumes of water.

4.9 Agricultural Production

ABS Agricultural Census data calculates the value of agricultural commodities produced within Lockhart Shire in 2010/11 was $119.5M. The contribution of each of the various commodities to the gross value of production is summarised in Table 5.

Table 5: Summary of gross value of total production for Lockhart Shire 2010-11

		$M	$M	Proportion	Proportion
		2005/06	**2010/11**	**2005/06**	**2010/11**
Crop	Hay	5.5	2.6	6%	2%
	Cereal Crops	63.2	70.3	64%	59%
	Legumes	1.7	1.5	2%	1%
	Oilseeds	9.2	24.7	-	-
	Fibre	-	-	-	-
	Other broadacre	0.1	0.4	0%	0%
	Vegetables	0.0		0%	
	Fruit	-	-	-	-
	Grapes	-	-	-	-
	Other crops	-	-	-	-
	Total Crop	**79.7**	**99.5**	**81%**	**83%**
Livestock	Sheep	6.7	6.8	7%	6%
	Wool	8.4	10.2	9%	-
	Beef cattle	2.2	2.3	2%	2%
	Dairy cattle	-	-	-	-
	Milk	-	-	-	-
	Pigs	1.1	0.7	1%	1%
	Other – eggs	0.2		0%	
	Total Livestock	**18.6**	**20.0**	**19%**	**17%**
Total – all commodities		**98.3**	**119.5**	**100%**	**100%**

Source: Australian Bureau of Statistics Agricultural Census

The following observations from Table 5 are:

- In 2010/11 approximately 85% of production was from cropping and the remainder from livestock;
- Cereal and oilseed crops account for 95% of all cropping production; and
- Of the cropping businesses approximately 65% of the cropping area is producing cereal crops, whereas the other lands producing oilseed crops is substantially lower at between 10% and 20%.

Table 6 summarises the crop production data and the changes in productivity for Lockhart Shire between 2000/01 and 2010/11 agricultural censuses.

Table 6: Crop production in Lockhart Shire

	Area (ha)			Production (tonnes)			No. of Businesses		
	2000/01	**2005/06**	**2010/11**	**2000/01**	**2005/06**	**2010/11**	**2000/01**	**2005/06**	**2010/11**
Pastures	90,956	-	74,186	-	0	-	275	-	216
Hay and silage	5,228	7,299	3,423	15,162	41,199	12,523	159	180	81
Wheat	58,125	82,260	75,399	217,022	277,839	243,344	302	288	217
Oats	3,659	6,184	3,756	8,238	14,914	7,069	97	122	85
Barley	10,475	18,038	15,634	25,789	53,533	44,542	90	131	106
Triticale	12,257	9,350	1,386	35,793	26,987	4,393	168	114	34
Canola	31,414	19,130	26,674	50,314	31,318	48,835	218	139	137
Other Oilseeds									
Legumes for grain	5,097	3,263	2,976	9.347	5,632	5,523	114	56	57
Fibre									
Other broadacre	85	105	2,387	212		1,189	1	3	40
Grapes		2	2		2	22		1	1
Total									

Note: No vegetables, horticulture or other speciality crops recorded
Legumes are mostly field peas and lupins with occasional chickpeas and faba beans

Source: 7125– Agricultural Commodities: Small Area Data, Australia,

Comments arising from Table 6 are:

- Wheat is the major cereal crop being produced with barley being generally 20% of the total wheat area;
- Oat production is minor and grown as a rotation crop for disease and weed control as well as for livestock supplementation;
- Triticale production has been significant in the past but has declined substantially;
- Of the oilseed crops canola is significant and should rainfall conditions permit the canola area is around 25% to 30% of the area planted to wheat. The years of low canola plantings appear to be the result of late autumn rainfall breaks reducing gross margin potential in comparison to alternative crops;
- Legumes for grain are minor but an important part of disease and weed control;
- Other broadacre crops are minor and most likely one-off crops for fodder production; and
- Other than a few grapes there is no production of commercial vegetables, speciality crops, trees or vines.

Table 7 summarises the ABS Agricultural Census data for livestock over the three censuses periods.

Table 7: Livestock Numbers

	No. of Head			No. of Businesses		
	2000/01	**2005/06**	**2010/11**	**2000/01**	**2005/06**	**2010/11**
Animal Species						
- Poultry	47		88	1	1	1
- Layers	290			1	1	
- Other						
Dairy	233	60	1	9	1	1
Beef	14,112	15,376	8,757	133	132	99
Sheep	450,969	409,613	287,828	289	267	205
Pigs	2,974	3,380	1,934	-	9	37
Other animals		2,002	1,013			
Animal Products						
- Wool						
- Milk						
- Eggs						
Total						

The key points arising from Table 7 are:

- Beef is a modest industry and in decline in terms of both total numbers and Dry Sheep Equivalents (DSE) compared to other livestock particularly sheep;
- Sheep are the main livestock industry which is also in decline in terms of total numbers and number of producers;
- Pig numbers are modest and most likely a supplementary enterprise to utilise some waste grains;
- Other animals are mostly horses; and
- The dairy sector has exited the region.

In summary the available data indicates a declining dependence on livestock industries in terms of economics, total numbers being run and in number of producers of livestock enterprises. The prolonged drought will have impacted on these figures as the last census in 2010/11 was taken at the end of this drought.

It is interesting to note that there is a 25% to 30% decline in the number of livestock producers particularly between 2005/06 and 2010/11. This decline is expected to be as a result of the prolonged drought and the need to gain increasing efficiency and farming operations and the conflict found in operating livestock enterprises in conjunction with more intensive farming operations seeking to maximise water use efficiency through minimum tillage and other advanced cropping production techniques.

4.10 Non-Primary Production

The other non-agricultural types of primary production include:

- Forestry;
- Extractive industries; and
- Potential for new primary industries.

These sectors are described in the following sub-sections.

4.10.1 Forestry

The ABS data in Table 5 states that there is less than 300ha of commercial forestry lands in the Shire. The remaining areas of high value biodiversity as depicted in Figure 5 are natural forests largely on Crown land which have been protected under legislation and are not to be used for commercial forestry purposes.

Given the need for business critical mass in any sector and the long lead time in establishing agroforestry projects in this relatively low rainfall zone for agroforestry purposes does indicate a strong future for a future of agroforestry within the Lockhart Shire.

4.10.2 Extractive Industries

The following is an extract from Brown (2012) titled "*Mineral Resource Audit Lockhart Shire*".

> *"Lockhart Shire has a range of construction material variants. A number of pits in metasedimentary and metavolcanic rocks produce unprocessed construction materials which are suitable for gravel road construction and maintenance. Three of these pits are used to produce crushed aggregate. The shire does not include a source of high quality hard rock aggregate or construction sand.*
>
> *Kaolin mining has been active in the Morgans Lane area for many years. The site should continue to produce material for the foreseeable future.*
>
> *There are no metalliferous mineral occurrences within the shire. Previous exploration for base metals, precious metals, tin and tungsten has proven unsuccessful. Exploration for these commodities is presently under way in the region.*
>
> *There is potential for petroleum and gas resources in the shire."*

According to Brown (2012):

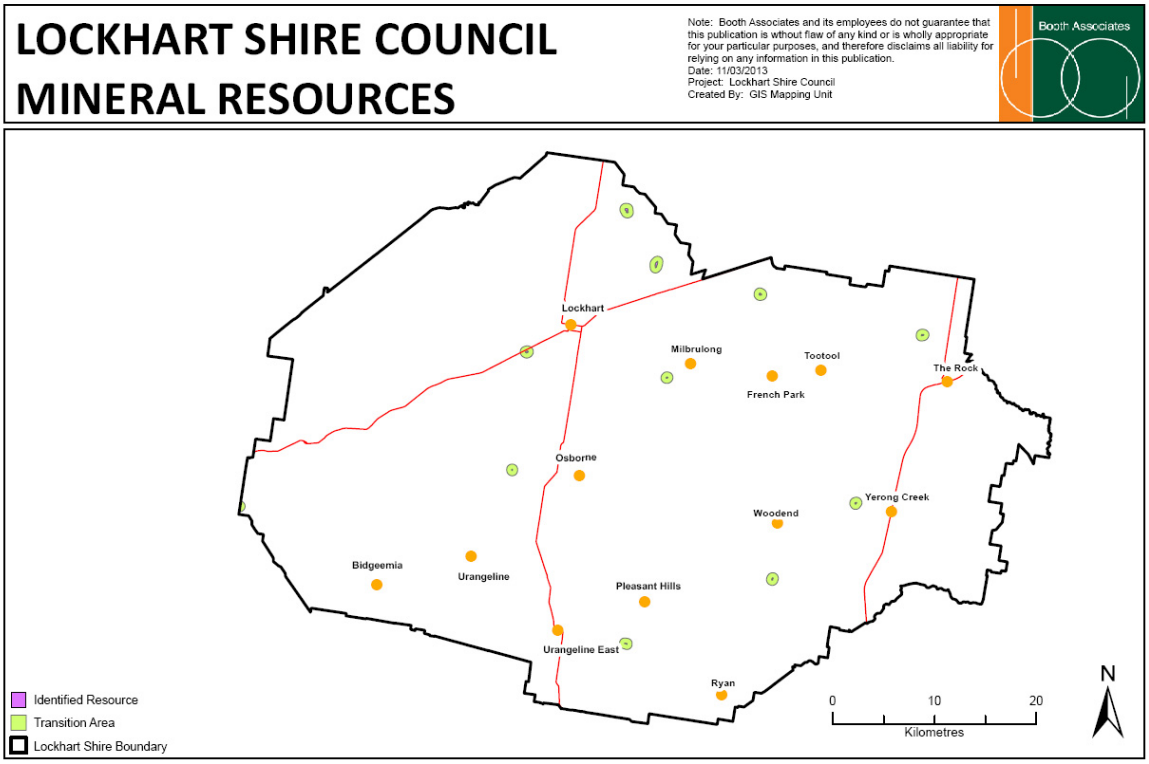
> *"NSW Trade & Investment recommends that councils adopt the following strategies regarding mineral resources in its planning.*
>
> 1. *Operating mines and quarries should be protected from sterilisation or hindrance by encroachment of incompatible adjacent development.*
> 2. *Known resources and areas of identified high mineral potential should not be unnecessarily sterilised by inappropriate zoning or development.*
> 3. *Access to land for mineral exploration and possible development should be maintained over as much of the planning area as possible."*

Brown (2012) lists 10 known sites across the Lockhart Shire with nine of those pits being operated by the Lockhart Shire Council to generate a combination of road base crushed aggregate and unprocessed construction materials. The tenth site is a mine known as "Morgan's Mine" operated by Boral Bricks Pty Ltd to produce brick clay from kaolinitic clay. The Boral Bricks mine site is currently a disused water filled pit which still has large potential resources plus a stockpile in use.

Because quarrying tends to occur in areas that generally have a low agricultural potential or are not as well suited to agriculture generally, quarrying at this point is unlikely to impact on prime agricultural land. Quarrying can however, have a significant impact on environmentally sensitive areas. Therefore it is important that all quarrying activities are undertaken in accordance with Council Regulations and State Regulations.

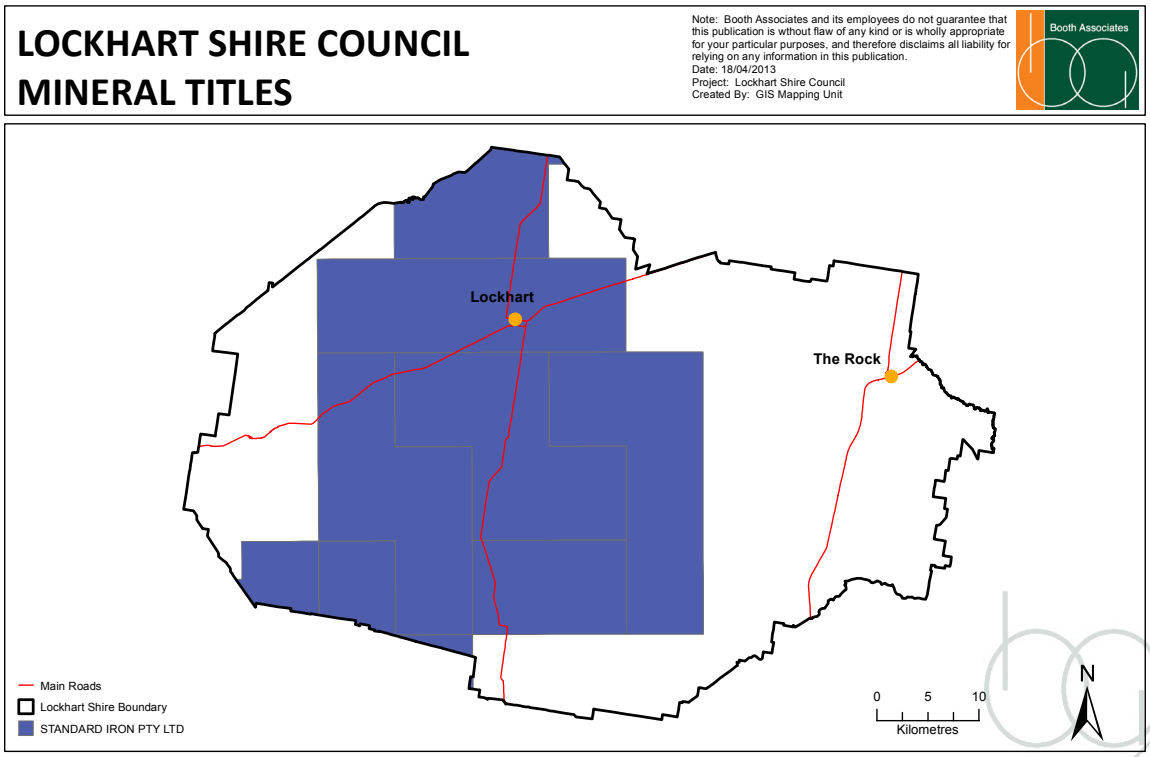
Figure 7 is the Section 117 Mineral Resource Advice Map with data provided by NSW Resources and Energy. Figure 7 is also attached as Annexure 9 to this report. Figure 7 depicts mineral resources across the LGA as identified by Brown (2012) with the buffer areas around each of the resources.

Figure 7: Section 117 Mineral Resources Advice Map



Included as Figure 8 is a mineral titles map for the Lockhart Shire. Figure 8 shows only one mineral title, held by Standard Iron Pty Ltd covering 151,263ha on the western side of the Shire.

Figure 8: Mineral Titles



4.10.3 Energy Generation

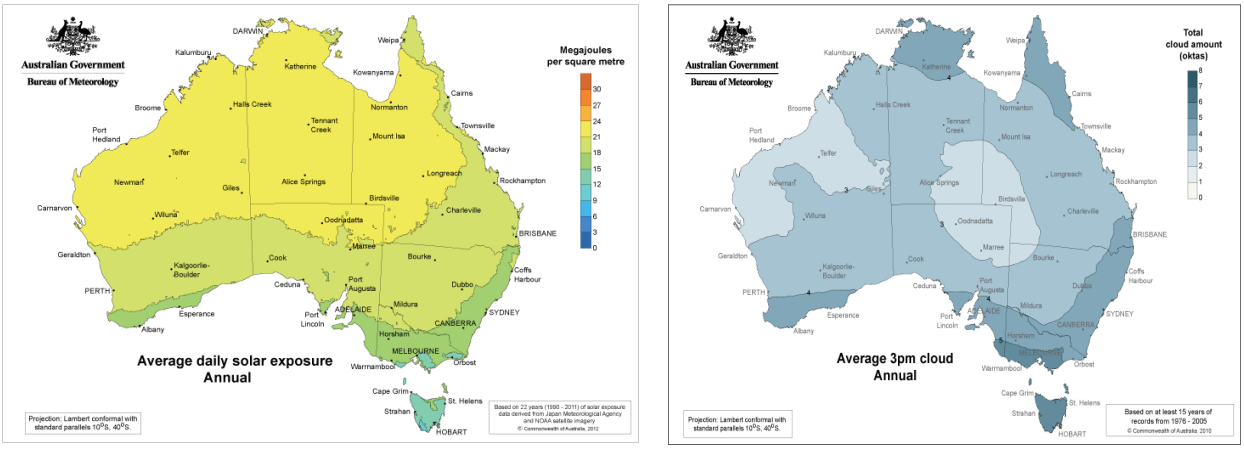
The rising costs of electricity and concerns about the impact of greenhouse gas emissions from coal burning energy generation systems has seen an increased interest in more renewable forms of energy generation. Wind turbines have been installed in several locations throughout NSW including near Blayney to the north east of the Shire. All current wind turbines across the State are located on the western fringes of the Great Dividing Range. These wind turbines are all located at least 500m above sea level, as winds tend to be stronger and more reliable at higher elevations and also receive the benefit of orographic uplift.

Using the NSW Wind Atlas Map Lockhart Shire is broadly categorised in the mid to lower range of the potential to generate wind electricity across all regions in the State. The eastern sections of the Shire appear to have a slightly higher potential to attract investment than the central sections.

It is noted that across regions with established wind farms there are community concerns about negative health impacts to people who live near wind turbines, so land use conflict is becoming a significant issue. Overall the Shire would not be expected to be of a high priority for investment in wind turbines in the foreseeable future.

