

Euroley Poultry Production Complex SSD 6882

Environmental Impact Statement

MAIN REPORT

VOLUME 1



Prepared by:

Intensive Livestock Agriculture
Euroley Poultry Production Complex
Environmental Impact Statement
SSD 6882

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SUBMISSION OF ENVIRONMENTAL IMPACT STATEMENT

Prepared under Part 4 of the *Environmental Planning and Assessment Act 1979*

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Development Application

Applicant Name: ProTen Holdings Pty Limited

Applicant Address: PO Box 1746, North Sydney NSW 2060

Land to be Developed: Lots 1, 41, 42, 44, 45 and 54 in DP 750898, and Lot 1 in DP 1054064,
Local Government Area of Narrandera

Proposed Development: Euroley Poultry Production Complex, Sturt Highway, Euroley NSW
(SSD 6882)

Description: Intensive Livestock Industry - Poultry Broiler Production Farm
(refer **Section 3**)

Declaration

We hereby certify that we have prepared the contents of this document and to the best of our knowledge:

- It has been prepared in accordance with Clauses 71, 72 and 73 of the *Environmental Planning and Assessment Regulation 2000*;
- It addresses the Secretary's Environmental Assessment Requirements (SSD 14_6882) dated 6 February 2015 provided by the NSW Department of Planning and Environment under Clause 73 of the *Environmental Planning and Assessment Regulation 2000*;
- It contains all available information that is relevant to the environmental assessment of the proposed development to which the document relates; and
- It is true in all material particulars and does not, by its presentation or omission of information, materially mislead.

Name: Nicole Armit
SLR Consulting Australia Pty Ltd

Signature: 

Date: 20 May 2015

EXECUTIVE SUMMARY

INTRODUCTION

ProTen Holdings Pty Limited (ProTen) is seeking Project Approval to develop an intensive poultry broiler production farm, known as the Euroley Poultry Production Complex, within a rural property near Euroley in south western New South Wales (NSW). ProTen specialises in the design, construction and operation of broiler chicken farms throughout Australia, currently owning and operating eight poultry production complexes, including seven in NSW near Griffith and Tamworth, and one in Western Australia near Serpentine. Cumulatively, these complexes represent approximately 7 percent of broiler chicken production in Australia. ProTen has long term extendible contracts to supply chickens to Australia's largest chicken processor, Baiada Poultry Pty Ltd (Baiada), who markets and sells chicken products under the well-established brand names of Steggles and Lillydale

The Euroley Poultry Production Complex will be constructed and operated in accordance with industry best practice guidelines, in particular the *Best Practice Management for Meat Chicken Production in NSW* (DPI, 2012), and will comprise five poultry production units (PPUs) where broiler birds will be grown for human consumption. The proposed development site comprises approximately 1,160 hectares of rural land positioned around 4 kilometres off the Sturt Highway, approximately 26 kilometres north-west of Narrandera and 48 kilometres south-east of Griffith within the Local Government Area (LGA) of Narrandera. The long-standing and existing use of the development site is traditional agricultural production. The site primarily comprises paddocks that have been consistently cropped and grazed for many years.

This Environmental Impact Statement (EIS) has been prepared by SLR Consulting Australia (SLR) on behalf of ProTen to accompany an application for State Significant Development (SSD 6882) to the NSW Department of Planning and Environment (DP&E), seeking Project Approval under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

PROJECT OVERVIEW

The Euroley Poultry Production complex (the Project) comprises the development of five PPUs and associated infrastructure, where broiler birds will be grown for human consumption. Each PPU will comprise 16 tunnel-ventilated fully-enclosed climate-controlled poultry sheds, with associated support infrastructure and staff amenities. Each shed will have the capacity to house a maximum of 49,000 broilers at any one time, equating to a PPU population of up to 784,000 broilers, and a total farm population of 3,920,000 broilers. **Table A** below summarises the key elements of the Project.

The proposed disturbance footprint of the Euroley Poultry Production Complex will be relatively small and the commercial activities associated with the poultry operation will be largely confined to this area. The land outside of the disturbance footprint will continue to be used for agricultural production purposes under some form of lease or share farming arrangement.

Table A - Summary of the Project

Aspect	Details
Purpose	Birds grown for human consumption
Number of PPUs	Five, with a total footprint of around 70 hectares
Number of poultry sheds per PPU	16, each measuring 160 metres long by 17 metres wide
Type of poultry sheds	Tunnel-ventilated, fully-enclosed, climate-controlled
Maximum shed population	49,000 birds
Maximum PPU population	784,000 birds
Maximum farm population	3,920,000 birds
Maximum bird density within sheds	40 kg/m ²
Hours of operation	24 hours a day, 7 days a week
Production cycle length	Approximately 9 weeks, comprising a maximum bird occupation of 8 weeks and a cleaning phase of 1 week.
Number of production cycles per year	Approximately 5.7 on average

In addition to poultry shedding, the Project will also include:

- The construction of farm managers' accommodation. 10 houses will be constructed to accommodate farm managers and assistant farm managers;
- The construction of ancillary infrastructure and improvements required to support the poultry production operation, including:
 - Amenity facilities encompassing office space, toilets, and staff change rooms;
 - Servicing infrastructure to ensure that the Project's electricity, gas and water requirements can be met;
 - An engineered surface water drainage and management system;
 - Dead bird chiller room;
 - Chemical storage;
 - Generator shed, workshop and poultry shed floor bedding material storage shed;
 - Wheel wash facility at the PPU entrance;
 - Feed silos, which will automatically dispense the feed into the poultry sheds; and
 - Water storage tanks, with the capacity to store adequate supply at peak demand.
- Construction of an intersection with the Sturt Highway to a new access road to gain access to the development site. This will include the development of an easement through privately owned land between the development site and the intersection with the Sturt Highway.

KEY ENVIRONMENTAL ISSUES

The assessment of environmental issues associated with the Project has been multi-disciplinary and involved consultation with key local and state government agencies and a pre-project risk assessment. As facilitated by the risk assessment, where a potential environmental impact/risk was considered unacceptable, or where a knowledge gap was identified, a specialist study was commissioned and appropriate management responses nominated. While the risk assessment did not identify any high ranking environmental risks, three medium risks relating to air quality, traffic and transport, and site services were identified.

The Project is not anticipated to pose any significant or long-term adverse impact to the local environment or surrounding populace. While the information presented within the body of this EIS and within the appended specialist reports should be read in their entirety, the following table provides a summarised overview of the significant findings of the EIS.

Table B - Key Findings of the Environmental Assessment

Environmental Aspect	Key Assessment Findings
Land Use Conflict	<ul style="list-style-type: none"> • The potential for conflict between the Project and the existing surrounding agricultural production activities is considered low. The proposed PPU sites will be relatively small and the commercial activity associated with the development will be largely confined to these areas. • The disturbance footprint within the development site will amount to a total area of approximately 90 hectares, equivalent to just 8 percent of the development site. ProTen intends to continue the use of the residue land within the site for agricultural production purposes under some form of lease or share farming arrangement. On this basis, the Project will not deny access to areas of viable agricultural lands nor significantly reduce the land area available for agricultural production. • The north-west corner of the development site abuts the 'Banandra' portions of the South West Woodland Nature Reserve and Murrumbidgee Valley National Park. The nearest PPU will be located 100 metres from the development site boundary that abuts the National Park. All other project related development will be considerably further away from the site boundary, with the next nearest PPUs to be located 1.3 km and 1.4 km to the south and south-east respectively. • The potential impacts of the Project were assessed in consideration of the document <i>Guidelines for developments adjoining land and water managed by the Department of Environment Climate Change and Water (DECC (now OEH) 2010)</i>. Given the design of the Project and the mitigation measures to be implemented as described in this EIS, no significant impacts are predicted on the National Park.
Air Quality	<p>Pacific Environment (2015) undertook a detailed assessment of potential air quality issues, including odour and particulate matter, associated with the Project. The assessment concludes the following:</p> <ul style="list-style-type: none"> • Odour levels at the nearest privately-owned residences are predicted to be below the adopted project-specific criterion of 7 odour units. • The 99th percentile odour concentration at all nearest receptor is predicted to be below 5 odour units, well below the adopted criterion of 7. • Dust concentrations at the nearest privately-owned residences are predicted to be well below the adopted project-specific criteria when the proposal is considered in isolation (without existing background levels).
Noise	<p>Global Acoustics (2015) undertook an assessment of the potential noise impacts associated with the Project. This assessment concludes the following:</p> <ul style="list-style-type: none"> • No exceedances of the conservatively derived Project Specific Noise Levels are predicted at any of the nearest receptors for any of the scenarios modelled. Three scenarios were modelled: worst case continuous operation, feed silo refilling and bird collection. • Worst-case sleep disturbance during night-time bird collection will not exceed the sleep disturbance criterion. • No exceedance of the construction noise criterion ($L_{Aeq,15min} 40$ dB) is predicted. • The relatively small increase in traffic volumes will not result in any discernible change in existing traffic noise levels.
Traffic and Transport	<p>RoadNet (2015) undertook an assessment of the potential traffic and transport issues associated with the Project. This assessment concludes the following:</p>

Environmental Aspect	Key Assessment Findings
	<ul style="list-style-type: none"> • The poultry development will generate an average of 96 vehicle trips per day (62 heavy vehicle trips and 34 car trips). • The additional traffic movements on the Sturt Highway is not expected to have any operational impact on the external road network, given that the existing traffic volumes on the Sturt Highway are relatively low and can be easily accommodated. • A new intersection will need to be constructed off the Sturt Highway to provide access to the development site. The new intersection should include BAL and BAR - type turn treatments to cater for the vehicle movements generated by the development. This access type is adequate for the low volume of traffic generated by the Project and existing low volumes on the Sturt Highway. The proposed intersection location meets safe intersection sight distance and stopping distance requirements.
Water Resources	<ul style="list-style-type: none"> • An engineered stormwater management system will be implemented to ensure stormwater within the PPU is appropriately managed. The total stormwater storage capacity to be constructed at each PPU of 28,000 m³ is equivalent to 170% of the capacity required to prevent runoff escaping the retention dams from a 1 in 100 ARI, 72 hour event. • Given the controlled environment in which the Project will operate, along with the environmental licensing conditions it will need to comply with, it poses a low risk to local water resources and no detectable impact is expected. Due to the low risk, no water monitoring program is warranted. • Based upon the 100 year ARI flood map (Lyll & Associates, 2015), aerial photographs of the 1974 flood event and information in SKM (2000), the development site is unlikely to be flood affected during mainstream flood events up to and including the 1 in 100 year ARI event. It is also unlikely that the site will be flood affected by Murrumbidgee River or Yanco Creek out of bank flows during an extreme flood event such as the PMF. • Importantly, flood warnings are likely to be available via the NSW State Emergency Service (SES) at least several days prior to a flood occurring. No significant drainage features transect the site, so minor localised flooding is likely to be isolated to topographical depressions onsite. • In relation to overland flooding, the output of the 1D hydraulic flood model developed for the site, combined with the site design, shows that the site infrastructure will be above the flood depth associated with a 1 in 100 year ARI event. • The Project will require a total water supply of around 460 megalitres per annum, which will be sourced via four new groundwater bores to be constructed on the site, consisting of two bores in two locations. • An existing Water Access Licence will be transferred from a bore located approximately 5 kilometres to the east of the development site, to the new bores to be constructed in the development site to account for the water to be sourced from the Lower Murrumbidgee Deep Groundwater Source. • The groundwater drawdown as a result of groundwater extraction within the development site will be minimal, and will be less than two metres at any nearby water supply work, thereby meeting the minimal impact considerations in the NSW Aquifer Interference Policy (NOW, 2012).
Flora and Fauna	<ul style="list-style-type: none"> • Significant disturbance of the natural environment within the development site has occurred as a result of historic clearing and long-term agricultural production. The proposed disturbance footprint is highly modified and disturbed having been cleared and consistently cropped for many decades, and is devoid of any significant resources. • The development will be relatively small, with a disturbance footprint of approximately 90 hectares, comprising just 8 percent of the development site.

Environmental Aspect	Key Assessment Findings
	<ul style="list-style-type: none"> • Unavoidable impacts on native vegetation are relatively minor and include impacting a small area of Sandhill Pine Endangered Ecological Community adjacent to the Sturt Highway (0.28 hectares) to allow construction of the access road from the highway, and a small area of low condition Black Box Grassy Open Woodland (0.46 hectares) in the south of the development site, to allow construction of one of the PPUs. • The total area of mapped vegetation removal required for construction and operation of the Project therefore totals 0.74 hectares, which represents 0.4% of the total area of mapped native vegetation within the study area and 0.06% of the total study area. • Application of the Credit Calculator in accordance with the Framework for Biodiversity Assessment (FBA) reveals that the impacts of the Project correlate to a requirement for just 16 ecosystem credits. Under the terms of the FBA, an appropriate offset strategy will be provided to compensate for vegetation and habitat loss.
Aboriginal Heritage	<ul style="list-style-type: none"> • Significant disturbance of the land within the development site has occurred as a result of historic clearing and long-term agricultural production. • Consultation with the local Aboriginal community was conducted for the Project in accordance with the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (DECCW, 2010). • A field survey found three heritage sites within the development site; two scarred trees and a hearth. • All three sites are outside of the proposed disturbance footprint and will not be impacted upon by the Project.
Visual Amenity	<ul style="list-style-type: none"> • The proposed PPU sites are relatively small and the commercial activity associated with the development will be largely confined to these areas. • The development site is removed from any urban areas and there is a very low density of surrounding residential dwellings. The nearest populated area is the Narrandera township approximately 26 kilometres to the south-east of the site. • The nearest privately-owned residence is located approximately 2.1 kilometres to the north of the northern-most PPU. • A Landscaping Strategy will be implemented to improve the visual and environmental amenity of the Project. As soon as practical following bulk earthworks and construction of development infrastructure, ProTen will progressively establish landscape plantings in accordance with the Landscaping Strategy.

ProTen will prepare and implement a site-specific Operational Environmental Management Plan (EMP) for the Project to ensure that the commitments made within this EIS, along with relevant statutory obligations and the conditions of development consent (including Environment Protection Licence requirements), are fully implemented and complied with.

JUSTIFICATION AND CONCLUSION

Having observed the continuing expansion of the Australian poultry meat market, ProTen's primary objective is to develop an intensive broiler production complex, adopting best practice in design, operation and management, within the Griffith area to augment the domestic supply of meat chickens. The poultry industry within the Griffith region plays an ever increasing role in the development of local agri-business. It is widely appreciated that the poultry industry has a good strategic fit and high recognition factor within the area.

Finding a site that is both available and meets all of the criteria for a viable poultry broiler production development is very difficult. Selection of alternative sites must be mindful of transport access to the necessary support and servicing facilities. The matter of a reliable water supply is very significant and the cost of satisfying the necessary power requirements is usually prohibitive. The proposed development site represents the preferred option of several considered and the culmination of a site selection process that has considered a range of criteria including economic, social and environmental aspects.

The assessment of ProTen's proposal to establish an intensive poultry broiler production complex within the development site, as detailed in this EIS, has been multi-disciplinary and involved consultation with various government agencies. Emphasis has been placed on anticipation and prevention of potential impacts, with best practice operation and mitigation measures identified to ensure environmental due diligence and minimal potential for adverse impact. On this basis the development will not result in significant or long-term adverse impacts to the local environment and surrounding populace. The development will be operated and managed in accordance with a site-specific Operational EMP, which will ensure that the commitments made in this EIS, along with relevant statutory obligations and conditions of development consent, are fully implemented and complied with.

Furthermore, the Project is justified in socio-economic terms as a catalyst for significant and sustained economic activity within the Griffith region, including positive employment and flow-on benefits.

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Appendix F	Noise Impact Assessment (Global Acoustics 2015)
Appendix G	Traffic Impact Assessment (RoadNet 2015)
Appendix H	Flooding Assessment (SLR 2015a)
Appendix I	Biodiversity Assessment Report (SLR 2015b)
Appendix J	Aboriginal Heritage Impact Assessment (OzArk 2015)
Appendix K	Preliminary Hazard Analysis (SLR 2015c)



Section 1

Introduction



1 INTRODUCTION

1.1 Background

This Environmental Impact Statement (EIS) has been prepared to support an application by ProTen Holdings Pty Limited (ProTen) seeking development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to develop an intensive poultry broiler production farm known as the Euroley Poultry Production Complex, within a rural property near Euroley in south-western New South Wales (NSW).

The Euroley Poultry Production Complex (herein referred to as the Project) comprises the development of five poultry production units (PPU), where broiler birds will be grown for human consumption. Each PPU will comprise 16 tunnel-ventilated fully-enclosed climate-controlled poultry sheds, with associated support infrastructure and staff amenities. Each shed will have the capacity to house a maximum of 49,000 broilers at any one time, equating to a PPU population of up to 784,000 broilers, and a total farm population of 3,920,000 broilers. The complex will employ a total of 30 full time employees, 10 of whom will live on site as farm managers and assistant managers.

1.2 Document Purpose

The purpose of this EIS is to enable consideration of the implications of proceeding with the Project, and has been prepared in accordance with the EP&A Act and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). This EIS has also been prepared to meet the Secretary's Environmental Assessment Requirements (SEARs) for the Project, issued by the DP&E on 6 February 2015 (refer **Section 1.8**), as well as the recommendations of other consulted agencies and relevant stakeholders.

In addition to describing the Project, the EIS presents a comprehensive and focussed assessment of the associated planning and environmental issues to a level of detail commensurate with the scale of the development, and describes the existing characteristics of the proposed development site and the legislative framework under which the Project is to be assessed and determined. The matters dealt with within the EIS are presented in a manner that addresses the specific requirements of the SEARs, as well as the requirements of other consulted government agencies.

1.3 The Applicant

The Applicant for the Project is ProTen, for which the contact details are:

Mr Daniel Bryant, CEO
Level 2, 66 Berry St
North Sydney 2060
Phone: +61 2 9458 1700

ProTen was founded in New Zealand in 2001 to consolidate the broiler chicken farming businesses of four existing operations in New Zealand. Investment into the Australian market commenced in 2002. From 2003 to 2006 all New Zealand assets were sold and the capital reinvested into the Australian market through acquisition and 'green field' development.

Today ProTen continues to specialise in the design, construction and operation of broiler chicken farms throughout Australia, currently owning and operating eight poultry production complexes, including seven in NSW near Griffith and Tamworth, and one in Western Australia near Serpentine. Cumulatively, these complexes comprise 172 poultry sheds and have an annual capacity of close to 42 million birds, representing approximately 7 percent of broiler chicken production in Australia.

ProTen has long term extendible contracts to supply chickens to Australia's largest chicken processor, Baiada Poultry Pty Ltd (Baiada), who markets and sells chicken products under the well-established brand names of Steggles and Lillydale. ProTen currently employs close to 60 people in NSW and WA.

1.4 Development Site

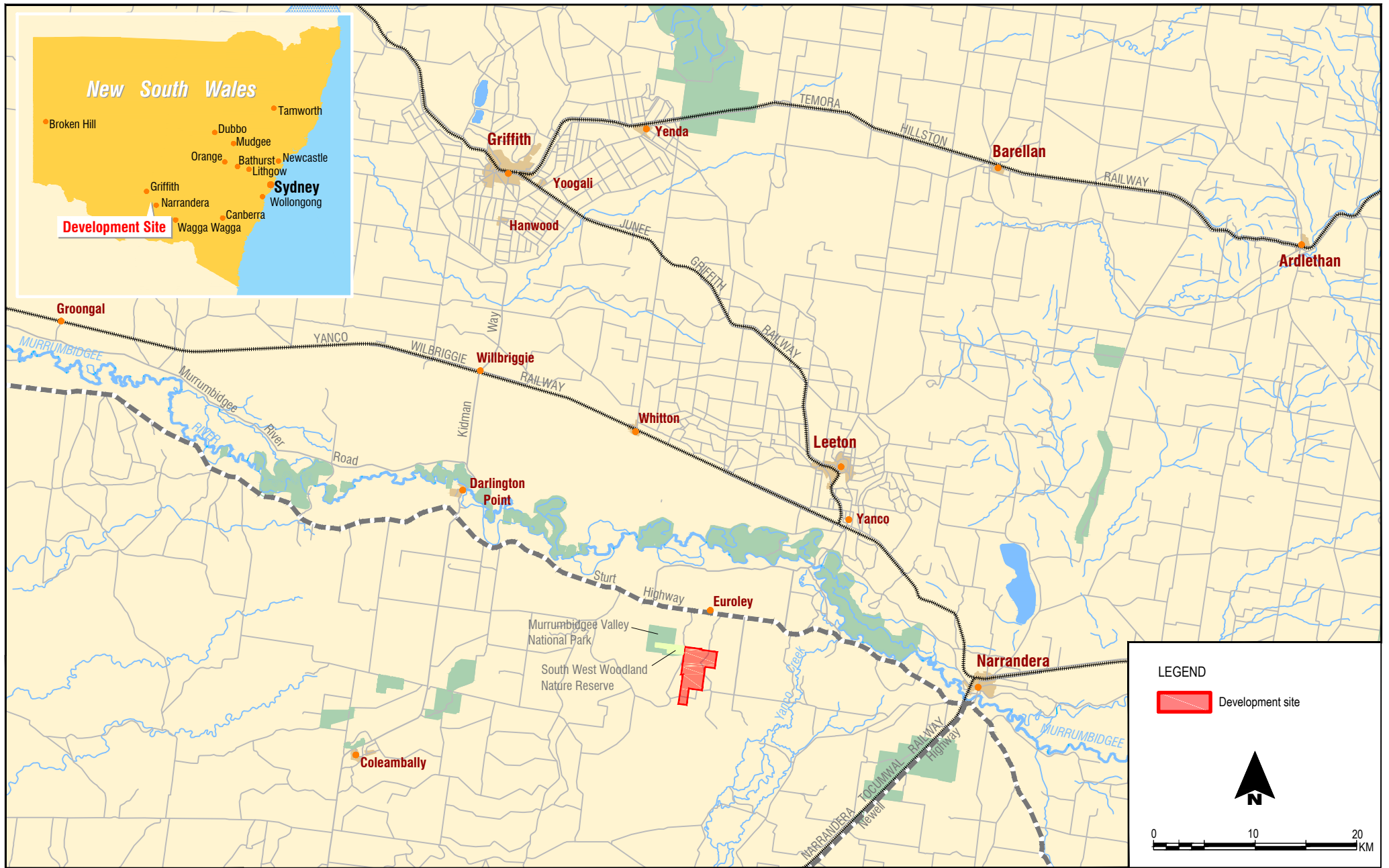
The proposed development site comprises approximately 1,160 hectares of rural land positioned around 4 kilometres off the Sturt Highway, approximately 26 kilometres north-west of Narrandera and 48 kilometres south-east of Griffith in south-western NSW, as illustrated on **Figure 1.1**. It is identified as Lots 1, 41, 42, 44, 45 and 54 in DP 750898 and Lot 1 in DP 1054064, as shown on **Figure 1.2**, and is located within the Parish of Ourendumbee, County of Boyd and the Local Government Area (LGA) of Narrandera.

The long-standing and existing use of the development site is traditional agricultural production. The site primarily comprises paddocks that have been consistently cropped and grazed for many years as can be seen in **Plate 1**, with no large remnant patches of vegetation remaining.

The development site is predominantly surrounded by land used for agricultural purposes, consistent with the dominant landuse in the region. The north-west corner of the development site abuts the 'Banandra' portions of the South West Woodland Nature Reserve and Murrumbidgee Valley National Park (refer **Figure 1.2**).

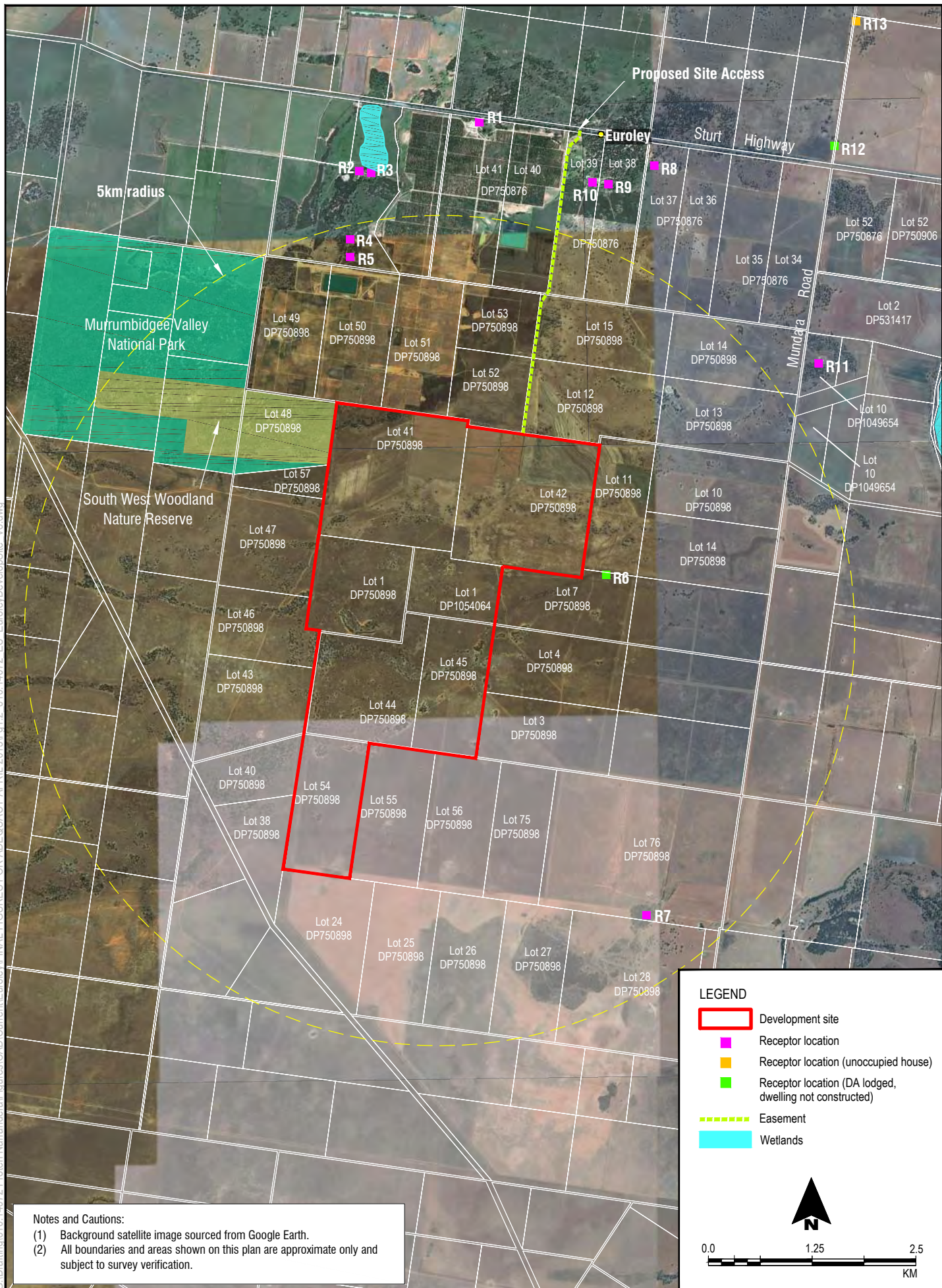


Plate 1 – The Development Site, looking southwest across location of PPU 1



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1.5 Project Overview

The Euroley Poultry Production Complex will be constructed and operated in accordance with industry best practice guidelines, in particular the *Best Practice Management for Meat Chicken Production in NSW* (DPI, 2012) (Best Practice Guidelines), and will comprise five PPUs where broiler birds will be grown for human consumption. **Figure 1.3** shows the conceptual layout of the development, and **Table 1.1** contains a summary of the key development elements.

Table 1.1 Summary of the Project

Aspect	Detail
Purpose	Birds grown for human consumption
Number of PPUs	Five, with a total footprint of around 70 hectares
Number of poultry sheds per PPU	16, each measuring 160 metres long by 17 metres wide
Type of poultry sheds	Tunnel-ventilated, fully-enclosed, climate-controlled
Maximum shed population	49,000 birds
Maximum PPU population	784,000 birds
Maximum farm population	3,920,000 birds
Maximum bird density within sheds	40 kg/m ²
Hours of operation	24 hours a day, 7 days a week
Production cycle length	Approximately 9 weeks, comprising a maximum bird occupation of 8 weeks and a cleaning phase of 1 week.
Number of production cycles per year	Approximately 5.7 on average

The development will be relatively small, with a disturbance footprint of approximately 90 hectares, comprising just 8% of the site, and the commercial activity associated with the development will be largely confined to this area. A Landscaping Strategy will be implemented to screen the development from neighbouring landholders and generally improve the visual and environmental amenity of the development site.

In addition to poultry shedding, the development will also include:

- The construction of farm managers' accommodation. 10 houses will be constructed to accommodate farm managers and assistant farm managers;
- The construction of ancillary infrastructure and improvements required to support the poultry production operation; and
- Construction of an intersection with the Sturt Highway to a new access road to gain access to the development site. This will include the development of an easement through privately owned land between the development site and the intersection with the Sturt Highway.