Solar power generation has potential as a future land use in the Lockhart Shire and the maps to assess the relative potential of this industry for the Shire are included as Figure 9.

Figure 9: Solar Exposure and Cloud Cover



Source: http://www.bom.gov.au/jsp/ncc/climate_averages/solar-exposure/index.jsp
http://www.bom.gov.au/jsp/ncc/climate_averages/cloud/index.jsp?maptype=3&period=an#maps

Aecom (2010) investigated potential locations for a solar power precinct in NSW. The areas selected by this report included Broken Hill, Darlington Point, Dubbo, Moree and Tamworth. Lockhart Shire potentially has some of the attributes of the Aecom selected areas have such as proximity to major power lines, a majority of sunny days, and cost effective land.

In brief, Lockhart should promote the concept whilst being aware of the alternative options available to a potential investor.

4.11 Value Adding Agriculture

4.11.1 Irrigation

The Lockhart Shire is noted for its excellent dryland agricultural production history and potential. However, the lack of reliable water resources of sufficient volume to undertake irrigation of any note effectively negates the potential for irrigation in the foreseeable future.

4.11.2 Other Primary Production

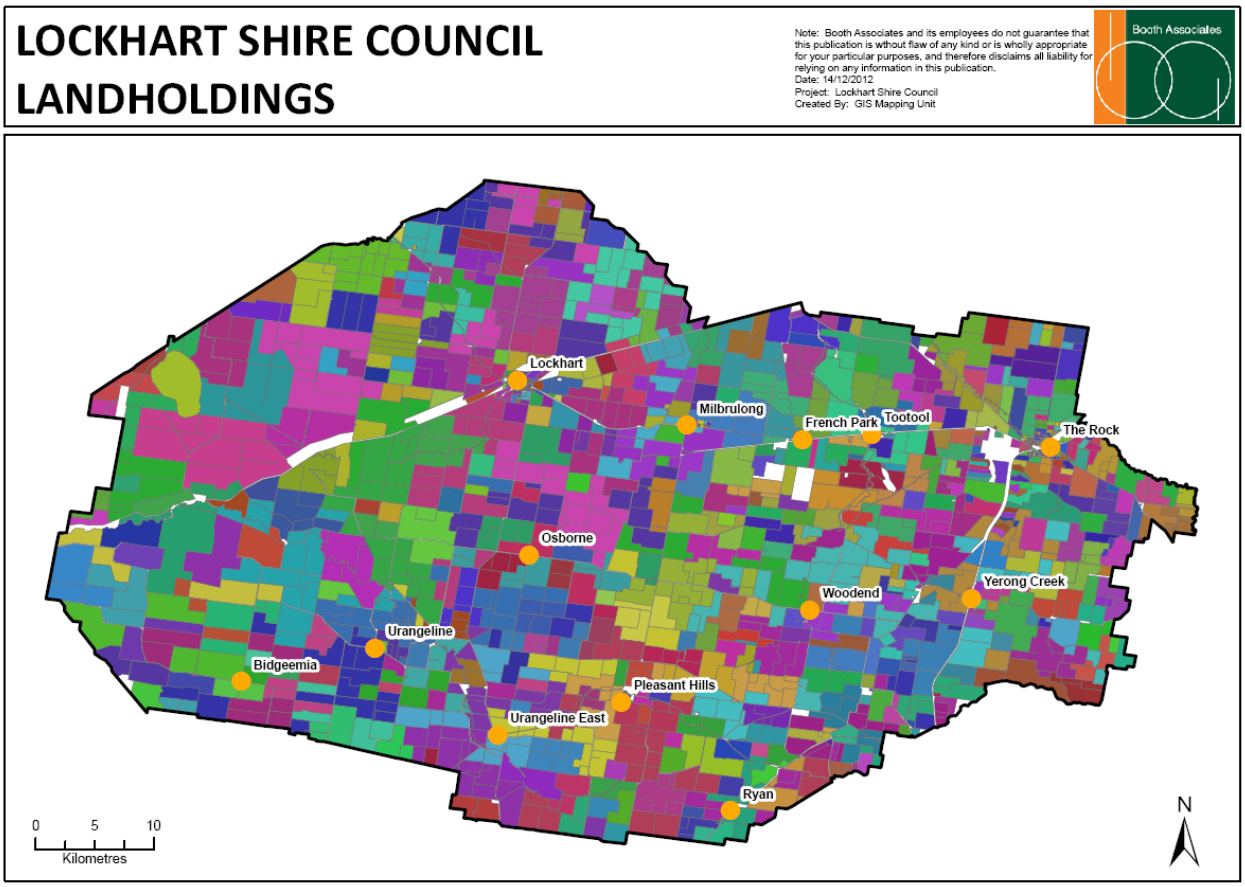
Other than for potentially value adding animals on a smaller scale the future for alternative industries would appear to be minor within the Lockhart Shire Council area.

5.0 AGRICULTURAL LANDHOLDINGS AND FARM SIZE ANALYSIS

5.1 Holdings Distribution

To ascertain the spatial distribution of landholdings throughout the Lockhart Shire, Council's cadastral database was interpreted to create a landholdings map which is included as Figure 10 and summarised in Table 8. All holdings <1ha were assumed to be urban and excluded from the assessment. Figure 10 is also included as Annexure 10 to this report.

Figure 10: Landholdings



Limitations of the Land Holding Analysis arise as it is based on land ownership, and it is likely that there are a portion of lands held in separate names that are operated by one business. Farms also tend to ignore Shire boundaries, and it is also likely there are farming operations conducted outside of the Lockhart Shire not captured in this assessment. The assessment also does not recognise land leased or sharefarmed. Notwithstanding all these limitations, this assessment still provides a useful overview of holdings patterns throughout the Lockhart Shire.

Table 8: Landholding Data Analysis

Holding Size	No. of Holdings	Proportion of Holdings	Area (ha)	Proportion of Area	Average (ha) Holding Size	Median (ha) Holding Size
<40ha	159	21%	1,325	0%	8	4
40ha – 200ha	161	21%	16,936	6%	105	104
200ha – 400ha	174	23%	49,766	18%	286	276
400ha – 650ha	122	16%	61,694	22%	506	496
650ha – 800ha	53	7%	38,153	14%	720	720
800ha – 1,300ha	57	8%	56,093	20%	984	957
>1,300ha	27	4%	52,782	19%	1,955	1,580
Total	**753**		**276,749**		**368**	**250**

Both average and median size for each holding size range is prescribed to show variance within the datasets. The average is simply the total area divided by the number of holdings and tends to be skewed by larger holdings, hence is always greater than the median. The median is the mid-point of each dataset. Once the median is identified half the dataset will be greater than the median and half the dataset will be less. For example, the data in Table 8 indicates the average farm size for RU1 land is 368ha. The median farm size is 250ha, so 50% of farms are larger than 250ha and 50% of farms are less than 250ha.

The following comments arise from Table 8:

- The average holding size is 368ha and median holding size is 250ha;
- There are 753 holdings covering an area of 276,749ha. This area equates to 96% of the Shire with the balance being State Forests, National Parks, remnant vegetation, towns and villages;
- There are 594 holdings larger than 40ha, covering 79% of the area, with an average size of 464ha and a median size of 342ha;
- There are 457 holdings ranging from 40ha to 650ha in size covering 61% of the area with an average area of 281ha and a median size of 259ha; and
- There are 137 holdings larger than 650ha covering 53% of the rural land in the Shire, with an average area of 1,013ha and a median farm size of 901ha.

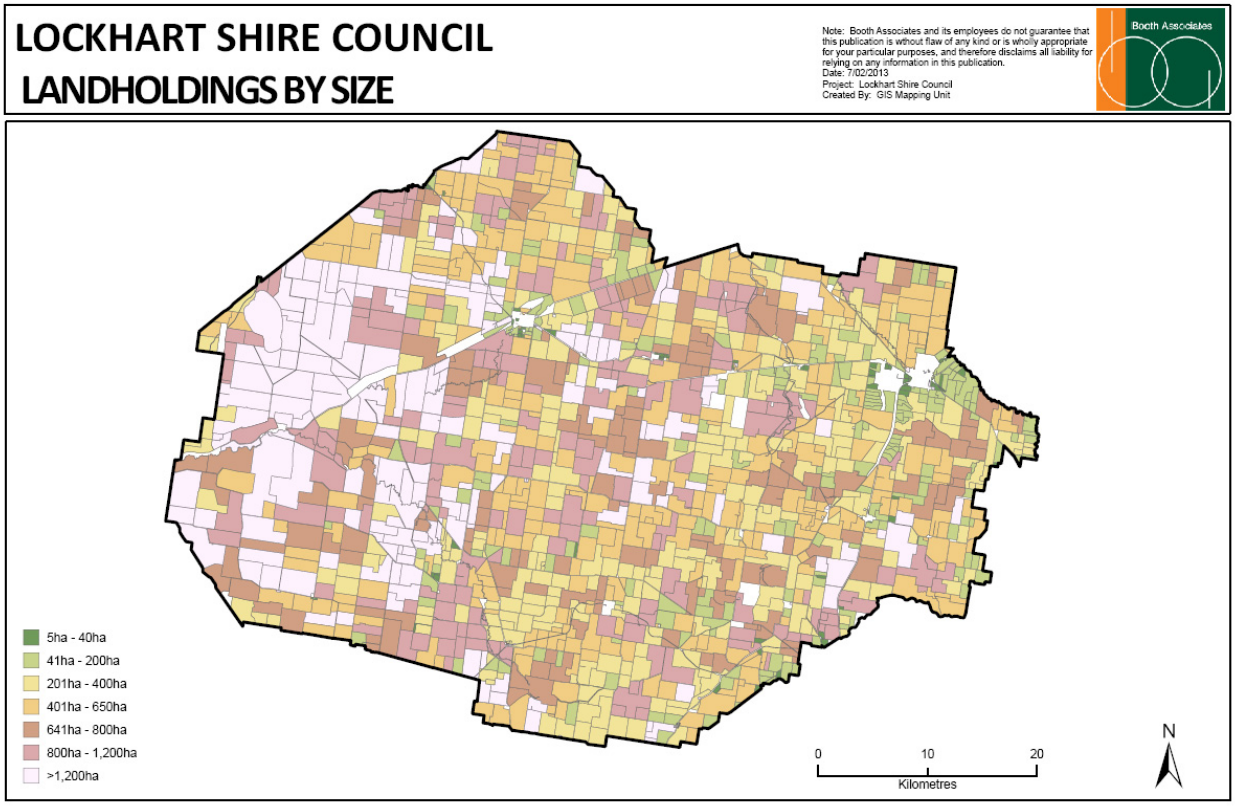
A review of the Landholdings Map included as Figure 10 indicates a trend towards smaller holdings size on the eastern side of the Shire trending larger on the western side of the Shire. The holdings data indicates there are 27 holdings larger than 1,300ha which is double the current minimum lot size of 650ha in size covering nearly 19% of the total area farmed. These large farms are mostly located on the western side of the Shire.

The holdings pattern is relative to rainfall and land classification described in Section 4.1 and 4.6. The climate data included in Section 4.1 indicates the annual rainfall for Lockhart is 481mm. BoM data for Urana near the western boundary indicates an annual rainfall of 443mm and at Yerong Creek is 532mm near the eastern Shire boundary. This has significant impact on crop yield potential and therefore the western farms tend to be larger to achieve similar levels of productivity. The landholding patterns in Figure 10 also correlate to land classification, as holding sizes on the western side of the Shire tend to be slightly larger than in the eastern side of the Shire which are predominantly Class 2 lands.

There is no evidence of fragmentation of agricultural land in the Holdings Map in Figure 10.

Included as Figure 11 is a map showing landholdings size with farms within specific sizes depicted in different colours. A copy Figure 11 is also included as Annexure 11 of this report.

Figure 11: Landholdings Size



The landholding by size map further affirms the nature and extent of farm size increases from east to west. The greatest number of smaller holdings in the Shire is located around The Rock indicating a minimum lot size less than 200ha may encourage undesired growth in lifestyle blocks impacting on agriculture.

5.2 Economic Analysis

Based on the data in Table 4, Table 6 and Table 7 together with information on farming practices in the Shire derived during the consultation with farmers and the Project Team's observation of the Shire, farming systems are broadly:

- Fifty percent of the agricultural land is used for pastures including small portions for hay and silage;
- Fifty percent of the agricultural land is used for cropping, of which 60% is used for wheat, nearly 25% is used for other cereals such as barley, oats and triticale and the balance of the area approximately 15% is used for canola and legumes; and
- A broad analysis indicates that approximately 80% of the total dry sheep equivalents (DSE)[1] are sheep and 20% cattle.

It is understood there would be overlaps between variations to the above broad agricultural system. Despite this generalised observation a fair analysis of the above system in the following sub-section provides a realistic indication of the minimum size for a commercial farm subject to rainfall and land productivity.

5.2.1 Typical Broadacre Dryland Holdings

The productivity assumed in the following economic analyses are based on Yerong Creek rainfall (east) and Urana rainfall (west). Long term trend prices are used for standardised gross margins and crop yields, and livestock grazing stocking rates are based on a review of rainfall and soil potential and affirmed by discussions with farmer groups in the Lockhart Shire. Land values have been derived from discussions with farmers and real estate agents. The analysis is based on the minimum sized farm that could support a single family unit, assuming no off-farm income.

A typical "average" broadacre holding may be described as:

Broadacre Dryland Farming – Eastern

▪	Total area	375	ha
▪	Rotation - wheat	113	ha
	- barley	38	ha
	- canola	38	ha
	- pasture/fallow	188	ha
	- livestock	1,600	DSE

[1] DSE (dry sheep equivalent) is the industry standard measure of agricultural land livestock carrying capacity NSW DPI defines a DSE as a standardised 50kg wether (dry adult sheep) maintaining a constant weight.
Source: www.dpi.nsw.gov.au/agriculture/farm-business/budgets/livestock/sheep/background/dse

Table 9: Broadacre Farming Analysis – Eastern Side

Assets		Profitability		
Land and Improvements	$1,125,000	Gross Margin Revenue		$145,342
Machinery and vehicles	$250,000	Less Overheads	$35,000	
Livestock	$120,000	Unallocated	$15,000	
Produce/Merchandise on hand	$10,000	Depreciation	$15,000	
Operating capital	$40,000	Drawings	$40,000	$105,000
Sundry	$5,000			
Total	**$1,550,000**	**Debt free profit (EBIT)**		**$40,342**
		Debt free return (EBIT Yield)		**2.6%**

Broadacre Dryland Farming – Western

- Total area 675 ha
- Rotation - wheat 203 ha
  - barley 68 ha
  - canola 68 ha
  - pasture/fallow 338 ha
  - livestock 1,350 ha

Based largely on NSW DPI typical gross margin data the average broadacre business would generate a debt free profit in an average year, and require an investment as follows:

Table 10: Broadacre Farming Analysis – Western

Assets		Profitability		
Land and Improvements	$1,350,000	Gross Margin Revenue		$151,413
Machinery and vehicles	$250,000	Less Overheads	$35,000	
Livestock	$101,250	Unallocated	$15,000	
Produce/Merchandise on hand	$10,000	Depreciation	$15,000	
Operating capital	$40,000	Drawings	$40,000	$105,000
Sundry	$5,000			
Total	**$1,756,250**	**Debt free profit (EBIT)**		**$46,413**
		Debt free return (EBIT Yield)		**2.6%**

The EBIT yield in Table 9 and Table 10 of 2.6% is in line with the Consumer Price Index (CPI) which has averaged 2.6% over the past 20 years. A full and more detailed copy of both Analyses in Table 9 and Table 10 is provided in Annexure 12.

5.2.2 Summary of Minimum Farm Size Analysis

The analysis includes the minimum size of a business that could support a single family unit (assuming no off-farm income) in the Lockhart Shire is:

- 375ha on the eastern side; and
- 675ha on the western side.

The typical dryland farm business survives by:

- Tight cost containment, delayed capital renewal and reduced drawings; and/or
- Adoption of new technology to increase water use efficiency (WUE) which significantly increases crop yields for a relatively modest increase in overall costs. Those costs being mostly for specialised machinery ownership and capital renewal costs; and/or
- Combination of the above with capital renewal deferred to the so-called "big years"; and/or
- Off-farm income; and/or
- Subsidies in drought, etc.

Based on ABS production data in Table 6 and rainfall data in Graph 1 the average water use efficiency for dryland farms is 8 – 10kg/ha/mm for wheat, whereas the leading managers average 15 – 18kg/ha/mm. With average in-season rainfall at Lockhart of 300mm and fallow rainfall of 175mm, the yield potential is:

- Average producers (10kg/ha/mm) 2.4 tonne/ha wheat equivalent
- Best producers (18kg/ha/mm) 4.2 tonne/ha wheat equivalent

The broad variation of yield potential has a significant impact on profitability, long term viability and therefore the minimum size of a viable farm. In broad terms the analysis of the typical agricultural holdings may be summarised as followed:

- The capital scale of both typical businesses in Table 9 and Table 10 is at the very low end of the "rule of thumb" scale for business critical mass. This does not infer that none of these businesses are viable in the longer term. What it does however, is suggest that:
    - A high proportion of those businesses will not be able to pass to the next generation and thus will be absorbed into larger businesses;

- A small proportion with high management skill and sound adoption of technological advances who are able to generate high EBIT yields (say >8%) will be able to grow ahead of the decline in the terms of trade.

- Inevitably there will be a trend to fewer and larger businesses with greater resource base. This will result in:
  - Fewer people on rural holdings;
  - Increased mechanisation;
  - Diminution in the "sense of community" within the rural landscapes and the role of the Villages as rural support centres; and
  - Greater use of contractors for the supply of machinery and labour.

5.2.3 Minimum Farm Size Analysis with Off-Farm Income

The analysis provided in Table 9 and Table 10 assumes drawings (owner salary) of $40,000 per annum. This figure is based on ABS average taxable income for Lockhart Shire for 2009 of $32,165 plus 25% to represent a salary paid to a business owner, exclusive of home mortgage and vehicle operating costs which can be legitimately claimed as a business expense and paid for by the farm operating entity.

Off-farm income is increasing as stated in Section 4.3.7.

> *"since 1990 the proportion of families deriving income from off-farm wages and salaries increased from 30% to 45% with average earnings rising from $18,000 to approximately $33,500 per year (NSW farms) in 2005/06"*[2]

ABARES 2011 reported total off-farm wages in the Riverina to be $20,403 in 2010 and $31,613 in 2011.

To demonstrate the impact of off-farm income on the minimum farm size analysis in Section 5.2.1 drawings as depicted in Table 10 and Table 11 were adjusted to be:

- $20,000 to reflect off-farm income of $20,403 or thereabouts; and
- $10,000 to reflect off-farm income of $31,613 or thereabouts.

In both cases the drawings were rounded to the nearest $10,000. The minimum farm sizes presented in Table 9 and Table 10were recalculated to target an EBIT yield (debt free return) of 2.6%, as used in Section 5.2.1 and the results are presented in Table 11.

[2] Review of Land Use Planning in the Central West 2007

Table 11: Minimum Farm Size Analysis with Off-Farm Income

Off-Farm Income	Farm Salary (Drawings)	Farm Size	
	Property Location	**Eastern**	**Western**
$30,000	$10,000pa	155ha	280ha
$20,000	$20,000pa	230ha	410ha
0	$40,000pa	375ha	675ha

The data in Table 11 demonstrates that off-farm income has a significant impact on the minimum farm size required to sustain a single family unit.

6.0 CONSULTATION

The Stakeholder Consultation in this project included the following meetings:

- Inception Meeting at Lockhart with Council and Departments of Planning and Infrastructure and Primary Industries on 18 December 2012;
- Workshop with Councillors and Senior Council Staff at Lockhart on 18 December 2012;
- Informal discussions with real estate agents;
- Farmer meetings on 13 and 14 February 2013 at Yerong Creek and Lockhart respectively;
- Workshop at Lockhart with Council and Departments of Planning and Infrastructure and Primary Industries on 4 March 2012;
- Workshop with Councillors at Lockhart on 4 March 2012;
- Public information sessions on draft report held at The Rock on 3 April 2013 and Lockhart on 4 April, 2013; and
- Submissions and feedback on draft report.

A summary of these meetings is provided in the following sub-sections. On route to and from these meetings the project team took time to travel around the Shire, observing the landscape and farming practices.

6.1 Inception Meeting (December)

The key outcomes from this meeting were:

- Project timeline was very tight and the Brief did not include allowance for public exhibition; A brief extension of the timeline and inclusion of public exhibition will be considered by the DoPI;
- Flood overlays for the LEP are based on 1974 data and data from 2010 and 2012 indicated floods to a far greater extent than the LEP overlay. A detailed flood study of Lockhart and The Rock is currently underway, but not expected to report until the end of 2013; and
- The new Lockhart LEP is about to be gazetted. The new LEP will allow for dual occupancy and second dwellings on farms for rural workers. This will alleviate some of the constraints with the current LEP.

The Lockhart LEP was gazetted in late December, 2012. Subsequent to the Inception Meeting the DoPI approved an extension of scope of the project to include public exhibition of the draft report.

6.2 Councillor Workshop (December)

The key outcomes from this meeting were:

- Some Councillors were newly elected and not fully appraised of the background to this project; and
- The Project was seen as a critical issue for Shire and Councillors were keen to have input into the process. This was to be facilitated by a workshop which was subsequently scheduled for March 2013.

6.3 Farmer Meetings (February)

The key issues that arose at these meetings were:

- The rural population of the Shire is declining and aging, meaning there are less children in the local schools and less volunteers for the Rural Fire Service;
- The Olympic Highway, which passes through The Rock and Yerong Creek, is a growth corridor because of proximity and location on the main road between Wagga Wagga and Albury/Wodonga with a combined population of 160,000 people;
- The minimum farm size needed to support a single family unit could be 800ha;
- There may be merit in having a range of minimum lot sizes across the Shire according to productivity;
- Land values were thought to be:
    - $1,500 per acre in the eastern part of the Shire;
    - $1,200 per acre in the central part of the Shire; and
    - $700 per acre in the western part of the Shire.
- Land values were related to productivity which was subject to rainfall and soil type. Rainfall generally reduces across the Shire. The soil types vary across the Shire.
- 650ha was felt to be too large for a minimum lot size, and created constraints for those who wanted to build a house on farm, as it was difficult and expensive to consolidate enough land to create a 650ha lot;
- 640 acres is a very common lot size in the Shire as it is a square mile which was used for soldier settlement blocks;
- Rural land is tightly held in the Shire and there are many disjointed holdings which makes it difficult to amalgamate land;

- At the meetings there were two farmers with young families who were seeking to build houses on farms which were greater than 2,500ha in size. Notwithstanding the large farm areas, these farmers found it impossible to find a single area of 650ha that could be reasonably consolidated for the purposes of creating a dwelling entitlement;
- There were no attendees at the meetings who felt that 650ha should be retained as the minimum lot size; and
- There were very few (if any) dwellings approved on 650ha since the 2004 LEP was gazetted.

Subsequent to these meetings Council Planning Staff advised that only one dwelling entitlement was created by meeting the 650ha minimum lot size criteria since the LEP was gazetted in 2004.

6.4 Information Discussions with Real Estate Agents

An informal discussion with Real Estate agents:

- Affirmed land values as indicated by farmers; and
- Rural land is tightly held and a lot of farm purchases are neighbour to neighbour.

6.5 Council and Government Agency Workshop (March)

At the workshop an extension of the project scope to include public exhibition of the draft report was affirmed. Wide ranging discussions were held on "minimum lot sizes" with Primary Industries to affirm their position via a submission on the draft report.

The aim of the minimum lot size for agricultural land was discussed as needing to be:

- Large enough to prevent unwarranted or speculative development and change of land use;
- Not too large to prevent entry of people to agriculture by a large upfront cost; and
- Large enough to have minimal impact on land values beyond what a farmer could afford to pay another farmer for rural land.

6.6 Councillor Workshop (March)

Councillors discussed in detail the restraints on the Shire the current minimum lot size imposed. After a considered discussion on the restrictions of the planning regime and the need to protect agricultural land and provide opportunities, whilst having regard for the data analysis provided so far in the project, Councillors supported a reduction in the minimum lot size to 250ha as a draft for comment. Public meetings were set for 3 and 4 April, 2013.

6.7 Public Information Session (April)

Public information sessions on the draft report were held on 3 April, 2013 at The Rock and 4 April, 2013 at Lockhart. The majority of meeting attendees were present to discuss the concurrent draft Rural Settlement and Industrial Rezoning Study.

Meeting attendees were asked their views on a reduction of the minimum lot size for RU1 land from 650ha to 250ha. All attendees supported the reduction and there was some enquiry as to whether it could be less than 250ha.

6.8 Submissions on Draft Report

Submissions on the draft report included:

- Feedback from DoPI on Section 117 Directions (as addressed in Section 3.6 of this report) and some corrections which were subsequently addressed; and
- Emails from the two landholders that were mention in Section 6.3 who were unable to create a dwelling entitlement for a new house despite being part of family farms with large areas. Both farmers supported a reduction of the minimum lot size from 650ha to 250ha on RU1 land.

7.0 RECOMMENDATIONS

7.1 Report Summary

The minimum lot size for rural lands (RU1) zone permissible under Lockhart's LEP (2012) is:

- No minimum if the land use purpose is agriculture and no dwelling is required; and
- No less than 650ha if the land use purpose is agriculture and a dwelling is required.

This report has reviewed the relevant background information in relation to Lockhart Shire's 650ha minimum lot size for rural land including:

- Government policy as presented in Section 3.0 of this report, in particular rural planning principles and rural subdivision principles within the Rural Lands (2008) SEPP;
- Rural Lands Analysis presented in Section 4.0 of this report including consideration of climate, landscape, agricultural trends, land use, land capability, land suitability and current agricultural production;
- Holdings analysis presented in Section 5.0 of this report including a review of existing holding sizes in the Shire, and an Economic Analysis of minimum farm sizes for the main agricultural enterprises in the Lockhart Shire; and
- Stakeholder consultation with landholders, government agencies, Council staff and Councillors presented in Section 6.0 of this report.

The Landholdings Analysis presented in Section 5.0 of this report found that there are:

- 753 holdings with an average size of 368ha and a median size of 250ha; and
- 594 holdings larger than 40ha covering 79% of the rural area with a median farm size of 464ha and an average farm size of 342ha.

The Economic Analysis presented in Section 5.2 of this report found that the minimum viable farm size that would support a single family unit was:

- 675ha on the western side of the Shire; and
- 375ha on the eastern side of the Shire.

Therefore, on the basis of the sizes of existing holdings and an Economic Analysis of typical farm business, the present 650ha minimum lot size in the Lockhart Shire (2012) LEP would at face value appear to be too large.

It is further noted the economic analysis did not consider off-farm income. The Analysis indicates when off-farm income is considered the minimum viable farm size reduces to:

- 155ha on the eastern side of the Shire; and
- 280ha on the western side of the Shire.

It is likely that if the 650ha minimum lot size is maintained it will protect agricultural land by minimising the risk of:

- Land use conflict, in particular houses being erected in rural areas and impacting on farmers' ability to carry out routine farming activities;
- Speculative development inflating land values beyond its true agricultural value;
- Fragmentation of land, such as the erection of dwellings in inappropriate locations; and
- Inappropriate change of land use such as conversion of prime agricultural land to *quasi* rural residential areas.

Notwithstanding the 650ha minimum standard is very large and likely to prevent new opportunities such as more intensive forms of agriculture and the entry of people into agriculture, particularly young people for the following reasons:

- The high up-front cost of 650ha of bare land on the eastern side of the Shire which is in the order of $2.5M;
- Rural land is tightly held throughout the Shire particularly on the eastern side of the Shire and there are few:
    - 650ha bare farms that come up for sale
    - 1,300ha holdings that have the potential to create a second dwelling entitlement
- The surrounding Shires have lower standards, which will disadvantage Lockhart Shire in terms of attracting investment; and
- Rural land is tightly held in the Shire and most property sales tend to be neighbour to neighbour. This means holdings are often disjointed and evidence was provided during farmer consultation that farming families with large holdings were unable to consolidate a 650ha unit to create a dwelling entitlement for the next generation to want to own land and live on the farm.

Each of the above points is explained in more detail in the following sub-sections.

Further evidence of the restrictive nature of the 650ha minimum lot size is provided by analysis of Lockhart's development applications for dwelling provided in Section 7.2.

7.2 Dwelling Application Approvals

An analysis of Lockhart Shire Council development application approvals for dwellings on rural land (RU1 zone previously 1(a)) from 2002 to 2012 indicates:

- Over the period 40 dwellings were approved;
- 20 applications were approved from 2002 to 2004 when the minimum lot size was 40ha on 1(a) land;
- 20 applications were approved from 2005 to 2012 when the minimum lot size was 650ha;
- Of the 20 approved since 2005, it is estimated:
    - Twelve were replacement dwellings;
    - Seven were existing dwelling rights; and
    - One was 735ha so met the 650ha minimum lot size criteria.

The drought experienced in the Lockhart Shire in the last decade would have reduced the demand for new dwelling on rural land. Notwithstanding the drought, the development application data includes:

- Twenty dwellings were approved from 2002 to 2004 (3 years);
- Twenty dwellings were approved from 2005 to 2012 (7 years); and
- Only one application met the 650ha minimum lot size criteria.

This indicates the large minimum lot size of 650ha is constraining the erection of homes on rural land, which is backed up by anecdotal evidence from consultation with landowners, real estate agents and Councillors.

7.3 Access to Land

Discussions with farmers and real estate agents in the Lockhart Shire as detailed in Sections 6.3, and 6.4 indicate that land across the Shire is generally tightly held. This is not unusual, particularly in highly productive agricultural areas such as the Lockhart Shire. Productive and prosperous farms tend to be transferred from one generation to the next, and properties often do not get sold on the open market, as neighbours buy neighbour's property without the property even being formally listed for sale. This feature provides a stable and strong real estate market, and also makes it difficult for people wanting to enter the area to find appropriate properties to purchase.

7.4 Surrounding Shires' Minimum Lot Sizes

The Lockhart Shire's boundary with other shires is depicted in Annexure 1. In preparing this report the minimum lot sizes of the Shires immediately adjacent to the Lockhart Shire were examined and are summarised below:

- **City of Wagga Wagga** – is located on the north and eastern side of the Lockhart Shire. RU1 land in this Shire has a minimum lot size of 200ha according to on the 2010 LEP which was carried forward from a previous LEP. The agricultural productivity of this Shire would be very similar to the eastern side of Lockhart Shire. Rural land values in this Shire are impacted by high demand from people who work in Wagga Wagga;

- **Greater Hume** – is located on the south and south eastern side of Lockhart Shire. The Greater Hume LEP 2012 has a minimum lot size of 100ha which was carried forward from a previous LEP. The agricultural productivity of the land in the Greater Hume Shire where it adjoins the Lockhart Shire would be the same as the eastern side of the Lockhart Shire. Rural land values in this Shire are impacted by high demand from people who work in Albury/Wodonga.

- **Urana** – is located on the south and western sides of Lockhart Shire. The Urana Shire LEP 2011 has a minimum lot size of 100ha which was carried forward from a previous LEP. As the Urana Shire is located on the western side of Lockhart Shire, the agricultural productivity of the Shire would be very similar to the adjacent land on the western side of Lockhart Shire.

- **Narrandera**– is located on the north western side of Lockhart Shire. Narrandera's LEP (1991) has a minimum lot size for non-irrigated land of 750ha. The new LEP for Narrandera is expected to be gazetted by mid-2013. The minimum lot size for RU1 (non-irrigated land) in the draft LEP is 400ha. The new LEP for Narrandera will also contain a clause allowing intensive agriculture (horticulture) to be carried out anywhere in the Shire with a minimum lot size of 40ha subject to the demonstration of bona fides by the applicant. Lockhart Shire should consider this intensive agriculture clause in their new LEP notwithstanding the lack of horticultural operations presently in the Shire.

The 100ha to 400ha minimum lot sizes for surrounding Shires will potentially disadvantage the Lockhart Shire with a minimum lot size of 650ha, as farmers who understand planning provisions seek to invest in areas with more flexible planning controls. There is no evidence that the smaller lot sizes found in those surrounding Shires has resulted in fragmentation of rural lands, or land use conflict, or negatively impacted on agricultural production.

7.5 Rural Land Values in the Lockhart Shire

Consultation with farmers and real estate agents as described in Sections 6.3 and 6.4 indicates that land values in the Lockhart Shire are in the order of:

- $3,750/ha on the eastern side of the Shire.
- $2,750/ha through the central parts of the Shire; and
- $1,750/ha on the western side of the Shire.

On this basis the upfront cost for bare land using the current minimum lot size of 650ha range from $1.1M to $2.4M, before house construction costs of more than $300K are considered. This high cost is a significant disincentive/barrier to anyone wanting to enter agriculture.

7.6 Alternative Minimum Lot Sizes

Evidence of constraints imposed by the current minimum lot size in the Lockhart Shire of 650ha includes:

- Feedback from farmers and Councillors in the consultation phase of this project emphasised that the existing standard was constraining growth;
- Only one approval for a new dwelling satisfying the 650ha criteria since the previous LEP was gazetted in 2004;
- Disparity between Lockhart Shire and its adjacent councils with the following minimum lot sizes:
    - Greater Hume – 100ha
    - Urana – 100ha
    - Wagga Wagga – 200ha
    - Narrandera – 400ha (to be gazetted)
- The high cost of land with a bare land price under the current minimum lot size of $1.1M to $2.4M.

These factors provide the impetus to examine alternative minimum lot sizes which is considered in the following sub-sections.

7.6.1 Impact of High Land Values

A summary of the upfront cost of bare land for a range of farm sizes is presented in Table 12. This summary is based on the land values outlined in Section 6.3 and Section 7.5.

Table 12: Land cost for a range of farm sizes

Farm Area (ha)								
Land Value	200ha	250ha	300ha	400ha	500ha	600ha	650ha	700ha
$/ha	$	$	$	$	$	$	$	$
3,750	750,000	937,000	1,125,000	1,500,000	1,875,000	2,250,000	2,437,500	2,625,000
2,750	550,000	687,000	825,000	1,100,000	1,375,000	1,650,000	1,787,500	1,925,000
1,750	350,000	437,500	525,000	700,000	875,000	1,050,000	1,137,500	1,225,000

Given current house construction costs exceed $300K, the data in Table 12 indicates:

- For the higher quality land located on the eastern side of the Shire, a 250ha minimum lot size with house construction costs would exceed $1.0M; and
- On the western side of the Shire a 250ha minimum lot size with house construction costs would exceed $0.7M.