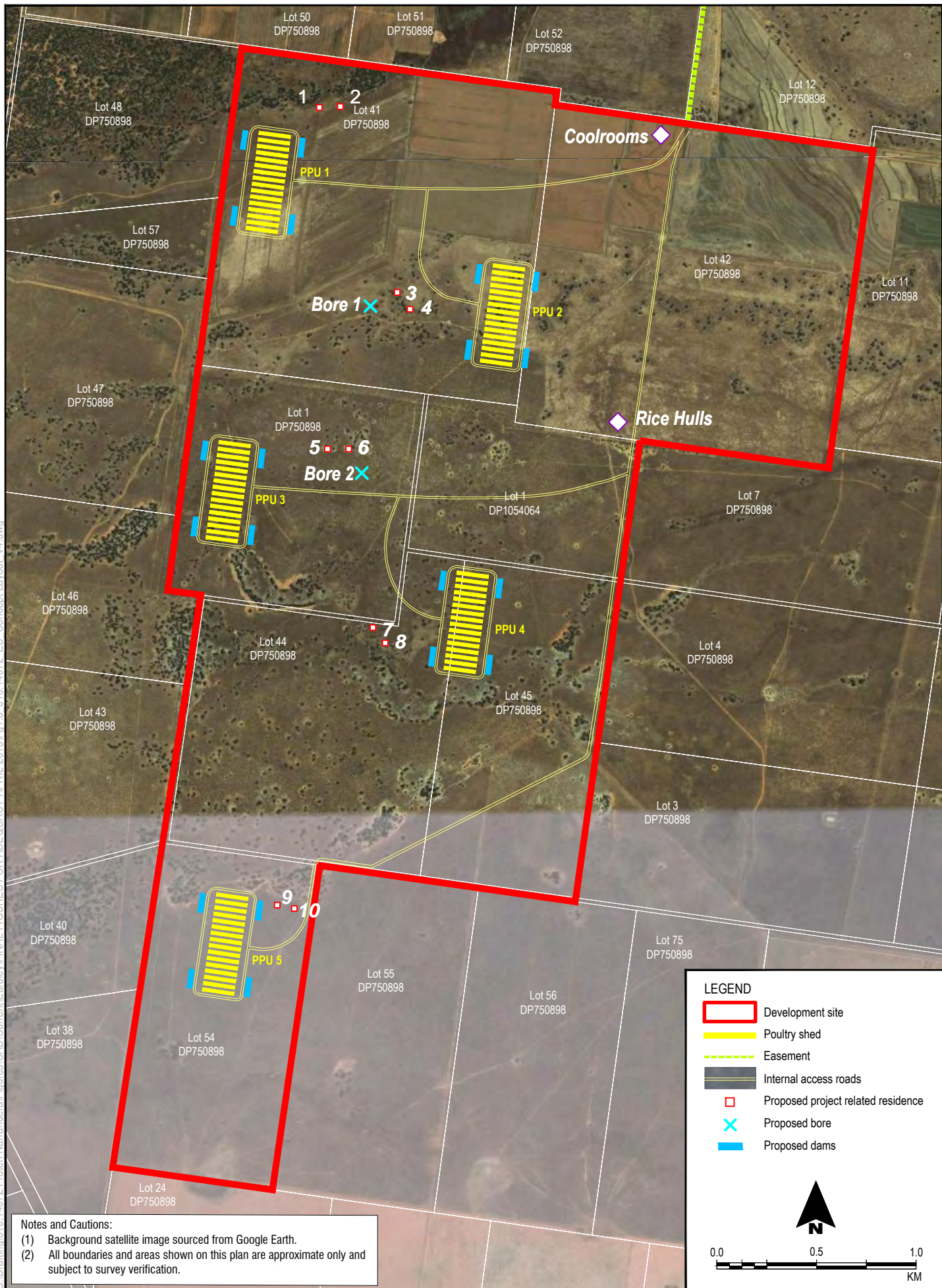
1.6 Project Rationale

1.6.1 Strategic Context

Demand for chicken meat

According to statistics published by the Australian Bureau of Agricultural and Resources Economics and Sciences (ABARES), the popularity of chicken meat has grown enormously over the last 30 years to the extent that it is currently the most consumed meat in Australia. The total chicken meat production in Australia has increased from approximately 380,000 tonnes in 1989-90 to around 1,046,000 tonnes in 2012-13, and it is expected to continue increasing to close to 1,250,000 tonnes in 2018-19.

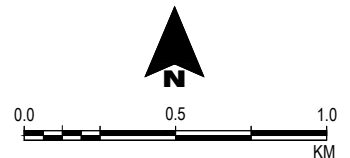
G:\Draft\610_14072_Protein_Narrandera\Figures\CAD\Current\Euro\w\FINAL FIGURES FOR ADEQUACY APRIL 2015\Fig 1.3_610_14072_EU_Concept Layout_V4.dwg



Notes and Cautions:
 (1) Background satellite image sourced from Google Earth.
 (2) All boundaries and areas shown on this plan are approximate only and subject to survey verification.

LEGEND

	Development site
	Poultry shed
	Easement
	Internal access roads
	Proposed project related residence
	Proposed bore
	Proposed dams



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Over 95 percent of the chicken meat produced in Australia is consumed domestically. The 2012-13 per capita rate of consumption was 44.1 kilograms, compared to 36 kilograms in 2008-09 and just 13 kilograms in 1975. ABARES estimates that chicken meat consumption in Australia will continue to rise, reaching 47.7kg per person by 2018-19. This trend is closely associated with price, nutrition and the industry's innovation to provide a variety of chicken meat products.

In 2012-2013, approximately 550 million chickens were processed in Australia, and based on current growth projections, it is estimated that by 2018-19 this will rise to close to 700 million birds per year.

NSW State Plan, NSW 2021 – A Plan to make NSW Number One

NSW 2021 is a 10 year plan released by the NSW Government in September 2011 to guide policy and budget decision making in NSW and to deliver on community priorities. The plan is based around five strategies; rebuild the economy, return quality services, renovate infrastructure, strengthen our local communities and environment, and restore accountability to Government.

This Project is particularly relevant to the first strategy and the NSW Government's number one priority; rebuilding the economy and restoring economic growth. NSW 2021 sets out a number of goals developed to achieve this economic objective. The relevant goals, and how the Project will assist in achieving these goals, are listed below.

- **Improve the performance of the NSW Economy** - The targets set to achieve this goal centre around growing business investment, growing Gross State Product and growing employment. The Project represents a substantial business investment in NSW, with a Capital Investment Value of \$60 million, as well as ongoing investment in the community and the resulting flow on effects through the use of goods and services (discussed further in the dot point below). The Project will also generate 30 permanent full time positions.
- **Drive Economic Growth in Regional NSW** – The targets set to achieve this goal includes increasing the share of jobs in regional NSW, and protecting strategic agricultural land and improving agricultural productivity. In this regard, the Project will enable the continuation of the existing agricultural land use within the development site through a form of lease sharing arrangement with the original owners, whilst also enhancing agricultural productivity of the site via construction and operation of the poultry production complex. As mentioned above, the Project will also generate 30 full time positions in regional NSW and, in addition to the permanent capital investment within Narrandera Shire, as discussed in **Section 3.21** will also provide ongoing opportunities for economic growth in the local community as follows:
 - Opportunities for local transport companies to participate in the haulage of materials to and from the site;
 - Opportunities for local growers and suppliers to provide various goods, such as bedding material, fuel, tyres, clothing and groceries;
 - Opportunities for local businesses to fulfil maintenance and servicing requirements; and
 - The additional grain needed to fulfil the feed demand of the Project represents a significant increase in the potential market for regional farmers. It is estimated that the operation will consume around 105,000 tonnes of poultry feed per annum, which represents a yearly recurrent expenditure of around \$33 million.

Another strategy set out in NSW 2021 of relevance to the Project is to 'strengthen our local communities and environment'. The first goal developed to achieve this strategy is to protect our natural environment. As documented in this EIS the Project has been developed to ensure the risk of significant impact on the environment as result of the Project is minimised. A number of development sites were considered, as well as site layouts within the development site as discussed in detail in **Section 8.2.3**, with the final site and layout chosen on the basis of environmental considerations including proximity to wetlands and the presence of mapped vegetation communities and archaeological sites, in conjunction with economic considerations relating to efficiency and viability of the farm.

Riverina Regional Action Plan

A number of regional action plans were developed as part of the implementation of NSW 2012, including an action plan for the Riverina. In developing this action plan, the priorities identified by the communities within the Riverina included:

- A prosperous and diverse economy;
- A skilled and competitive workforce;
- Coordinated and effective service delivery; and
- Quality infrastructure to deliver critical services.

Of particular relevance to this Project is the first priority – a prosperous and diverse economy. In this regard the Riverina Regional Action Plan States that *"The Riverina will be recognised as the place for new and innovative business concepts, products and services, taking full advantage of its geographic location at the centre of South East Australia's major population area. It will consolidate its place at the heart of Australia's food production and the agriculture sector will continue to produce outstanding quality grain, fruit, vegetable, wine and livestock products. The region will foster the development of new industries to provide local people with more job opportunities."*

The proposed Euroley Poultry Production Complex is consistent with these objectives. It will be a major contributor to strengthening the Riverina as a key food production area in NSW, whilst also providing jobs in the region within the agricultural sector.

1.6.2 Project Objectives

ProTen's primary objective is to develop an intensive broiler production complex within the Griffith area, adopting best practice in design, operation and management, to meet the immediate and projected long-term demand for broiler/meat chickens.

The poultry industry has a high recognition factor in the Griffith region and provides a significant contribution to the economy. Combined with the operations of Baiada, including a chicken hatchery, a poultry feedmill and a poultry processing complex, the poultry industry within the Griffith area is a perfect example of vertical integration where each of the operations produce a different product or service and these combine to satisfy a common need.

It is imperative that poultry broiler farms, such as that proposed, be allowed to exist in close proximity to the grain belt, a reliable water and power supply, and interdependent hatchery, feedmill and processing facilities. The development site meets all of these requirements, and has therefore been chosen by ProTen as an appropriate and desirable site to develop the Euroley Poultry Production Complex to meet the current demand for broiler chickens.

1.7 Project Approval Pathway

The development assessment and approval system in NSW is set out in Parts 4 and 5 of the EP&A Act. Division 4.1 of Part 4 provides for the assessment and determination of State Significant Development (SSD). Pursuant to Section 89C of the EP&A Act, projects are classified as SSD if they are declared to be such by the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Clause 3 of Schedule 1 of the SRD SEPP identifies development for the purposes of intensive livestock agriculture with a Capital Investment Value (CIV) of more than \$30 million as SSD. As a result, pursuant to clause 8(1) of the SRD SEPP and as a result of the development having a capital investment value (CIV) of approximately \$60 million, the Project comprises SSD. As outlined in **Section 5.5**, the development is permissible with consent under the provisions of the *Narrandera Local Environmental Plan 2013* (Narrandera LEP 2013).

The Minister for Planning (or their delegate) determines development applications for SSD under Part 4 of the EP&A Act. The Minister has delegated the consent authority function for SSD projects to the NSW Planning Assessment Commission (PAC) and to senior staff of the DP&E.

1.8 Secretary's Environmental Assessment Requirements

A Project Briefing Paper and request for SEARs relating to the form and content of the EIS required to accompany the development application for the Project was submitted to the NSW DP&E in December 2014. The SEARs were subsequently issued by the DP&E on 6 February 2015. **Table 1.2** presents the general requirements and key issues to be addressed in the EIS in accordance with the SEARs, and identifies where each requirement is addressed in this EIS. The SEARs are contained within **Appendix A**.

Table 1.2 Secretary's Environmental Assessment Requirements

NSW Department of Planning and Environment (SSD 14_6882)	EIS Section
General Requirements	
The EIS must meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 of the EP&A Regulation.	Cover Pages, Executive Summary and main body of this EIS
<ul style="list-style-type: none"> • detailed description of the development including: <ul style="list-style-type: none"> • need for the proposed development; • justification for the proposed development; • likely staging of the development; • likely interactions between the development and existing, approved and proposed developments in the vicinity of the site; and • plans of any proposed works. • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments; • risk assessment of the potential environmental impacts of the development; identifying key issues for further assessment; • detailed assessment, where relevant, of the key issues below, and any other potential significant issues identified in the risk assessment, must include: <ul style="list-style-type: none"> a description of the existing environment, using adequate baseline data; • consideration of potential cumulative impacts due to other development in the vicinity; and • measures to avoid, minimise and if necessary, offset the predicted impacts, including detailed contingency plans for managing any 	<p>Section 1.6</p> <p>Section 8</p> <p>Not Applicable</p> <p>Section 3.2</p> <p>Section 3</p> <p>Section 4</p> <p>Section 5</p> <p>Section 6</p>

NSW Department of Planning and Environment (SSD 14_6882)	EIS Section
<p>significant risks to the environment.</p> <ul style="list-style-type: none"> consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. 	Section 7
Key Issues	
<p>Strategic Context – including:</p> <ul style="list-style-type: none"> justification for the proposal and suitability of the site; and demonstration that the proposal is generally consistent with all relevant planning strategies and environmental planning instruments, and justification for any inconsistencies. 	Section 1.6 and Section 8 Section 5
<p>Air quality and odour - including:</p> <ul style="list-style-type: none"> a description of all potential air emission and odour sources; a quantitative odour and air quality impact assessment in accordance with the relevant Environment Protection Authority guidelines; a description and appraisal of air quality and odour impact monitoring and mitigation measures. 	Section 6.2 and Appendix E
<p>Transport and road traffic - including:</p> <ul style="list-style-type: none"> details of all road transport routes; access to the site from the road network including intersection location, design and sight distance; road traffic predictions for the development during construction and operation; an assessment of predicted impacts on road safety and the capacity of the transport network, including an appraisal of any impact mitigation measures; a description and plans of any road upgrades required for the development; and plans for the layout of the internal roads and parking. 	Section 6.4 and Appendix G
<p>Waste and wastewater management - including:</p> <ul style="list-style-type: none"> identification and classification of waste streams that would generated at the site; description of waste transport, storage, handling, processing and disposal; a description of wastewater management; and a description and appraisal of waste impact mitigation and management. 	Sections 3.8.5 and 3.10
<p>Biodiversity – including:</p> <ul style="list-style-type: none"> accurate predictions of any vegetation clearing on site or for any road upgrades a detailed assessment of the potential impacts on any threatened species, populations, endangered ecological communities or their habitats, groundwater dependant ecosystems and any potential for offset requirements; a detailed description of the measures to avoid, minimise, mitigate and offset biodiversity impacts; and the assessment of the proposal and all biodiversity values on the site under the Framework for Biodiversity Assessment 2014. 	Section 6.7 and Appendix I
<p>Animal welfare, biosecurity and disease management – including:</p> <ul style="list-style-type: none"> details of how the proposed development would comply with relevant codes of practice and guidelines; details of all disease control measures; and a detailed description of the contingency measures that would be implemented for the mass disposal of livestock in the event of disease 	Sections 3.17 (animal health & welfare), 3.18 (biosecurity) and 6.12 (poultry disease) Section 6.12.2

NSW Department of Planning and Environment (SSD 14_6882)	EIS Section
outbreak.	
<p>Hazards and risk - including:</p> <ul style="list-style-type: none"> • a preliminary risk screening completed in accordance with <i>State Environmental Planning Policy No. 33 - Hazardous and Offensive Development and Applying SEPP 33</i> (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development; and • should preliminary screening indicate that the project is "potentially hazardous," a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). 	Section 6.9 and Appendix K
<p>Noise and vibration - including:</p> <ul style="list-style-type: none"> • a description of all potential noise and vibration sources during construction and operational, including traffic noise; • a noise and vibration impact assessment in accordance with the relevant Environment Protection Authority guidelines; and • a description of noise and vibration monitoring and mitigation measures. 	Section 6.3 and Appendix F
<p>Soils and water - including:</p> <ul style="list-style-type: none"> • a description of the water demands and a breakdown of water supplies including any water licensing requirements; • a description of the measures to minimise water use; • a description of surface, groundwater and stormwater management, including on site detention, flood impact mitigation and measures to treat or reuse water; • an assessment of any potential existing soil contamination; and • a description and appraisal of impact mitigation, management and monitoring measures. 	<p>Sections 6.5 (surface water and flooding), 6.6 (groundwater), 3.8.3 (water supply) and Appendix B (stormwater design report)</p> <p>Section 4.4.3</p>
<p>Visual impacts- including:</p> <ul style="list-style-type: none"> • a description of the visual catchment and visual impacts including lighting impacts on surrounding receivers and public areas; and • an appraisal of visual impact mitigation measures. 	Section 6.10
<p>Socio-economic- including:</p> <ul style="list-style-type: none"> • an analysis of the economic and social impacts of the development, particularly of any benefits to the community. 	Section 3.21

1.9 Project Team

SLR was engaged by ProTen to project manage the development application and prepare the EIS required to accompany the application for the Project. The following specialist studies were also conducted to assist in the assessment of the Project:

- Pacific Environment – Air Quality Impact Assessment;
- Global Acoustics – Noise Impact Assessment;
- RoadNet – Traffic Impact Assessment;
- OzArk – Aboriginal Heritage Assessment;
- SLR – Ecology Assessment;
- SLR – Hazard and Risk; and
- SLR and Lance Ryan Consulting Engineers – Water Resources and Flooding.

1.10 Document Structure

The EIS is provided in three volumes. Volume 1 comprises the main report (this document), and sets out the Project in the context of the existing environment, planning considerations, key environmental issues, potential impacts, and mitigation measures. It is informed by the technical assessments contained in Volumes 2 and 3, and provides a concise, integrated summary of these specialist assessments.

The content of the EIS is summarised in **Table 1.3**

Table 1.3 Structure and Content of the EIS

Volume 1 – Main Report	
Preliminaries	Statement of Validity, Executive Summary
Section 1	Provides the background and context for the Project, introduces the Applicant and the Project team involved in producing the EIS, provides a summary of the primary Project components, and nominates the approval pathway.
Section 2	Provides an overview of the Project Site in terms of locality, land ownership, zoning, surrounding land uses, climate and vegetation.
Section 3	Provides a detailed description of the Project.
Section 4	Describes the planning approval and environmental legislative framework for the Project, including the applicability of Commonwealth and State legislation, as well as local planning instruments.
Section 5	Provides details on the environmental risk assessment undertaken for the Project, and the consultation undertaken with various stakeholders during preparation of the EIS.
Section 6	Contains an assessment of the potential environmental impacts relevant to the Project, including cumulative impacts, and presents proposed management and mitigation measures.
Section 7	Lists the Draft Statement of Commitments proposed to be adopted throughout the life of the Project in order to mitigate potential adverse impacts and to ensure appropriate management and monitoring.
Section 8	Outlines the Project alternatives considered, the justification for the project, and the conclusion of the EIS.
Section 9	Lists the reference documents referred to within the EIS.
Volume 2 – Appendices A to H	
Appendix A	Secretary's Environmental Assessment Requirements
Appendix B	Stormwater Report (Lance Ryan Consulting Engineers 2014)
Appendix C	Complaints and Incident Management Strategy
Appendix D	Project Environmental Risk Register
Appendix E	Air Quality Impact Assessment (Pacific Environment 2015)
Appendix F	Noise Impact Assessment (Global Acoustics 2015)
Appendix G	Traffic Impact Assessment (RoadNet 2015)
Appendix H	Flooding Assessment (SLR 2015a)
Volume 3 – Appendices I to K	
Appendix I	Biodiversity Assessment Report (SLR 2015b)
Appendix J	Aboriginal Heritage Impact Assessment (OzArk 2015)
Appendix K	Preliminary Hazard Analysis (SLR 2015c)

Section 2

Site Description



2 SITE DESCRIPTION

2.1 Overview

The development site is positioned off the Sturt Highway, approximately 26 kilometres north-west of Narrandera and 48 kilometres south-east of Griffith in south-western NSW (see **Figure 1.1**). It comprises approximately 1,160 hectares of rural land and is identified as Lots 1, 41, 42, 44, 45 and 54 in DP 750898, and Lot 1 in DP 1054064.

The development site is located within the Parish of Ourendumbee, County of Boyd and Local Government Area (LGA) of Narrandera. The nearest major town to the development site is Griffith, which is the service centre for the western area of the Riverina Region and is the largest centre in the Murrumbidgee Irrigation Area. The Narrandera LGA covers approximately 4,116 square kilometres and has a population of around 6,800, residing in the town of Narrandera and villages of Barellan, Grong Grong and Binya. Rural land in the LGA is primarily used for agriculture (traditional grazing, as well as cropping and irrigated cropping) and horticulture.

The topography of the development site (and surrounding lands) is relatively flat, ranging between approximately 133 metres Australian Height Datum (AHD) and 138 metres AHD. As evident on **Figure 1.2**, the visual amenity is that of a rural property that has been significantly modified by historic land clearing and long-term agricultural production activities. There are no water courses within the development site, with only some small depressions which may hold water during significant rainfall events. As mentioned the majority of the site is devoid of significant vegetation, primarily comprising paddocks that have been consistently cropped and grazed for many years.



Plate 2 – The development site, looking across proposed location of PPU 4

2.2 Zoning

Under the provisions of the Narrandera LEP 2013, the development site and the vast majority of all surrounding land is zoned RU1 Primary Production, as shown on **Figure 2.1**. Intensive livestock agriculture, such as the poultry development proposed, is permissible within this zone. Three lots adjacent to the development site are zoned E1 National Parks and Nature Reserves, comprising the Banandra portions of the South West Woodland Nature Reserve and Murrumbidgee Valley National Park, with a small area zoned RU3 Forestry under the provisions of the Murrumbidgee LEP 2013 in the adjacent Murrumbidgee LGA.

2.3 Land Ownership

ProTen has entered into a conditional contract for the purchase of the development site from the current land owners, with settlement subject to receiving development consent. This conditional contract covers Lots 1, 41, 42, 44, 45 and 54 in DP 750898, and Lot 1 in DP 1054064, which are the subject of this Development Application (refer **Figure 1.2**).

Various sections of discrete Crown road exist within or adjacent to the development site. Sections of Crown road traverse the southern section of the development site, and are held under an enclosure permit, as shown on **Figure 2.1**. The proposed southern-most PPU is located over the portion of Crown road between Lots 44 and 54 in DP 750898. ProTen will therefore apply to close and purchase the Crown roads traversing across the development site.

In addition, a section of Crown road runs across the northern boundary of the site, along the boundaries of Lots 41 and 42 in DP 750898 as shown on **Figure 2.1**. The portion of Crown road that exists along the northern boundary of Lot 42 DP 750898 and the southern boundary of Lot 12 DP 750898 is covered by an enclosure permit. The proposed access road into the development site from the Sturt Highway will cross this portion of Crown road. ProTen will also apply to purchase and close the portion of Crown road over which access will be gained to the development site.

It is also noted that Lot 57 DP 750898, adjacent to the development site, is Crown land.

2.4 Existing Land Use

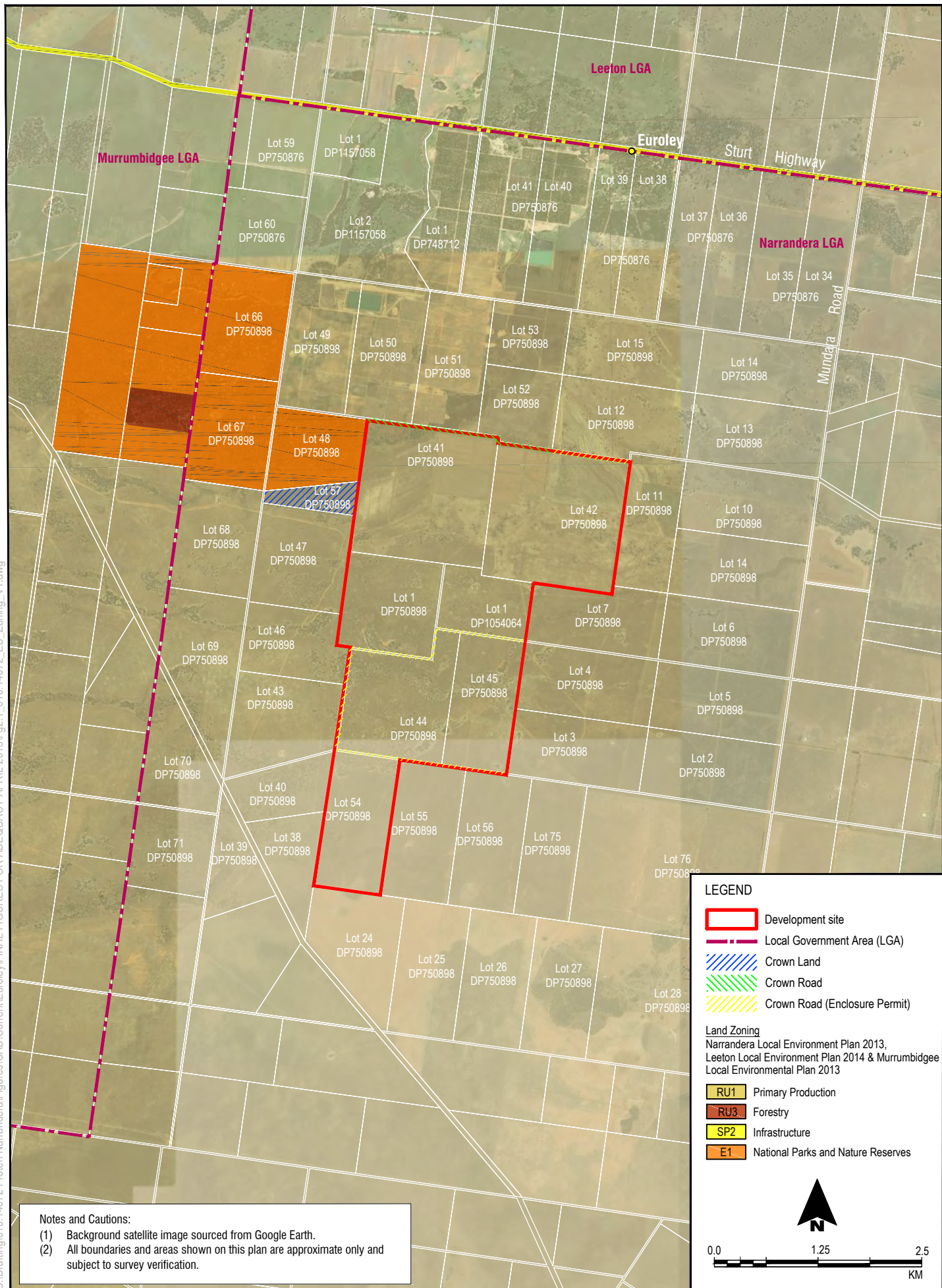
The long-standing and existing use of the development site is traditional agricultural production, with the site comprising paddocks that have been consistently cropped and grazed for many years. As evident in the aerial photo in **Figure 1.2**, the northern section of the development site has been extensively cropped, whilst the main agricultural land use of the southern portion is grazing. No large remnant patches of vegetation remain within the development site with only small, isolated areas of vegetation remaining, such as a small portion in the north-west corner and within depressions that traverse the site.

2.5 Surrounding Residences and Land Use

The development site is removed from any urban areas and, as evident on **Figure 1.2**, there is a very low density of surrounding residential dwellings. The nearest populated area is identified as the Narrandera township located approximately 26 kilometres to the south-east of the site.

The primary surrounding land use is agricultural, consistent with the dominant land use across the region. 10 privately owned occupied residences have been identified in the neighbouring and nearby properties surrounding the development site, labelled R1, R2, R3, R4, R5, R7, R8, R9, R10 and R11 on **Figure 1.2**. Of these, R1 - R5 are part of the Belvedere property, an almond farm owned by Select Harvest. R9 and R10 are properties also owned by the landowners with whom ProTen have a conditional contract to purchase the development site. The surrounding properties are understood to predominately consist of dry area grazing.

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LEGEND

- Development site
- Local Government Area (LGA)
- Crown Land
- Crown Road
- Crown Road (Enclosure Permit)

Land Zoning
 Narrandera Local Environment Plan 2013,
 Leeton Local Environment Plan 2014 & Murrumbidgee
 Local Environmental Plan 2013

- RU1 Primary Production
- RU3 Forestry
- SP2 Infrastructure
- E1 National Parks and Nature Reserves

0.0 1.25 2.5

 KM

Notes and Cautions:
 (1) Background satellite image sourced from Google Earth.
 (2) All boundaries and areas shown on this plan are approximate only and subject to survey verification.

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A further three potential receptors have been identified, two of which (R6 and R12) represent properties for which development applications have been lodged with Narrandera Shire Council, however it is understood these applications have not been determined and as such residential dwellings have not been constructed. It is also noted that one of these, R12, is owned by one of the landowners with whom ProTen have a conditional contract to purchase the development site. R6 and R12 have however been conservatively assessed as possible receptors in the air and noise assessments for the Project (refer **Sections 6.2** and **6.3** respectively). Similarly, an unoccupied house (R13) has been identified to the north east of the development site, on the northern side of the Sturt Highway.

The nearest privately-owned residences are R5 and R4, which are located approximately 2.1 kilometres and 2.3 kilometres respectively to the north of the northern-most PPU (PPU 1), as illustrated on **Figure 1.2**.

As mentioned above the north-west corner of the development site abuts the 'Banandra' portions of the South West Woodland Nature Reserve and Murrumbidgee Valley National Park (refer **Figure 1.2**).

2.6 Surrounding Poultry Operations

From a local and regional perspective, the poultry industry has a high recognition factor in the Griffith area and provides a significant contribution to the economy. Combined with the operations of other poultry companies in the area (particularly Baiada), which include a chicken hatchery, a feedmill and a processing complex, the poultry industry within the Griffith region is a perfect example of vertical integration where each of the operations produce a different product or service and these combine to satisfy a common need.

Importantly, from a cumulative impact perspective, the nearest poultry facilities to the development site are Baiada's breeder farms, located approximately 20 kilometres to the west. The nearest existing broiler farms are located near Hanwood, approximately 35 kilometres north-west of the development site.

Significant facilities within the region servicing the local poultry production industry include:

- Baiada's chicken hatchery facility located approximately three kilometres west of Griffith on Snaldero Road;
- Baiada's feedmill facility located approximately one kilometre south of the Hanwood township on the corner of Kidman Way and McWilliams Road; and
- Baiada's poultry processing complex located approximately one kilometre south of the Hanwood township on the corner of Kidman Way and Murphy Road.