The high upfront cost for land with the present minimum lot size of 650ha as shown in Table 12 is effectively denying entry to agriculture by young farmers and those with modest capital resources. In so doing the high entry cost is favouring opportunities for corporate farms.

If the primary aim of a minimum lot size is to protect agricultural land from unwarranted dwellings appearing in rural lands, an upfront cost of $0.7M to $1.2M (inclusive of house construction costs) is a strong enough disincentive for speculative or unwarranted development. This will provide adequate protection for the agricultural resource, and offer some form of compromise for those wishing to enter agriculture.

A minimum lot size of 250ha still provides a significant upfront investment cost (as depicted in Table 12) which will be a disincentive for those seeking a rural lifestyle, as the capital cost in land alone will necessitate it being run as a commercial operation to provide a worthy return. That is, if the upfront land value was say $0.625M (250ha @ $2,500/ha) this investment is of a scale that necessitates a commercial operation be carried out rather than being a lazy asset on a lifestyler's balance sheet.

To examine the impact of varying minimum lot sizes on the value of land, being the potential inflation of land beyond agricultural land values, a nominal $40K has added to land values, in Table 13. The $40K is used as the average value of a bare house block in Lockhart and The Rock. It is noted such town house blocks have access to services such as water and sewer and so $40K is a conservatively high number to use for this assessment.

Table 13: Land Price Impacts

Farm Area (ha)								
Land Value $/ha	200ha	250ha	300ha	400ha	500ha	600ha	650ha	700ha
3,750	5%	4%	4%	3%	2%	2%	2%	2%
2,750	7%	6%	5%	4%	3%	2%	2%	2%
1,750	11%	9%	8%	6%	5%	4%	4%	3%

Note: calculations assume dwelling entitlement value of $40,000
Data is presented as proportion of the land value depicted in Table 13

As expected the data in Table 13 shows the larger the minimum lot size, the lower the impact of a dwelling entitlement on land values. Notwithstanding the minor impact a dwelling entitlement may have on a 650ha farm when the minimum lot size is 650ha, a reduction of minimum lot size to 250ha will have less than 9% impact on rural land values.

7.6.2 Impact of Off-Farm Income on Economic Analysis

In Section 5.2 of this report an economic analysis was outlined for typical farming systems in the Lockhart Shire with a targeted debt free return of 2.6%, being the average CPI over the past 20 years.

This analysis has been re-run for a range of farm sizes to examine the level of off-farm income required to retain a debt free return of 2.6%. The analysis is summarised in Table 14.

Table 14: Economic Analysis with Off-Farm Income

Farm Size	150ha	200ha	300ha	350ha	400ha
(ha)	$	$	$	$	$
Farm salary (drawings)	15,000	20,000	25,000	30,000	40,000
Off-Farm Income	36,500	28,000	10,500	2,000	-
Debt Free Profit	20,752	25,272	33,812	38,332	49,352

The data in Table 14 is based on the "eastern side" of the Shire analysis as presented in Section 5.2.1 of this report with a target debt free profit of 2.6%. Noteworthy in regards to off-farm income is ABARES 2011 stating off-farm wages of $20,400 in 2010 and $31,613 in 2011 for the Riverina. These figures would suggest a minimum farm size of 200ha to 300ha (on the eastern side of the Shire) would be economically sustainable allowing for off-farm income.

In terms of debt servicing capacity the debt free profit shown in Table 14 provides the quantum of funds available for debt servicing and capital renewal. At current interest rates of 6.0% for progressive farmers with good equity and best practice interest cover of 50%, the borrowings which could be serviced would range from:

- $320,000 for a 150ha farm up to; and
- $759,000 for a 400ha farm.

Using capital values depicted in Section 7.5 the above figures equate to just under 80% equity. ABARES 2012 reported an equity ratio of 88% in 2010/11 for all broadacre industries which indicates debt levels for Australian farms are less than that which could be serviced by the analysis depicted in Table 15.

In regard to off-farm income the *Review of Land Use Planning in the Central West* stated:

> *"In addition off-farm income is increasingly becoming an essential part of an agricultural enterprise and should therefore be legitimately considered in any policy position."*

In relation to the economic assessment of minimum farm size the findings of the *Review of Land Use Planning in the Central West*, states:

> *"The Panel has determined that the Department of Primary Industries' current methodology for determining minimum allotment sizes in rural zones, recently promoted throughout the Region, is inappropriate as a planning tool and should therefore be abandoned for that purpose. It has found that the methodology is based solely on economic viability and does not recognise the increasing trend of off-farm income for many farming enterprises in what is seen as 'the changing face of agriculture'."*

The comments in the *Central West Review* suggest that the basis for a minimum lot size should be broader than the economic viability assessment. To this end other factors have been considered in this report in recommending alternative minimum lot size, including:

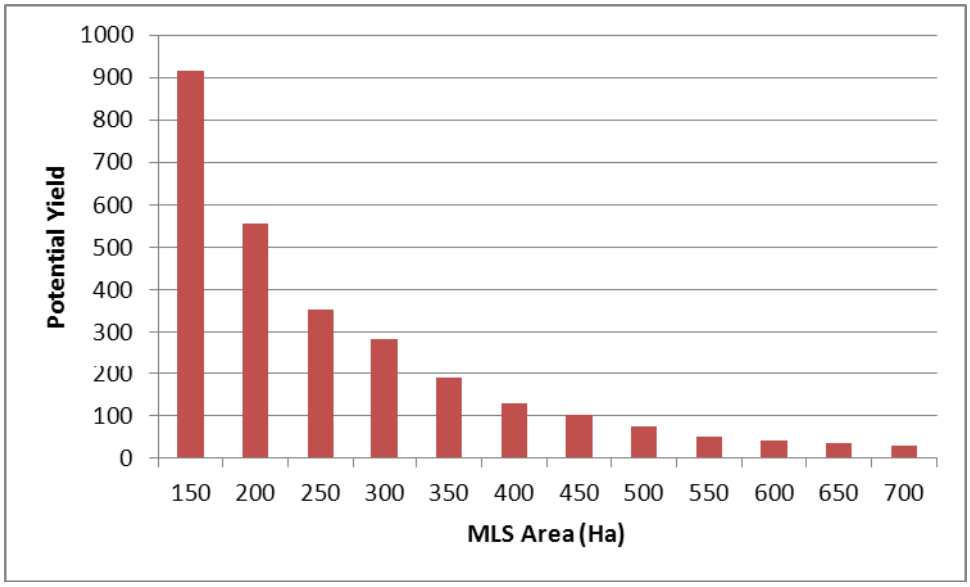
- The value of varying land parcel sizes (Table 12);
- The impact of off-farm income on economic viability (Table 14);
- The potential yield of new dwellings (Section 7.6.3); and
- Anecdotal evidence provided by farmers, real estate agents and Councillors (Section 6.0).

7.6.3 Potential Supply

Anecdotal evidence provided during consultation by farmers, real estate agents and Councillors was that land was tightly held in the Lockhart Shire, and with the current 650ha minimum lot size there are few, if any, farms currently for sale with a dwelling entitlement without a dwelling.

To examine the potential new dwelling yield, an analysis was undertaken for a range of possible minimum lot sizes. In the preparation of this report no data was available on the number and location of existing houses and dwelling entitlements. The analysis assumes each holding has a dwelling and a larger holding size is capped at 2,000ha, as there are only eight holdings in the Shire larger than 2,000ha. The data analysis is depicted in Graph 8.

Graph 8: New Dwelling Potential Yield



The data in Graph 8 shows an exponential relationship between minimum lot size and new dwelling potential yield. On the basis that there is limited (or no) supply of new dwelling entitlements under the current minimum lot size of 650ha, the data in Graph 8 indicates the minimum lot size would need to be decreased to at least 350ha or less to address the current limited (or nil) availability. The data in Graph 8 also indicates reducing the minimum lot size to 200ha or less may create an excessive new dwelling yield potential.

7.6.4 Labour Issues

The type of people capable of buying and sustaining a 250ha farm will have social and economic merit for the rural communities of the Lockhart Shire. Owners of 250ha lots would not necessarily have their labour fully committed to a 250ha farm, and could become an experienced and reliable labour source for large businesses, seeking part-time employees. Potential employers need not necessarily be farmers, but could work in surrounding rural towns.

The attraction of people to the Shire, via the opportunity to sustain themselves through a combination of farming and off-farm income, will provide the community of the benefits of enhanced workforce and economic activity. In this way small sustainable commercial farms (of 250ha) will not diminish the value of rural land by speculative development, but rather enhance the value of the agricultural industry, and in so doing may reverse the trend of depopulation of rural areas driven by a range of factors.

7.6.5 Rural Lands (2008) SEPP

Included as Table 15 is a summary matrix which assesses a range of possible minimum lot sizes against the *Rural Planning Principles* and *Rural Subdivision Principles* of the *Rural Lands (2008) SEPP*. The assessment scale used is 1 to 5 with 5 the highest ranking and 1 the lowest.

A summary of the assessment is provided Table 15. The maximum possible scores are:

- 35 for the Rural Planning Principles; and
- 25 for the Rural Subdivision Principles.

Table 15: Rural Lands SEPP Assessment

Farm Area	150ha	200ha	250ha	300ha	350ha	400ha	450ha	500ha	550ha	600ha	650ha
Rural Planning Principles	20	26	28	25	24	21	20	17	17	17	17
Rural Subdivision Principles	14	16	21	21	23	23	21	21	20	18	18
Total	**34**	**42**	**49**	**46**	**47**	**44**	**41**	**38**	**37**	**35**	**35**

The analysis in Table 15 shows a minimum lot size of 250ha has the highest score of 49 (out of a possible 60). A full copy of the matrix is included as Annexure 13.

7.7 Recommended Minimum Lot Size

This Report recommends the minimum lot size for RU1 land the Lockhart Shire be reduced from 650ha to 250ha on the following basis:

- Agriculture is the largest industry in the Shire by value of production, land use and employment and therefore warrants protection under the LEP;
- A 250ha minimum lot size is large enough to minimise the risk of:
  - Land use conflict – particularly new dwellings impacting on farming practices;
  - Impacts on land value beyond its true agricultural value;
  - Fragmentation of rural lands;
  - Inappropriate change of land use;
  - 250ha will provide a measure of intergenerational equity by lowering the upfront capital cost of a holding with a dwelling entitlement making it easier for young people to enter agriculture.
- 250ha is a reasonable risk managed balance to:
  - Provide opportunity for new industries and entry into agriculture;
  - Protect the agricultural land resource.

These recommendations align with the *Rural Planning and Rural Subdivision Principles* of the Rural Lands (2008) SEPP as described in Section 3.3 of this Report.

The figure of 250ha is based on the following:

- Analysis of the *Rural Planning* and *Rural Subdivision Principles* of *the Rural Lands (2008) SEPP* in Section 3.3;
- Analysis of all rural holdings (Section 5.1) which shows a median farm size of 250ha for all land zoned RU1 (rural) in the Lockhart Shire;
- Analysis of land values for a range of minimum lot sizes which shows the value of a 250ha parcel of bare land would be worth in the order of $0.4M to $0.9M (Table 12););
- Economic analysis of the minimum farm size to support a single family unit in Section 5.2 having regard for existing off-farm income reported by ABARES and the ability to service debts Section 7.6.2;
- Potential new dwelling yields as depicted in Section 7.6.3 and anecdotal evidence from farmer, real estate agents and Councillors that there are few, if any, parcels of land available for sale in the Lockhart Shire upon which a new dwelling may be erected; and
- The potential impact of a change to a minimum lot size of 250ha on land values (Table 13).

A minimum lot size of 250ha will not unduly influence land values beyond their true agricultural value as depicted in Table 13. In so doing it will therefore not prevent the aggregation of smaller farms which will most likely be influenced by location, size, production potential and commodity market forces.

Because the potential for the expansion of irrigation in the Shire is limited (or nil) only intensive animal industries such as feedlots, piggeries and poultry farms are likely to expand in the Lockhart Shire (subject to favourable market forces and secure access to water). A 250ha minimum lot size for intensive animal industries would allow for appropriate buffers (refer to Section 7.9 and Annexure 14).

In recommending a minimum lot size of 250ha, the option of having more than one minimum lot size was considered. As farm size generally increases from east to west across the Lockhart Shire the option of having a larger minimum lot size on the western side of the Shire has some merit. However, a review of the topography, land classes, rainfall and holding patterns provided no discernible points to set for varying the minimum lot size. The pressure for new dwellings appears to be more towards the eastern side of the Shire and so a single minimum lot size only for the Shire is recommended.

In relation to young farmers entering agriculture, typically it works best for the farmer to live on the land, even if they spend a substantial proportion of their time off-farm accessing off-farm income. Routine activities such as supervising stock during lambing or calving, during period of increased fly strike (wet summer) and to muster the evening before contract operations such as shearing, crutching and lamb marking are best carried out by residing on the farm. These operations may need to be carried out daily for several weeks, but may only take half to one hour per day. Supervision of lambing or calving livestock can be carried out by the husband or wife, or even teenage children. Therefore, it is necessary for those entering agriculture in the majority of cases to reside on-farm.

Rural worker dwelling provisions and dual occupancy provisions in the 2012 LEP may be an option where families seek to move back to the family farm. However, this prevents the land with dwellings being owned as separate title in the younger generation's name, which is an impediment to accessing finance and prevents or delays the building of the next generation's balance sheet, thereby becoming a significant disincentive.

7.8 Section 117 Directions

A 250ha minimum lot size is sufficiently large to:

> *"protect the agricultural production value of rural land"*

Whilst also facilitating:

> *"the orderly and economic development of rural lands for rural and related purposes"*

Therefore a 250ha minimum lot size meets the objective of Section 117, 1.5 Rural Land Direction.

This Strategy provides justification for the change to the existing minimum lot size as it is consistent with both the Rural Planning Principles and Rural Subdivision Principles of the *Rural Lands (2008) SEPP*.

Notwithstanding the lack of known mined deposits (as depicted in Annexure 11) a 250ha minimum lot size will not impact unduly on mining in the Lockhart Shire as it will lead to the potential for up to 300 new dwellings (Graph 8) across the Lockhart Shire, which is less than one new dwelling per 1,000ha of rural land. A 250ha land parcel, if it was square, would have dimensions of 1,580 metres by 1,580 metres which would allow a house to be sited in a location to allow the buffers of up to 1,000 metres detailed in Annexure 14 (refer to Section 7.9). This limits the potential for land use conflict, particularly between extractive industries and dwellings. Therefore, a 250ha minimum lot size is consistent with the objective of Section 117 Direction 1.3, Mining, Petroleum Production and Extractive Industries.

7.9 Managing Land Use Conflict

Rural land uses require adequate support services and can create a need for ancillary development such as rural dwellings. The location of dwellings in rural areas can create issues with interface conflict when dwellings exist close to boundaries and competing land uses exist.

Separation distances or buffers are a land use planning tool which can work to effectively manage rural resources and mitigate the potential of interface conflict from competing land uses. Regulatory mechanisms such as legislative requirements can also act to mandate land use practices.

An extract from *Learmonth et al* (2007) which provides recommended minimum buffers for primary industries is included as Annexure 14.

A 250ha minimum lot size is large enough to not constrain energy generation such as solar farms and wind turbines as described in Section 4.10.3. As detailed in Section 7.8 a square 250ha parcel of land has dimensions of 1,580 metres which provides a large enough footprint to achieve buffer distances for dwellings for a range of energy generation and mining activities set out in Annexure 14.

7.10 Agricultural Land Uses and the Standard Instrument

The Standard Instrument (Local Environment Plans) Order 2006 identifies the RU1 Primary Production Zone as being the relevant Zone for agricultural land uses. The RU4 Zone is known as the Primary Production Small Lots Zone for intensive plant agriculture. There is no land zoned RU4 in the Lockhart Shire.

The Order also defines the following land use terms which are relevant to agriculture.

Agriculture means any of the following:

- Aquaculture;
- Extensive agriculture;
- Intensive livestock agriculture; and
- Intensive plant agriculture.

Extensive Agriculture means any of the following:

- The production of crops or fodder (including irrigated pasture and fodder crops) for commercial purposes;
- The grazing of livestock for commercial purposes;
- Beekeeping; and
- A dairy (pasture based).

Intensive Livestock Agriculture means the keeping or breeding, for commercial purposes, of cattle, poultry, pigs, goats, horses or other livestock that are fed wholly or substantially on externally sourced feed, and includes any of the following:

- Dairies (restricted);
- Feedlots;
- Piggeries; and
- Poultry farms, but does not include extensive agriculture, aquaculture or the operation of facilities for drought or similar emergency relief.

Intensive Plant Agriculture means any of the following:

- The cultivation of irrigated crops for commercial purposes (other than irrigated pasture or fodder crops);
- Horticulture;
- Turf farming; and
- Viticulture.

In the Lockhart Shire all agricultural land uses, should be permissible within the Primary Production Zone although consent should be required for those intensive livestock agricultural land uses with the potential to result in adverse environmental impact.

Other rural land uses including extractive industry, rural industry, forestry and waste or resource management facility are also appropriate in the Primary Production Zone subject to the development consent of the Council.

The Lockhart LEP should include a provision for a smaller minimum lot size for intensive plant agriculture of 40ha, such as is proposed in the Narrandera LEP (expected to be gazetted in mid-2013). The application of this smaller minimum lot size would be subject to applicant demonstrating their bona fides.

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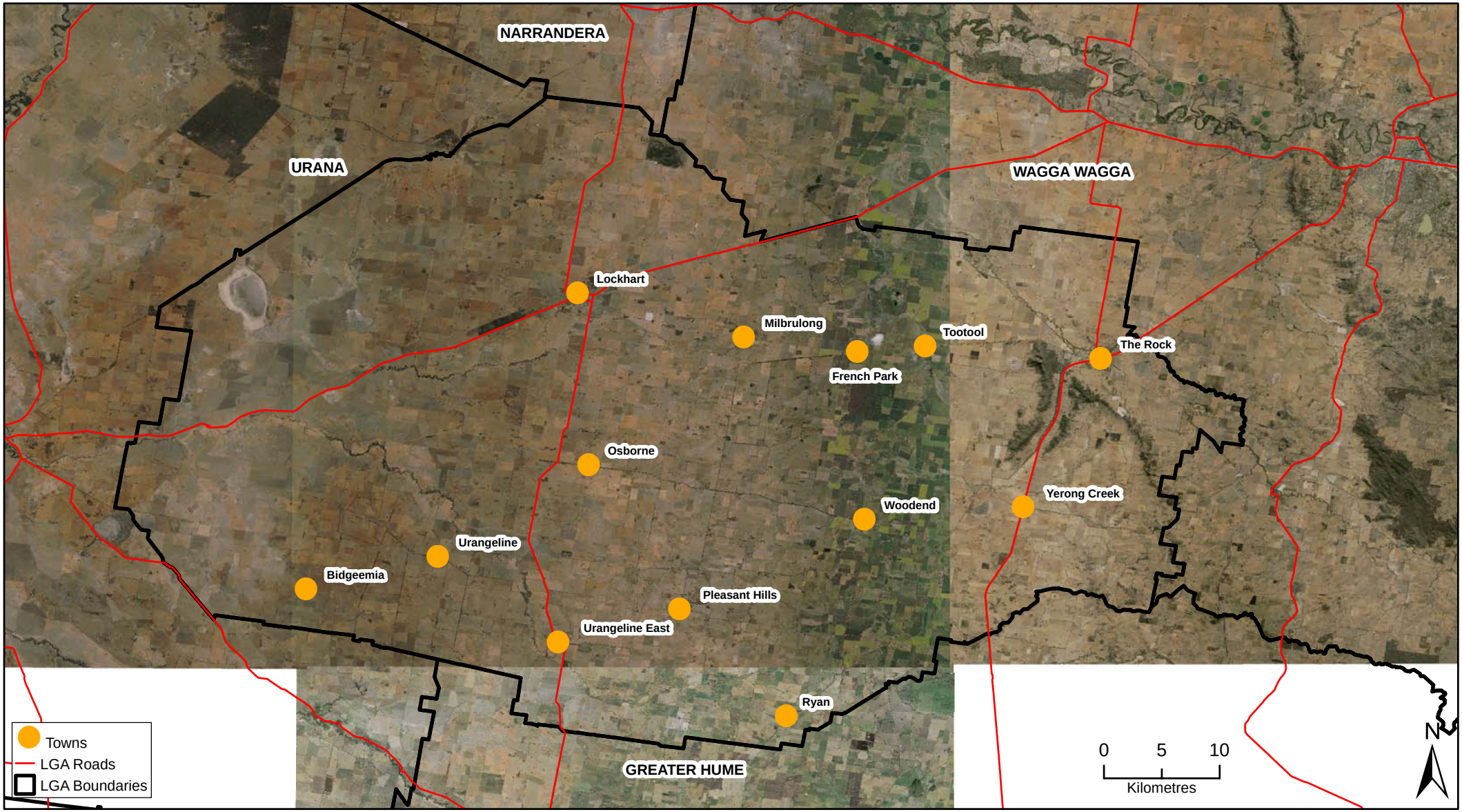
Annexure 1

Shire Map

LOCKHART SHIRE COUNCIL
GENERAL CONTEXT

Date:07/01/13
Project: Lockhart Shire Council
Created By: GIS Mapping Unit

Booth Associates



Annexure 2

LEP Zone Map

LOCKHART SHIRE COUNCIL
LEP ZONES

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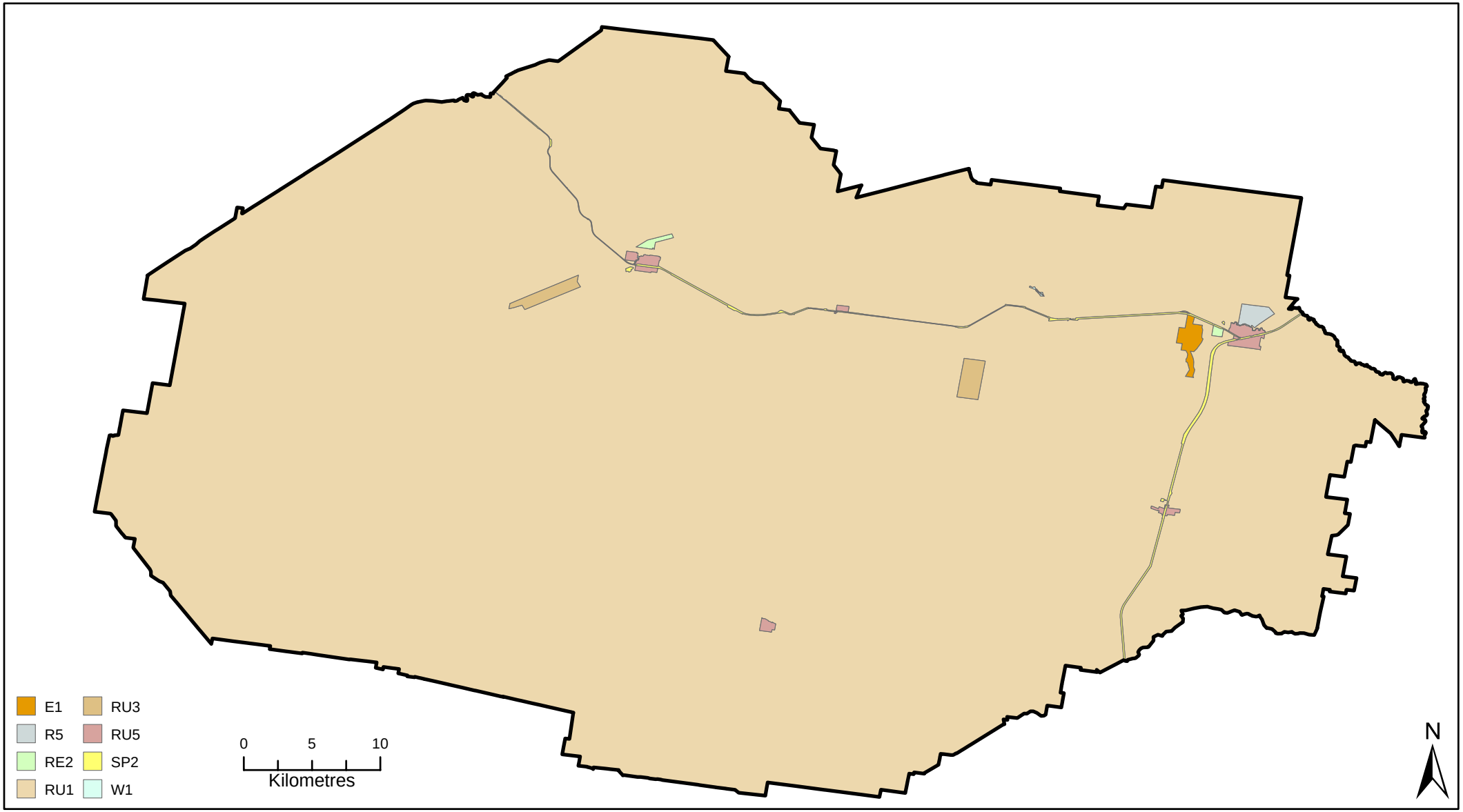

Annexure 3

Geology

LOCKHART SHIRE COUNCIL
GEOLOGY

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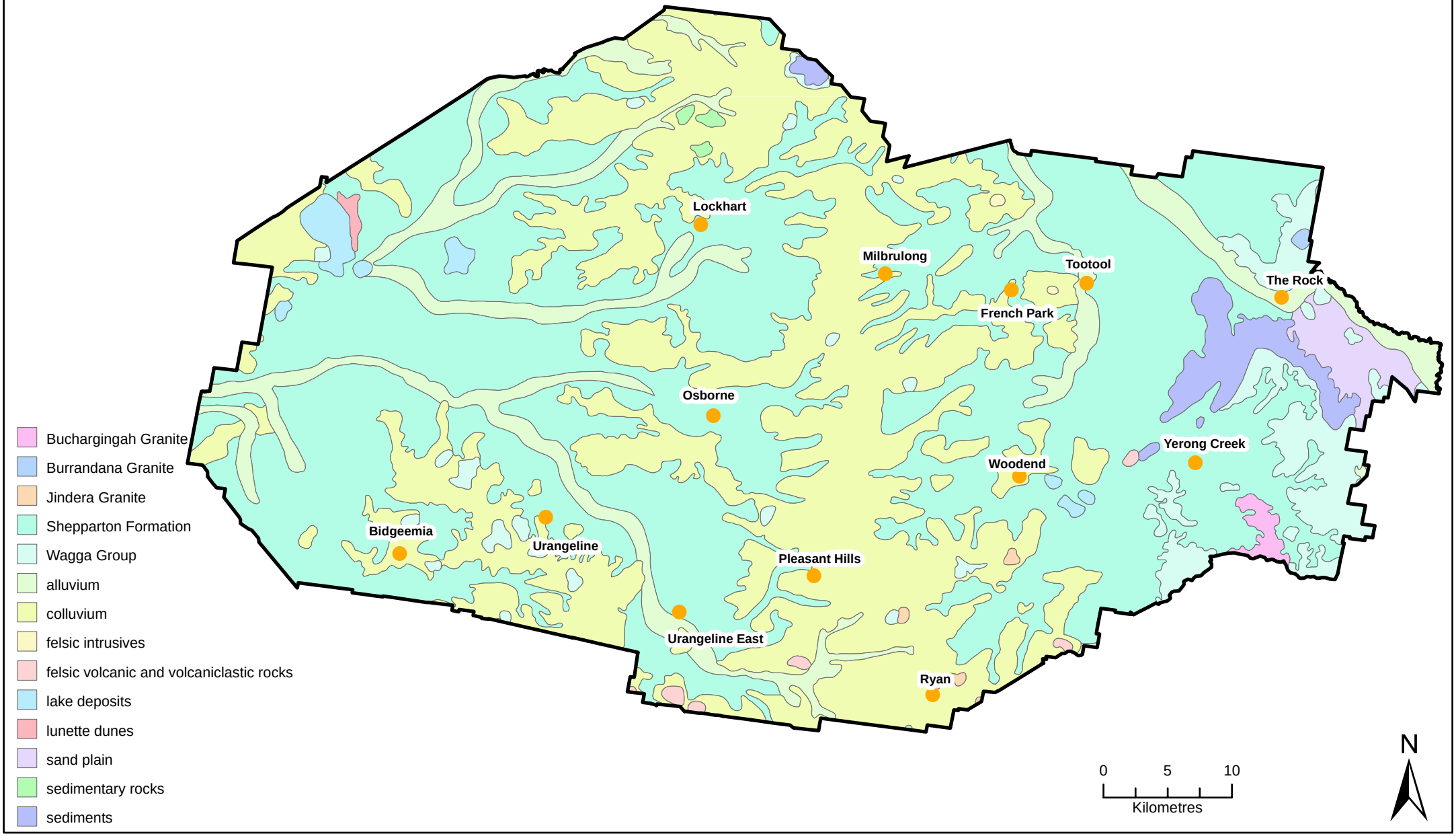

Annexure 4

Land Use Map

LOCKHART SHIRE COUNCIL
LAND USE

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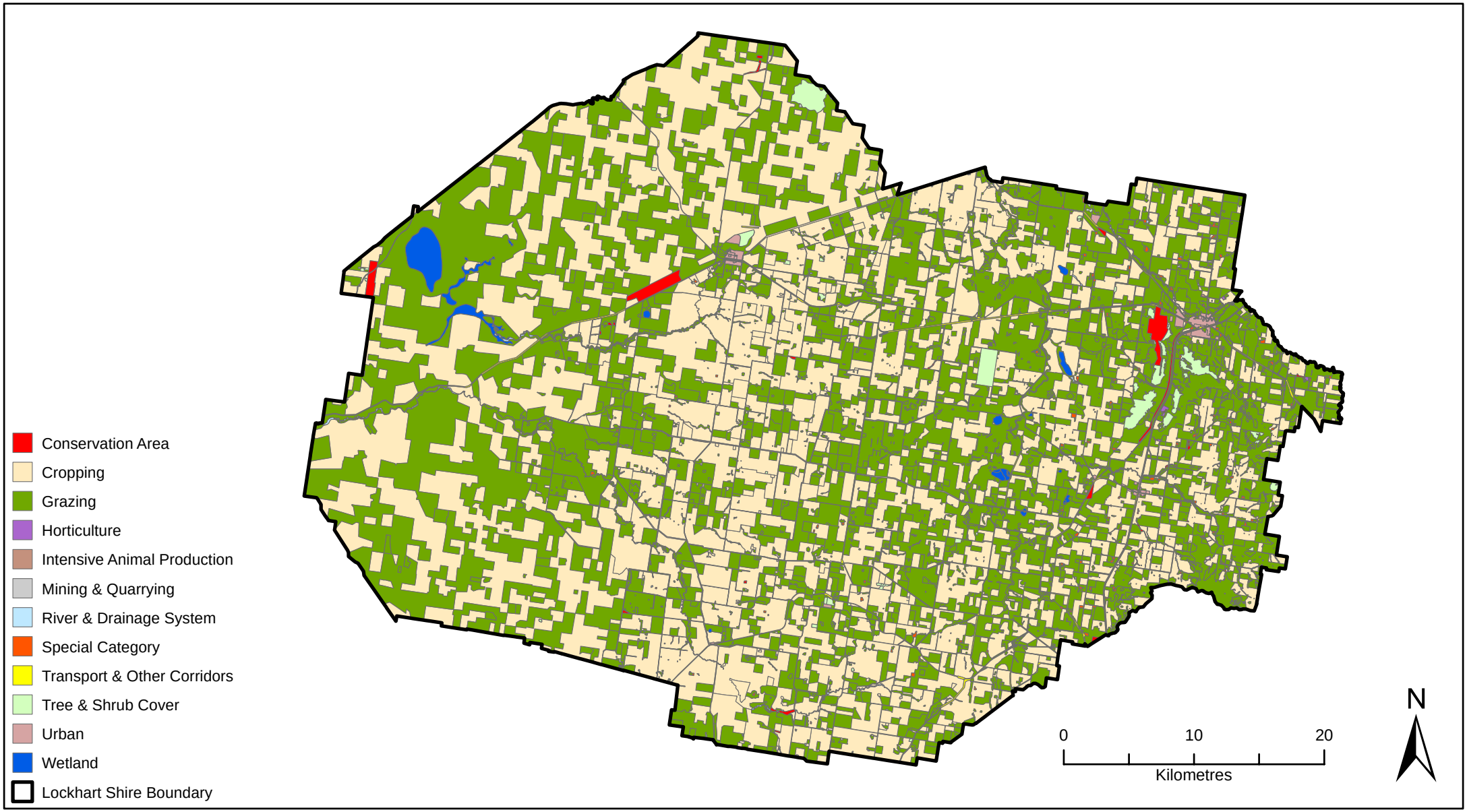