2.7 Meteorology

The development site is situated within the Riverina Region of south-western NSW, which is generally dominated by a dry semi-arid climate and characterised by hot summers and cool winters. Rainfall levels in the Riverina are generally low, with the highest levels typically occurring in May and September. Summer rainfall tends to occur mainly from localised thunderstorms, with more consistent rainfall occurring in the winter months.

Long-term average data for temperature, rainfall and relative humidity has been sourced from an automated weather station (AWS 074037) operated by the Bureau of Meteorology (BoM) at the Yanco Agricultural Institute, which is located approximately 8.6 kilometres to the north-east of the development site. This station has been operational since 1957.

Long-term average evaporation data has been sourced from a BoM weather station at the Griffith CSIRO (AWS 075028). While this station ceased operation in 1989, it appears to be the only BoM weather station within the area with evaporation data recorded and available. While the daily evaporation rates may have changed slightly since 1989, the data provided between 1962 and 1989 provides a reasonable indication of typical rates. **Table 2.1** summarises this long term temperature, rainfall, humidity and evaporation data.

Table 2.1 Long-Term Meteorological Conditions (BoM Station 074037)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Monthly Maximum Temperature (°C) for Years 1999 to 2013 ¹												
34.0	32.1	28.6	24.2	19.0	15.3	14.3	16.4	20.4	24.3	28.7	30.9	24.0
Mean Monthly Minimum Temperature (°C) for Years 1999 to 2014 ¹												
18.8	18.4	15.2	11.6	7.8	5.8	4.9	5.5	7.7	10.3	14.5	16.2	11.4
Mean Monthly Rainfall (mm) for Years 1957 to 2014 ¹												
29.1	32.0	33.4	29.6	35.9	33.4	33.4	35.2	35.2	38.3	29.5	30.0	395.1
Mean Number of Days of Rain (>=1mm) for Years 1957 to 2014 ¹												
4.2	3.9	4.5	5.2	8.0	10.4	11.5	10.7	8.9	7.2	5.7	5.2	7.1
Mean Monthly Evaporation (mm) for Years 1962 to 2089 ^{2,3}												
269.7	224.0	186.0	105.0	62.0	42.0	49.6	71.3	102.0	151.9	213.0	251.1	1727.6
Mean Monthly 9am Relative Humidity (%) for Years 1999 to 2010 ¹												
46	55	58	61	76	87	89	80	68	53	51	46	64
Mean Monthly 3pm Relative Humidity (%) for Years 1999 to 2010 ¹												
23	30	30	37	45	61	60	51	43	33	29	27	39

1 – sourced from BoM AWS 074037 at Yanco Agricultural Institute
2 – sourced from former BoM AWS 075028 at Griffith CSIRO

Red = Highest Value Blue = Lowest Value
3 – based on mean daily rates.

Temperature

The local climate is characterised by very warm to hot summers and cool to mild winters. Mean monthly maximum temperatures range between 14.3 and 34.0 degrees Celsius, with January being the warmest month. Mean monthly minimum temperatures range between 4.9 and 18.8 degrees Celsius, with July being the coolest month. Autumn and spring are generally mild with sporadic temperature fluctuations.

Rainfall

Rainfall is, on average, relatively evenly distributed throughout the year, with October being the wettest month. Rainfall levels in the Riverina are generally low, with the area also quite susceptible to periods of drought.

Evaporation

It is apparent that mean monthly evaporation exceeds mean monthly rainfall throughout the year. Evaporation is greatest during the warmer months of November through to February (inclusive), with mean monthly rates over this period exceeding 200 millimetres.

Relative Humidity

The area has a moderate relative humidity, with the winter months tending to be slightly more humid than other times of the year. The mean annual 9.00 am and 3.00 pm relative humidity is 64 percent and 39 percent, respectively.

Wind

As part of their air quality impact assessment of the Project, Pacific Environment (2015) generated meteorological data for 2010 by CALMET, which was used in the dispersion modelling for the assessment. The annual wind rose plotted from this data is presented in **Figure 2.2**.

Figure 2.2 shows that the wind commonly blows from all directions, but with a low frequency of southerly and south easterly winds.

In the early morning and late at night, winds are typically light (<3 m/s) and from the south-west or north-east depending on the time of year. During the morning (7am to 12 noon) the winds are typically stronger and from a variety of directions, but with a low frequency from the south-east. During the early afternoon the winds are also from these directions, but are on occasion stronger and with a higher frequency of winds from the south-west.

Overall the wind data shows a high frequency of calm to light winds (up to 3 m/s), occurring 48% of the time.

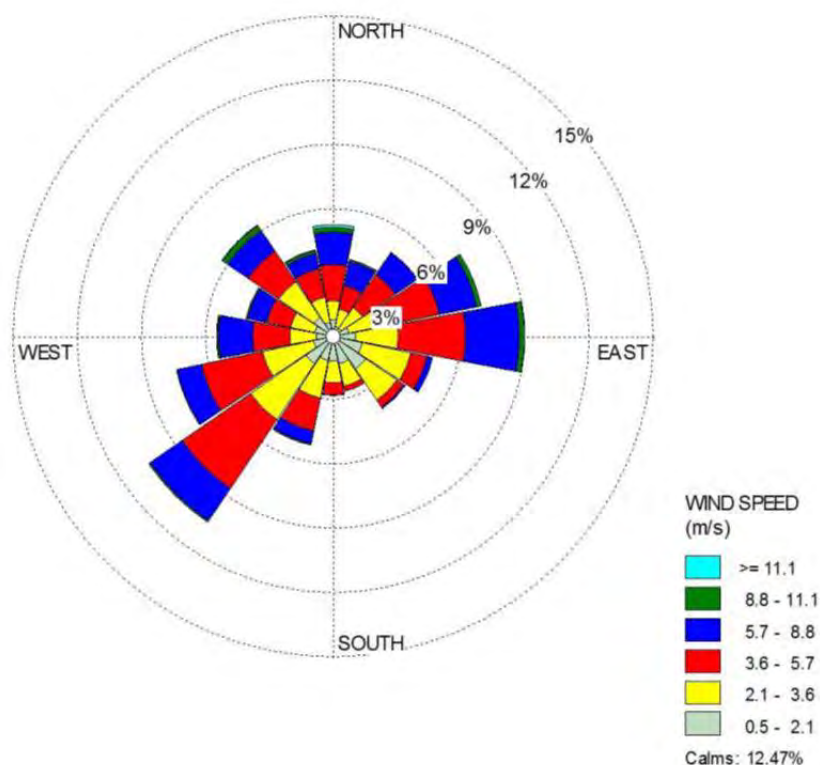


Figure 2.2 Annual Wind rose for the Development Site (Pacific Environment, 2015)

2.8 Soil and Land Classification

There are no soil profiles or soil landscape mapping within the vicinity of the development site which were able to give an indication of the soil characteristics within the site. Information on soils within the locality of the development site has been sourced from the Land and Soil Capability (LSC) Mapping of NSW managed by the OEH.

The LSC dataset uses the best available soils natural resource mapping across New South Wales. The mapping is based on an eight class system with values ranging between 1 and 8 which represent a decreasing capability of the land to sustain land use. Class 1 represents land capable of sustaining most land uses including those that have a high impact on the soil (e.g., regular cultivation), whilst class 8 represents land that can only sustain very low impact land uses (e.g., nature conservation).

The development site is broadly mapped by OEH as being LSC Class 4 land (moderate capability land). LSC Class 4 land is defined as 'land which has moderate to high limitations for high-impact land uses', which will restrict land management options for land uses such as cropping, high-intensity grazing and horticulture. Therefore the site may be constrained by erosion hazards or other environmental constraints which may limit the land's ability to be cultivated, and so with regard to agricultural production the land is best suited to low-impact grazing and/or some horticulture.

2.9 Acid Sulphate Soils

Acid sulfate soils are naturally occurring soils, sediments or organic substrates (e.g. peat) formed under waterlogged conditions that contain iron sulfide minerals (predominantly as the mineral pyrite) or their oxidation products. When exposed to the air following the lowering of the water table (through, for example, dewatering, groundwater abstraction, drainage or excavation) the sulfides in these soils readily oxidise, releasing sulfuric acid and iron into the soil and groundwater (Ahern et al., 2004).

Acid sulphate soils, which are the main cause of acid generation within the soil mantle, are commonly found less than five metres above sea level (ASL), particularly in low-lying coastal areas. The development site is located approximately 370 km from the coast and has an elevation range of approximately 130 m ASL. It is therefore very unlikely that acid sulphate soils (to a depth of 1.5 m) are present in the development site.

2.10 Water Resources

On a regional scale, the development site is located within the catchment of the Murrumbidgee River, which covers 84,000 square kilometres of southern NSW. The catchment supports numerous regional cities and towns including Cooma (near to where the river rises in the Monaro Plains), as well as Tumut, Narrandera, Leeton, Griffith, Hay and Balranald, near to where it joins the Murray River. The Murrumbidgee River flows to the north of the development site, flowing from Narrandera through to Darlington Point. At its closest point the river flows approximately 9 kilometres to the north of the development site (refer **Figure 1.1**).

At a more local level, there are no notable surface water bodies or tributaries within the bounds of the development site. Two minor topographical depressions which act as minor drainage features for the site were observed during the site inspection conducted for the flood assessment (refer **Section 6.5**). The features have no formed banks and are only distinguishable as drainage features by their location topographically and the vegetation present within it. Some agricultural drains also run along the field boundaries in the north of the development site. The nearest notable natural waterway appears to be Yanco Creek, approximately 8 kilometres to the east of the development site boundary. Yanco Creek is a regulated stream of the Murrumbidgee River System.

No wetlands exist within the development site as shown on the Wetlands Map in the Narrandera LEP. The nearest wetland is a small area identified as a wetland on the NSW Wetlands Database (Department of Climate Change and Water, 2006) and the Wetlands Map in the Narrandera LEP, approximately 3.2km north of the northern-most PPU as shown on **Figure 1.2**. The proposed development is therefore in accordance with the *Best Practice Management for Meat Chicken Production in New South Wales Manual 1 – Site Selection & Development* (DPI, 2012), which states that new farms should preferably be located 3000 metres away from waterways and wetlands that are used extensively by waterfowl.

The development site is located in the Lower Murrumbidgee Groundwater Management Area (GMA), which lies within the eastern Riverine Plains province of the Murray Geological Basin. The groundwater sources in the area include the Shepparton and Calivil/Renmark aquifers, more commonly known as Shallow and Deep Sources. The proposed development will access water from the Deep Sources in the Calivil formation via the construction of groundwater wells (refer **Section 3.8.3**). The development site is mapped as a groundwater vulnerable area within the Narrandera LEP 2013 Groundwater Vulnerability Map.

A search of the Bureau of Meteorology Australian Groundwater Explorer indicates that there are around 24 bores recorded within a five kilometre radius of the development site. Groundwater within the area is primarily used for monitoring, irrigation, and stock and domestic purposes.

Further details regarding surface water and groundwater, including potential impacts and mitigation, are provided in **Sections 6.5** and **6.6** respectively.

2.11 Flooding

Flood planning is addressed in Part 6 clause 6.2 of the Narrandera LEP 2013. This clause applies to land that is identified as 'flood planning area' on the flood planning map in the LEP, or to other land at or below the 'flood planning level' (FPL). The development site is not identified as 'flood planning area' in the Narrandera LEP. A flood assessment and flood management plan has however been prepared as part of this EIS. Further detail on flooding, including the flood management plan is provided in **Section 6.5**.

2.12 Land Contamination

Detailed testing and examination of soil samples from the development site has not been undertaken as it is held that the circumstances of this matter do not require such. The risk of discovering significant land contamination within the site is considered to be minimal given the following:

- The long-term and existing use of the site and adjoining lands is traditional agricultural production, primarily comprising cropping with some livestock grazing;
- There are no identified previous or existing land use activities that may have caused or attributed to significant soil contamination; and
- There are no known areas within the site where toxic wastes, poisons or the like have been dumped or buried to cause or attribute to soil contamination.

On this basis, land contamination is unlikely to be an issue within the development site and further investigation is not warranted.

2.13 Bush Fire Prone Land

As evident on **Figure 1.2**, the majority of the land within the development site and surrounding properties is devoid of significant stands of vegetation, primarily comprising treeless paddocks, and has a low fuel level. On this basis, the land is not considered to be bush fire prone.

ProTen have negotiated a lease agreement with the current landholders (with whom they have a conditional contract to purchase as described in **Section 2.3**), which will see the current landholders continue to graze the property during operation of the poultry production complex. This grazing will enable active management of the fuel level in the paddocks around the PPU's, further reducing bushfire risk across the development site.

As described in **Section 2.4** the development site is adjacent to the Murrumbidgee Valley National Park. The nearest PPU is 100 metres from the development site boundary in the vicinity of the National Park. The area within this 100 metre buffer is devoid of trees, having been cleared as part of the current agricultural land use of the development site, as shown on **Figure 1.3**. This area therefore provides a buffer between the National Park and the nearest PPU, should fire occur within the National Park, or vice versa.

Section 3

Proposed Poultry Development



3 PROPOSED POULTRY DEVELOPMENT

3.1 Overview

ProTen is seeking development consent under Part 4.1 of the EP&A Act to develop a poultry production complex where broiler birds will be grown for human consumption. **Figure 1.3** shows the preferred location and conceptual layout of the complex.

The development will comprise five PPU's each with 16 tunnel-ventilated fully-enclosed climate-controlled poultry sheds, with associated support infrastructure and staff amenities. Each shed will have the capacity to house a maximum of 49,000 broilers at any one time, equating to a PPU population of up to 784,000 broilers and a total farm population of 3,920,000 broilers.

The proposed PPU sites will be relatively small and the commercial activities associated with the poultry operation will be largely confined to this area. The proposed disturbance footprint within the development site will amount to a total area of approximately 90 hectares which is 8% of the site area (totalling 1,160 hectares). ProTen intends to enable continued use of the residue land within the development site for continued agricultural production purposes under some form of lease or share farming arrangement.

In addition to poultry shedding, the development will also include:

- The construction of farm managers' accommodation. 10 houses will be constructed to accommodate farm managers and assistant farm managers; and
- The construction of ancillary infrastructure and improvements required to support the poultry production operation, as described in detail in **Section 3.4.2**.

Plate 3 shows ProTen's Rothdene Poultry Production Complex also located in the Griffith region. This shows the typical layout of poultry sheds and ancillary infrastructure and improvements.



Plate 3 – Example Poultry Production Unit

Engineering design drawings for the anticipated earthworks, including surface water drainage and management works, are currently being prepared and will be submitted to Council as part of the construction certificate application. Further detail is provided below in **Section 3.13**.

Some important, and possibly contentious, facts to be noted about modern poultry broiler production, which have been verified by the Australian Chicken Meat Federation, are presented below.

Housing

Broiler birds are run in large open poultry sheds on bedding material. They are NOT kept in cages.

Feed

Broiler feed comprises between 65 and 90 percent grains, such as wheat, sorghum, barley, oats, lupins, soybean meal, canola and other oilseed meal and grain legumes.

Hormones

Hormones are NOT added to chicken feed or administered to commercial meat chickens in Australia. Hormone supplementation is a practice that has been banned internationally for over 40 years.

Growth

Chickens are NOT genetically engineered or modified. Around 50 to 60 percent of the improvement in broiler growth rates over the last 50 years is due to improved breeds of chicken. A further 20 to 25 percent is due to improved nutrition, with feed being specifically formulated to match the chicken's precise nutritional requirements throughout its lifecycle, thereby optimising growth. Other gains made in meat chicken growth and performances are due to better husbandry techniques and health management.

Antibiotics

Antibiotic use is important in chicken meat production to ensure the overall health and wellbeing of the flock. Only antibiotics approved by Australia's regulatory authorities are used and they are administered in accordance with strict regulatory guidelines. Antibiotics are usually delivered via drinking water (not in feed) and only a veterinarian can authorise and supervise these treatments.

Avian Influenza

Whilst there have been a couple of recent outbreaks in the free range layer industry, Avian Influenza is generally not present in Australia and the industry has rigorous systems to keep it that way (see **Section 3.20**).

3.2 Separation Distances

Consideration of alternative PPU sites within the development site is dependent upon a number of factors including environmental impact considerations, engineering design requirements and servicing provisions. While other locations were considered, the proposed layout is considered optimal in terms of minimising the potential for adverse impact, minimising the trees to be cleared, minimising earthwork requirements and enabling appropriate surface water management. Also, by limiting the poultry operation to within the disturbance footprint nominated on **Figure 1.3**, it will ensure that the proposal does not deny access to large areas of viable agricultural land nor significantly reduce the land area available for agricultural production.

The Best Practice Guidelines (DPI, 2012) state the following with regards to the location of new poultry farms:

- Locate new poultry farms as far apart as possible to minimise the risk of disease transfer between farms. There should be a minimum of 1000 metres to other intensive poultry farms (500 metres when there are extenuating circumstances such as farms with a common owner or farms supplying the same processor); 3000 metres to commercial duck farms; and 5000 metres to poultry breeder farms.

- Preferably locate new farms away from waterways and wetlands (ideally 3000 metres) that are used extensively by waterfowl, as these birds can carry avian diseases.

Table 3.1 lists the minimum separation distances afforded between the proposed PPU's and notable surrounding features in the natural and built environments. It is noted that the separation distances listed are approximate only and have been scaled from satellite imagery and topographic mapping. These separation distances will assist in minimising the potential for conflict between the poultry development and the local environment and surrounding populace over the life of the operation.

Table 3.1 Separation Distances

Feature	Minimum Distance from Proposed PPU's (metres)	Comments
Urban / residential area	26,000	Township of Narrandera located to the east of the proposed development site.
Surrounding residences	2100	The nearest privately-owned residences is 2.1 kilometres to the north of the northern-most PPU.
Property boundaries	100	
Public road	4,000	Sturt Highway
Other poultry farm	20,000	Baiada's breeder farms on Donald Ross Drive, south-east of Darlington Point. Nearest broiler farm is 35 km to the north-west.
Watercourse	9,700	Yanco Creek is located to the east of the development site
Remnant vegetation	100	The north-west corner of the development site is adjacent to the Banandra portion of the South West Woodland Nature Reserve.

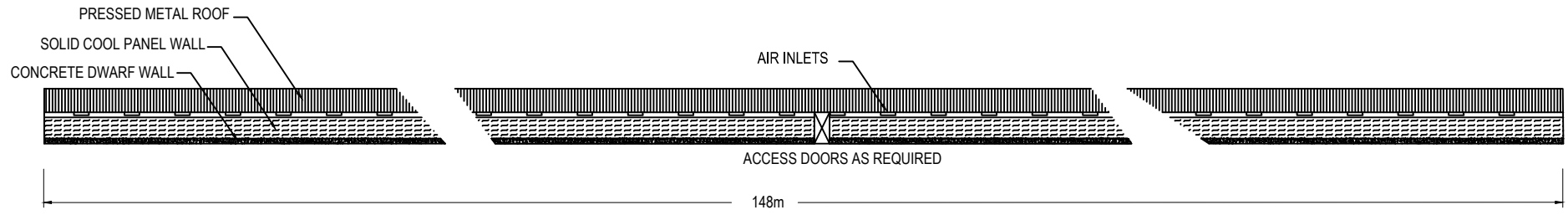
As shown in **Table 3.1**, the development site is in accordance with the recommended best practice separation distances, being well in excess of 1000 metres from other intensive poultry operations and greater than 3000 metres from areas identified as a wetland. With a low density of surrounding residential dwellings, significant separation distances and no identified sensitive environmental features, the proposed site is well suited to the development of intensive livestock agriculture.

3.3 Poultry Sheds

3.3.1 Overview

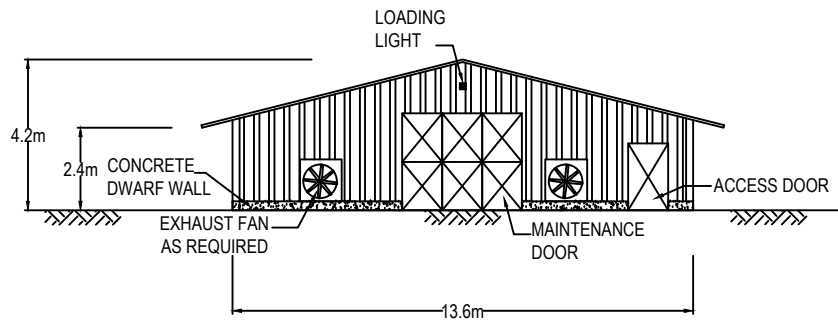
Each poultry shed will measure approximately 160 metres long by 17 metres wide, with a bird space of approximately 2,720 square metres. They will measure approximately 4.2 metres to the ridge of the roof and approximately 2.4 metres to under the eaves. The conceptual poultry shed design is illustrated on **Figure 3.1**, and the PPU layout is shown on **Figure 3.2**.

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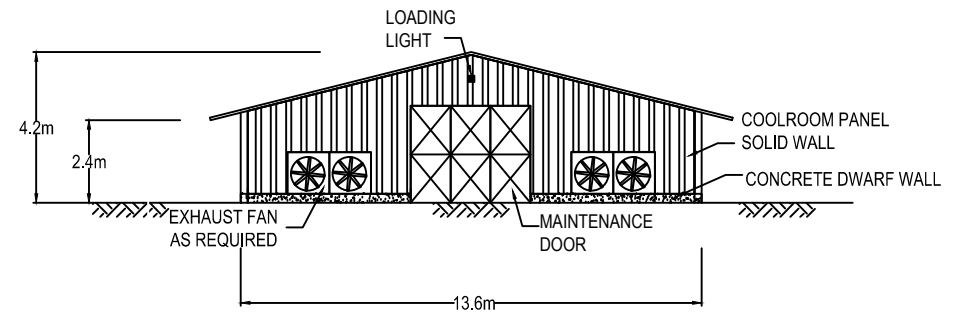
SIDE ELEVATION

Not to Scale



FRONT ELEVATION

Not to Scale

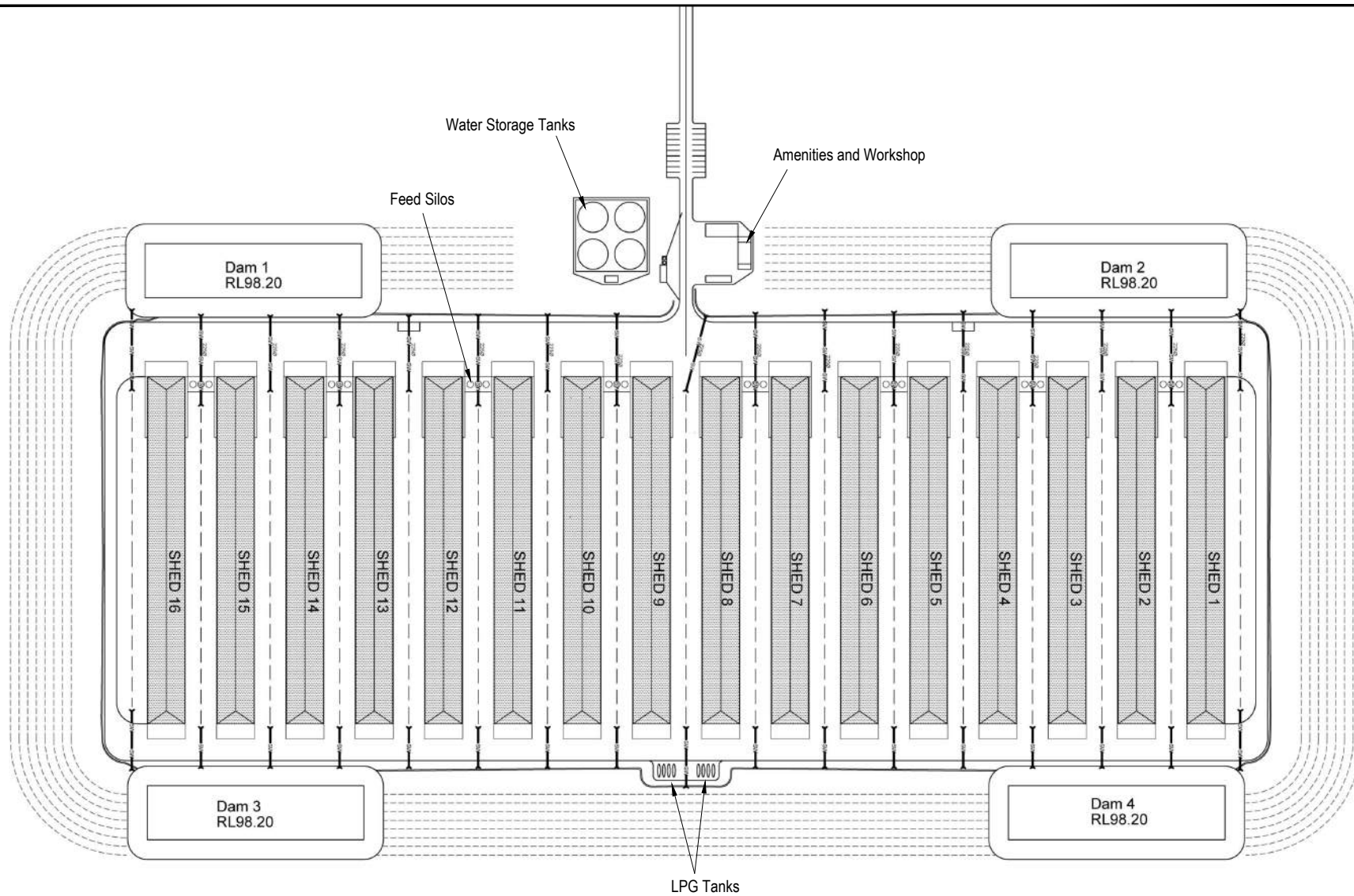


BACK ELEVATION

Not to Scale

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Poultry Production Unit Layout

FIGURE 3.2

The poultry sheds will be separated laterally within each PPU by a distance of approximately 15 metres. Construction will comprise steel framework, zincalume corrugated iron roofs and coolroom sandwich panel walls (two metal faces with a fully insulated core) using a non-reflective colour-bond type material in an appropriate shade, such as eucalyptus green. The sheds will have fully-sealed concrete flooring and will be surrounded by a 400 mm high dwarf concrete bund wall to prevent rainwater and runoff entering the sheds and to allow for the controlled discharge of wash down water from the sheds.

A relatively thick layer of clean and fresh floor bedding material, such as soft wood shavings, rice hulls or chopped straw, will be spread over the floor of the sheds prior to the placement of day old chicks. Feed and water lines, as evident on **Plate 4**, will run the length of each poultry shed and will be automatically supplied by external silos and water storage tanks. Feed pans and water nipple drinkers (with drip cups) will be spaced along these lines at regular intervals so that the birds are never more than a few metres from food and water.

Additional shed features include front and rear access, external lighting over the loading-unloading, and will be fully computer controlled and alarm monitored.



Plate 4 – Interior of Typical Broiler Shed

3.3.2 Tunnel Ventilation

The sheds will be fully-enclosed climate-controlled and tunnel-ventilated. On each shed, air extraction fans mounted at one end (see **Plate 5**) will uniformly draw air into the shed through mini-vents along the sides of the shed and later in the growing cycle across cooling pads (see **Plate 6**) and through tunnel vents. The air is pulled over the chickens and exhausted through the extraction fans. Temperature sensors within the sheds will allow the ventilation to be adjusted as required. Heating, which is anticipated to be required for up to 14 days of each production cycle, will be provided by wall mounted gas heaters.

The use of tunnel ventilated sheds has grown to steadily replace poultry housing that conventionally relied on natural ventilation. Tunnel ventilation is easier to manage than natural ventilation and provides a complete climate controlled environment, enabling the grower to provide close to optimum conditions for bird comfort, health, growth and performance throughout the year. Additional benefits include control over shed moisture, which is directly related to odour emissions, and reduced consumption of power and water.



Plate 5 – Broiler Shed Exhaust Fans



Plate 6 – Broiler Shed Cooling Pad

3.4 Supporting Infrastructure

Additional infrastructure necessary to support the operation of the proposed poultry production complex is outlined in the following sub-sections.

3.4.1 Farm Managers' Accommodation

The scale of the proposed poultry development will necessitate the construction of 10 houses within the development site to accommodate five Farm Managers and five Assistant Farm Managers. These houses are considered ancillary and subsidiary to the proposed development, in that they will provide necessary support to the poultry production operation. Farm managers and assistant farm managers must live on farm due to the 24 hour nature of the operation. This is industry standard, and consistent with all other ProTen poultry farms. It is also noted that the use of the dwellings will be limited to the life of the Project.

While the indicative location of these houses within the development site is shown on **Figure 1.3**, the final location and construction of the houses will be subject to the necessary Council approvals. Importantly, as discussed further in **Section 6.7** (Biodiversity), houses will be positioned so as to avoid tree clearing.

3.4.2 Ancillary PPU Improvements

In addition to the poultry shedding, ancillary improvements will be required at each PPU to support the poultry production operation. This infrastructure will comprise:

- An amenities facility encompassing office space, toilets, and staff change rooms;
- An engineered surface water drainage and management system;
- Chemical storage;
- Generator shed;
- Workshop;
- Wheel wash facility at the PPU entrance;
- Feed silos, which will automatically dispense the feed into the poultry sheds (refer **Plate 7**); and
- Water storage tanks, with the capacity to store adequate supply at peak demand.

The final location of these infrastructure items at each of the PPUs will be subject to detailed engineering design and the necessary Council approvals. In addition to the infrastructure listed above, a dead bird chiller/cool room and storage shed for poultry shed floor bedding material (such as rice hulls) will be constructed within the development site, as shown on **Figure 1.3**. Servicing infrastructure will also be required to ensure that the development's electricity, gas and water requirements can be met, as described further in **Section 3.8**.