Annexure 5

Land Capability Map

LOCKHART SHIRE COUNCIL
LAND CAPABILITY

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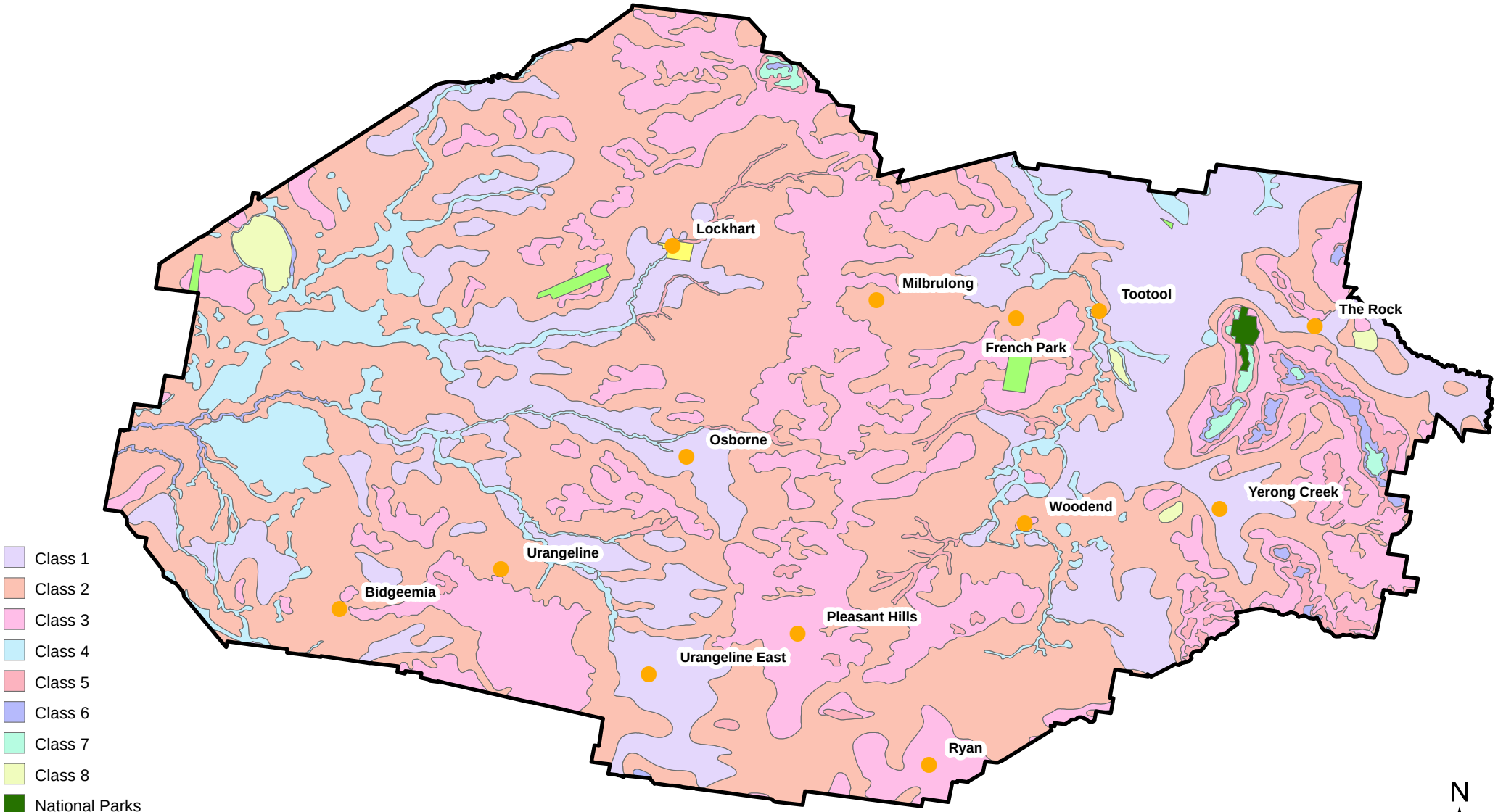

Annexure 6

Prime Agricultural Land

LOCKHART SHIRE COUNCIL
PRIME AGRICULTURAL LAND

Date: 11/03/2013
Project: Lockhart Shire Council
Created By: GIS Mapping Unit

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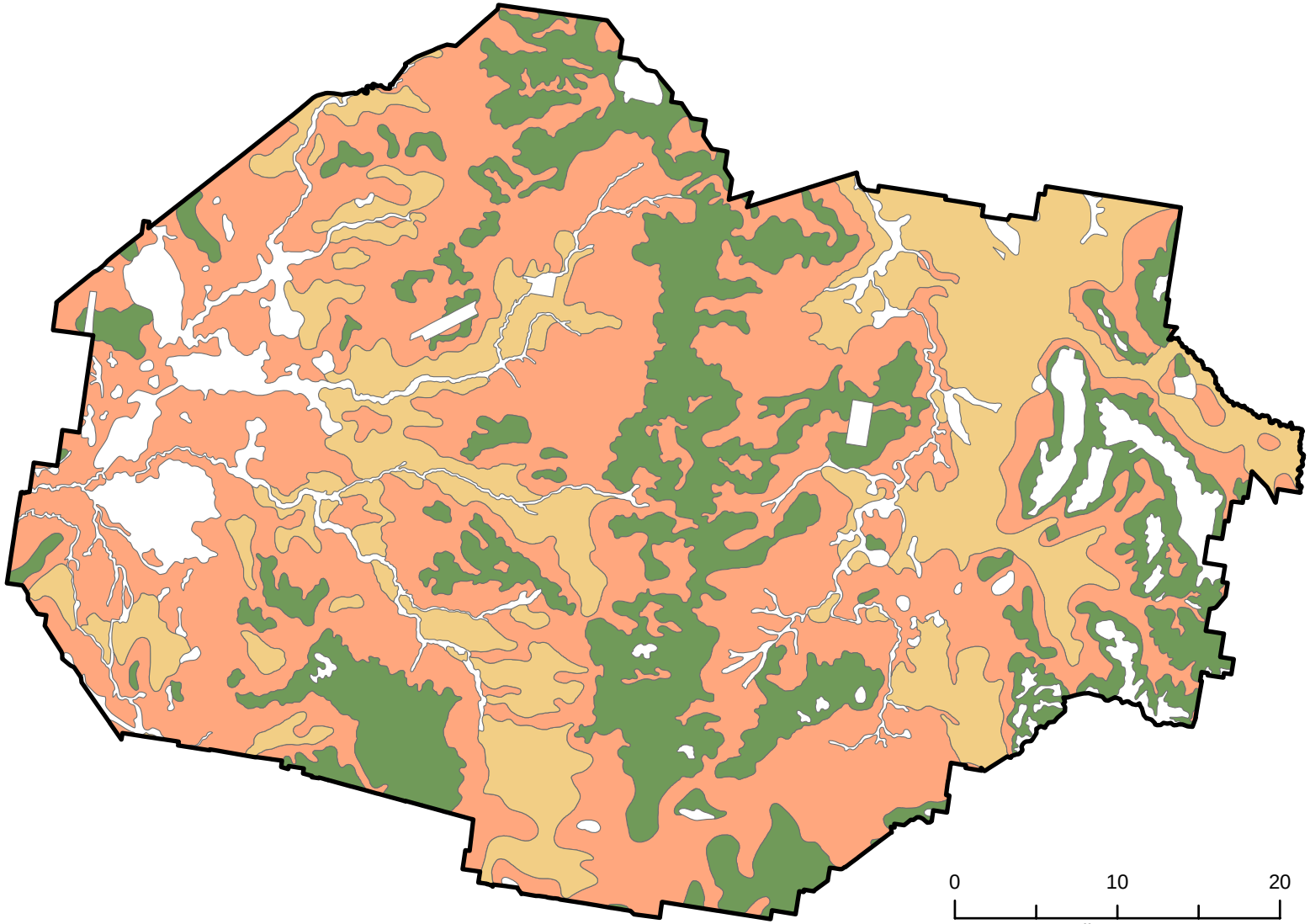

Class 1
Class 2
Class 3
Lockhart Shire Boundary

0 10 20
Kilometres

N

Annexure 7

Sensitive Natural Resources – Biodiversity

LOCKHART SHIRE COUNCIL
BIODIVERSITY

Date:12/02/2013
Project: Lockhart Shire Council
Created By: GIS Mapping Unit

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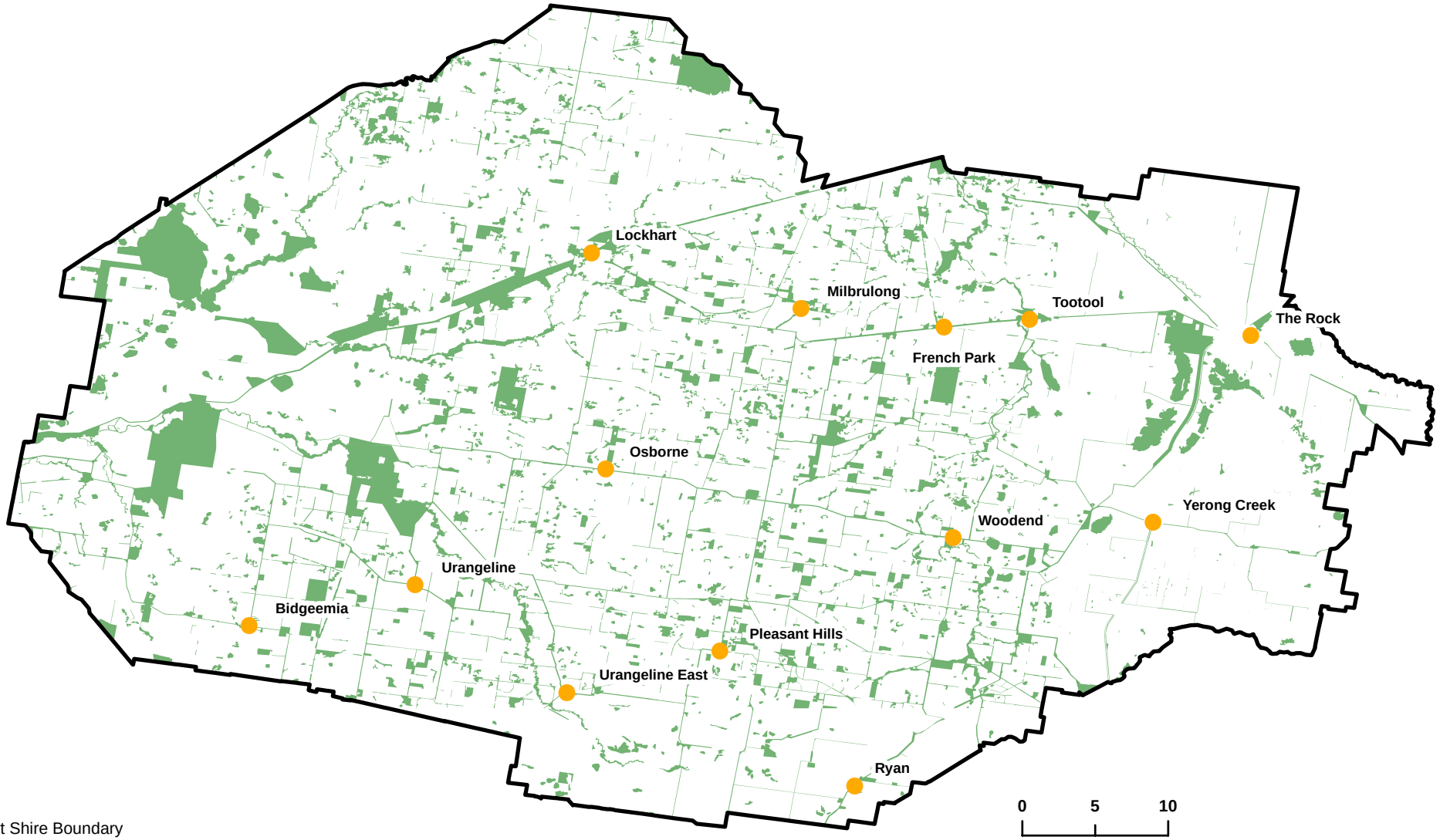

Annexure 8

Sensitive Natural Resources – Water

LOCKHART SHIRE COUNCIL
SENSITIVE NATURAL RESOURCES - WATER

Date: 04/03/2013
Project: Lockhart Shire Council
Created By: GIS Mapping Unit

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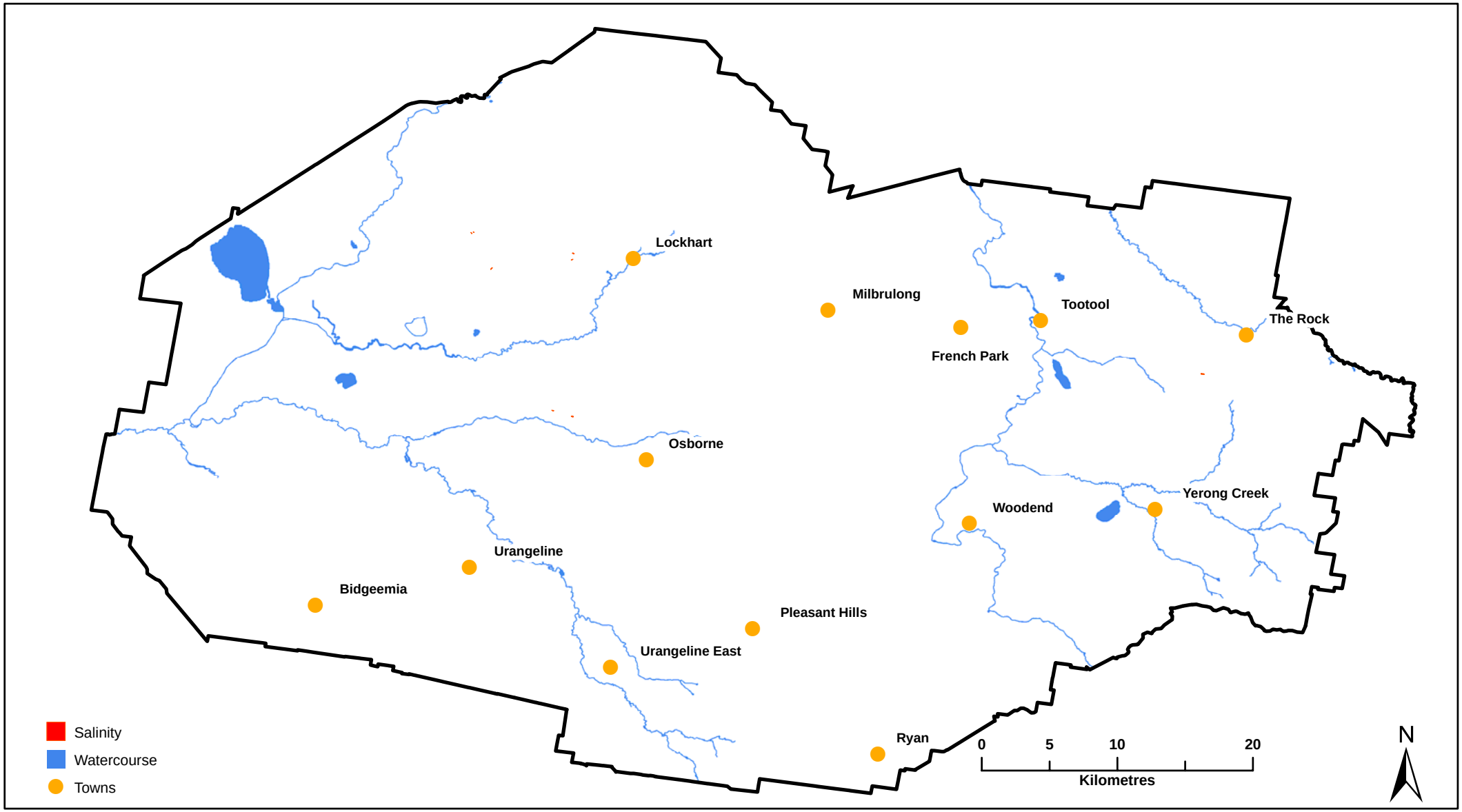

Annexure 9

Mineral Resources

LOCKHART SHIRE COUNCIL
MINERAL RESOURCES

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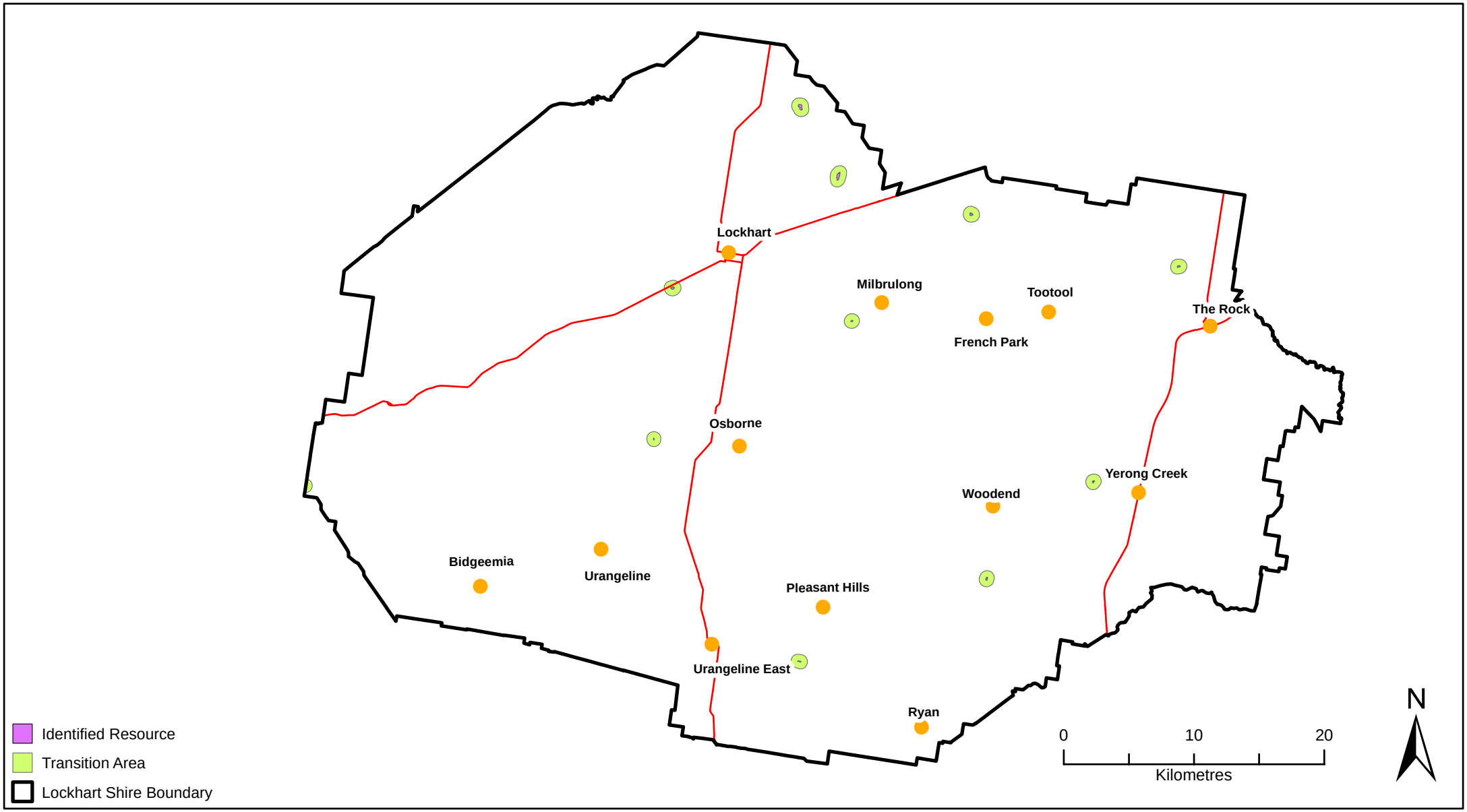