Photo location: ProTen's Murrami Broiler Complex near Tamworth NSW

Plate 7 – Typical Feed Silos Servicing Poultry Sheds

3.5 Hours of Operation

While the proposed poultry development will operate 24 hours a day, seven days a week, the majority of activity will be carried out between 7.00 am and 7.00 pm. As the birds reached their desired slaughter weight they will be removed from the sheds and transported from the site between 8.00 pm and 2.00 pm. However for reasons of livestock welfare, birds will generally be removed when it is cooler and the birds are more settled.

There will typically be one daily shift for farm workers commencing at 7.00 am and finishing at 4.00 pm.

3.6 Production Cycle

The cycle of a broiler production farm typically lasts about nine weeks, with a maximum bird occupation of eight weeks and a 'down-time' of close to one week for cleaning in preparation for the next batch of birds. There are 5.7 production cycles per year, with each cycle typically comprising the following steps:

1. Delivery of Bedding Material - Clean and fresh bedding material, such as soft wood shavings, rice hulls or chopped straw, will be delivered to the site from a storage facility near Hanwood and spread over the floor of the poultry sheds.
2. Delivery of Chicks - Day-old chicks will be transported from Baiada's hatchery facility on the western outskirts of Griffith to the development site in ventilated chick boxes in specially designed air-conditioned rigid trucks. On arrival, the day-old chicks will be placed onto the floor of the shed, where they will initially be confined to a smaller area within the shed (the 'brooding area') and given supplementary heating from gas heaters.
3. Chick Nurturing - Chicks will be nurtured and grown within the sheds on site, with their period of service depending on the live-weight of the birds. The desired processing age will primarily be determined by customer weight specifications, but is normally achieved between five and eight weeks of age.
4. Removal of Birds - As birds reach their desired slaughter weight, they will be removed from the sheds and transported to Baiada's processing complex near Hanwood in plastic crates designed for good ventilation and bird welfare. Shed thinning (partial depopulation) will occur at various times during the production cycle depending on the live-weight of the birds. Chickens will typically be harvested between 8.00 pm and 2.00 pm when the air is cooler and the birds are more settled.
5. Removal of Poultry Litter - When all birds have been removed after about eight weeks, the spent bedding material (poultry litter) will be removed from the sheds and transported off-site for disposal or re-use (see **Section 3.11.3**).
6. Cleanout – The poultry sheds will be cleaned and sanitised to reduce the risk of pathogens and disease using high pressure water in preparation for the next batch of chicks. Additional activities will include scrubbing feed pans, cleaning out water lines, cleaning the feed silos and scrubbing fan blades and other equipment.

The maximum broiler density for tunnel ventilated sheds is typically 0.055 square metres (m²) of floor space per bird. ProTen's broiler 'pick-ups' (shed thinning or depopulation) are in most instances governed by the further limiting factor of a maximum of up to 40 kilograms of live-weight per square metre (kg/m²) of floor area, which complies with the maximum stocking density for domestic poultry in tunnel ventilated sheds as recommended in the *National Animal Welfare Standards for the Chicken Meat Industry* (Barnett et al 2008).

On this basis, the first round of shed thinning/de-populating will commence at around day 32 of bird occupation. Shed thinning will typically occur on another two occasions, being at around day 40 and day 45, with the final bird collection at day 56.

The average mortality rates for broiler poultry housed within tunnel ventilated sheds is:

- Week 1 of cycle (1 to 7 days of age) - 1.0 percent of population; and
- Weeks 2 to 8 of cycle (7 to 56 days of age) - 0.6 percent of population per week.

3.7 Traffic

3.7.1 Operational Traffic

The majority of traffic generated by the Project will travel between the development site, Griffith and Hanwood (approximately 6 kilometres south of Griffith on Kidman Way). The primary operational activities that will generate traffic to and from the development site are:

- Delivery of the shed floor bedding material in rigid trucks from a storage facility located near Hanwood;
- Delivery of day-old chicks from Baiada's hatchery facility located approximately 3 kilometres west of Griffith on Snaldero Road in insulated pantechnicon trucks;
- Delivery of feed from Baiada's feedmill facility located approximately 1 kilometre south of Hanwood on the corner of Kidman Way and McWilliams Road in semi-trailers;
- Delivery of bulk liquid petroleum gas (LPG) from Griffith in rigid trucks;
- Removal of birds to Baiada's processing complex located approximately 1 kilometre south of Hanwood on the corner of Kidman Way and Murphy Road in semi-trailers;
- Removal of shed floor litter (spent bedding material) in semi-trailers to various locations;
- Removal of dead birds to Baiada's processing complex, which includes a protein recovery/rendering plant, located approximately 1 kilometre south of Hanwood on the corner of Kidman Way and Murphy Road in rigid trucks;
- Removal of general garbage in rigid trucks to disposal facilities located within the vicinity of Griffith; and
- Staff visits by cars. It is assumed that the majority of farm workers will travel from Narrandera and Griffith areas.

Table 3.2 summarises the anticipated traffic volumes to be generated by the Project over a typical nine week production cycle, and over a typical year comprising 5.7 production cycles.

Table 3.2 Estimated Operational Traffic Volumes

Activity	Vehicle Type	Vehicles (Two Way Vehicle Trips)	
		Production Cycle <i>approx. 9 weeks</i>	Annual <i>approx. 5.7 cycles</i>
Heavy Vehicles			
Delivery of shed bedding material	Twin axle rigid truck	108 (216)	613 (1226)
Delivery of chicks	Twin axle rigid truck	45 (90)	256 (513)
Delivery of feed	Semi-trailer	722 (1,445)	4,118 (8,236)
Delivery of fuel	Rigid tanker	2 (4)	12 (24)
Delivery of gas	Rigid tanker	10 (20)	56 (112)

Activity	Vehicle Type	Vehicles (Two Way Vehicle Trips)	
		Production Cycle <i>approx. 9 weeks</i>	Annual <i>approx. 5.7 cycles</i>
Removal of birds	Semi-trailer	745 (1,490)	4,246 (8,493)
Removal of birds – catching equipment transporter	Semi-trailer	6 (12)	34 (68)
Removal of birds – catching staff	Bus	42 (84)	240 (480)
Removal of shed litter material	Semi-trailer	178 (355)	1012 (2024)
Shed wash down equipment transporter	Semi-trailer	2 (4)	12 (24)
Removal of dead birds	Twin axle rigid truck	64 (128)	364 (728)
Removal of garbage	Rigid truck	2 (4)	12 (24)
Heavy Vehicle Sub-Total		1,926 (3,852)	10,975 (21,950)
Light Vehicles			
Staff Visits (ProTen and Baiada)	Car	970 (1,940)	5,529 (11,058)
Tradesman	Ute / Van	10 (20)	58 (116)
Catching equipment maintenance	Van	22 (44)	126 (252)
Shed litter material removal contractors	Car	24 (48)	136 (272)
Shed wash down contractors	Car	36 (72)	206 (412)
Light Vehicle Sub-Total		1,062 (2,124)	6,055 (12,110)
TOTAL		2,988 (5,976)	17,030 (34,060)

The following points should be noted in terms of the volume of traffic to be generated:

- It is estimated that close to 35 percent of the total traffic will be generated by light vehicles (car/ute/van);
- With the exception of live bird removal, which will generally occur between the hours of 8.00 pm and 2.00 pm, all transport activities will occur during daylight hours;
- There will typically be one daily shift for farm workers between 7:00 am and 4:00 pm each day;
- Heavy vehicle trips will be mostly spread over the nine week production cycle and will be distributed relatively evenly over the predicted delivery hours;
- There will be on average 96 vehicle movements a day associated with the development, 62 of which will be heavy vehicles.

It is also noted that the traffic volume calculations used in the traffic assessment are based on the largest truck being a semi-trailer, which provides a conservative estimate of traffic movements to and from the site. However, it is possible that future contractors may use B-Doubles to service the site, which would result in less heavy vehicle movements.

On this basis, RoadNet (2015) has calculated the anticipated daily traffic generation and hourly volumes during the peak generating times of the development, as listed in **Table 3.3**. A discussion on the potential impacts on the traffic to be generated by the development is provided in **Section 6.4**.

Table 3.3 Estimated Traffic Generation per Day and Peak Hours

Vehicle Type	Vehicles per Day (Vehicle Trips)	AM Peak Hour Vehicles (Vehicle Trips)	PM Peak Hour Vehicles (Vehicle Trips)
Cars	17 (34)	14 (10 in, 4 out)	14 (4 in, 10 out)
Heavy Vehicles	31 (62)	6 (4 in, 2 out)	6 (2 in, 4 out)
Total	48 (96)	20 (14 in, 6 out)	20 (6 in, 14 out)

3.7.2 Heavy Vehicle Route

Heavy vehicles will travel between the development site and facilities located near Griffith and Hanwood on a daily basis via the Sturt Highway and Kidman Way, through Darlington Point. Deliveries to and from the development site will be in articulated or rigid trucks, and are already accommodated on the road network in the vicinity of Griffith.

Day old chicks from Baiada's hatchery facility located approximately three kilometres west of Griffith on Snaldero Road will be delivered to the site in rigid trucks. A designated B-double route currently exists along the Sturt Highway through to Narrandera. The daily volumes along this route are low and therefore, as discussed further in **Section 6.4**, it is expected these vehicles can be accommodated on the local road network without any significant traffic impacts.

3.7.3 Vehicular Access

Access to the development site will be via the Sturt Highway (refer **Figure 1.2**). The following works will be required to provide safe and adequate access for light and heavy vehicles to the site:

- Construction of an intersection with the Sturt Highway and site access road at the location shown on **Figure 1.2**;
- Development of an easement through privately owned land between the proposed development site and the intersection with the Sturt Highway, and construction of an access road to the development site along this easement (**Plate 8** and **Figure 3.3**).

Due to the low traffic volumes predicted to use the intersection, a basic right turn treatment (BAR) and basic left turn treatment (BAL) is the minimum highway intersection required to be constructed, as per the requirements set out in Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections (Austroads), specifically figure 4.9 (reproduced from RoadNet (2015) below in **Figure 3.4**).

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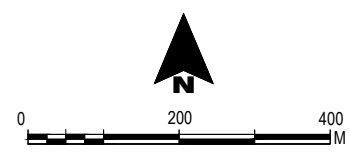


Notes and Cautions:

- (1) Background satellite image sourced from Google Earth.
- (2) All boundaries and areas shown on this plan are approximate only and subject to survey verification.

LEGEND

Proposed Access Road Route



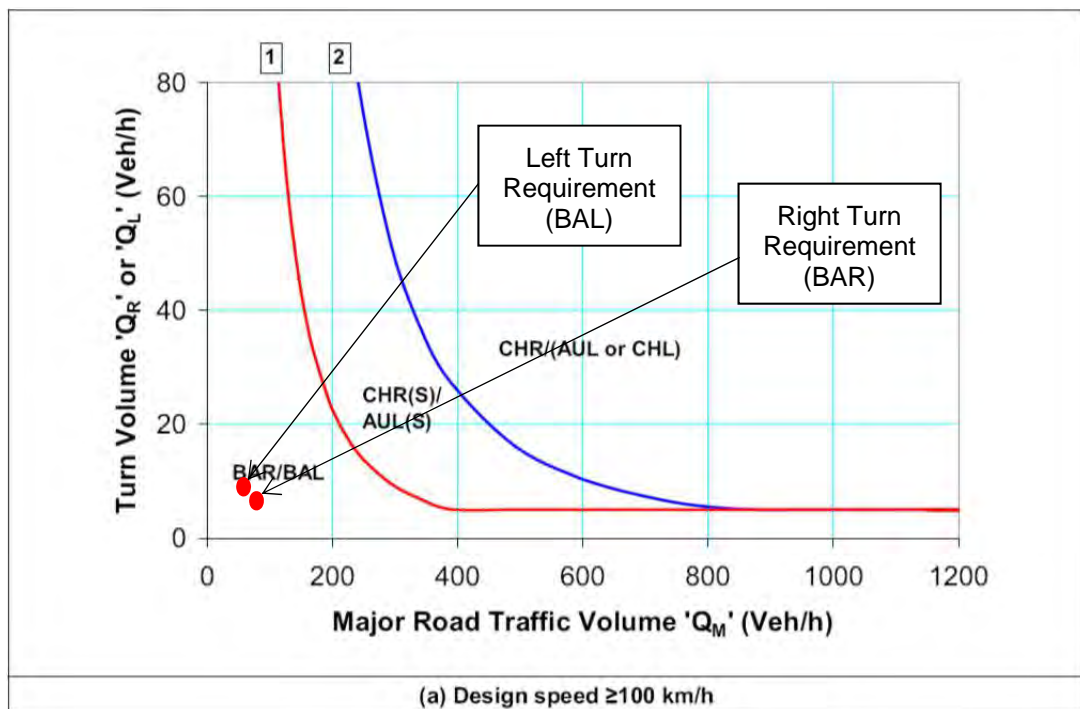
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Proposed Access Road Route
FIGURE 3.3



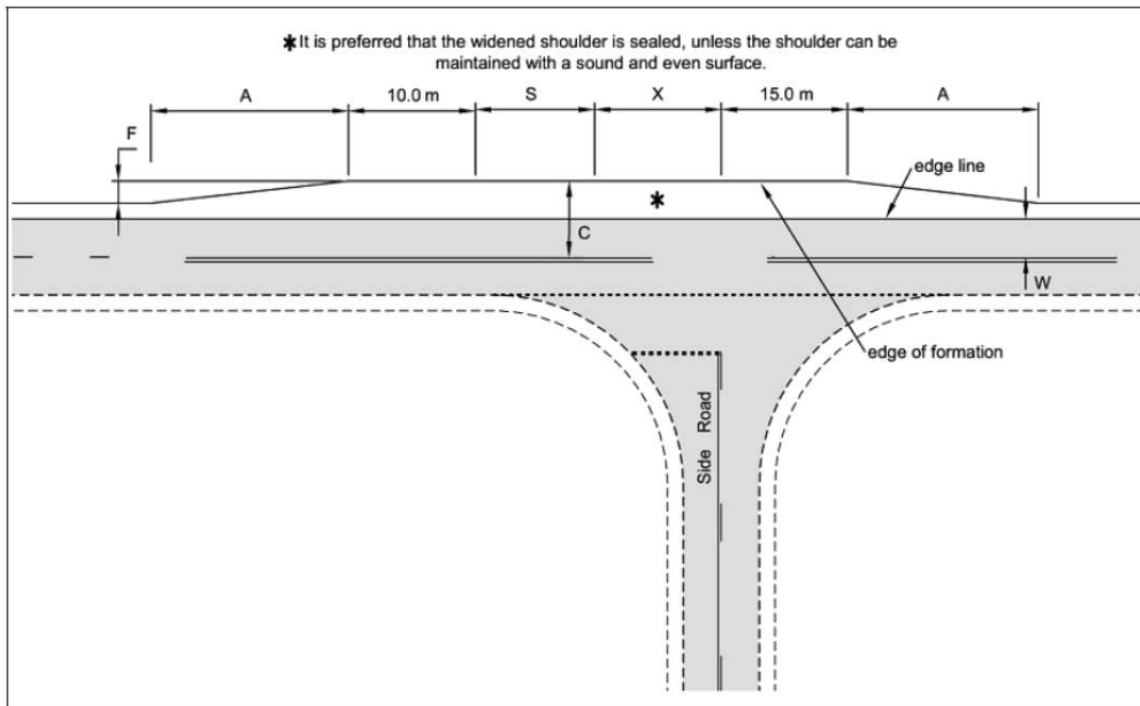
Plate 8 – View along northern section of proposed access track location



Reproduced from RoadNet, 2015

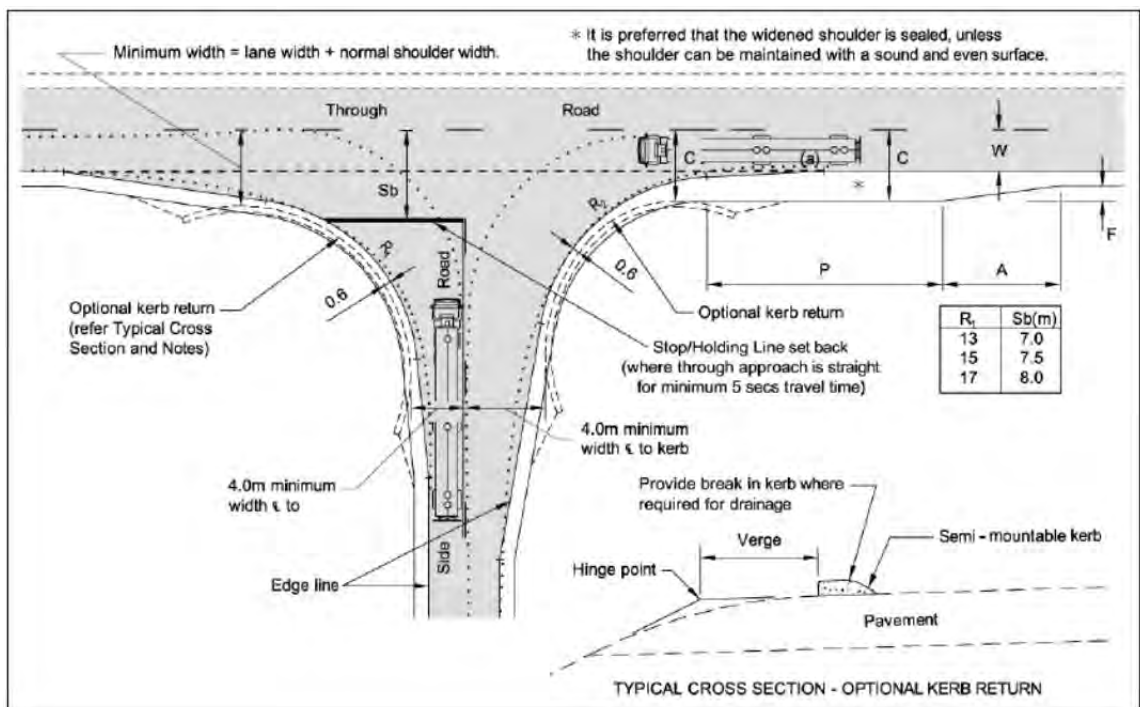
Figure 3.4 Access Turn Warrants

The BAR and BAL treatments require sufficient widening for through vehicles to pass turning vehicles. Indicative diagrams for the treatments are shown in **Figures 3.5** and **3.6**, extracted from Figure 7.5 and Figure 8.2 from Austroads, respectively.



Reproduced from RoadNet, 2015

Figure 3.5 BAR Treatment



Reproduced from RoadNet, 2015

Figure 3.6 BAL Treatment

The road reserve at the access point is sufficiently wide and level for these requirements to be constructed with minimal road works. The radii of the left turn road edge will be constructed to accommodate the turn path of the largest vehicles likely to enter the site, which are anticipated to initially be semi-trailers however may be B-doubles in the future. The through lanes along the Sturt Highway will continue to be of a width suitable to accommodate vehicles up to the size of Road Trains consistent with its designation as a Road Train Route.

The intersection with the Sturt Highway and development site access road will be constructed to the standard of a public road and bitumen sealed for a minimum length of 50 metres to ensure orderly driver behaviour at the intersection and to avoid gravel spreading onto the Sturt Highway. The access road to the development site will be a minimum width of 6.5 metres to enable the safe passage of cars, trucks and other farm vehicles travelling in opposite directions.

During consultation regarding the Project, the RMS requested that a CHR (short) type intersection be considered (a painted right turn lane) at the Sturt Highway. Based on the traffic volumes to be generated by the development, RoadNet (2015) found that the warrants do not require this level of intersection upgrade. However, the BAL and BAR treatment warranted could be supplemented with advance signposting in both directions warning of trucks turning. In addition, an intersection direction sign opposite the access would further help identify the access point.

3.7.4 Internal Access

Adequate and suitable vehicular access within the development site will be provided via the construction of new rural-type all-weather property internal access roads able to carry the anticipated heavy vehicle movements. Appropriate easements will be created over the access road. The internal access driveway off the access road will meet the minimum requirements of AS 2890.2, to accommodate the turning movements of the largest vehicles generated by the poultry development, which will initially be semi-trailers however may include B-doubles in the future.

The development site will have one-way circulation roads (ring roads) around the perimeter of each PPU to enable traffic to enter, exit and manoeuvre around the PPUs for loading-unloading and servicing activities in a forward direction to minimise the potential for traffic conflict and noise. The internal roads will be constructed to suitable strength and width to accommodate passing and the turn paths for the type of vehicles anticipated to enter the development site.

3.7.5 Construction Traffic

The construction period for the Project is expected to be 18 months. All construction activities will be scheduled to be undertaken during standard daytime construction hours, which in accordance with the NSW Industrial Noise Policy (DECC, 2009) are:

- Monday to Friday - 7.00 am to 6.00 pm;
- Saturday - 8.00 am to 1.00 pm; and
- No construction work on Sunday and public holidays.

Construction activities during this time period will include:

- Site Preparation;
- Earthworks;
- Foundation and slab construction;
- Superstructure construction including portal frames, roofing, and cladding;
- Electrical installation and installation of equipment and silos;

- Construction of a new intersection with the Sturt Highway;
- Construction of a new access road from the Sturt Highway to the development site, and one-way circulating ring roads around the perimeter of each PPU (standard rural all-weather property access roads);
- Construction of ten dwellings to house farm managers and farm assistant managers;
- An amenities facility encompassing office space, toilets and staff change rooms at each PPU;
- Construction of a workshop and other storage facilities at each PPU;
- Construction of storm water management systems; and
- Landscaping.

The anticipated construction traffic to be generated by these construction activities are summarised in **Table 3.4**.

Table 3.4 Estimated Construction Traffic Volumes

	Daily (two way trips)	Weekly (two way trips)
Light Vehicles		
ProTen Staff	3 (6)	15 (30)
Tradespeople	15 (30)	75 (150)
Sub-total light vehicles	18 (36)	90 (180)
Heavy Vehicles		
Tradespeople – trucks	-	3 (6)
Construction material delivery	-	3 (6)
Equipment delivery	-	2 (4)
Roading material	12 (24)	60 (120)
Concrete materials	2 (4)	10 (20)
Other	2 (4)	10 (20)
Sub-total heavy vehicles	16 (32)	88 (176)
Total	34 (68)	178 (356)

3.8 Servicing

3.8.1 Electricity

Reticulated electricity will be the poultry development's principal source of energy and will be used to operate the tunnel ventilation systems, shed lighting, cooling pads, water pumps and staff amenities. ProTen commenced consultation with Essential Energy in the latter part of 2014 to discuss options for the supply of power to the development site. In order to service the requirements of the site, power supply infrastructure will need to be constructed from the existing substation at Coleambally to the development site, over a distance of approximately 30 km. Consultation between ProTen and Essential Energy is continuing in relation to making the appropriate arrangements for this extension of power to the site, and work has commenced with regards to obtaining the appropriate approval under Part 5 of the EP&A Act.

Emergency standby diesel generators will be installed for when power from the electricity grid is lost. They will be appropriately sited and housed to minimise noise emissions.

3.8.2 Gas

Heating of the poultry sheds, which is anticipated to be required for up to 14 days of each production cycle, will be provided by wall mounted gas heaters. At present the only option is LPG, which will be supplied from Griffith and stored on-site in bulk tanks installed at each of the PPU sites. The storage of LPG on site, along with other Dangerous Goods, is assessed in detail in **Section 6.9** (Hazard and Risk).

3.8.3 Water Supply

Poultry broilers are like any other livestock in that they need to drink water each day of their life-cycle. Water lines, with nipple drinkers and drip trays, will run the length of each poultry shed and will be automatically supplied by external water storage tanks.



Plate 9 - Day Old Chicks at Nipple Drinkers

Each shed will be temperature controlled by tunnel ventilation during the hotter months, with evaporative cooling pads used once the external air temperature reaches approximately 30 degrees Celsius.

Based on industry acknowledged figures, the development will require a total water supply of around 460 megalitres per annum. This includes water supply for shed ventilation, bird consumption, shed cleaning, landscaping and staff requirements.

The development site's water requirement will be sourced via four new groundwater bores to be constructed on the site, consisting of two bores in two locations (refer **Figure 1.3**). ProTen will transfer the water access licence from an existing bore located on Lot 52 DP 750906, (approval number 40CA403632 issued under the *Water Management Act 2000* for the Lower Murrumbidgee Deep Groundwater Source) to the new bores to be constructed on Lot 41 DP 750898 (Bore 1) and Lot 44 DP 750898 (Bore 2). ProTen have commenced discussions with NOW on the transfer of this water access licence. An assessment of the potential impacts as a result of construction and operation of these bores is provided in **Section 6.6**.

Water extracted from the bores will be treated as per the recommendations by the *National Water Biosecurity Manual – Poultry Production* (DAFF 2009). Water will be pumped from the bore and filtered through sand media. The water pH is monitored and if it is found to be high, citric acid will be added to maintain pH at approximately 7.0. The water will then be chlorinated to deliver approximately 3 ppm into storage tanks. Finally, chlorine dioxide will be dosed into the water delivery system supplying the sheds at between 0.5 – 0.1 ppm.

While not anticipated, if the water requirement cannot be provided for example during times of extreme drought, this is a commercial risk of the operator. If this occurs, several options will be available including the purchase of water from off-site and/or reducing the operating capacity of the development until the required water supply can be obtained. On this basis, there should not be any impact or disadvantage to other local water users.

Due to biosecurity requirements, ProTen does not intend to capture and re-use stormwater run-off from the roofs of the poultry sheds. While the captured roof water can be chlorinated, there is still an element of risk associated with introducing disease pathogens to the livestock and the possibility of spreading disease.

3.8.4 Feed Supply

Broiler feed will be supplied from Baiada's feedmill facility located approximately one kilometre south of Hanwood on the corner of Kidman Way and McWilliams Road. Silos will be located between the poultry sheds and will automatically dispense feed into the sheds. Feed lines, with feed pans, will run the length of each poultry shed and will be automatically supplied by the external grain silos. The feed pans will be spaced at regular intervals so that the birds are never more than a few metres from feed.



Plate 10 – Day Old Chicks at Feed Pans

The dietary formulation will vary with changes in the availability, price and quality of specific feed ingredients, season of the year and broiler flock age. The optimum and most economical combination of feed ingredients that meets the strict nutritional specifications at any particular time will be selected.

As previously mentioned, broiler feed comprises between 65 and 90 percent grains, such as wheat, sorghum, barley, oats, lupins, soybean meal, canola and other oilseed meal and grain legumes. Hormones are not added to chicken feed or administered to commercial meat chickens in Australia, a practice that has been banned internationally for over forty years.

3.8.5 Sewage

Sewage generated by the on-site staff amenities and residences will be appropriately treated and disposed of via on-site waste water management systems installed and operated in accordance with the requirements of Council and the relevant standards/guidelines. No detectable impact to surface or groundwater quality is anticipated as a result of the low volume that will be generated, the on-site system requirements, the available land area and available separation distances.

The management of waste water from the sheds (wash down water) is discussed in **Section 3.11**.

3.9 Lighting

3.9.1 Internal Shed Lighting

Lighting control programs are required throughout the entire poultry production cycle. Adequate internal shed lighting will be provided to enable the birds to see and find feed and water, with dark periods each day to allow them to rest. Reduced light has been found to minimise livestock stress and, as such, low lux internal lighting is provided to promote calm. Control of light intensities will be via dimmer controls.

3.9.2 External Shed Lighting

The primary source of external lighting will comprise one luminaire mounted at a height of approximately four metres over the front and rear loading-unloading areas of each poultry shed. Each luminaire will be aimed downwards and only switched on during loading-unloading and servicing activities outside of daylight hours and during heavy fog.

3.10 Waste Management

Appropriate systems will be implemented to ensure that each waste stream generated by the development is effectively managed and/or disposed of off-site, as described in the sub-sections below. There will not be any on-site stockpiling or disposal of waste materials.

3.10.1 Daily Waste

Day to day general waste, including waste from the manager's houses, will be placed into enclosed skips and removed from site by a licensed contractor on a regular basis. This type of waste will be transported to and disposed of at a local landfill site. No waste material will be disposed of on-site.

3.10.2 Chemical Containers

The only chemicals that will be used at the site will be for sanitisation and disinfection purposes, along with pest, vermin and weed control.

Chemicals will be purchased from a local chemical supply company and/or delivered to the site by Baiada. It is the usual practice for chemicals to be delivered only a few days prior to the commencement of the cleaning phase in order to minimise on-site chemical storage requirements and time. Appropriate bunded areas or specifically-purchased chemical sheds will be installed at the Site for the short-term storage of the limited volumes of chemicals delivered.

On the basis of the best management practices and mitigation measures to be implemented, including appropriate staff training and incident management procedures, the potential for adverse environmental impact from chemical use is considered low.

3.10.3 Poultry Litter

The sheds are cleaned out and washed down at the end of each cycle, a process that takes approximately two to three days. This process involves removing all of the poultry litter and disinfecting the sheds ready for the next batch of chickens, and comprises the following steps:

- Manure is pushed up using a skid steer type loader and loaded into a covered elevator from within the shed, which in turn deposits the manure into trucks that are covered (ensuring the potential for spillage of dust creation is avoided) for offsite disposal as a fertiliser;
- Sheds are blown and swept. Remaining manure is also loaded onto trucks;

- “Total Clean” detergent is used to pre-soak the sheds. Sheds are then washed using high pressure low volume water pressure cleaners.

The management of the wash down water from the clean out process is described in **Section 3.11**.

At the end of each production cycle a typical poultry shed of the size proposed will have around 200 cubic metres (m³) of poultry litter (spent bedding material), comprising around 90 m³ metres of soft wood shavings/rice hulls/chopped straw and 110 m³ of manure accumulated over the eight weeks of bird occupation.

For sound farm management and quarantine control reasons, it is not in ProTen’s interest to stockpile poultry litter near the PPU sites due to the vulnerability of the younger birds coming in to commence cycle. As such, at no time will the litter be stored within the bounds of the property. The sole reason a valuable commodity such as poultry litter is removed from the site is to ensure minimal opportunity for disease transfer to the flock. Furthermore, for biosecurity reasons, ProTen prefers not to see the spreading of litter within a five kilometre radius of a poultry shed. The product does not pose a health threat to the surrounding community.

Poultry litter is highly sought after as an organic fertiliser and/or rehabilitation agent for agricultural lands. On this basis, the material will be collected from the sheds at the end of each production cycle by an approved/licensed contractor(s) who will more than likely sell it as a commercial raw product and/or directly to regional farmers. The safe handling and application of the material once it has left the development site is the responsibility of the end-user. ProTen will make every effort to ensure truck loads leaving the development site are covered to minimise emissions of odour and particulate matter.

3.10.4 Dead Birds

Dead birds will be collected from the poultry sheds on a daily basis and stored in on-site chillers. A rigid truck will visit the site on a regular basis to collect the dead birds and transport them to Baiada’s protein recovery plant (rendering plant), which is part of the poultry processing complex, near Hanwood on Kidman Way. Dead birds will not be allowed to stockpile within the development site for reasons of strict quarantine control.

3.11 Surface Water Management

An engineered surface water drainage and management strategy will be prepared and implemented to provide long-term structural controls and management to mitigate the impact of surface water runoff throughout the life of the operation. The main water sources to be managed within the water management system for the site include:

- Wash down water from within the sheds at the end of each eight week production cycle;
- Rainfall runoff from the shed roofs; and
- Rainfall runoff from the ground surfaces surrounding the poultry sheds and additional improvements.

As previously mentioned, each poultry shed will be surrounded by a 400 mm high dwarf concrete bund wall to prevent rainwater and runoff entering the sheds and to allow for the controlled discharge of wash down water from the sheds. The concrete bunds will have strategically located seepage holes to convey excess wash down water from the sheds into grassed swales between each of the sheds. Rainfall runoff from the shed roofs and from some of the surrounding surfaces will also be directed into the grassed swales.

The design of the swale drains is provided in **Figure 3.7**. As shown on **Figure 3.7**, the swale drains have been conservatively designed to capture a 1 in 100 year rainfall event. The swales allow infiltration of the water into the topsoil for nutrient uptake by the grass, which will be regularly slashed. During heavy rainfall events, excess water from the grassed swales will be directed to underground pipes and into a catch drain that will be installed around the perimeter of the poultry sheds. The construction of the perimeter catch drain will ensure that all rainfall runoff from the ground surfaces surrounding the sheds is contained within the controlled storm water management system. Further discussion on the effectiveness of the drains in mitigating potential impacts on water resources is provided in **Section 6.5.3**.

Runoff from this catch drain will be directed to four small storage dams, one constructed at each corner of each PPU, as illustrated on **Figures 1.3** and **3.2**, as per the stormwater management system at all of ProTen's farms. These dams will be designed to capture all runoff from within each PPU, and are generally designed to capture the rainfall runoff volume of the design event, being a 1 in 20 year (20 year annual recurrence interval), 24 hour event. In the case of the proposed development at Euroley however, the size of the dams will in part be dependent on the amount of material required to be extracted as part of the cut and fill process to create the necessary pads for the PPUs, as well as ensuring effective management of stormwater runoff. As described in **Section 6.5** (flooding), the finished floor levels of the sheds will be set at a minimum of 300 mm above adjacent ground level to reduce the likelihood of floodwater ingress to the buildings during an extreme flood event. The dams at each corner of the PPUs will be constructed via the excavation process to extract the material required to achieve this. This will result in each dam having a capacity of approximately 7000 m³, totalling 28,000 m³ of retention at each PPU.

Lance Ryan Consulting Engineers (LRCE) were engaged to assess the capture and retention of stormwater from each PPU, and to assess what storm event the total dam storage at each PPU would capture. The report found that the total storage at each PPU of 28,000 m³ is equivalent to 170% of the capacity required to prevent runoff escaping the retention dams from a 1 in 100 annual recurrent interval (ARI), 72 hour event. The report by LRCE is attached as **Appendix B**.

Water in these dams will be allowed to evaporate, or will be used to irrigate the landscape plantings around the sheds.

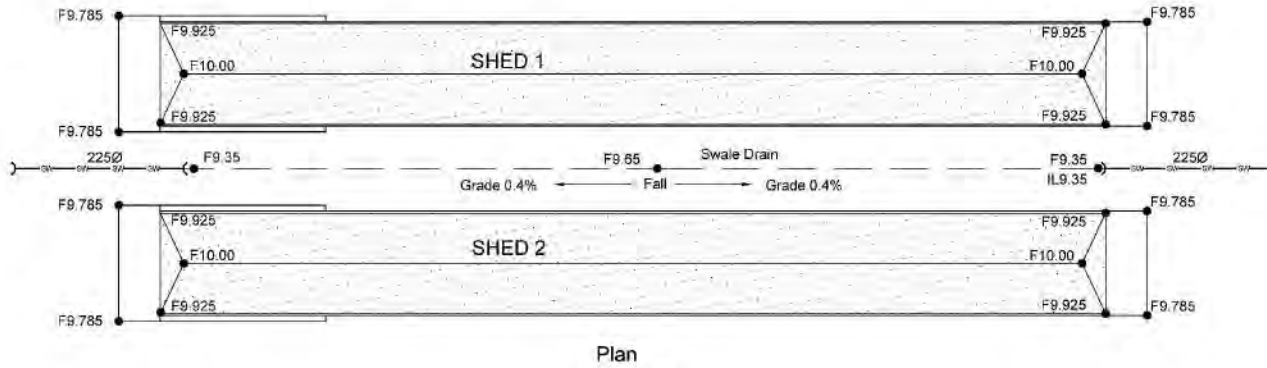
3.12 Revegetation

The most effective means of controlling erosion and sedimentation is through the establishment and maintenance of a healthy vegetation cover. General disturbance areas, that will not be sealed or actively utilised for operational activities, will be promptly rehabilitated to a stable landform and vegetated following completion of the construction/disturbance activities. Broadcast seeding will be utilised as the preferred revegetation method for all disturbance areas requiring revegetation. Broadcast seeding involves the spreading of a suitable pasture seed mix over the area to be revegetated, and will generally be undertaken according to the following:

- Topsoil will be re-spread in the reverse sequence to its removal where possible, so that the organic layer, containing any seed or vegetation, is returned to the surface. Topsoil should be spread to a minimum depth of 100 millimetres on flat slopes. Re-spreading on the contour will aid runoff control and increase moisture retention for subsequent plant growth. Re-spread topsoil should be levelled to achieve an even surface, avoiding a compacted or an over-smooth finish;
- After surface soil tillage is completed for any given area, revegetation will commence as soon as practicable; and
- Appropriate fertiliser will be applied during the seeding operation.

The pasture grass and legume mix provided in **Table 3.5** is considered suitable.

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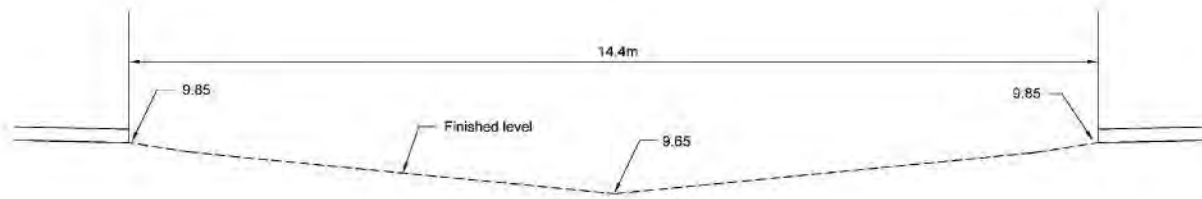
Plan

Chezy ch	Mannings Roughness n	Area Inv-HFL A (m ²)	Wetted Perimeter WP (m)	Slope Decimal So	Hydraulic Radius R	Velocity V (m/sec)	Discharge Q (m ³ /sec)
19.46	0.035	1.44	14.41	0.004	0.10	0.39	0.56

Swale Drain Capacity at Level 9.65
(0.56m³/s)

Chezy ch	Mannings Roughness n	Area Inv-HFL A (m ²)	Wetted Perimeter WP (m)	Slope Decimal So	Hydraulic Radius R	Velocity V (m/sec)	Discharge Q (m ³ /sec)
22.67	0.035	3.60	14.43	0.004	0.25	0.72	2.58

Swale Drain Capacity at Level 9.35
(2.58m³/s)



SWALE DRAIN
Section 1-1

Total catchment Area (A) for the swale drains = 2560m²
 This comprises 1464m² of hardstand area and 1096m² of landscaped area.
 Fraction impervious for hardstand area = 0.95 and landscaped areas 0.2
 Runoff Coefficients (C) are 1.0 for hardstand areas and 0.41 for landscaped areas
 Time of concentration = 12minutes
 Rainfall Intensity (I) = 132mm/hr
 Discharge = CAI / 360 = (1 x 0.1464 + 0.41 x 0.1096) x 132 / 360 = 0.07m³/s
 Therefore the swale drains are capable of handling over the 1 in 100 year rainfall event.
 At the end of each swale drain is a 225Ø pipe graded at a minimum 1%. This pipe has a capacity of 70L/s which is also capable of handling the 1 in 100 year storm event.

Source: Lance Ryan Consulting Engineers

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Table 3.5 Pasture Specification

Species	Rate (kilograms per hectare)	
	Spring/Summer	Autumn/Winter
Japanese Millet	20	5
Ryecorn/Oats	5	20
Couch Grass	10	8
Wimmera Ryegrass	5	10
White Clover	8	-
Lucerne	5	-
Sub Clover	-	8
Serradella	-	10
Consol	-	2

All legumes (clovers and lucerne) will be inoculated with Rhizobia and lime pelleted to promote nodulation thus facilitating subsequent nitrogen fixation. For critical areas requiring quick revegetation or for areas where poor revegetation is identified, more intensive revegetation methods (i.e. hydromulching) may be considered.

3.13 Landscaping

3.13.1 Overview

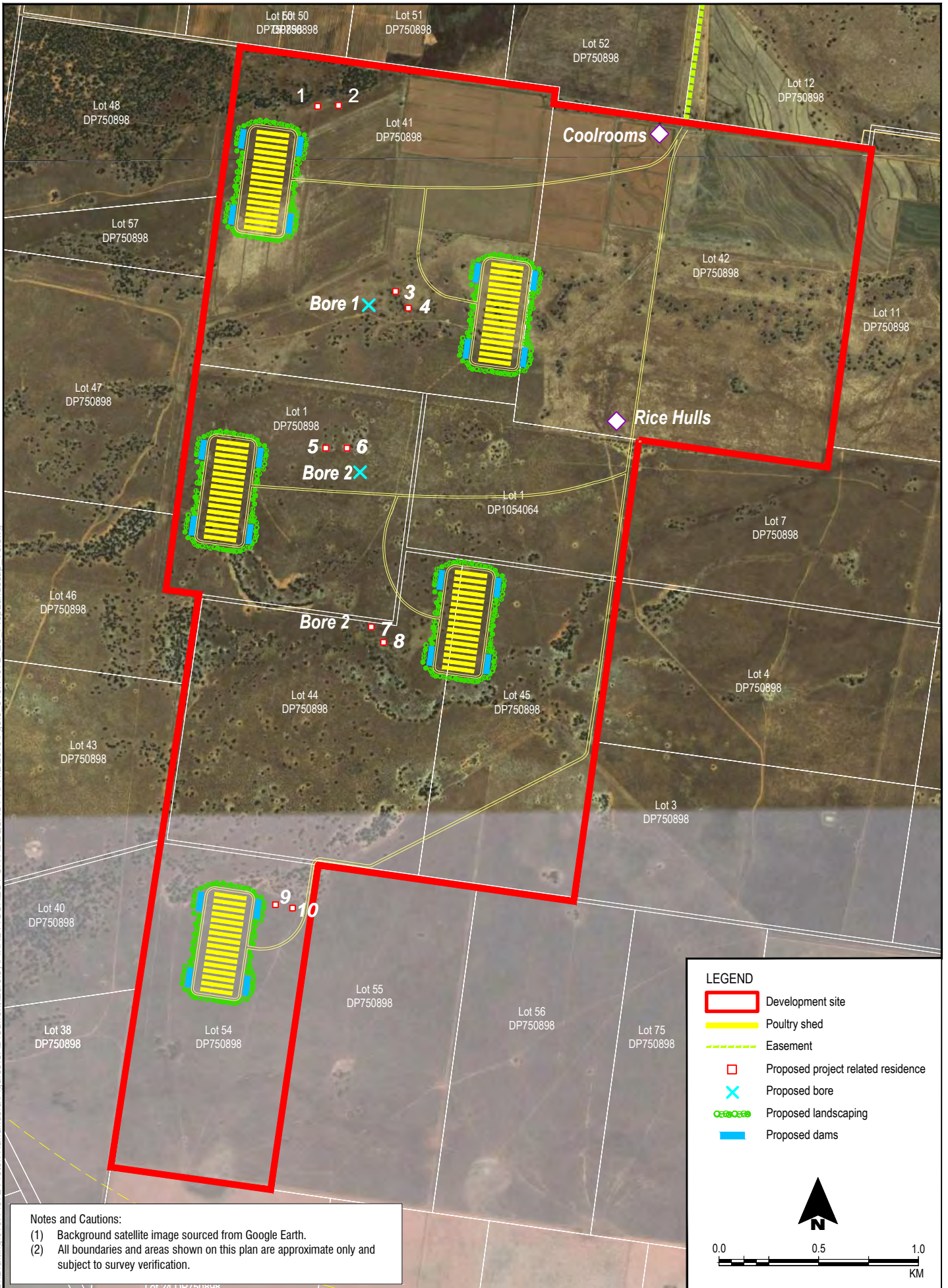
ProTen typically undertake significant landscaping activities to improve the visual and environmental amenity of the company's poultry development sites. Additional benefits of landscape plantings include:

- Protecting the poultry sheds against any spray drift or off-target applications of chemicals from neighbouring agricultural land users;
- Reducing the magnitude and frequency of any adverse air quality impacts by effectively slowing and filtering air movement, which enhances dust deposition and odour dispersion;
- Buffering or reducing the audible level of any noise emissions from the development site;
- Providing a high level of light screening; and
- Increasing the total area under vegetation within the locality, creating habitat and increasing the local biodiversity.

Suitable tree and shrub species will be strategically planted around the perimeter of each PPU to screen the poultry sheds, as shown on **Figure 3.8**. The proposed plantings will be based on the relevant recommendations outlined in *Planning Guidelines Separating Agricultural and Residential Land Uses* (Queensland Department of Natural Resources 1997), as follows:

- Provide a biological buffer of a minimum total width of around 40 metres;
- Contain consistent, yet random, plantings of a variety of tree and shrub species of differing growth habits, at spacing's of around four to seven metres;
- Include species with long, thin and rough foliage to facilitate the capture of spray droplets and dust particles;
- Provide a permeable barrier that allows air to pass through the buffer. The plantings will aim to achieve a porosity of around 0.5 (i.e. around 50 percent of the screen will be air space);

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- Include species that are hardy and fast growing; and
- Foliage from base to crown (i.e. lower and upper storey vegetation) to ensure that the buffer is effective in slowing and filtering air movement at all levels.

ProTen will progressively establish the landscape plantings, as soon as practically possible, following bulk earthworks and construction of development infrastructure.

3.13.2 Tree and Shrub Siting

In order to allow maximum leaf area and room for future growth, large trees will be planted at intervals of around seven metres and the small trees and large shrubs will be planted at intervals of around four metres. Shrubs will be planted between the trees in order to form a lower foliage screen.

As previously stated, species will be randomly, yet consistently, planted in a band around 40 metres wide in order to allow air movement whilst trapping fine particulate matter and spray droplets on foliage. If necessary, appropriate fencing or tree guards will be used to limit grazing animals such as rabbits and kangaroos.

3.13.3 Site Preparation

Good site preparation is critical to root development, tree/shrub survival and establishment of rapid growth rates. The proposed landscaping areas will be sprayed out using a herbicide to remove grass and weeds, followed by deep ripping and cultivation. In newly ripped soil air pockets occur which may cause a seedling to die from lack of available water. The rip lines will therefore be left to settle and maintained in a weed free condition for around a month. This period can be shortened with good rain or irrigation.

Appropriate mulching will also help promote growth and reduce water requirements. Mulch retains soil moisture, increases soil temperature, reduces erosion, encourages earthworm activity and builds a humus layer that adds to and benefits the topsoil.

3.13.4 Planting

Following good site preparation, it is anticipated that the planting method will comprise the following key steps:

- If possible, planting will be undertaken during the winter/autumn months to reduce moisture stress;
- The proposed landscaping areas will be deep watered approximately one week prior to planting in order to ensure a good moisture base;
- Randomly, yet consistently, plant trees and shrubs in the rip lines;
- Erect necessary fencing and/or tree guards;
- Apply a good cover of mulch, such as lucerne hay, around the trees and shrubs;
- Deep water each of the newly planted trees and shrubs; and
- If necessary, apply an appropriate fertiliser.

3.13.5 Maintenance

A commitment to effective landscaping involves an on-going monitoring and maintenance for a period of at least 12 to 18 months following planting. The vegetation plantings will be regularly inspected and assessed for maintenance requirements, including success of tree and shrub plantings and the presence/absence of weeds.

Where the health and/or growth of the plantings appear limited, maintenance activities will be initiated. These may include re-planting and where necessary, topdressing and/or the application of specialised treatments such as composted mulch to areas with poor vegetation establishment.

Tree guards will be re-placed around planted stock if damaged and animal grazing is found to be excessive. Watering of the landscaping plantings will occur, as required, in the formative years.

3.14 Site Maintenance

Regular and effective site maintenance is essential based on the fact that issues such as odour, dust, noise, pests and flock health are directly related to site operation and management.

The proposed poultry development will be managed in strict compliance with ProTen's standard operating procedures. This includes a regular site inspection and maintenance program in order to minimise the potential for adverse environmental impacts, extend the life of farm equipment, reduce operating costs and maximise operational efficiency.

Emphasis will be placed on keeping the insides of the poultry sheds and surrounding environment as clean as possible, with maintenance activities including:

- Regular inspection and maintenance of ventilation systems, bird drinkers and bird feeders to avoid blockages, spillages, leaks and uneven distribution;
- Regular examination and management of stocking densities and bird health within the poultry sheds;
- Daily inspection and removal of dead birds from within the sheds;
- Daily monitoring and maintenance of the bedding material to identify, remove and replace any caked material beneath drinking lines and/or areas with excessive moisture content;
- Regular site slashing and mowing;
- Maintenance of the landscape plantings;
- Implementation of pest control measures (see **Section 3.16**), which will primarily comprise a preventative baiting system;
- Regular inspection and maintenance of water supply pumps and pipelines to identify and fix any blockages or leaks; and
- Maintenance of the internal access roads to minimise tyre wear and dust emissions.

3.15 Pest Control

The presence of pest populations in and around poultry operations is a potential health hazard and an indicator of poor farm management. The development site will be managed in strict compliance with ProTen's standard operating procedures. Emphasis will be placed on keeping the poultry sheds and surrounding environs as clean as possible in order to discourage pests from establishing residency within and around the development site.

The following pest control measures, which will form part of the site maintenance program and biosecurity commitment, will be employed:

- Implementation of ProTen's standard pest control program, which primarily comprises the installation and maintenance of baits as a preventative measure to prevent and control outbreaks;
- Dead birds will be collected from the poultry sheds on a daily basis and stored in on-site chillers for removal off-site;
- At the end of each production cycle, poultry litter will be promptly removed from the poultry sheds and transported off-site;
- There will be no on-site stockpiling or disposal of waste materials;
- Any feed or grain spills will be promptly cleaned up;
- All site rubbish will be collected in the designated waste bins and removed offsite by a licensed waste contractor;
- The grass within the vicinities of the sheds will be maintained short; and
- Appropriate sanitising agents will be used during the shed cleaning phase.

3.16 Workplace Health and Safety

The design, construction and operation of the proposed poultry development will comply with all relevant workplace health and safety requirements. ProTen understands that it has 'duty of care' obligations under the *Work Health and Safety Act 2011* (and its associated Regulation).

3.17 Animal Health and Welfare

The conditions under which broiler poultry are housed and the way that they are managed during their growing phase, transportation and slaughter are prescribed in several government and industry endorsed Codes of Practice designed to safeguard their health and welfare.

Throughout its history within the poultry industry, ProTen has proven its commitment to high standards of bird welfare. The company understands that bird welfare, flock performance and economic functioning go hand-in-hand. ProTen has advised that it is committed to the standards of care and management detailed in the *National Animal Welfare Standards for the Chicken Meat Industry* (Barnett et al, 2008), which is based on the *Model Codes of Practice for Poultry Production*, Australian Standards, international and national guidelines for animal welfare, and scientific evidence. Key features of this commitment, some of which have already been touched on, are discussed below.

Space Allowance

As outlined in **Section 3.6**, the maximum broiler density for ProTen's tunnel ventilated sheds is typically 0.055 square metres of floor space per bird. ProTen's broiler 'pick-ups' (shed thinning or depopulation) are in most instances governed by the further limiting factor of a maximum of up to 40 kilograms of live-weight per square metre of floor area, which complies with the maximum stocking density for domestic poultry in tunnel ventilated sheds as recommended in the *National Animal Welfare Standards for the Chicken Meat Industry* (Barnett et al 2008).

Equipment

All equipment to which the birds have access will be selected and appropriately maintained to avoid injury, pain and stress. In addition, the automated shed control equipment will be regularly checked and maintained to ensure optimum efficiency.

Lighting

As outlined in **Section 3.9**, lighting control programs are required throughout the entire poultry growing cycle. Adequate internal shed lighting will be provided to enable the birds to see and find feed and water, with dark periods each day to allow them to rest. Reduced light has been found to minimise livestock stress and, as such, low lux internal lighting is provided to promote calm.

Ventilation

The proposed development will comprise tunnel-ventilated fully-enclosed climate-controlled poultry sheds. Tunnel ventilation is able to deliver the required environmental parameters throughout the entire year and poultry have an optimum environmental range for health, growth and productivity. The tunnel ventilation systems will be fully computer controlled and alarm monitored, with back-up power available via emergency standby generators.

Feed Supply

Feed lines will run the length of each poultry shed and will be automatically supplied by the external grain silos. Feed pans will be spaced at regular intervals so that the birds are never more than a few metres from feed and, in compliance with the *Model Code of Practice for the Welfare of Animals, Domestic Poultry* (Primary Industries Standing Committee 2002), there will be a maximum of around 80 birds per feed pan at maximum density.

Water

Water lines will run the length of each poultry shed and will be automatically supplied by external water storage tanks. Nipple drinkers with drip cups will be spaced at regular intervals so that the birds are never more than a few metres from water and, in compliance with the *Model Code of Practice for the Welfare of Animals, Domestic Poultry* (Primary Industries Standing Committee 2002), there will be a maximum of around 12 birds per nipple drinker at maximum density.

Inspections

The birds will be inspected on a daily basis for health, injury, distress, feed and water. Dead and injured birds will be removed for disposal or treatment in a humane manner.

Transportation

All measures will be taken to ensure that the birds are not subjected to any unnecessary stress during catching, transportation, loading and unloading. Both ProTen and Baiada (operator of the chicken hatchery and poultry processing complex to service the proposed development) are fully committed to the standards of care detailed in the *National Animal Welfare Standards for the Chicken Meat Industry* (Barnett et al, 2008) and the *Model Code of Practice for the Welfare of Animals, Land Transport of Poultry* (Primary Industries Standing Committee, 2006).

3.18 Biosecurity

Biosecurity refers to those measures taken to prevent or control the introduction and spread of infectious agents to a flock. It aims to prevent the introduction of infectious diseases, and prevent the spread of disease from an infected area to an uninfected area. Biosecurity plays a vital role in the incidence of disease and is an integral part of any successful poultry production system.

The nature of each avian influenza outbreak that has occurred in Australia (five over the past 50 years) suggests that one or more biosecurity deficiencies was involved in the spread of the virus within and between properties (Australian Animal Health Council 1999).

ProTen has demonstrated strict biosecurity commitment over the years. A copy of the *National Farm Biosecurity Manual for Chicken Growers* (Australian Chicken Meat Federation 2010) will be kept at the development site and staff will be provided with training in the relevant parts of the Manual. The key biosecurity measures that will be implemented at the proposed development site include, but will not be limited to, the following:

Farm Signage

Appropriate signage will be erected at the entrance of the PPU site to notify visitors of the biosecurity zone, directing them to contact the operator prior to proceeding and any other requirements.

Farm Isolation

The greater the separation distance between poultry farms, the less opportunity there is for disease spread. The layout of the Project affords approximately 1000 metres between PPUs.

Disease organisms (pathogens) can survive for some time on people and their clothes and as such isolation in time is also important in providing a break between visits of personnel and equipment. Time isolation allows equipment to be disinfected and allows personnel to shower and change clothing.

Additional measures to ensure isolation from disease include:

- Poultry sheds and equipment will be cleaned and disinfected at the end of each production cycle;
- Bedding material and dead birds will not be allowed to stockpile within the development site;
- Poultry water supply will be disinfected prior to discharge into the on-site storage tanks;
- Staff members working in direct contact with livestock will not be permitted to keep other bird species or pigs at their place of residence;
- Staff members and visitors will not be permitted to travel between poultry farms without changing clothes and foot wear;
- Attempts will be made to limit wild birds and vermin from farm buildings and surrounding areas; and
- A vehicle wheel wash will be installed at the entrance to the site, as described further below.

Wheel Wash

The potential for mechanical transmission of disease pathogens will be reduced through the installation of a wheel wash facility on the access road to each PPU. All vehicles wishing to enter a PPU site will be required to pass through the wheel wash to remove dust particles from the wheels and chassis.

The wheel wash facility will be designed as a self-contained unit in order to minimise the potential for runoff. It is anticipated that a chemical sanitiser, such as Microgard 755N or Micro-4, which are commonly used on poultry farms, will be added to the wash water.

It is proposed to construct a turkey nest dam below the wheel wash facility to contain the full volume of water in the wash basin. The dam will be used to hold water resulting from excessive rainfall, accidental overflow and/or periodic cleanouts. It is anticipated that the dam's capacity will be around twice that of the wheel wash.

If considered necessary, the turkey nest dam will be lined to achieve a permeability of 10^{-9} metres per second. Prior to construction a soil sample will be tested. If deemed suitable the dam will be constructed and the soil compaction tested by a NATA accredited laboratory. If suitable soil cannot be sourced, an alternative synthetic liner capable of achieving the required permeability will be used.



Photo location: ProTen's Murrumbidgee Broiler Complex near Tamworth NSW

Plate 11 – Example of a wheel wash to be constructed at the farm entrance

Single Age Farm

Vaccinated stock can become infected and show no clinical signs of disease, yet can transfer the disease to younger and/or more susceptible birds. To reduce the risk of disease transfer and outbreak, whole flock units with minimum age difference will be placed into each poultry shed. On this basis, the site will operate on an 'all in – all out' placement and depopulation program.

Closed Flock

Birds on other sites may be exposed to different strains of organisms to which other flocks may not have developed immunity to. In addition, birds may have been exposed to a disease organism and not have developed clinical signs of the disease. Moving apparently healthy birds into a disease-free flock could mean introducing disease to a clean farm site. For these reasons, once a flock is placed, no new birds will be introduced from any other source.

Pest Control

The control measures listed in **Section 3.16** will be implemented to discourage pests and vermin from establishing residency within and around the site. Various additional biosecurity measures will be implemented on a routine basis in accordance with the *National Farm Biosecurity Manual for Chicken Growers* (Australian Chicken Meat Federation 2010).

3.19 Environmental Complaints and Incidents

The Complaints and Incident Management Strategy contained within **Appendix C** will be implemented to ensure that all complaints and incidents relating to the poultry operation are promptly and effectively addressed. Appropriate documentation of complaint/incident handling will assist in identifying and implementing measures to negate the possibility of re-occurrence in the future.

3.20 Socio-Economic Aspects

3.20.1 Employment

ProTen has advised that at full production the development will require:

- Five full-time site managers (live on-site);

- Five full-time assistant site managers (live on-site); and
- Around 20 additional full-time equivalent staff members.

There may be times when additional labour will be called upon. ProTen's poultry production complexes provide vital employment in regional areas, with the majority of positions demanding only low skill levels and on-the-job training is provided.

3.20.2 Capital Investment

The construction cost associated with the Project is estimated at approximately \$60 million. This capital is a permanent investment within the Narrandera Shire.

3.20.3 Consumables and Flow-On Benefits

At this point in time, it is difficult to quantify the expenditure in terms of the various consumable products and services that will be required to construct, operate and maintain the development. Some examples include:

- Annual telecommunications, electricity, water and gas supply costs;
- Opportunities for local transport companies to participate in the haulage of materials to and from the site;
- Opportunities for local growers and suppliers to provide various goods, including bedding material, fuel, tyres, clothing and groceries, to name a few; and
- Opportunities for local business to fulfil maintenance and servicing requirements.

The additional grain needed to fulfil the feed demand of the development represents a significant increase in the potential market for regional farmers. It is estimated that the operation will consume around 105,000 tonnes of poultry feed per annum, which represents a yearly recurrent expenditure of around \$33 million (based on the average price of feed at the time this document was prepared).

Given the anticipated expenditure on consumables, along with the significant flow-on benefits, it is clear that the stimulus to the local and regional economies will be substantial.

Section 4

Planning Considerations



4 PLANNING CONSIDERATIONS

The Project has been assessed in full consideration of the applicable statutory planning instruments. This section describes the relevant statutory instruments and assesses their implications in relation to the approval process.