Annexure 10

Landholdings

LOCKHART SHIRE COUNCIL LANDHOLDINGS

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Project: Lockhart Shire Council
Created By: GIS Mapping Unit

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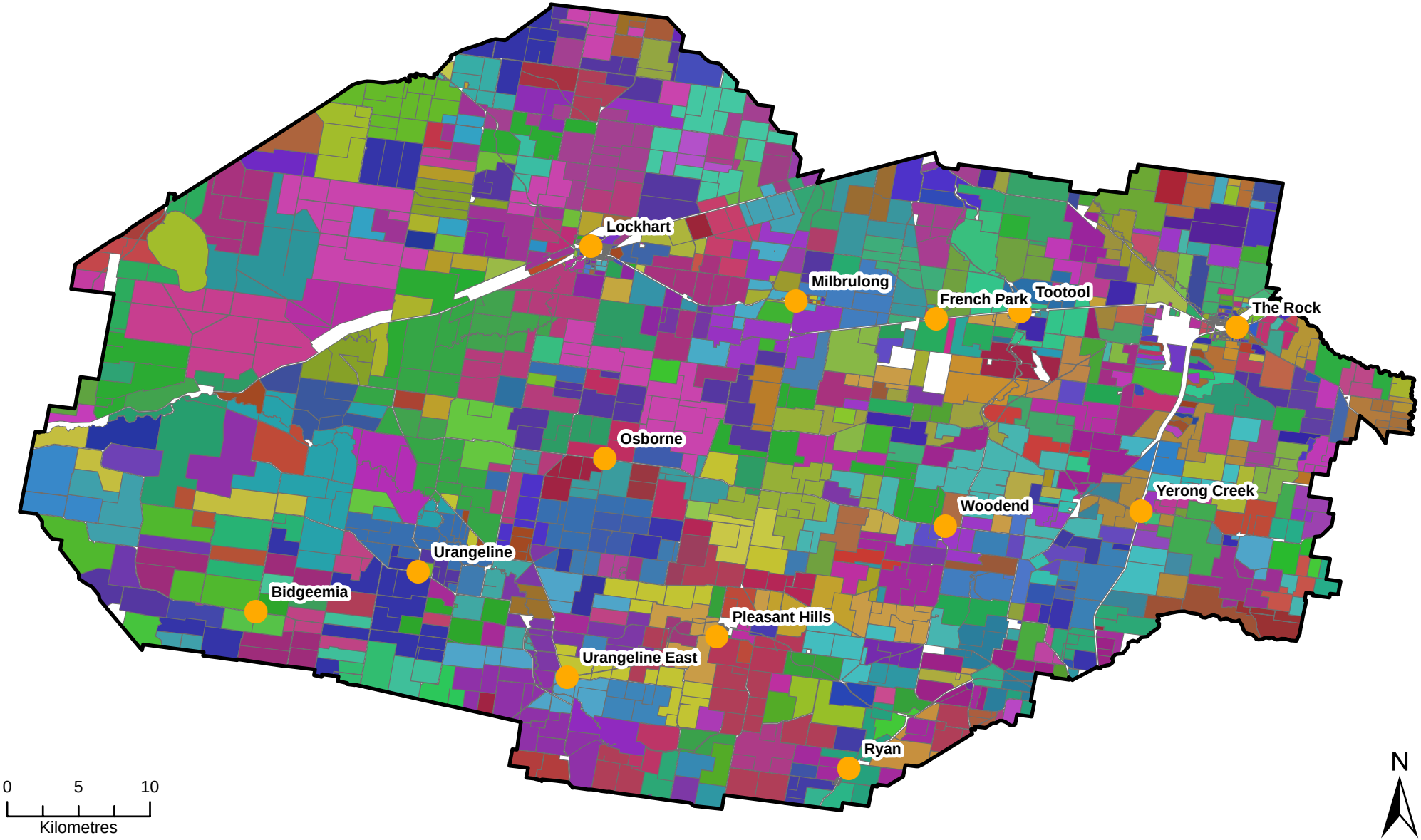

Annexure 11

Landholdings by Size

LOCKHART SHIRE COUNCIL
LANDHOLDINGS BY SIZE

Date: 7/02/2013
Project: Lockhart Shire Council
Created By: GIS Mapping Unit

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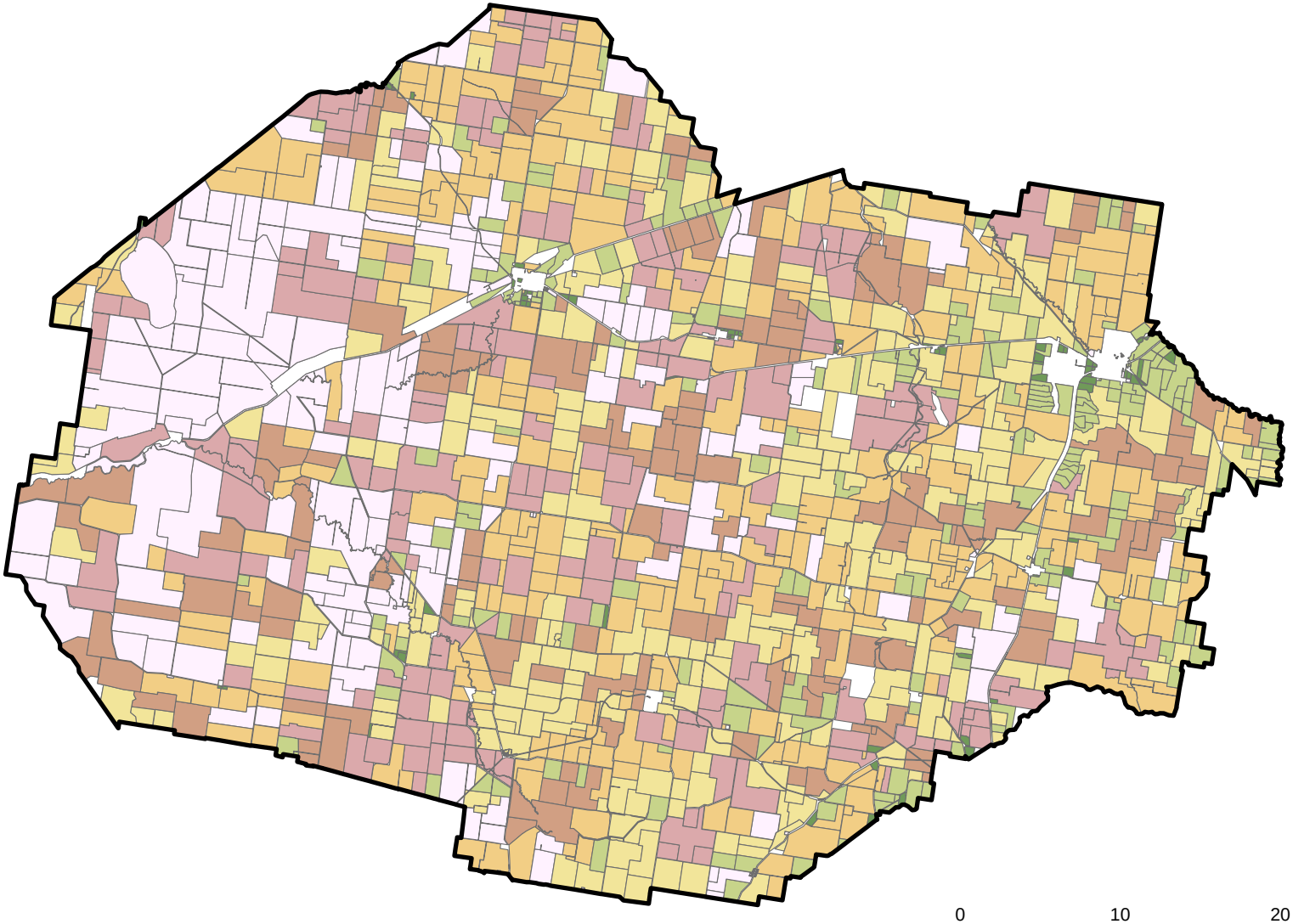

- 5ha - 40ha
- 41ha - 200ha
- 201ha - 400ha
- 401ha - 650ha
- 641ha - 800ha
- 800ha - 1,200ha
- >1,200ha

0 10 20
Kilometres

N

Annexure 12

Farm Size Analysis

Typical broadacre dryland farm - Lockhart Shire - Eastern Side

Assumed farm criteria

Resource base	Total area	375	ha	
	Arable area	338	ha	
Rotation	wheat	113	ha	
	barley	38	ha	
	canola	38	ha	
	pasture/fallow	188	ha	
	livestock	1,600	DSE	

Assumed balance sheet

Assets	Land & improvements	$ 3,000	/ha	$	1,125,000
	Machinery & vehicles			$	250,000
	Livestock	$ 75	/DSE	$	120,000
	produce/merchandise on hand			$	10,000
	Operating capital			$	40,000
	Sundry/rounding up			$	5,000
		Total assets		$	1,550,000
Liabilities	Assume debt free for this exercise			$	-
		Total liabilities		$	-
		Net worth		$	1,550,000
		Equity			100%

Assumed profitability

Revenue (GP)	wheat	4.0 t/ha	$200 /t	$ 350 /ha costs	$	50,625
	barley	4.0 t/ha	$150 /t	$ 300 /ha costs	$	11,250
	canola	2.2 t/ha	$520 /t	$ 450 /ha costs	$	26,025
	pasture/fallow			$ 20 /ha costs	-$	3,750
	livestock			$ 32 /DSE GM	$	51,192
	sundry	rebates, contracting, etc			$	10,000
	off farm income				$	-
						145,342
Expenses	overheads			$ 35,000		
	variable unallocated			$ 15,000		
	depreciation/capital renewal			$ 15,000		
	management drawings			$ 40,000	$	105,000
				Debt free profit (EBIT)	$	40,342
				EBIT yield		2.6%

Note No allowance for off-farm income such as salaries & wages
No allowance for subsidies such as drought, etc

Typical broadacre dryland farm - Lockhart Shire - Western Side

Assumed farm criteria

Resource base	Total area	675	ha
	Arable area	641	ha
Rotation	wheat	203	ha
	barley	68	ha
	canola	68	ha
	pasture/fallow	338	ha
	livestock	1,350	DSE

Assumed balance sheet

Assets	Land & improvements	$ 2,000	/ha	$	1,350,000
	Machinery & vehicles			$	250,000
	Livestock	$ 75	/DSE	$	101,250
	produce/merchandise on hand			$	10,000
	Operating capital			$	40,000
	Sundry/rounding up			$	5,000
		Total assets		$	1,756,250
Liabilities	Assume debt free for this exercise			$	-
		Total liabilities		$	-
		Net worth		$	1,756,250
		Equity			100%

Assumed profitability

Revenue (GP)	wheat	2.5 t/ha	$200 /t	$ 175 /ha costs	$	65,813
	barley	2.5 t/ha	$150 /t	$ 175 /ha costs	$	13,500
	canola	1.5 t/ha	$520 /t	$ 400 /ha costs	$	25,650
	pasture/fallow			$ 20 /ha costs	-$	6,750
	livestock			$ 32 /DSE GM	$	43,200
	sundry	rebates, contracting, etc			$	10,000
	off farm income				$	-
						151,413
Expenses	overheads			$ 35,000		
	variable unallocated			$ 15,000		
	depreciation/capital renewal			$ 15,000		
	management drawings			$ 40,000	$	105,000
				Debt free profit (EBIT)	$	46,413
				EBIT yield		2.6%

Note No allowance for off-farm income such as salaries & wages
No allowance for subsidies such as drought, etc

Annexure 13

Rural Planning Principles and Rural Subdivision Principles Assessment Matrix

Annexure 13

The following matrix assesses a range of possible minimum lot sizes against the Rural Planning Principles and Rural Subdivision Principles of the Rural Lands (2008) SEPP.

7. Rural Planning Principles

Principle	150ha	200ha	250ha	300ha	350ha	400ha	450ha	500ha	550ha	600ha	650ha	Comment
(a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas.	4	5	5	4	3	2	2	1	1	1	1	High land values mean once farm sizes exceed 250ha the upfront capital cost of bare land is greater than $1.0M on the higher value lands in the Shire. Large farm sizes will protect current production but prevent new opportunities.
(b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State	1	2	3	4	5	5	5	5	5	5	5	As identified by Central West Rural Lands Inquiry (2007) "*big farms are getting bigger, small farms smaller*". Economic Analysis indicates when off-farm income is considered all farms except 150ha can be considered viable.
(c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development	1	3	4	3	3	2	2	1	1	1	1	Small farm areas lack economic sustainability; large farm areas do not provide social and intergenerational equity. All farms provide sustainable environmental outcomes.
(d) in planning for rural lands, to balance the social, economic and environmental interests of the community	1	3	4	3	3	2	2	1	1	1	1	Small farm areas lack economic sustainability; large farm areas do not provide social and intergenerational equity. All farms provide sustainable environmental outcomes.
(e) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land	4	4	4	4	4	4	4	4	4	4	4	Strategy has identified natural resources and the range of farm sizes assessed will not directly impact on these.
(f) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities	5	5	4	3	2	2	1	1	1	1	1	Evidence suggests a lack of opportunities with the current 650ha standard.
(g) the consideration of impacts on services and infrastructure and appropriate location when providing for rural housing	4	4	4	4	4	4	4	4	4	4	4	No additional services or infrastructure required, and appropriate dwelling locations are accessible for the range of farm sizes assessed.
(h) ensuring consistency with any applicable regional strategy of the Department of Planning or any applicable local strategy endorsed by the Director-General	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No known regional or local strategy.
TOTAL	**20**	**26**	**28**	**25**	**24**	**21**	**20**	**17**	**17**	**17**	**17**	

8. Rural Subdivision Principles

Principle	150ha	200ha	250ha	300ha	350ha	400ha	450ha	500ha	550ha	600ha	650ha	Comment
(a) the minimisation of rural land fragmentation	3	3	4	4	5	5	5	5	5	5	5	Smaller farm sizes may allow for some level of fragmentation of rural lands.
(b) the minimisation of rural land use conflicts, particularly between residential land uses and other rural land uses	2	3	4	4	5	5	5	5	5	5	5	Larger farm sizes favour minimisation of the potential for rural land use conflict.
(c) the consideration of the nature of existing agricultural holdings and the existing and planned future supply of rural residential land when considering lot sizes for rural lands	2	2	5	5	5	5	4	4	3	2	2	Holdings analysis includes acreage holding size of 368ha and median holdings size of 250ha. Rural residential land addressed in a separate report as part of this project.
(d) the consideration of the natural and physical constraints and opportunities of land	4	4	4	4	4	4	4	4	4	4	4	Natural and physical constraints identified in Annexures 3, 5, 7, 8 and 4.
(e) ensuring that planning for dwelling opportunities takes account of those constraints	3	3	4	4	4	4	3	3	3	2	2	Smaller farm sizes are economically viable when off-farm income is considered in a minimum farm size analysis large farms present opportunities
TOTAL	**14**	**16**	**21**	**21**	**23**	**23**	**21**	**21**	**20**	**18**	**18**	
GRAND TOTAL	**34**	**42**	**49**	**46**	**47**	**44**	**41**	**38**	**37**	**35**	**35**	

Annexure 14

Extract from Learmonth *et al* (2007) Living and Working in Rural Areas

Land use buffers

Rural land use conflicts come in a variety of different forms. Land use buffers are an accepted land use planning tool and have an important role in reducing risk of land use conflict and impacts between incompatible land uses through separation of land uses. Buffers provide increasing certainty in the planning approval process and minimise the potential for conflict to occur.

It needs to be remembered that conflicts can occur between: individual rural activities and/or natural resource users; commercial land users and residents; land uses and the natural environment. The purpose and application of buffers will vary depending upon the individual circumstances. Buffers are an important tool to reduce land use conflicts but are not the only tool. The role and value of buffers can however be undermined if they are reduced by encroaching land use.

Key points

While buffers are important in managing land use conflicts, they do not lessen the need for sound land use planning practices, in particular the strategic planning processes of appropriate zoning and land use strategy development.