4.1 Approval Pathway

The development assessment and approval system in NSW is set out in Parts 4 and 5 of the EP&A Act. Division 4.1 of Part 4 provides for the assessment and determination of State Significant Development (SSD). Pursuant to Section 89C of the EP&A Act, projects are classified as SSD if they are declared to be such by the SRD SEPP. Clause 3 of Schedule 1 of the SRD SEPP identifies development for the purposes of intensive livestock agriculture with a CIV of more than \$30 million as SSD. As a result, pursuant to clause 8(1) of the SRD SEPP and as a result of the development having a CIV of approximately \$60 million, the Project comprises SSD. As outlined in Section 4.5, the development is permissible with consent under the provision of the Narrandera LEP 2013.

The Minister for Planning (or their delegate) determines development applications for SSD under Part 4 of the EP&A Act. The Minister has delegated the consent authority function for SSDs projects to the NSW Planning Assessment Commission (PAC) and to senior staff of the DP&E.

4.2 Commonwealth Legislation

4.2.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth Department of the Environment (DoE), and provides a legal framework to protect and manage nationally important flora, fauna, ecological communities and heritage places defined as matters of National Environmental Significance. An action that “has, will have or is likely to have a significant impact on a matter of National Environmental Significance” may not be undertaken without prior approval of the Commonwealth Minister, as provided under Part 9 of the EPBC Act.

A Protected Matters Search was performed on the DoE website as part of the Biodiversity Assessment Report (SLR, 2015b) to ascertain if any matters of national environmental significance protected by the EPBC Act had been identified as occurring in, or relating to, the proposed development site. A summary of the findings of this database search is presented below.

World Heritage Properties

The site is not a World Heritage Property and there are no World Heritage Properties listed within the search area.

National Heritage

The site is not a National Heritage Place and there are no National Heritage Places listed within the search area.

Wetlands of International Significance (RAMSAR Wetlands)

There are no RAMSAR wetlands protected by international treaty (RAMSAR Convention) within the proposed development site or surrounding search area. The search results nominated 4 RAMSAR wetlands protected by international treaty (RAMSAR Convention) which are located downstream of the development site. These wetlands are:

- Banrock Station Wetland Complex;
- Coorong and Lakes Alexandrina and Albert;
- NSW Central Murray State Forests; and
- Riverland.

All of these wetlands are located large distances away from the development site, and therefore will not be impacted by the Project. Three of these wetlands, namely Banrock Station Wetland Complex, Coorong and Lakes Alexandrina and Albert, and Riverland, are all located in South Australia at distances of greater than 500 kilometres from the development site, and as such the Project will not have any impact on these wetlands. The NSW Central Murray State Forests wetlands are the closest to the development site; however are still over 150 kilometres away and therefore will not be impacted upon by the Project.

Commonwealth Marine Areas

Not applicable. The development site is significantly removed from any Commonwealth marine areas.

Great Barrier Reef Marine Park

Not applicable. The development site is significantly removed from the Great Barrier Reef Marine Park.

Threatened Ecological Communities and Threatened Species

The Protected Matters Search identified the following:

- Four threatened ecological communities
- 13 threatened species

Significant disturbance of the natural environment within the development site has occurred as a result of historic clearing and long-term agricultural production, as is clearly evident in the aerial photo in **Figure 1.2**. The modified nature of the vegetation, particularly cropped and mostly treeless paddocks, significantly limits the value of the area as habitat for native fauna.

As described in **Section 6.7**, of the 13 threatened species identified in the Protected Matters Search, one, the Superb Parrot, was recorded in the development site. Individuals were recorded within woodland habitats in the central parts of the site and it is possible that this species utilises the site as part of its wide ranging foraging activities.

With regard to the EPBC Act listed species that are not listed on the TSC Act, SEARs or Credit Calculator, such as the Koala, Malleefowl and Australian Bittern – habitat for these species is not present in the development site. Similarly, there are no watercourses available on the development site for threatened fish species, namely the Silver Perch, Murray Cod and Macquarie Perch.

Taking into consideration all stages and components of the Project, and all related activities and infrastructure, there is the potential for impacts, including indirect impacts, on matters of national environmental significance, being mainly loss of a small area of degraded habitat for mobile threatened fauna species. However, it is highly unlikely that any of such species will be adversely impacted by the Project.

Nationally Listed Migratory Species

The Protected Matters Search identified eight migratory species. However, as discussed in **Section 6.7**, none of which are likely to inhabit the development site. The proposed disturbance footprint (see **Figure 1.3**) is highly modified and disturbed, and the proposal is highly unlikely to substantially modify, destroy or isolate an area of important habitat, result in an invasive species that is harmful to the migratory species becoming established in the area, or seriously disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.

All Nuclear Actions

No type of nuclear activity is proposed.

In conclusion, the Project is not anticipated to have a significant impact upon any matters of national environmental significance and referral to the DoE is not considered necessary.

4.3 NSW State Legislation

4.3.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the principal piece of legislation overseeing the assessment and determination of development proposals in NSW. It aims to encourage the proper management, development and conservation of resources, the protection of the environment and ecologically sustainable development (ESD).

As stated above in **Section 1.7**, the Project is classified as state significant development and accordingly, approval is sought under Division 4.1 of Part 4 of the EP&A Act.

4.3.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) establishes the State's environmental regulatory framework and includes licensing requirements for certain activities. As a result of having the capacity to accommodate more than 250,000 birds at any time, the Project is a scheduled activity under Clause 22 of Schedule 1 of the POEO Act, and will be required to operate under an EPL administered by the EPA under Section 43(b) of the POEO Act.

4.3.3 Roads Act 1993

The objective of the *Roads Act 1993* includes, but is not limited to, regulating the carrying out of various activities in public roads.

The proposed development site will be accessed via the Sturt Highway, which is a State Highway (HW14) under the control of the RMS. As outlined in **Section 3.7.3** and shown on **Figure 1.2**, the development will require a new intersection to be constructed, as well as an easement along the eastern boundaries of Lot 39 DP 750876, Lot 15 DP 750898 and Lot 12 DP 750898 to allow access to the development site, which will be through Lot 42 DP 750898.

RoadNet (2015) has determined that a basic right turn treatment (BAR) and basic left turn treatment (BAL) is required at the access point with the Sturt Highway. While RoadNet (2015) advises that the reserve of the Sturt Highway at the proposed access point is sufficiently wide and level for the access requirements to be constructed with minimal road works, it will require approval from RMS under Section 138 of the *Roads Act 1993*. By operation of Clause 89K of the EP&A Act, consent under Section 138 of the *Roads Act 1993* cannot be refused if it is necessary for carrying out an approved SSD proposal, and must be granted substantially consistent with the SSD consent.

4.3.4 Water Management Act 2000

The WM Act is intended to ensure that water resources are conserved and properly managed for sustainable use benefitting both present and future generations. As described in **Section 3.8.3**, the water needs of the Project will be met via new groundwater bores to be constructed within the development site. A water access licence will therefore be required under the WM Act. ProTen will transfer the water access licence from an existing bore located on Lot 52 DP 750906, (approval number 40CA403632 issued under the WM Act for the Lower Murrumbidgee Deep Groundwater Source) to the new bores to be constructed on Lot 41 DP 750898 (Bore 1) and Lot 44 DP 750898 (Bore 2).

By the operation of Section 89J of the EP&A Act, the Project will not require water use approvals under Section 89 of the WM Act, water management approvals under Section 90 or a controlled activity approval under Section 91.

4.3.5 Crown Lands Act 1989

As described in **Section 2.3**, various sections of discrete Crown road exist within or adjacent to the development site. The location of one of the PPU's is across a portion of Crown road, and the site access road will also cross a Crown road. ProTen will therefore apply to close and purchase the portions of Crown road within the development site, as well as the portion of Crown road along the development site boundary over which the site access road will cross. Pending Project Approval, should the closure and purchase of the relevant Crown roads not be complete when construction is ready to commence, ProTen will apply for a licence to use Crown Land in the interim period under the provisions of the *Crown Lands Act 1989*.

4.3.6 National Parks and Wildlife Act 1974

The NPW Act contains provisions for the protection and management of national parks, historic sites, nature reserves and Aboriginal heritage. As described in **Section 6.8**, three Aboriginal heritage sites were found within the development site during the field survey conducted for the Project. These sites are outside of the disturbance footprint of the Project and therefore will not be impacted upon in any way as a result of the Project. Further, by operation of Section 89J of the EP&A Act, the Project does not require any additional approvals under the NPW Act.

4.3.7 Threatened Species Conservation Act 1995

The TSC Act provides protection for threatened plants and animals native to NSW (excluding fish and marine vegetation) and integrates the conservation of threatened species into development control processes under the EP&A Act. The potential for impacts on flora and fauna as a result of the Project are considered in **Section 6.7**. The Project Site is highly modified and disturbed; the majority having been cleared for many decades.

4.4 State Environmental Planning Policies

State Environmental Planning Policies (SEPPs) are legal Environmental Planning Instruments (EPIs) prepared by the Minister to address issues significant to the State and people of NSW.

The following sub-sections outline the SEPPs identified as relevant considerations for the Project. It is noted that the SEPP No. 3 – Intensive Agriculture is not a relevant consideration for this proposal given it relates specifically to cattle feedlots and piggeries only.

4.4.1 SEPP (State and Regional Development) 2011

The *SRD SEPP* came into effect upon the repeal of Part 3A of the EP&A Act. It identifies development to which the state significant development and approval processes under Part 4 of the EP&A Act apply.

Schedule 1 of the SEPP identifies development for the purpose of intensive livestock agriculture that has a CIV of more than \$30 million as State Significant Development. Given that the CIV of the Project is approximately \$60 million, it is classified as State Significant Development.

4.4.2 SEPP (Infrastructure) 2007

SEPP (Infrastructure) 2007 provides a consistent planning regime for infrastructure and the provision of services across NSW. The SEPP aims to facilitate the effective delivery of infrastructure across the State by improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and providing greater flexibility in the location of infrastructure and service facilities.

Clause 104 of the SEPP specifies that development applications for new premises of relevant size or capacity must be referred to the RMS for comment and must take into consideration the accessibility of the site and any potential safety, congestion or parking implications. The Project, which is defined as 'intensive livestock agriculture', does not appear to match any of the traffic-generating development categories listed in Schedule 3 of the SEPP.

Notwithstanding, the development application will be referred to the RMS under the requirements of the *Roads Act 1993* in relation to the new vehicular access to be constructed from the Sturt Highway. Information regarding the traffic and transport issues associated with the Project is therefore contained within this EIS to enable meaningful consideration of the Project by both the consent authority and the RMS, including as may be required under the SEPP (Infrastructure) 2007.

4.4.3 SEPP No. 55 – Remediation of Land

SEPP No. 55 – Remediation of Land provides state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed.

A detailed testing and examination of soil samples from the development site has not been undertaken as it is held that the circumstances of this matter do not require such. The risk of discovering significant land contamination within the site is considered to be minimal given the following:

- The long-term and existing use of the site and adjoining lands is traditional agricultural production, primarily comprising cropping with some livestock grazing;
- There are no identified previous or existing land use activities that may have caused or attributed to significant soil contamination; and
- There are no known areas within the site where toxic wastes, poisons or the like have been dumped or buried to cause or attribute to soil contamination.

Considering the historical use of the land and the fact that the majority of the development site will continue to be used for agricultural production purposes, with the majority of the commercial activity associated with the proposal being confined to the relatively small PPU sites, the land is considered suitable for the proposed poultry development.

On this basis, land contamination is unlikely to be an issue within the proposed development site and further investigation under SEPP No. 55 is not warranted.

4.4.4 SEPP No. 33 – Hazardous and Offensive Development

SEPP No 33 - Hazardous and Offensive Development links the permissibility of an industrial development proposal to its safety and environmental performance. Certain activities may involve handling, storing or processing a range of materials which, in the absence of locational, technical or operational controls, may create an off-site risk or offence to people, property or the environment. Such activities would be defined as 'potentially hazardous industry' or 'potentially offensive industry'. SEPP No. 33 is an enabling instrument (that is, it allows for the development of industry), while ensuring that the merits of proposals are properly assessed in relation to off-site risk and offence before being determined.

Clause 12 of SEPP 33 states that a person who proposes to make a development application to carry out development for the purposes of a potentially hazardous industry must prepare a preliminary hazard analysis in accordance with the current circulars or guidelines published by the DP&E and submit the analysis with the development application.

In accordance with the SEARs and SEPP 33, a preliminary risk screening of the Project was undertaken by SLR, finding that the Project is considered potentially hazardous due to the amount of LPG to be stored on site. A Preliminary Hazard Analysis (PHA) was therefore prepared for the Project (SLR, 2015c). The PHA found that the operation of the Project meets the criteria laid down in *HIPAP 4 Risk Criteria for Land Use Safety Planning*, and would not cause any risk, significant or minor, to the community.

The PHA is discussed further in **Section 6.9**, with the full report attached in **Appendix J**.

4.5 Local Environment Plan

Local Environmental Plans (LEPs) are legal EPIs that guide planning decisions for local government areas. They allow Council's to supervise the ways in which land is used through zoning and development consents.

The development site is zoned RU1 Primary Production under the provisions of the Narrandera LEP. The objectives of this zone include:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

Intensive livestock agriculture is permissible, with development consent, within the RU1 Primary Production zone. The proposed poultry development is therefore permissible, with development consent, under the provisions of the LEP.

As described in **Section 3.4.1**, an element of the Project involves the construction of farm managers' accommodation within the development site to house farm staff. Clause 4.2C of the Narrandera LEP contains development standards relating to the erection of dwelling houses in the RU1 Primary Production zone, one of which (clause 3a) states that development consent must not be granted for the erection of a dwelling house on land unless the land is a lot that is at least the minimum lot size shown on the Lot Size Map in relation to that land. This minimum lot size is 400 hectares, which is greater than the individual lot sizes within the development site on which the farm managers' accommodation are proposed to be constructed.

However, in the context of the proposed development, clause 4.2C of the Narrandera LEP is not a relevant consideration in determining the development application pursuant to section 79C(1) of the EP&A Act, due to the following points:

- the objective of the development standard in clause 4.2C of the Narrandera LEP is to minimise unplanned rural residential development on land in the RU1 Primary Production Zone;
- the proposed development is not for rural residential development, it is for an Intensive Livestock Agriculture Project. While one element of the proposed development comprises the construction of farm managers' accommodation, this accommodation is ancillary and incidental to the Project and is not a type of 'rural residential development' which is intended to be regulated by clause 4.2C of the Narrandera LEP; and
- in light of the above, it is not relevant to consider the application of the development standard to an isolated and incidental component of the Project.

4.6 Development Control Plan

Development Control Plans (DCPs) differ from EPIs in that they are never more than factors to be considered. DCPs are not legally binding even though they might spell out planning policy and development standards in quite specific terms.

The Narrandera Development Control Plan 2012 was made under section 74(C)(1) of the EP&A Act and applies to all land within the Narrandera LGA. However Clause 11 of the SRD SEPP states that DCPs do not apply to SSD Projects. Clause 7 of the SRD SEPP also states that in the event of an inconsistency between the SRD SEPP and another environmental planning instrument, the SRD SEPP prevails to the extent of the inconsistency.

Therefore the Narrandera Development Control Plan 2012 is not applicable to the Project.

Section 5

Issue Identification and Consultation



5 ISSUE IDENTIFICATION AND CONSULTATION

5.1 Identification of Issues

The key issues associated with the Euroley Poultry Production Complex warranting detailed investigation and reporting were identified through:

- The environmental context of the development site and surrounding locality (see **Sections 2 and 6**);
- The legislative framework applicable to the development (see **Section 4**);
- A broad brush pre-project environmental risk assessment (see **Section 5.2**);
- Consultation undertaken with various local and State government agencies, including the SEARs (SSD 14_6882) issued by the DP&E (see **Section 5.3**); and
- Specialist studies completed as part of the preparation of the EIS (see **Section 6**).
- Numerous guideline documents and policies were also consulted, including the following:
 - *NSW Department of Primary Industries (2012) Best Practice Guidelines for Meat Chicken Production in NSW – Manual 1 and Manual 2* (NSW Department of Primary Industries, 2012);
 - *Preparing a Development Application for Intensive Agriculture in NSW* (NSW Department of Planning and NSW Department of Primary Industries 2006); and
 - *EIS Guideline – Poultry Farms* (Department of Urban Affairs and Planning 1996).

5.2 Pre-Project Risk Assessment

A pre-project broad brush risk assessment was conducted by SLR and ProTen personnel in order to:

- Identify those issues relating to the Project that represent the greatest risk to the local environment and surrounding populace; and
- Assist in setting (and justifying) priorities for the level of assessment required to address each identified risk in the EIS.

A qualitative risk assessment methodology, which was developed in accordance with the requirements of the *Australian Standard AS/NZS 31000:2009 – Risk Management – Principles and Guidelines*, was utilised to provide a consistent and reliable approach. Where the individual risks were considered unacceptable, or where a knowledge gap was identified, specialist studies were commissioned and additional mitigation measures and/or management responses were nominated.

The Risk Register is contained within **Appendix D**, and was prepared to document the findings and outcomes of the risk assessment. The various issues considered, in no particular order, were:

- Project Planning and Consultation
- Land Use Conflict
- Air Quality
- Noise
- Traffic and Transport
- Lighting
- Flora and Fauna
- Water Resources
- Heritage
- Visual Amenity
- Greenhouse Gas
- Site Services

- Waste Management
- Chemicals
- Poultry Disease
- Pest Populations
- Cumulative Impacts
- Socio-Economic

The risk assessment did not identify any high risk issues (Level IV or V). This can primarily be attributed to the location of the development site, including distance from urban areas, low density of surrounding residential dwellings, the nature of the existing environment, and the best management practices and mitigation measures to be employed by ProTen. There were however three medium risks (Level III) identified associated with odour emissions, traffic generation and site servicing.

Section 6 contains a comprehensive and focussed assessment of the issues identified by the risk assessment to a level of detail commensurate with the risk ranking and significance of each issue. The majority of the issues have been investigated and reported on by SLR, with specialist consultants engaged to assess air quality, noise and traffic issues, as noted above. As outlined in **Section 3.8**, arrangements for the servicing of the development in terms of electricity, gas and water are underway and ProTen has commenced extensive consultation with the relevant stakeholders in this regard.

5.3 Consultation

Consultation was undertaken throughout preparation of this EIS with various local and State government agencies and additional stakeholders. **Table 5.1** provides a summary of the consultation, including the purpose and key outcomes of the consultation.

ProTen will continue to consult with the relevant government agencies, as necessary, during the evaluation of the development application to discuss any issues and address additional information requirements. ProTen will also undertake consultation, as required, with the relevant government agencies during the development commissioning and operation phases.

Table 5.1 Stakeholder Consultation

Stakeholder		Mode of Engagement	Date	Purpose of Consultation/Outcomes
Local Government	Narrandera Shire Council (NCS)	Phone call	11 Feb 2015	ProTen briefed Council on the Project.
		Email	25 Feb 2015	ProTen provided Council with a plan detailing the proposed development layout. Extensive consultation was conducted with Narrandera Shire Council during the preparation of a development application and accompanying EIS for a proposed poultry production complex at an alternative site to the current development site (refer Section 8.2). A similar poultry complex was proposed at a property 5 km east of the development site. The EIS was prepared and exhibited, however ProTen did not proceed with the application due to reasons outlined in Section 8.2 , instead selecting the current development site as a preferred location for the proposed poultry production complex. An understanding of Council's requirements and expectations with regards to the poultry development was gained throughout the preparation of the EIS for the previous development application. Key issues raised during this process were in relation to potential impacts of flooding, groundwater related impacts and the process proposed to dispose of birds in the event of a mass mortality on site. These aspects of the development are discussed in detail in this EIS in Sections 6.5, 6.6 and 6.12.2 respectively. ProTen has continued to liaise with Council to inform them of the current proposed development.
	Murrumbidgee Shire Council	Phone calls	Feb 2015	The development site is approximately 2 kilometres from the boundary of the Narrandera/ Murrumbidgee LGAs. The proposed powerline from Coleambally substation will travel through the Murrumbidgee LGA, and hence ProTen have contacted Council to inform them of the proposed development.
State Government	DP&E	Submission of Briefing Paper	19 Dec 2014	Submission of Project Briefing Paper and request for SEARs.
		Meeting	20 Jan 2015	SLR and ProTen met with the DP&E to brief the Department on the development.
	EPA	Phone call	31 Jul 2014	Numerous discussions were held with the EPA during the preparation of a development application and accompanying EIS for the above-mentioned proposed poultry production complex at an alternative site to the current development site (5 km to the east). Discussions included the likely odour criteria to be applied to the development. EPA indicated 7 odour units was the likely criterion.
	RMS	Site inspection Emails	Jan 2015 13 Feb 2015 & 20 Feb 2015	RMS representatives attended a site visit with ProTen to discuss the most appropriate location for the intersection of the proposed access road to the development site with the Sturt Highway. The required intersection treatment was also discussed during this site inspection, with RMS noting in subsequent email communication that the intersection treatment will depend on the

Stakeholder		Mode of Engagement	Date	Purpose of Consultation/Outcomes
				characteristics of the traffic generation as a result of the development and existing highway traffic volumes. Any treatment should also accommodate at least 10 years traffic growth. The traffic impact assessment of the Project conducted by RoadNet (2015) considered all of these points raised by RMS, as discussed in detail in Section 6.4 .
	NSW T & I - Crown Lands	Phone call and emails	11 Feb 2015 26 Feb 2015	As discussed in Section 2.3 a number of Crown roads exist within the development site. Crown Lands were consulted during preparation of the EIS to discuss the possible impact of the development on these Crown roads, and the potential requirement for ProTen to apply to close and purchase the roads.
	OEH	Phone call	11 Feb 2015	Seeking clarification of OEH's requirements following receipt of the SEARs.
		Email	13 Feb 2015	Clarification of OEH's requirements with respect to flooding.
		Phone call/email	24 Feb 2015	Clarification of OEH's requirements with regards to surface water and stormwater management.
	Department of Primary Industries (DPI)	Phone calls and emails	December 2014	Discussions with the Dairy and Intensive Livestock Industries Unit, specifically relating to biosecurity and the DPI's preferred options for mass disposal strategies for poultry developments. The DPI provided reference material to assist in the development of the disposal strategy, including the paper ' <i>The Biosecurity of Mass Poultry Mortality Composting</i> ' (RIRDC, 2014) as referenced in Section 6.12.2 , as well as the AUSVETPLAN for disposal procedures.
	DPI - NOW	Phone call	12 Feb 2015	Seeking clarification from NOW on environmental assessment requirements relating to water resources.
Neighbours	Belvedere - Select Harvest (R1, R2, R3, R4, R5)	Meetings	Dec 2014 Jan/Feb 2015	The Belvedere property is an almond farm owned by Select Harvest, and encompasses receptors R1, R2, R3, R4 and R5 on Figure 1.2 . Several meetings have been held between ProTen and Belvedere to inform them of the Project.
	Heath and Mahy properties (R9, R10 and R12)	Meetings/phone calls	Dec 2014/Jan 2015	ProTen have entered into a conditional contract to purchase the development site from the current landowners, whom also own R9, R10 (Heath) and R12 (Mahy).
	Properties through which powerline will be constructed.	Meetings	Dec 2014/Jan 2015	Discussion of possible HV power route across nearby properties, as follows: Tubbo Station, Sustainable Farming, and Coleambally Irrigation.
Aboriginal Community	Leeton and District Local Aboriginal Land Council (L&DLALC)	Letters, phone calls, emails, and fieldwork.	Stage 1 began on 6 January 2015. Fieldwork conducted on	Consultation with the Aboriginal community was undertaken in accordance with the <i>Aboriginal Cultural Heritage Consultation Requirements for Proponents</i> (ACHCRs) (DECCW, 2010). Stage 1 advertising for expressions of interest in the Project began on 06 January 2015. The following organisations were contacted in order to identify Registered Aboriginal Parties (RAPs):

Stakeholder		Mode of Engagement	Date	Purpose of Consultation/Outcomes
			10 and 11 February 2015 with the L&DLALC	<ul style="list-style-type: none"> Office of the Registrar (ALRA); Native Title Services Corporation (NTSCORP); OEH, Southwest Region; National Native Title Tribunal (NNTT); Local Lands Services; Narrandera Shire Council; Narrandera Local Aboriginal Land Council (NLALC); and Leeton & District Local Aboriginal Land Council (L&DLALC) <p>Only one expression of interest was received for the Project, which was from the L&DLALC. An information package and details of fieldwork were sent to L&DLALC on 5 and 6 February 2015. L&DLALC confirmed that they would send a representative for the scheduled fieldwork on 10 and 11 February 2015. OzArk sent L&DLALC a draft version of the report on 24 February 2015 with a request for feedback. In reply, L&DLALC requested that they be contacted in the event that any unexpected finds of Aboriginal heritage. This request is included in the management recommendations, as documented in Section 6.8.4, and in Appendix J (OzArk, 2015).</p> <p>Following completion of the fieldwork and the review of the Aboriginal Archaeological Assessment Report (OzArk, 2015) by the L&DLALC, the location of the southern-most PPU (PPU 5) was altered to avoid clearing within an area of mapped vegetation, as discussed in Section 8.2.3. Given this small amendment, the revised report was re-sent to the L&DLALC for review.</p>
Other Stakeholders	Energy Serve	Phone calls and meetings	Jan/Feb 2015	Energy Serve engaged to look into routes, design and costs for new High Voltage (HV) line to development from the substation at Coleambally
	Essential Energy	Phone calls and meeting	Jan/Feb 2015	Power requirements for the new development discussed with Essential Energy, including options to get power into the area.
	Baiada	Phone calls and meetings	Dec 2014	Discussions between ProTen and Baiada regarding contingency plans for when the Hanwood facility cannot take birds for processing in the event of an emergency situation such as flooding. Baiada confirmed that they have contingency plans in place in the event that the Hanwood plant is unavailable or inaccessible, which consider alternative transport routes between farms and the Hanwood plant, as well as the capacity and agreements with alternate processing facilities in both NSW and interstate. These discussions assisted in the development of the flood management plan, including alternative transport options, as detailed in Section 6.5 .

Section 6

Impacts, Mitigation and Management



6 IMPACTS, MITIGATION AND MANAGEMENT

This chapter contains a description of the existing environment, an assessment of the potential environmental issues/impacts relevant to the Project, and a description of the mitigation measures committed to by ProTen so as to ensure the potential for impacts to occur is avoided or minimised.

6.1 Land Use Conflict

6.1.1 Surrounding Agricultural Land

As described above in **Section 2.4**, the primary surrounding land use is agricultural, consistent with the dominant land use across the region. The potential for conflict between the development and the existing surrounding agricultural production activities is therefore considered low. The footprint of the five proposed PPU sites will be relatively small at 90 hectares and the commercial activity associated with the development will be largely confined to this area. ProTen intend to continue using the land outside of the disturbance footprint for continued agricultural production purposes (crop cultivation and/or livestock grazing) under some form of lease or share farming arrangement. On this basis, the proposal will not deny access to large areas of viable agricultural lands nor significantly reduce the land area available for agricultural production.

6.1.2 Murrumbidgee Valley National Park

One exception to the surrounding agricultural land use is the nearby South West Woodland Nature Reserve and Murrumbidgee Valley National Park. The north-west corner of the development site abuts the 'Banandra' portions of the South West Woodland Nature Reserve and Murrumbidgee Valley National Park as shown on **Figure 1.2**. The nearest PPU will be located 100 metres from the development site boundary that abuts the National Park. All other project related development will be considerably further away from the site boundary, with the next nearest PPUs being 1.3 km and 1.4 km to the south and south-east respectively.

In assessing potential impacts of the Project the document *Guidelines for developments adjoining land and water managed by the Department of Environment Climate Change and Water (DECC (now OEH) 2010)* has been considered.

These guidelines list a number of matters to be considered when assessing proposals adjoining land managed by the National Parks and Wildlife Service, which include erosion and sediment control, stormwater runoff, wastewater, pests, weeds and edge effects, fire, access through DECCW land, visual, noise, odour and air quality impacts, threats to ecological connectivity and groundwater dependant ecosystems, and cultural heritage. Each of these aspects in relation to the proposed development has been considered with the outcomes presented in **Table 5.1**

Table 6.1 Matters to be considered with respect to the adjoining National Park

Aspect	Impacts and management
Erosion and sediment control	<p>The risk of erosion and subsequent sedimentation of downstream areas will be an important consideration during construction of the Project. Erosion and sediment control measures will be implemented during construction in accordance with the publication <i>Managing urban stormwater: soils and construction, Volume 1(Landcom 2004)</i> (the 'Blue Book'). This will include the use of temporary erosion and sediment control structures, such as hay bales and silt fencing, to prevent soil loss and sediment-laden runoff throughout the duration of construction activities.</p> <p>It is important to note however that the area of National Park adjacent to the development site is at a higher elevation than the development site. The closest PPU will be constructed in area which is at an elevation of 133-134 metres AHD, whilst the National Park is slightly higher, ranging from 135 to 141 metres AHD</p>

Aspect	Impacts and management
	<p>within the adjacent Lot (Lot 48 DP 750898). Notwithstanding, particular focus will be placed on the erosion and sediment controls around the north-western PPU (PPU1). Disturbed areas will be promptly rehabilitated and revegetated to a stable landform, as described in Section 3.12. A regular maintenance program will be implemented during the construction period to ensure the continued integrity of the temporary erosion and sediment control structures.</p> <p>All unsealed access tracks will be constructed in accordance with the publication <i>Managing urban stormwater: soils and construction, Volume 2C Unsealed Roads</i>.</p> <p>It is also noted that the vast majority of the development site is already cleared, with the site having undergone extensive agricultural related activities for many years. The Project therefore does not present an increased risk of erosion and sedimentation compared to the current landuse of the site.</p> <p>Given the above, the risk of offsite impacts on the National Park as a result of erosion and sedimentation is therefore considered negligible.</p>
Stormwater runoff	<p>Stormwater runoff to be managed within the poultry production complex will be as a result of rainfall runoff from the shed roofs and rainfall runoff from the ground surfaces surrounding the poultry sheds and additional improvements. This runoff will be managed by an engineered surface water drainage system to ensure no offsite impacts occur.</p> <p>Rainfall runoff will be directed into grassed swales around the sheds, which will be designed to allow infiltration of the water into the topsoil for nutrient uptake by the grass, which will be regularly slashed. During heavy rainfall events, excess water will be directed to four small storage dams, one constructed at each corner of each PPU, via catch drains. This water will then be allowed to evaporate, or will be used to irrigate landscape plantings around the sheds.</p> <p>The runoff to be captured in the stormwater dams will predominantly be clean runoff. The washdown water that will enter this system may have some level of nutrients, however levels are predicted to be very low as per ProTen's other farms, given that the floors in the sheds are regularly cleaned. The vegetated swale drains around the sheds will provide a very effective means of nutrient removal, as discussed further in Section 6.5.2.</p> <p>Therefore, when already starting with a very low nutrient level, and with vegetated swales providing an effective take up of nutrients, there is negligible risk of nutrient high runoff flowing offsite. In addition, as mentioned above the adjacent National Park is at a slightly higher elevation than the development site, meaning that the risk of offsite runoff into the National Park is negligible.</p> <p>The engineered drainage system to be implemented is described further in Section 3.11.</p>
Wastewater	<p>The proposed poultry development will be a largely dry operation, with no effluent generated as a result of the poultry-rearing itself. There will therefore be no effluent from the poultry operation to dispose of.</p> <p>Each poultry shed will be fully enclosed and have concrete flooring. Each shed will also be surrounded by a dwarf concrete bund wall to prevent rainwater and runoff entering the sheds thereby minimising the wastewater to be managed by the farm.</p> <p>Sewage generated by the on-site staff amenities and residences will be appropriately treated and disposed of via on-site wastewater management systems installed and operated in accordance with the requirements of Council and the relevant standards/guidelines.</p> <p>The only other wastewater generated by the poultry operation will be the wash down water from within the sheds at the end of each nine week production cycle. This water will be managed within the engineered drainage management system, as described above.</p> <p>No offsite impacts on the National Park relating to wastewater are therefore anticipated as a result of the Project.</p>
Pests, weeds and edge effects	<p>The development site will be managed in strict compliance with ProTen's standard operating procedures with regards to pest control, which are described in detail in Section 3.16. Weeds will also be controlled across the development site as part of the site maintenance program. A wheel wash will be constructed at the entrance to the PPUs to control pests and weeds both entering and exiting the site, as described in detail in Section 3.18.</p>

Aspect	Impacts and management
Fire and asset protection zones	As described in Section 2.13 , the nearest PPU will be 100 metres from the development site boundary in the vicinity of the National Park. The area within this 100 metre buffer is devoid of trees, having been cleared as part of the current agricultural land use of the development site, as shown on Figure 1.3 . This area therefore provides a buffer between the National Park and the nearest PPU, should fire occur within the National Park, or vice versa.
Access through DECCW land	No access will be gained to the development site from the National Park. The development site will be fenced in accordance with OEH's boundary fencing policies to prevent access from the National Park.
Visual	The proposed PPU sites are relatively small and the commercial activity associated with the development will be largely confined to these sites. The footprint of the Project, including the PPUs, ancillary infrastructure, associated residences and internal access roads will be approximately 90 hectares, comprising just 8 percent of the total development site. A landscaping strategy will be implemented to reduce residual impacts of the proposed development. Visual amenity is addressed in further detail in Section 6.10 .
Noise and vibration	A noise and vibration impact assessment of the Project was conducted by Global Acoustics (2015). The assessment predicts all noise levels associated with the development to be well within the relevant criteria at all nearest residences. Noise and vibration is discussed in further detail in Section 6.3 .
Odour and air quality	An air quality impact assessment of the Project was conducted by Pacific Environment (2015). Figure 6.1 (refer Section 6.2 below) shows that the predicted one second peak to mean odour concentration in the eastern portion of the National Park (Lot 48 DP 750898) closest to the development site, will be around 7 OU, which is equivalent to the odour criterion adopted for the Project. This level occurs across a small portion of the National Park, with levels then reducing across the middle and western section of the park to between 5 OU and 2 OU, well below the adopted odour criterion. Air quality is discussed in further detail in Section 6.2 .
Threats to ecological connectivity and groundwater dependent ecosystems	There will be no change to ecological connectivity as a result of Project. As previously mentioned the existing landuse of the development site is agricultural which has resulted in the majority of the development site being cleared of vegetation for many years. Some isolated trees remain within the site; however these are no significant patches of vegetation, and none providing ecological connectivity with the adjacent National Park. The potential ecological impacts of the Project are discussed in further detail in Section 6.7 . Water for the proposed development will be supplied via new groundwater bores to be constructed within the development site, at a rate of approximately 460 ML per year. The drawdown associated with this groundwater extraction is anticipated to be within the minimal impact considerations of the NSW Aquifer Interference Policy. The potential groundwater related impacts as a result of the Project are addressed in Section 6.5 , with further detail on GDEs provided in Section 6.6 .
Cultural heritage	Impacts on Aboriginal objects in a National Park may result from erosion, sedimentation and stormwater runoff in adjoining developments. As described above in this table, offsite impacts resulting from erosion, sedimentation and stormwater runoff as a result of the development are predicted to be negligible. Further, an Aboriginal Cultural Heritage Assessment of the Project was conducted by OzArk (2015), who concluded that the Project would not impact upon cultural heritage within the bounds of the development site. It follows that there will be no offsite impacts on cultural heritage as a result of the development.

6.1.3 Mitigation Measures

No significant impacts on landuses around the development site are anticipated, as described above in **Section 6.1.1** and **6.1.2**, and summarised in **Table 6.1**. Notwithstanding, a number of measures will be implemented to minimise and manage the potential for land use conflict, as summarised below.

Landscaping Strategy

Landscape plantings (vegetation screens) will be established as described in **Section 3.14** and illustrated on **Figure 3.8**. In addition to screening off the property, the plantings will reduce the magnitude and frequency of any adverse air quality impacts and noise emissions.

Erosion and Sediment Control, and Stormwater Management

An engineered stormwater management system as described in **Section 3.11** will be constructed and appropriately maintained to ensure no offsite impacts related to stormwater runoff occur.

Erosion and sediment control measures will be implemented during construction and operation of the Project in accordance with the Blue Book.

Chemical Use

Staff members will be instructed in the proper use and handling of all chemicals used on-site. If appropriate, this will include completion of training such as SMARTtrain or ChemCert (or similar).

All chemical use will be undertaken in full compliance with the relevant statutory requirements, including the *Pesticides Act 1999*.

Where appropriate, chemicals used will be approved by the Australian Pesticide and Veterinary Medicine Authority as safe and fit for that particular use.

Environmental Complaints and Incidents

The Complaints and Incidents Management Strategy contained within **Appendix C** will be implemented to ensure that all complaints and incidents relating to the poultry operation are promptly and effectively addressed. Appropriate documentation of complaint/incident handling will assist in identifying and implementing measures to negate the possibility of re-occurrence in the future.

6.2 Air Quality

6.2.1 Introduction

Air quality is a sensitive issue associated with intensive poultry developments. Given the nature of such operations it is inevitable that there may be the intermittent release of fugitive odours and particulate matter during the poultry production cycle. However this statement is applicable to many agricultural pursuits. The odour and particulate matter produced in broiler farms, such as that proposed, is generally less than that associated with older poultry and also other intensive livestock operations such as piggeries and cattle feedlots. The poultry industry has come a long way over the past 20 years and operates on the basis of continual environmental improvement driven by environmental legislation and community expectations.

The proposed development site offers several advantages in terms of potential air quality impacts. These include being removed from any urban areas, low density of surrounding residences and significant separation distances.

Pacific Environment was engaged to undertake the appropriate assessment and reporting of air quality issues associated with the Project. The assessment was undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Approved Methods) (DEC 2005) and *Assessment and Management of Odours from Stationary Sources in NSW* (DEC 2006). A copy of Pacific Environment's Air Quality Assessment (2015) is contained within **Appendix E**, with the key findings summarised below.

6.2.2 Existing Environment

The prevailing wind directions around the development site are from the south-west and east, as illustrated on **Figure 2.2** (refer **Section 2.7**). Overall the wind data shows a calm to light winds (up to 3 m/s), occurring 12.5% of the time.

Published information on existing air quality within the locality is limited, with no known monitoring sites in the vicinity. However, as the development site is situated in a rural area with no major sources of air pollution, the local air quality is likely to be good and concentrations of pollutants are unlikely to exceed air quality criteria.

In order to gain an understanding of what current pollutant levels may be within the vicinity of the site, Pacific Environment (2015) looked at PM₁₀ (particulate matter with a diameter of equal to or less than 10 microns, with a micron being one-millionth of a metre) data collected by the EPA at a monitoring station near Albury, which is considered to be representative of the proposed development site. This data shows that the average PM₁₀ concentration for the last six years of monitoring is 16 micrograms per cubic metre (µg/m³), which is well below the EPA annual average assessment criterion of 30 µg/m³. The highest annual average PM₁₀ concentration was 21 µg/m³ recorded in 2007, which is still well below the criterion.

With regards to atmospheric stability, the data show that the combined frequency of E and F stability classes, the most critical for air quality impacts, is 44%. The frequency of neutral conditions is also relatively high, occurring 25% of the time. The data is consistent with the expectations for sites in inland southern regions of Australia.

6.2.3 Assessment Criteria

When assessing any development proposal with potential significant air emissions, it is necessary to compare the potential impacts with relevant air quality criteria. Such criteria are used to assess the potential for ambient air quality to give rise to adverse health or nuisance effects.

Odour

The Approved Methods (DEC 2005) include ground-level concentration (glc) criterion for complex mixtures of odorous air pollutants. They have been refined to take account of population density in the area. **Table 6.2** lists the odour glc criterion to be exceeded not more than one percent of the time, for different population densities.

Table 6.2 Odour Performance Criteria for Odour Assessment

Population of Affected Community	Ground Level Concentration Criterion (OU)
≤2	7
~10	6
~30	5
~125	4
~500	3
Urban (2000) and/or schools and hospitals	2

Based on discussions between Proten and the EPA, Pacific Environment adopted an odour criterion of $C_{99\ 1sec} = 7$ odour units (OU), which is considered appropriate for the development given the surrounding sparsely populated area.

Particulate Matter

In its modelling and assessment guidelines, the EPA specifies air quality assessment criteria relevant for assessing impacts from dust generating activities (NSW EPA, 2005). **Table 6.3** summarises the air quality criteria for dust that are relevant to the Project.

Table 6.3 Adopted Criteria for Particulate Emissions

Pollutant	Standard/Criterion	Averaging Period	Agency
Particulate matter < 10µm (PM ₁₀)	50 µg/m ³	24-hour maximum	NSW EPA
	30 µg/m ³	Annual mean	NSW EPA

6.2.4 Impact Assessment

The air dispersion modelling conducted by Pacific Environment (2015) was based on an advanced modelling system using the models TAPM and CALPUFF. This system substantially overcomes the basic limitations of the steady-state Gaussian plume models such as AUSPLUME, and is described below.

TAPM is a three dimensional meteorological and air pollution model that predicts airflow important to local scale air pollution, such as terrain induced flows, against a background of larger scale meteorology provided by synoptic analyses.

CALPUFF is a multi-layer, multi-species, non-steady state puff dispersion model that can simulate the effects of time and space varying meteorological conditions on pollutant transport, transformation and removal. Emission rates and source details, terrain and surface details, and meteorology are the three major model inputs.

Odour

Odour emission rates were estimated by Pacific Environment (2015) using a modelling approach based on data from a variety of broiler farms in Australia, as well as theoretical considerations. The approach generates hourly varying emission rates from broiler sheds based on the following factors:

- Number of birds, which varies later in the batch as harvesting takes place;
- Stocking density of birds, which is a function of bird numbers, bird age and shed size;
- Ventilation rate, which depends on bird age and ambient temperature; and
- Design and management practices, particularly those aimed at controlling litter moisture.

Data from existing farms were gathered from tunnel-ventilated sheds and chicken batches at approximately five weeks of age or more. Given that maximum emissions occur around 5 weeks and later, these samples represent the maximum odour generating potential.

Figure 6.1 shows a contour plot of the predicted one second peak to mean odour concentrations for site.

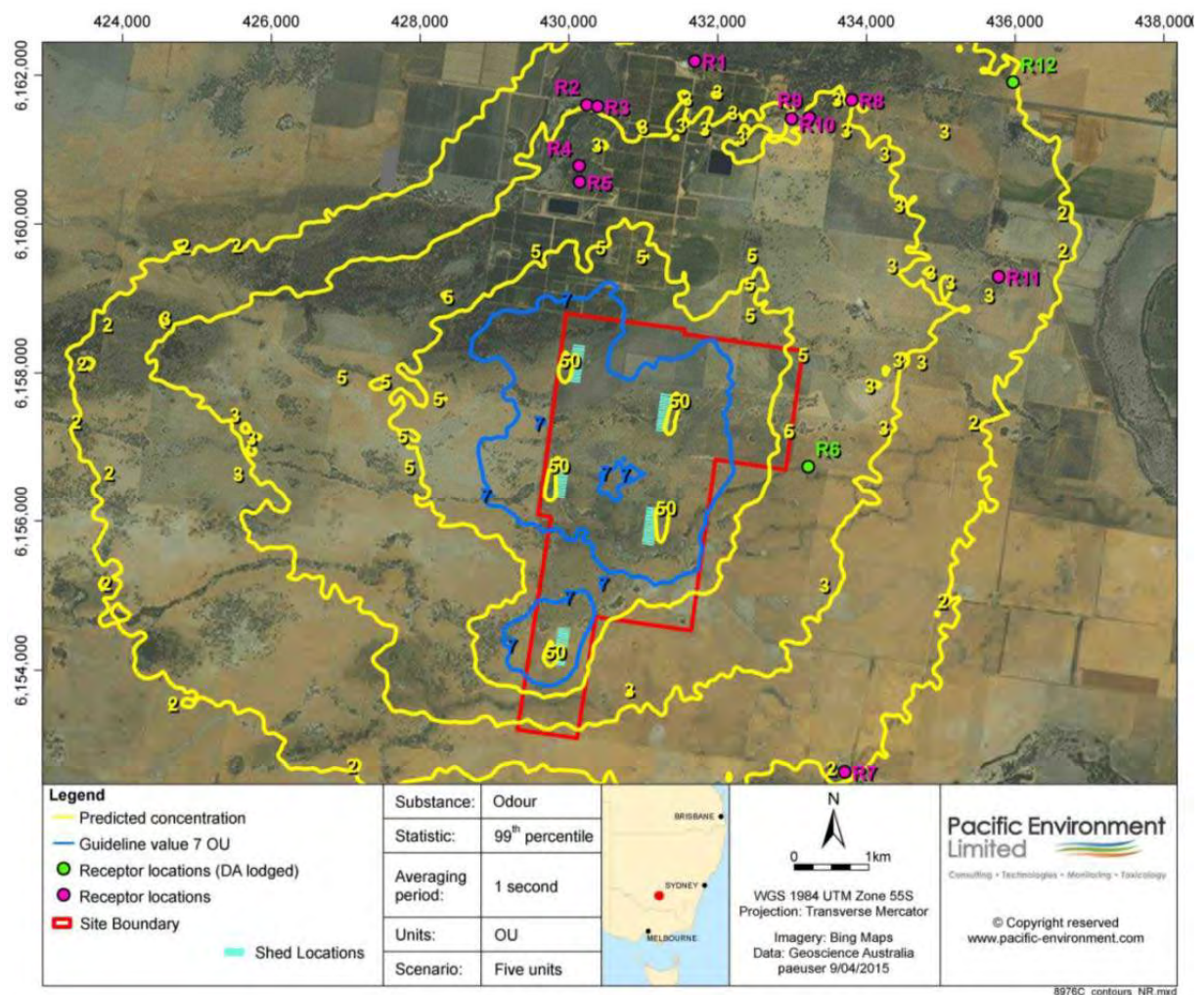


Figure 6.1 Predicted 1-second peak to mean concentration

As evident on **Figure 6.1**, the predicted odour concentration at all of the nearest receptors is predicted to be well below the criterion of 7 OU, with odour concentrations at all receptors being at or below 5 OU.

Particulate Matter

Pacific Environment (2015) estimated particulate emission rates for the proposed poultry production complex based on a modelling approach using data from broiler farms in NSW, as well as theoretical considerations. Data from an existing farm with tunnel-ventilated sheds and cup and nipple drinkers was gathered for chicken batches between one to eight weeks of age (i.e. over a full production cycle). The approach generates hourly varying emission rates from each shed based on the following factors:

- Total weight of all of the birds, which varies later in the batch as harvesting takes place;
- Ventilation rate, which depends on bird age and ambient temperature; and
- Design and management practices.

Figures 6.2 and 6.3 show the predicted 24-hour maximum and annual average PM₁₀ levels respectively at the nearest sensitive receptors due to the operations of the proposed poultry production complex. Modelling results show that maximum 24 hour and annual average PM₁₀ levels as a result of the Project will be below the respective assessment criterion at all of the sensitive receptors.

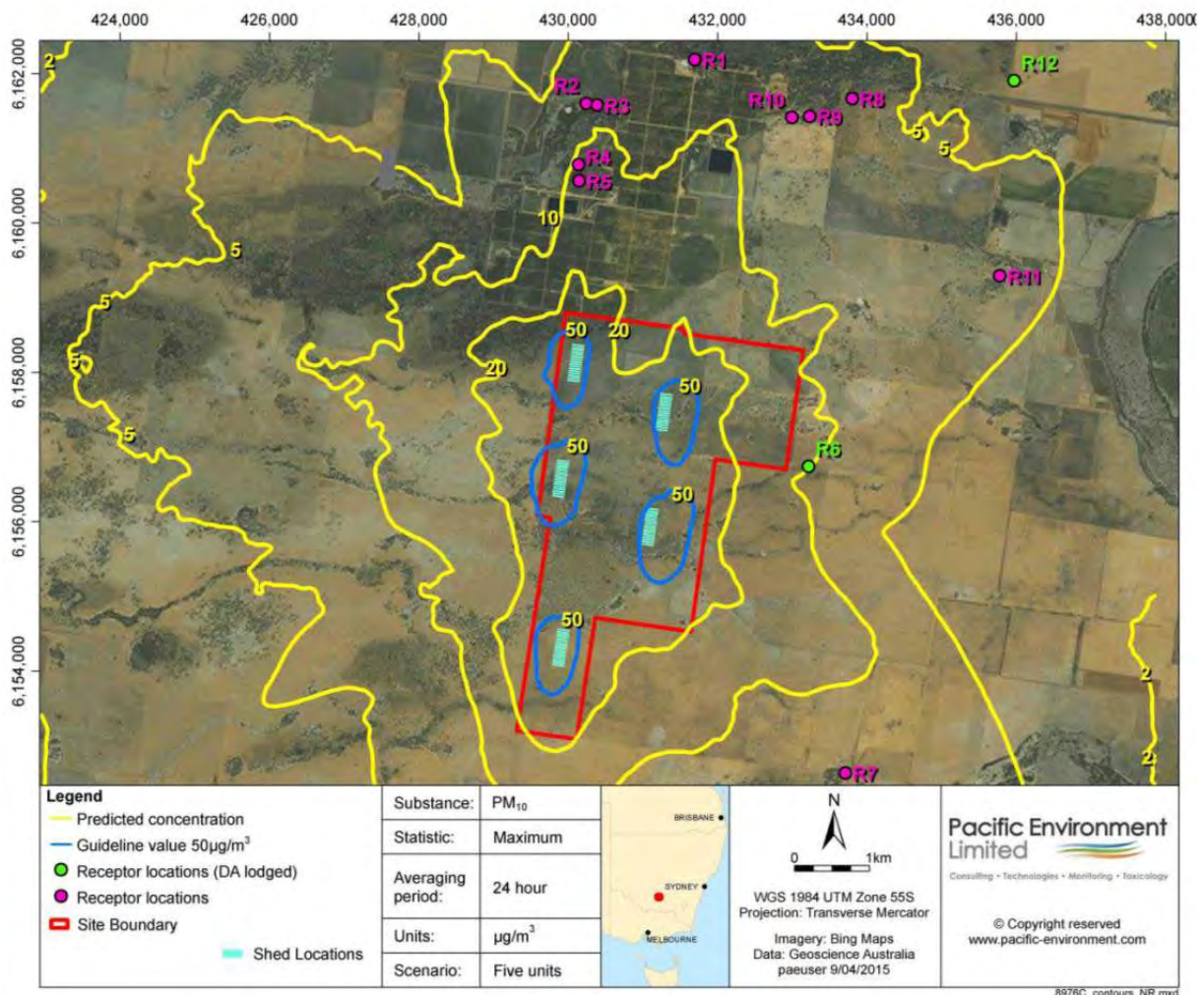


Figure 6.2 Predicted maximum 24-hour PM₁₀ concentration

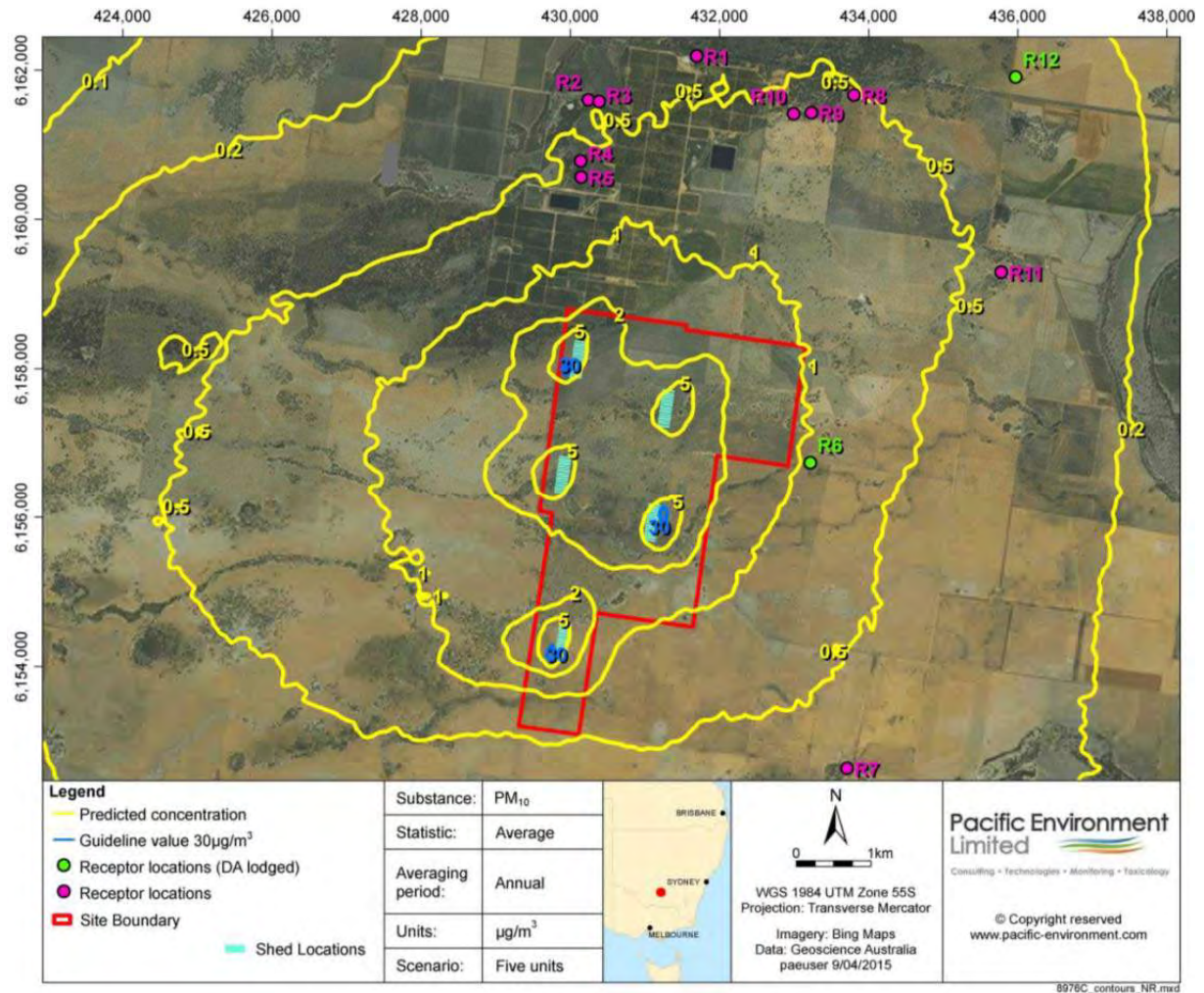


Figure 6.3 Predicted annual average PM₁₀ concentration without background

Wheel generated dust

Given the size of the property and the extent of internal roads, as shown on **Figure 1.3**, the potential for wheel generated dust from these roads was considered in the Air Quality Assessment (Pacific Environment, 2015).

The internal roads will be 7 metres wide and will be constructed as follows:

- Compacted clay base to 98%
- 200mm of road base, as follows:
 - 120mm of 80mm “Jawbone” rock
 - 80mm of 40mm “DGS” gravel on top.

Pacific Environment concluded that given the roads will be constructed rather than consisting of unformed tracks, the emission potential of the roads will not be significant due to a lower silt loading on the constructed road surface. Should dust emissions become an issue, standard control methods could be applied such as limiting the internal speed on the roads.

6.2.5 Mitigation Measures

ProTen understands that air quality issues are directly related to farm operation, with good management practices playing a significant role in reducing the potential for offensive odour and particulate matter emissions. Again, the proposed development site offers several advantages in terms of the potential for air quality impacts, including low density of surrounding residences and significant separation distances.

While the Project is predicted to have negligible impact on local amenity with respect to odour and dust impacts, ProTen will take reasonable and practicable measures to prevent or minimise emissions. As listed below, a range of complementary design features, best management practices and mitigation measures will be applied to minimise and manage potential air quality impacts.

Development Design

- The poultry sheds will be fully enclosed, have adequate roof overhang (wide eaves) and be surrounded by dwarf concrete bund walls to prevent rainwater entering the sheds and to allow for the controlled discharge of wash down water from the sheds. These measures will all reduce the level of moisture within the poultry sheds, which is identified as a significant potential odour source.
- The feed silos will be fully enclosed to both prevent the entry of rainwater, with wet feed also identified as a potential odour source, and minimise emissions of dust/particulate matter when loading and unloading.
- The poultry sheds will be tunnel-ventilated, which will allow control over the moisture levels and promote optimum growing conditions and bird health. The increased airflow and improved feed conversion in tunnel-vented sheds helps to maintain bedding material within the optimal moisture range.
- All sheds will be fitted with nipple drinkers with drip cups, as opposed to traditional cup drinkers, to minimise water spillage and reduce the risk of increased shed moisture.

Operation and Maintenance

- Regular monitoring and maintenance of the tunnel ventilation systems and bird drinkers will be undertaken to avoid spillage, leaks and uneven distribution.
- Stocking densities and bird health within each of the poultry sheds will be regularly checked and, if necessary, appropriate corrective measures will be implemented.
- Daily monitoring and maintenance of the bedding material will occur to identify, remove and replace any caked material beneath drinking lines and/or areas with excessive moisture content.
- Poultry litter (spent bedding material) will be promptly removed from the sheds and transported off-site in covered trucks at the end of each production cycle during the clean-out phase. Wherever possible the handling of the material will be avoided during adverse climatic conditions, such as times of cold air drainage during early morning or towards nights and strong winds. The shed ventilation systems will not be used during the removal of bedding material.
- Dead birds will be collected from the sheds on a daily basis and stored in on-site chillers prior to removal from site.
- The insides of the poultry sheds and the surrounds will be maintained at all times to ensure a clean and sanitary environment.
- During sanitisation, the amount of air released from the sheds while any sanitising scent is present will be minimised and, if possible, a low scent sanitiser will be utilised.
- Internal access roads will be appropriately maintained to minimise dust emissions.

Landscaping Strategy

- Landscape plantings (vegetation screens) will be established in accordance with the Landscaping Strategy described in **Section 3.14**. In addition to screening the PPU's, the plantings will act to effectively slow and filter air movement, which will enhance dust deposition and odour dispersion.

Meteorological Station

- A meteorological station will be installed within the development site to collect on-going and up-to-date weather data. The collected data will assist in responding to any complaints relating to possible odour emissions.

Environmental Complaints and Incidents

- The Complaints and Incidents Management Strategy contained within **Appendix C** will be implemented to ensure that all complaints and incidents relating to the poultry operation are promptly and effectively addressed. Appropriate documentation of complaint/incident handling will assist in identifying and implementing measures to negate the possibility of re-occurrence in the future.

6.2.6 Conclusion

On the basis of dispersion modelling undertaken by Pacific Environment (2015), the poultry production complex will operate within the proposed development site without significant adverse effects on local amenity with respect to odour and air quality.

6.3 Noise and Vibration

6.3.1 Introduction

While noise generated by construction and operational activities has the potential to impact upon surrounding residences, noise has been demonstrated not to be an issue for well-managed poultry broiler production operations.

Again, the proposed development site offers several advantages in terms of potential noise impacts, including being removed from any urban areas, low density of surrounding residences and significant separation distances. Furthermore, the five proposed PPU sites are relatively small and the commercial activity associated with the development will be largely confined to these areas.