As well, they do not replace the need for the individual assessment of a proposal based upon the specific characteristics of the site, the locality and the proposal itself. Aspects such as scale of development, topographic and climatic conditions, environmental attributes and the nature and sensitivity of uses within the locality will influence the required impact mitigation measures and the separation distances that are considered necessary and appropriate in the circumstances. Innovative solutions to land use conflict and interface issues is to be encouraged.

Role of buffers

Defining minimum buffer distances between incompatible land uses and key natural resource assets is a useful mechanism for reducing and avoiding the threat of land use conflict issues between incompatible land uses. However, buffers have their limitations and need to be used with caution and in combination with other strategies to reduce land use conflict risks and manage interface issues. Chapter 3 describes management practices to reduce land use conflicts, additional to the establishment and maintenance of buffers.

There are various documents that prescribe minimum separation distances between incompatible land uses. Table 6 is a guide to recommended minimum separation distances for primary industries. Table 7 outlines the recommended minimum buffers for environmental assets. Table 8 outlines the recommended minimum buffers for other rural land uses. **The buffers recommended should be used as a starting point and guide only in the absence of any other or more appropriate separation arrangements.** Local and site specific circumstances and application of relevant policies and specific guidelines will dictate the minimum separation required and what is reasonable and appropriate in the circumstances.

It is not possible to prescribe a minimum buffer distance for all interface situations. In such cases, Tables 6–8 include an alternative approach such as site specific assessment. This site specific assessment is comparable to the assessment that would be typically

undertaken to satisfy the requirements of Section 79C of the EP&A Act. The minimum buffer distances need to be used and applied in combination with the planning principles previously outlined to ensure the desired outcome is achieved.

Key points

Complying with an adopted buffer setback will help decrease the potential for conflict though it cannot guarantee that land use conflict and interface issues will be totally removed. Variables such as changes in ownership of adjoining lands, changes in land use and management practices and variable climatic conditions can affect the success of land use buffers.

Similarly, complying with a buffer setback does not guarantee that a development proposal will be approved by the consent authority. Mitigation of land use conflict and the application of land use buffers are part of a broader consideration of environmental, social and economic factors which an approval authority must take into account in determining the merits of a given land use proposal.

Types of buffers

Separation buffers are the most common and involve establishing a physical separation between land uses where conflict could arise. The aim of doing this is to reduce the impacts of the uses solely by distance separation, rather than by any physical means such as earthworks or vegetation planting. These can be fixed separation distances or variable. Fixed separation distances generally apply in the absence of evidence that an alternate lesser buffer will be effective in the circumstances. Variable separation distances are calculated based on the site specific circumstances given factors such as the scale of the development, risk of conflict and risk to the adjoining environment have regard to accepted procedures for assessing these risks. The odour assessment process in NSW involving stationary sources is a form of a variable buffer as it varies according to specifics of the development and the site.

Biological and vegetated buffers are buffers created by vegetation planting and physical landscaping works. They are most commonly designed to reduce visual impact and reduce the potential for airborne-created conflict such as chemical spray drift and dust and can help provide environmental protection through vegetated filter strips and riparian plantings.

Landscape and ecological buffers refer to the use of existing vegetation to help reduce the impacts from development. They are mostly used to protect a sensitive environment by maintaining or enhancing existing habitat and wildlife corridors.

Property management buffers refer to the use of alternative or specialised management practices or actions at the interface between uses where the potential for conflict is high. The aim of these buffers is to reduce the potential of conflict arising in the first place. Examples include siting cattle yards well away from a nearby residence to reduce potential nuisance issues, and adopting a specialised chemical application regime for crops close to a residence or waterways with the aim of minimising off-site impacts on neighbours and the environment.

Other buffers

There are other statutory and recommended buffers that can apply to a specific sites and situations. These include:

- bushfire protection buffers
- mosquito buffers
- airport buffers
- power line buffers
- rifle range buffers
- railway line buffers
- cultural heritage buffers.

Key points

People intending to develop within a rural area or within the rural/residential interface should contact their local council to find out about the buffer requirements specific to their locality, site and the land use proposed.

Similarly, with regard to Aboriginal cultural heritage issues, including significant sites, places and landscapes, it is recommended that you consult with the local council's Aboriginal liaison officer, the Local Aboriginal Land Council community support officer or the Northern Aboriginal Cultural Heritage Section at your closest Department of Environment and Climate Change. Buffer zones and management options will vary according to the significance of a site, its locality, the topography of the land and its relationship to a range of other geographic and culturally relevant factors. Councils such as the Tweed Shire Council have Aboriginal cultural heritage management plans for localities within their shire boundaries for the protection of Aboriginal significant sites and places.

Summary of recommended minimum buffers

The following tables summarise the recommended minimum buffers to help councils develop development control plans and to implement development control procedures that reduce land use conflicts and protect the values of key environmental assets and rural production areas. **The separation distances in the tables represent a synthesis of existing recommended and best practice minimum buffer distances.** As such, and given the varying sources they are drawn from, they represent an approximation of what constitutes best practice and a level of separation that will assist to minimise rural land use conflict at this time while acknowledging that site specific and development specific factors will always play a role in determining the most appropriate level of separation and approaches to conflict avoidance.

It is acknowledged that appropriate buffer distances may vary between proposals and between councils based on local topographic, climate, environmental and social considerations. The minimum buffers recommended are not intended to take the place of local council policy on buffers, setbacks etc, where such policy has been developed and adopted. The recommended minimum buffer distances do not apply to existing developments that have already been approved. The conditions of consent placed on these developments form the minimum standards that these developments should achieve.

Where a new dwelling is proposed on an existing vacant lot that has a dwelling entitlement, the setbacks and buffers normally required may not necessarily be appropriate or practical. In these cases, council will need to use discretion to determine the most appropriate location, design and arrangement for the new dwelling. The principle of conflict avoidance should be maintained and the maximum achievable buffer and conflict avoidance measures implemented.

Table 6: Recommended minimum buffers (metres) for primary industries

(NB: The desirable buffer in the circumstances will be the separation distance and conflict avoidance strategy that protects: community amenity, environmental assets, the carrying out of legitimate rural activities in rural areas and the use of important natural resources.)

		Residential areas & urban development	Rural dwellings	Education facilities & pre-schools	Rural tourist accommodation	Watercourses & wetlands	Bores & wells	Potable water supply/ catchment	Property boundary	Roads
Piggeries[1]	Housing & waste storage	1000	500	1000	500	100	SSD	800	100	100
	Waste utilisation area	500	250	250	250	100	SSD	800	20	20
Feedlots[2]	Yards & waste storage	1000	500	1000	1000	100	SSD	800	100	100
	Waste utilisation area	500	250	250	250	100	SSD	800	20	20
Poultry[3]	Sheds & waste storage	1000	500	1000	500	100	SSD	800	100	100
	Waste utilisation area	500	250	250	250	100	SSD	800	20	20
Dairies[4]	Sheds & waste storage	500	250	250	250	100	SSD	800	100	100
	Waste utilisation area	500	250	250	250	100	SSD	800	20	20
Rabbits[5]	Wet shed, ponds & irrig.	300	150	150	150	100	SSD	800	50	50
	Dry shed	120	60	120	60	100	SSD	800	20	20
Other intensive livestock operations[6]		500	300	500	300	100	SSD	800	100	100
Grazing of stock		50	50	50	50	BMP	SSD	BMP	NAI	BMP
Sugar cane, cropping & horticulture		300	200	200	200	BMP	SSD	BMP	NAI	BMP
Greenhouse & controlled environment horticulture		200	200	200	200	50	SSD	SSD	50	50
Macadamia de-husking		300	300	300	300	50	SSD	SSD	50	50
Forestry & plantations		SSD	SSD	SSD	SSD	STRC	SSD	SSD	BMP	STRC
Bananas		150	150	150	150	BMP	SSD	SSD	BMP	BMP
Turf farms[8]		300	200	200	200	50	SSD	SSD	BMP	SSD
Rural industries (incl. feed mills and sawmills)		1000	500	500	500	50	SSD	SSD	SSD	50
Abattoirs		1000	1000	1000	1000	100	SSD	800	100	100
Potentially hazardous or offensive industry		1000	1000	1000	1000	100	SSD	800	100	100
Mining, petroleum, production & extractive industries		500 1000*	500 1000*	500 1000*	500 1000*	SSD	SSD	SSD	SSD	SSD

* Recommended minimum buffer distance for operations involving blasting.

NAI: Not an issue.

SSD: Site specific determination (no standard or simple buffer distance applies).

BMP: Best management practice to apply given site circumstances. Buffer and/or management practice should represent duty of care to the environment and the public and include measures necessary to protect bank stability, maintain riparian vegetation and protect water quality. The incorporation of best management practice measures in property and farm plans is encouraged.

STRC: Subject to relevant codes.

Buffer distances represent the recommendations of the North Coast Land Use Conflict Working Group following a synthesis of existing guidelines and policy. In some cases, specific and relevant guidelines may require larger buffers or lesser buffers than those prescribed may be appropriate in the circumstances.

Notes:

1. Subject to environmental assessment in accordance with National *Environmental Guidelines for Piggeries* (APL 2004) and *Assessment and Management of Odour from Stationary Sources in NSW* (DEC 2006)
2. Subject to environmental assessment in accordance with *NSW Feedlot Manual* (NSW Agriculture 1997) or *A Producers Guide to Starting a Small Beef Feedlot in NSW* (NSW Agriculture, 2001) and *Assessment and Management of Odour from Stationary Sources in NSW* (DEC 2006)
3. Subject to environmental assessment in accordance with *NSW Poultry Farming Guidelines* (NSW Agriculture 1996), NSW Meat Chicken Guidelines (NSW Agriculture 2004), *Assessment and Management of Odour from Stationary Sources in NSW* (DEC 2006)
4. Subject to environmental assessment in accordance with *NSW Guidelines for Dairy Effluent Resource Management – Draft* (NSW Agriculture 1999), and *Assessment and Management of Odour from Stationary Sources in NSW* (DEC 2006)
5. Subject environmental assessment in accordance with *Rabbit Farming: Planning and development control guidelines* (NSW Inter-Departmental Committee on Intensive Agriculture, 1999) and environmental assessment in accordance with *Assessment and Management of Odour from Stationary Sources in NSW* (DEC 2006)
6. Subject to environmental assessment in accordance with *Assessment and Management of Odour from Stationary Sources in NSW* (DEC 2006) and any other relevant guideline or policy
7. Subject to environmental assessment in accordance with *Guidelines for the Development of Controlled Environment Horticulture* (NSW DPI 2005)
8. Subject to environmental assessment in accordance with *Turf Farming – Guidelines for Consent Authorities in NSW* (NSW Agriculture 1996)

Table 7: Recommended minimum buffers (metres) for key environmental assets

	Residential areas & urban development	Rural settlement & on-site waste systems	Education facilities & pre-schools	Rural tourist accommodation
Native vegetation/habitat	50	50	50	50
Ecosystem & wildlife corridors	50	50	50	50
Estuaries & major waterways	100	100	100	100
Minor waterways	50*	50*	50*	50*
Wetlands	100	50*	50*	50*
SEPP 26 littoral rainforests	100	100	100	100
State & regionally significant farmland	300	300	300	SSD

* Site assessment is necessary as 50m buffer may be inadequate given groundwater, soil type, topography and site factors.

NAI: Not an issue.

SSD: Site specific determination (no standard or simple buffer distances apply).

STRC: Subject to relevant codes.

Buffer distances represent the recommendations of the North Coast Land Use Conflict Working Group following a synthesis of existing guidelines and policy. In some cases, specific and relevant guidelines may require larger buffers or lesser buffers than those prescribed may be appropriate in the circumstances.

Table 8: Recommended minimum buffers (metres) for other land uses

	Residential areas & urban development	Rural settlement	Education facilities & pre-schools	Rural tourist accommodation
Waste facilities	300	300	300	300
Sewerage works	400	400	400	400
Dip sites[1]	200	200	200	200
Boarding kennels	500	500	500	500
Stock yards including cattle yards	200	200	200	200
Stock homes/stables[2]	SSD	SSD	SSD	SSD
Effluent re-use areas[3]	SSD	SSD	SSD	SSD

SSD: Site specific determination (no standard buffer distances apply).

Notes:

1. The Cattle Tick Dip Site Management Committee (DIPMAC) recommends a nominal 200 metre radius assessment zone around cattle dip sites. Residential development proposed within this zone should be subject to a contaminated lands assessment to determine the extent of contamination and risks posed by contamination. The assessment and any proposed remediation works must also meet the requirements of *State Environmental Planning Policy No. 55 – Remediation of Land*. Urban encroachment onto working cattle dip sites is to be avoided where possible.
2. Subject to assessment in accordance with NSW Department of Environment and Conservation publication *Environmental Management on the Urban Fringe – Horse Properties on the Rural Urban Fringe, Best Practice Environmental Guide for Horses* (2004).
3. Subject to assessment in accordance with NSW Department of Environment and Conservation publication *Use of Effluent by Irrigation* (2003) or local policy as adopted by individual councils.

Table 9: Sources of information for minimum buffers

Land use or environmental asset	Reference source
Piggeries	*National Environmental Guidelines for Piggeries* APL 2004 *North Coast Guidelines for Subdivision and Development in Agricultural Areas* NSW Agriculture 1995 Lismore Development Control Plan Chapter 11 – Buffer Areas Nambucca Shire Council DCP 16 – Rural Buffers (2005)
Feedlots	*NSW Feedlot Manual* NSW Agriculture 1997 Lismore Development Control Plan Chapter 11 – Buffer Areas Tweed DCP *North Coast Guidelines for Subdivision and Development in Agricultural Areas* NSW Agriculture 1995 Nambucca Shire Council DCP 16 – Rural Buffers (2005)
Poultry farms	Lismore Development Control Plan Chapter 11 – Buffer Areas Tweed DCP
Dairy farms	Lismore Development Control Plan Chapter 11 – Buffer Areas Tweed DCP *North Coast Guidelines for Subdivision and Development in Agricultural Areas* NSW Agriculture 1995 Nambucca Shire Council DCP 16 – Rural Buffers (2005) *NSW Guidelines for Dairy Effluent Resource Management* NSW Agriculture, 1999
Other intensive livestock operations:	Tweed DCP
Grazing	Lismore Development Control Plan Chapter 11 – Buffer Areas Nambucca Shire Council DCP 16 – Rural Buffers (2005)
Sugar cane, cropping & horticulture	*North Coast Guidelines for Subdivision and Development in Agricultural Areas* (NSW Agriculture) Lismore Development Control Plan Chapter 11 – Buffer Areas *Planning Guidelines; Separating Agricultural and Residential Land Uses* Qld Department of Natural Resources 1997
Greenhouse & controlled environment Horticulture	*North Coast Guidelines for Subdivision and Development in Agricultural Areas* NSW Agriculture 1995 *Guidelines for the Development of Controlled Environment Horticulture: Planning Greenhouse and Hydroponic Horticulture in NSW* NSW DPI 2005
Macadamia de-husking	Lismore Development Control Plan Chapter 11 – Buffer Areas *Code of Practice for noise management of on-farm processing of macadamia nuts* Australian Strategic Planning Pty Ltd 2003 Nambucca Shire Council DCP 16 – Rural Buffers (2005)
Bananas	Nambucca Shire Council DCP 16 – Rural Buffers (2005) Pesticide Control Order AIR-1 1987
Turf farms	*North Coast Guidelines for Subdivision and Development in Agricultural Areas* NSW Agriculture 1995
Abattoirs	Lismore Development Control Plan Chapter 11 – Buffer Areas Tweed DCP Nambucca Shire Council DCP 16 – Rural Buffers (2005)
Ecosystems & wildlife corridors Native vegetation/ habitat	State Environmental Planning Policy No. 26 – Littoral Rainforests Lismore Development Control Plan Chapter 11 – Buffer Areas Recommendations of NSW Department of Environment and Climate Change

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Table 9 cont.

Land use or environmental asset	Reference source
Estuaries and major waterways	*Policy and Guidelines: Aquatic Habitat and Fish Conservation* – NSW Fisheries (1999) Lismore Development Control Plan Chapter 11 – Buffer Areas
Waste facilities	Tweed DCP
Sewerage works	Lismore Development Control Plan Chapter 11 – Buffer Areas Byron DCP Nambucca Shire Council DCP 16 – Rural Buffers (2005)
Dip sites	DIPMAC (NSW Cattle Tick Dip Site Management Committee) *North Coast Guidelines for Subdivision and Development in Agricultural Areas* NSW Agriculture 1995 Nambucca Shire Council DCP 16 – Rural Buffers (2005)
Stock yards including cattle yards	*North Coast Guidelines for Subdivision and Development in Agricultural Areas* NSW Agriculture 1995
Boarding kennels	Western Australian EPA Dungog Council DCP
Extractive Industries	Lismore Development Control Plan Chapter 11 – Buffer Areas Tweed DCP Recommendations of NSW DPI Mineral Resources Nambucca Shire Council DCP 16 – Rural Buffers (2005)
State & regionally significant farmland	*North Coast Guidelines for Subdivision and Development in Agricultural Areas* NSW Agriculture 1995 Northern Rivers Farmland Protection Project and the Mid North Coast Farmland Mapping Project
Rural land uses as listed	*Rural Land Use Conflict: Review of Management Techniques* Robert J. Smith, Report to Lismore Living Centres, Planning NSW 2003