Global Acoustics was engaged to undertake a noise impact assessment to determine potential noise impact at the nearest residential receptors to the site. This assessment was undertaken in accordance with the *Interim Construction Noise Guideline* (DECC, 2009), *Industrial Noise Policy* (EPA, 2000) and the *NSW Road Noise Policy* (DECCW, 2011). Acoustic modelling was undertaken using CadnaA, noise prediction software developed by DataKustic.

A copy of Global Acoustics' Noise Impact Assessment (2015) is contained within **Appendix F**, with the key findings summarised in the sub-sections below.

A summary of acoustic terminology used in the assessment is as follows:

- L_A , the A-weighted root mean squared (RMS) noise level at any instant.
- L_{A1} , the noise level which is exceeded for 1% of the time.
- L_{A90} , the level exceeded for 90% of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes.
- L_{Aeq} , the average noise energy during a measurement period.
- dB(A), noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise.

6.3.2 Existing Environment

The development site is in a quiet rural area with road traffic noise as the only significant noise source. Global Acoustics therefore conservatively assumed that background levels may be less than L_{A90} 30 dB during all time periods, which is typical of a rural environment that primarily comprises traditional agricultural activities with some vehicle traffic on the road network. It is reasonable to say that the existing noise levels in the area are directly related to the current land use activities and infrastructure.

6.3.3 Assessment Criteria

Construction Noise

The *Interim Construction Noise Guideline* (DECC, 2009) specifically relates to construction, maintenance and renewal activities. It specifies standard construction hours as:

- Monday to Friday, 7.00 am to 6.00 pm;
- Saturday, 8.00 am to 1.00 pm; and
- No construction work on Sunday and public holidays.

For major construction projects a quantitative assessment is required, with comparison to relevant criteria. The criteria for work undertaken in the standard construction hours are:

- LAeq,15min equal to background plus 10 decibels (dB); or
- LAeq,15min 75 dB.

An LAeq criterion of background plus 5 dB is specified for work outside the standard construction hours.

Given the rural location of the development site, Global Acoustics (2015) has adopted the Industrial Noise Policy's (EPA 2000) default minimum rating background noise level (RBL) of 30 dB for all time periods for the Project, and subsequently a construction noise criterion of $L_{Aeq,15min}$ 40 dB. This is a conservative daytime construction criterion.

Operational Noise

The Industrial Noise Policy (EPA 2000) states that objectives for environmental noise are '*to account for intrusive noise and ... to protect the amenity of particular land uses*'. To achieve this, limits are specified where the 'intrusiveness criterion essentially means that the equivalent continuous (energy-average) noise level of the source should not be more than 5 dB above the measured background level'. Amenity is protected by 'noise criteria specific to land use and associated activities'. Amenity criteria 'relate only to industrial-type noise and do not include road, rail or community noise'.

As advised above, a minimum RBL of 30 dB for all time periods has been adopted by Global Acoustics (2015) for the Project. The development is in a quiet rural area with road traffic noise as the only real noise source. Because of this an L_{A90} of 30 dB has been assumed, which results in an $L_{Aeq,15min}$ intrusiveness criterion of 35 dB.

Table 6.4 summarises the intrusiveness and amenity criteria adopted by Global Acoustics (2015) that apply for day, evening and night periods. The lower of the two (intrusiveness or amenity) apply, where applicable, and is adopted as the Project Specific Noise Level (PSNL).

Table 6.4 Project Specific Operational Noise Level Criteria

Period ¹	Adopted RBL (dB) ²	Intrusiveness Criterion L_{Aeq} (dB)	Acceptable Amenity Criterion L_{Aeq} (dB)	Project-Specific Noise Level L_{Aeq} (dB)
Day	30	35	50	35
Evening	30	35	45	35
Night	30	35	40	35

Notes:

1. Day: 7.00 am to 6.00 pm; Evening: 6.00 pm to 10.00 pm; Night: 10.00 pm to 7.00 am; and
2. An RBL of 30 dB has been assumed for a rural environment.

Sleep Disturbance

The potential for sleep arousal has been assessed using the guidance provided in the INP Application Notes and the *NSW Road Noise Policy* (RNP) (DECCW, 2011). The INP guideline suggests that the $LA1(1minute)$ level of 15 dBA above the RBL is a suitable screening criteria for sleep disturbance for the night-time period. The RNP also provides the following conclusions from research on sleep disturbance:

- Maximum internal noise levels below 50 - 55 dBA are unlikely to awaken people from sleep.

- One or two noise events per night, with maximum internal noise levels of 65 - 70 dBA, are not likely to affect health and wellbeing significantly.

The night period background noise levels around the development site are likely to be less than or equal to L_{A90} 30 dB. Therefore, a sleep disturbance criterion of $L_{A1,1\text{minute}}$ 45 dB (30dB +15dB) has been adopted for the Project.

Traffic Noise

The RNP outlines the traffic noise criteria applicable to the Project. The Policy applies different noise limits dependent upon the road category and type of development/land use. **Table 6.5** contains the criteria considered the most suitable for the Project, which relies on the Sturt Highway for access. Direct access to site will occur via an access road which will be constructed as part of the development, however vehicles travelling on the site access road are assessed as an operational noise impact against a conservative operational criterion. Only potential noise impacts for residents along the Sturt Highway have been assessed by Global Acoustics (2015) against the road traffic noise criteria.

Table 6.5 Project Specific Traffic Noise Criteria

Road Category	Development Type / Land Use	Assessment Criteria	
		Day $L_{Aeq,15hr}$ dB	Night $L_{Aeq,9hr}$ dB
Freeway/arterial/sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	60	55

A secondary objective of the RNP is to protect against excessive decreases in amenity as the result of a project by applying the relative increase criteria. In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person. The relative increase in road traffic noise levels was also considered in the assessment.

6.3.4 Impact Assessment

Nearest Sensitive Receptors

The surrounding residential dwellings are reasonably well removed from the Project, with the closest located approximately 2.1 kilometres from the nearest PPU. As outlined in **Section 2.5**, thirteen nearest sensitive receptors (NSR) have been identified in the local region surrounding the development site (refer **Figure 1.2**).

Of these thirteen receptors, two locations (R12 and R13) were found to have a predicted noise level of <20 dB for all construction and operational conditions assessed. Noise impacts at these two receptor locations are unlikely to be audible to residents and were therefore not considered further. Noise impacts for the remaining 11 NSR were generally greater than 20 dB and have been included. It is important to note however that of these 11 receptors, 10 represent existing residential dwellings. As mentioned in **Section 2.5**, R6 represents a property for which a development application has been lodged with Council, however it is understood that this development application has not been determined and as such a residential dwelling has not been constructed. This location has however been conservatively assessed as a possible receptor.

Construction Noise

A construction noise model was created for the construction of the Project, and noise levels predicted by Global Acoustics using the CONCAWE calculation methodology within the CadnaA software.

The construction period for the Project is expected to take 18 months with all construction activities scheduled to be undertaken during standard daytime construction hours. Construction activities during this time period will include:

- Site Preparation;
- Earthworks;
- Foundation and slab construction;
- Superstructure construction including portal frames, roofing, and cladding;
- Electrical installation and installation of equipment and silos;
- Construction of a new intersection with the Sturt Highway;
- Construction of a new access road from the Sturt Highway to the development site, and one-way circulating ring roads around the perimeter of each PPU (standard rural all-weather property access roads);
- Construction of ten dwellings to house farm managers and farm assistant managers within the development site, as well as an amenities facility encompassing office space, toilets and staff change rooms at each PPU;
- Construction of a workshop and other storage facilities;
- Construction of storm water management systems; and
- Landscaping.

Of these tasks, site preparation/earthworks and road construction are considered to represent the worst case for noise impact. These activities will likely involve the use of the greatest amount of noise generating equipment.

Construction of the Sturt Highway intersection and site access road has been modelled to represent the worst case construction impact for the Project due to the close proximity to some of the NSR (R10). However it is also noted that whilst the intersection construction represents the worst case scenario for construction noise impact, it will not take place for the entire construction period. The construction of the new Sturt Highway intersection is expected to take approximately 2-3 weeks, with the access road taking a further 4 weeks.

Construction model predictions are presented in **Table 6.6** for neutral atmospheric conditions, as construction is to occur in the daytime only, and represent the worst-case impact for the roadworks construction scenario. No exceedance of the construction noise criterion ($L_{Aeq,15min}$ 40 dB) is predicted.

Table 6.6 Calculated LAeq, 15minute Construction Noise Levels (dB)

Receptor ID	Neutral Conditions
R1	27
R2	<20
R3	<20
R4	<20
R5	<20

Receptor ID	Neutral Conditions
R6	<20
R7	<20
R8	28
R9	33
R10	36
R11	<20

Operational Noise

An operational noise model was created for the Project and noise levels predicted by Global Acoustics for three operational scenarios using the CONCAWE calculation methodology within the CadnaA software.

The primary noise sources associated with the operation of a poultry production complex are:

- Continuous operation of ventilation fans;
- Operation of heaters and water pumps;
- The mechanical feed delivery system and feed silo refill pump and auger;
- Heavy vehicle movements;
- Occasional tractor and other farm type machine and vehicle movements; and
- Night movements of trucks and forklifts during bird delivery and collection.

Ventilation fans have been identified as the primary continuous noise generating activity. Feed silo refill and bird delivery/collection have been identified as the primary intermittent noise generating activities. All of these sources were modelled in the noise assessment.

The three operational scenarios developed to assess the various combinations of noise sources that could occur are:

Scenario 1 - Worst-case continuous operation

This scenario models all 18 ventilation fans running continuously on each shed. During the production cycle the ventilation fans turn on automatically as required to maintain the required temperature. The fans are not always operated all together, with only a few required early in the production cycle or in the cooler months. All fans are only typically required late in the production cycle as the birds become larger in size. This scenario therefore represents the worst case continuous operation of all 18 fans. Daytime and evening/night-time meteorological conditions have been considered in this assessment.

Scenario 2 - Feed silo refilling

This scenario includes the continuous noise sources in Scenario 1, as well as the maximum result from the assessed feed silo refilling scenarios. Feed deliveries will occur during daytime delivery hours only so only daytime meteorological conditions have been considered.

Scenario 3 – Site Access Road

Due to the close proximity of R10 to the access road the largest potential impact from transport would be road traffic on the access road to site. Bird collection is the most traffic intensive activity associated with this development and will occur predominantly at night time when noise impact is the greatest. A FHWA road traffic model was therefore used to determine the impact of traffic noise on the site access road at the most affected residence (R10). To conservatively assess site access road impacts all continuous noise sources in Scenario 1 were included in this scenario.

Sound power data for noise sources were typically sourced from the Global Acoustics database of representative sound powers. Where possible, sound power data from plant measured at similar facilities was adopted. Sound power for ventilation fans and feed silo refill pump were measured at an existing ProTen Poultry Complex in Bective NSW.

Based on a site inspection and attended noise measurements at a similarly designed broiler production complex (ProTen Bective Complex), water pumps, feed augers and heaters were not included in modelling. These sources were not audible above the ventilation fans and would not contribute to overall noise levels measured off site. As such they were not included in Global Acoustics (2015) assessment.

Model predictions for Scenarios 1 and 2 are provided in **Tables 6.7** and **6.8**. All results indicate that the PSNL will be below criteria for all scenarios.

Model results indicate general day to day operations from continuous noise sources would be less than the PSNL of 35 dB under both neutral and prevailing meteorological conditions, as shown in **Table 6.6**.

Table 6.7 Calculated LAeq, 15minute Operational Noise Levels – Scenario 1 (dB)

Receptor ID	Neutral	Inversion	East-north-east Wind	South-west Wind	Maximum
R1	<20	21	<20	20	21
R2	<20	22	<20	21	22
R3	<20	22	<20	21	22
R4	20	26	<20	25	26
R5	21	27	<20	26	27
R6	28	32	24	32	32
R7	<20	22	<20	<20	22
R8	<20	<20	<20	<20	<20
R9	<20	21	<20	21	21
R10	<20	21	<20	21	21
R11	<20	<20	<20	<20	<20

Event noise from feed silo refilling was shown to increase noise at the NSR, but as feed deliveries will only occur during daytime delivery hours there is no predicted exceedance of the PSNL, as shown in **Table 6.7**. The predicted noise levels presented in **Table 6.7** include worst-case impact due to silo refilling, combined with worst-case continuous noise source operations.

Table 6.8 Calculated LAeq, 15minute Operational Noise Levels – Scenario 2 (dB)

Receptor ID	Neutral
R1	<20
R2	<20
R3	<20
R4	21
R5	22
R6	29
R7	<20
R8	<20
R9	<20
R10	<20
R11	<20

Bird collection is the most traffic intensive impact associated with the operations. **Table 6.9** presents the maximum number of total vehicle movements per hour on the access road that will not cause an exceedance of the PSNL at the most affected NSR (R10). The cumulative effect of continuous operational noise sources outlined in Scenario 1 has been conservatively considered in this scenario, however in reality some of the ventilation fans will be turned off during collection.

Table 6.9 Calculated Allowed Heavy Vehicle Movements at R10

Access Road Speed Limit (km/hr)	Maximum Allowed Heavy Vehicle Movements (per hour)
40	25
60	10
80	5

As shown in **Table 3.2** 745 trucks (1490 movements) will be required for the removal of birds per production cycle, with movements occurring each night during the last 4 weeks of the cycle. Removal of birds will be between 8pm and 2pm with truck arrivals and departures spread out over that period. This equated to an average of 54 vehicle movements per day, or approximately 3 movements per hour. If a 60 km/h speed limit was adopted the noise impact from traffic on the site access road from the Sturt Highway would be well below the operational PSNL.

Sleep Disturbance

Sleep disturbance criteria typically only apply to the night period, which is defined in the INP as 10pm to 7am. Sleep disturbance is generally caused by short duration noise sources that give rise to a significant increase to noise emission over and above general operational noise. Global Acoustics (2015) identified that the primary noise generating activity that may cause sleep disturbance is bird collection, which will generally occur when it is dark (during evening/night time hours). Trucks on the site access road are the closest noise source to NSR and the most likely to cause a sleep disturbance impact.

Global Acoustics modelled sleep disturbance predictions for neutral atmospheric conditions, and for each of the assessed prevailing meteorological conditions (**Table 6.10**). No exceedance of the sleep disturbance criterion is predicted.

Table 6.10 Calculated $L_{A1,1\text{minute}}$ Sleep Disturbance Noise Levels (dB)

Receptor ID	Neutral	Inversion	East-north-east Wind	South-west Wind	Maximum
R1	21	24	22	22	24
R2	<20	23	<20	22	23
R3	<20	23	<20	22	23
R4	21	26	<20	25	26
R5	22	27	20	26	27
R6	29	33	24	32	33
R7	<20	22	<20	<20	22
R8	21	25	<20	25	25
R9	28	32	23	32	32
R10	33	36	27	36	36
R11	<20	20	<20	20	20

Road Traffic Noise

As detailed below in **Section 6.4.2**, approximately 565 vehicle trips (including 171 heavy vehicle movements) occur on the Sturt Highway daily, as determined by RoadNet (2015) as part of the Traffic Impact Assessment for the Project. Traffic generated by the development would account for a 17% increase in total traffic volume and a 36% increase in heavy vehicle traffic. The heavy vehicle trips will be mostly spread over the nine week production cycle and will be distributed relatively evenly over the predicted delivery hours.

Heavy vehicle movements are likely to result in the most significant impact from the Project. An increase of 36% represents an increase of 1.3 dB to existing road traffic noise levels. This increase is unlikely to be perceptible to the human ear.

A goal of the RNP is to protect against excessive decreases in amenity as the result of a project by applying the relative increase criteria. The policy recognises an increase of up to 2 dB as a minor impact that is considered barely perceptible to the average person. Given this an increase of 1.3 dB is considered acceptable.

6.3.5 Mitigation Measures

While Global Acoustics (2015) concludes that the Project will have negligible impact on local amenity with respect to noise impacts, ProTen will take reasonable and practicable measures to prevent or minimise noise emissions. As listed below, a range of complementary design features, best management practices and mitigation measures will be applied to minimise and manage potential noise impacts.

Construction

- Construction activities will be restricted to the following standard times:
 - Monday to Friday – 7.00 am to 6.00 pm;
 - Saturday – 8.00 am to 1.00 pm; and
 - No audible construction work will take place on Sundays or public holidays.

- Plant and equipment operators will be appropriately instructed on how to minimise noise generation at all times. Measures may include avoiding the operation of noisy plant and equipment simultaneously.
- All plant and equipment will be maintained to meet regulatory and industry standards, as well as ensure optimal operating conditions.

Operation and Maintenance

- A 60 km/hr speed limit will be adopted on the site access road between the development site and the Sturt Highway.
- Plant and equipment operators will be appropriately instructed on how to minimise noise generation at all times. Measures may include avoiding the operation of noisy plant and equipment simultaneously and/or close together.
- Noise generating equipment purchased by the operator will comply with relevant occupational health and safety requirements.
- Emergency standby diesel generators will only be used when power from the electricity grid is lost and they will be appropriately sited and housed to minimise noise emissions.
- All plant and equipment will be maintained to meet regulatory and industry standards, as well as ensure optimal operating conditions.
- A unidirectional traffic movement system, via a one-way circulation road around each PPU site, will be established to minimise the use of reversing alarms.
- Internal access roads will be appropriately maintained to minimise noise levels.
- Suitable signage will be erected to direct traffic, limit traffic speed and minimise night time noise levels.

Landscaping Strategy

- Landscape plantings will be established in accordance with the landscaping strategy described in **Section 3.13**. In addition to screening the PPUs, the plantings will provide some noise buffering.

Environmental Complaints and Incidents

The Complaints and Incidents Management Strategy contained within **Appendix C** will be implemented to ensure that all complaints and incidents relating to the poultry operation are promptly and effectively addressed. Appropriate documentation of complaint/incident handling will assist in identifying and implementing measures to negate the possibility of re-occurrence in the future.

6.3.6 Conclusion

The noise impact assessment concludes that construction, operational and sleep disturbance noise levels will comply with project specific noise levels at all nearest sensitive receptors for all scenarios. Furthermore, an assessment of road traffic noise showed no discernible impact.

6.4 Traffic and Transport

6.4.1 Introduction

RoadNet undertook an assessment of the potential traffic and transport issues associated with the Project. A copy of RoadNet's Traffic Impact Assessment (2015) is contained within **Appendix G**, and a summary of the key findings provided below.

6.4.2 Existing Environment

The development site has extensive frontage to the Sturt Highway, which is a sealed, 2-lane rural highway under the control of RMS. In the vicinity of the development site, the Sturt Highway is approximately 7.0 metres wide with 1.0 metres wide sealed shoulders and a speed limit of 100 kilometres per hour (kph). Existing access to the development site is via a number of unsealed rural tracks.

RoadNet (2015) obtained traffic volumes for the Sturt Highway for the 18 month period between January 2011 and June 2012, which were collected by RMS via an Infra-Red Traffic Logger (TIRTL) located just west of the development site. The data generally indicates a very low daily and hourly traffic volume across the frontage of the development site, with the total number of vehicles on the majority of days less than 200 vehicles per day. Traffic volumes generally increase during the morning to a mid-day peak before reducing through the afternoon to an over-night low (four vehicles per hour (vph)). Traffic volumes are generally evenly split between eastbound and westbound directions at most times of the day.

RoadNet also conducted an onsite traffic count on Friday 25 July 2014. The count indicated a peak hour of 57 vehicles between 12:15pm – 1:15pm. This peak hour traffic count was used for assessment of the impacts of the Project, as the volumes were higher than the traffic volume data provided by the RMS.

6.4.3 Impact Assessment

Operational Traffic Movements

As detailed in **Section 3.7**, the Project is expected to generate additional operational traffic amounting to approximately 34,060 vehicle movements per year, of which 21,950 will be heavy vehicle movements. On average, this is equivalent to approximately 96 vehicle movements per day, of which 62 will be heavy vehicle movements. The majority of traffic generated by the Project will travel between the site and Hanwood (approximately 6 kilometres south of Griffith).

The following points are noted in terms of the volume of traffic to be generated by the Project:

- It is estimated that close to 35 percent of the total traffic will be generated by light vehicles (car/ute/van);
- With the exception of live bird removal, which will generally occur between the hours of 8.00 pm and 2.00 pm, all transport activities will occur during daylight hours;
- There will typically be one daily shift for farm workers between 7:00 am and 4:00 pm each day; and
- Heavy vehicle trips will be mostly spread over the nine week production cycle and will be distributed relatively evenly over the predicted delivery hours.

RoadNet (2015) advises that the additional traffic generated by the poultry operation will be minimal and will not impact on the safety or operation of the external road network. The additional traffic anticipated to be generated by the development, compared with existing vehicle movements on the Highway, is presented in **Table 6.11**.

Table 6.11 Additional Traffic on the Sturt Highway

Road Section	Existing Vehicle Trips per Day			Additional Vehicle Trips per Day			Percentage Increase		
	Cars	Heavy Vehicles	Total	Cars	Heavy Vehicles	Total	Cars	Heavy Vehicles	Total
Sturt Highway – West of Narrandera	394	171	565	34	62	96	8.6%	36%	17%

The expected increase in light vehicle trips is anticipated to be approximately 34 per day, with 14 of these movements expected during the peak periods at the start and end of a 7am - 4pm shift. This additional traffic, representing just an 8.6% increase in light vehicle movements, will have minimal impact on the Sturt Highway and the external road network.

Heavy vehicles on the Sturt Highway are expected to increase by approximately 36%, once the site is fully operational. This seemingly large increase is due to the already low traffic volumes currently utilising the Sturt Highway. RoadNet (2015) advises that the additional 62 heavy vehicle trips per day is not expected to have any operational impacts on the external road network due to the relatively low volume of traffic currently utilising the highway.

As previously noted in **Section 6.4.2**, the current traffic volumes on the Sturt Highway generally peak around the middle of the day, while the peak volumes generated by the Project are estimated to coincide with the beginning and end of daytime staff shifts i.e. 7 am and 4 pm. The counted traffic volumes along the Sturt Highway adopted for the analysis are also substantially higher than those recorded by the RMS Infra-Red Traffic Logger.

Allowing for these two factors, an adjustment to the peak hour traffic volumes on the Sturt Highway used in the analysis to accommodate 10 years of background traffic growth (as per normal RMS requirements for examining future intersection requirements) has not been explicitly undertaken, since the volumes adopted in the assessment already more than compensate for this adjustment and are therefore conservative for the purposes of considering the future intersection requirements at the site access.

Sturt Highway Intersection

As described in **Section 3.7.3**, construction of a new intersection off the Sturt Highway will be required to access the development. The proposed location of the intersection is illustrated on **Figure 6.4** and on **Plates 12** and **13**.

Due to the low traffic volumes predicted to use the intersection, a basic right turn treatment (BAR) and basic left turn treatment (BAL) is the minimum required of a highway intersection to the development site access road, as per the requirements set out in *Austrroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections*, and as described above in **Section 3.7.3**. This will allow adequate room for development generated vehicles to manoeuvre or queue without impacting on highway traffic.

The peak hour traffic volumes at the Sturt Highway and the additional traffic to be generated by the development are well below the intersection volumes nominated in *Austrroads Guide to Traffic Management Part 3: Traffic Studies and Analysis* for which capacity analysis is necessary. RoadNet (2015) have estimated that all through and turn movements at the intersection will have a Level of Service of 'A', and result in minimal delays and queuing, and as such the proposed intersection will operate adequately.



Figure 6.4 Proposed Intersection Location



Plate 12 - Proposed intersection location looking east towards Narrandera



Plate 13 - Proposed intersection location looking west towards Darlington Point

Safe Intersection Sight Distance (SISD) has been assessed for the proposed intersection using *Austrroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*. For a design speed of 110km/hr (10 km above the posted speed of 100 km/hr to allow for a factor of safety) and a maximum reaction time of 2.5 seconds, the SISD for cars is calculated as 311 metres to the west and 305 metres to the east. The approaches from both the direction of Griffith and Narrandera exceed these sight distance requirements, with the location of the proposed access point optimally located between two crests to maximise sight distance.

Stopping Sight Distance (SSD) along the Sturt Highway in the vicinity of the proposed access has also been checked in accordance with *Austrroads Guide to Road Design Part 3: Geometric Design*, Table 5.4 based on the same design speed, reaction time and grade corrections. The required SSD values of 219 metres to the west and 213 metres to the east are exceeded along the subject section of highway.

Heavy Vehicle Routes

Heavy vehicles will generally travel to and from the site from facilities located in Hanwood 6 kilometres south of Griffith on a daily basis via the Sturt Highway. Deliveries of day old chicks, feed etc. will be delivered from sources generally based around Griffith, which will be delivered in articulated or rigid trucks, and are already accommodated on the road network in the region.

A designated B-double route currently exists along the Sturt Highway through to Narrandera. The Sturt Highway is also an approved Road Train Route. The daily volumes along this route are low. The additional 62 heavy vehicle trips per day (6 in each of the peak hours) for the development along the Sturt Highway are not expected to have any significant traffic impacts. It is possible that future contractors may use B-doubles to service the site.

Goods delivered to and from Narrandera, or locations further east, will utilise the Sturt Highway and Newell Highways which are both suitable for B-doubles. RoadNet (2015) advises that this route is considered adequate and has sufficient capacity to accommodate the additional heavy vehicles generated by the Project without any upgrades to the roadway or intersections.

Construction related impacts

There is not expected to be a significant impact to the external road network during construction of the Project. Construction of the poultry sheds, internal roads and other features will attract some heavy vehicles associated with deliveries of materials and equipment, as well as construction site worker trips to the site. Construction traffic will likely originate from Griffith in the west and Narrandera in the east, and will generally follow the Sturt Highway to the development site.

The number of vehicle movements associated with the construction phase will be lower than that anticipated during operation of the poultry complex, as shown in **Table 3.2** and **Table 3.4**, with approximately 96 daily vehicle movements predicted during farm operation compared to around 68 daily movements during construction. As described above, the increased volume of traffic during operation of the poultry complex is not expected to have any operational impacts on the external road network due to the relatively low volume of traffic currently utilising the highway. Therefore, it follows that the smaller volume of construction generated traffic is also not expected to impact on the operation or safety of the external road network.

Construction of the new intersection of the Sturt Highway may require short term shoulder and lane closures at times. This will be undertaken in accordance with the appropriate traffic control guidelines and by approved traffic control contractors. The impact of this traffic control, in terms of delays and queuing, is expected to be minimal due to the relatively low traffic volumes on this section of the Sturt Highway.

6.4.4 Mitigation Measures

ProTen commits to the following road works and mitigation measures, some of which are recommendations of RoadNet (2015), to ensure that safe and appropriate vehicular access in accordance with RMS requirements is provided and to prevent and/or minimise potential traffic related issues:

Road and Intersection Construction

- A new intersection of the Sturt Highway will be provided with BAR and BAL type turn treatments (see **Figures 3.5** and **3.6**) at the location shown on **Figure 6.4**.
- The BAL and BAR treatment warranted will be supplemented with advance signposting in both directions warning of trucks turning. In addition, an intersection direction sign opposite the access will be erected to further help identify the access point.
- The site access road between the development site and the Sturt Highway will be constructed along the proposed easement as shown on **Figures 1.2** and **3.3** to a minimum 6.5 metres in width, and to provide a surface suitable for B-doubles.
- The access road will be bitumen sealed for a minimum length of 50 metres from the Sturt Highway intersection.
- The farm access will meet the minimum requirements of AS 2890.2, to accommodate the turning movements of the largest vehicles generated by the poultry development, which will initially be semi-trailers however may include B-doubles in the future.
- The internal PPU access roads will be constructed as one-way circulation roads (ring roads) around the perimeter of each PPU to enable traffic to enter, exit and manoeuvre in a forward direction. The roads will be constructed as all-weather rural-type roads able to carry the anticipated heavy vehicle movements.

Operation and Maintenance

- All internal roads will be appropriately maintained to minimise noise and dust emissions.
- Suitable signage will be erected indicating internal traffic direction and speed limits to ensure the orderly and safe use of the site, as well as to minimise the potential for traffic conflict and noise.
- All internal roads will be maintained clear of obstruction and used exclusively for the purposes of transport, loading-unloading and parking. Under no circumstances will these areas be used for storage of goods or waste products.
- Heavy vehicles will follow designated B-double routes, when travelling to and from facilities south of Griffith.

6.4.5 Conclusion

The existing traffic volumes on the Sturt Highway in the vicinity of the development site are low, and the additional traffic generated by the development can be easily accommodated. Provided the recommendations as per RoadNet (2015) and as outlined in this EIS with regards to traffic and transport are met, the Project is not expected to cause any significant impacts in terms of road safety or operation, and there are no issues from a traffic perspective that warrant refusal of the Project.

6.5 Surface Water and Flooding

6.5.1 Introduction

SLR undertook an assessment of the potential surface water issues associated with the Project, including a flooding assessment. The full Flooding Assessment Report (SLR, 2015a) is contained within **Appendix H**, and a summary of the key findings provided below.

6.5.2 Existing Environment

As described in **Section 2.10**, the development site is located within the catchment of the Murrumbidgee River, which covers 84,000 square kilometres of southern NSW. The Murrumbidgee River flows to the north of the development site, flowing from Narrandera through to Darlington Point. At its closest point the river flows approximately 9 kilometres to the north of the site.

The nearest waterway to the development site is Yanco Creek, a regulated stream of the Murrumbidgee River System, flowing approximately 8 kilometres to the east of the site boundary at its closest point. Although inflows to Yanco Creek are controlled by Yanco weir under normal conditions, during large floods the Murrumbidgee River breaks out of its banks before the Yanco Weir and flows directly to Yanco Creek (SKM, 2000).

There are no notable surface water bodies or tributaries within the bounds of the development site. SLR's hydrologist observed two minor topographical depressions which act as minor drainage features for the site. The features have no formed banks and are only distinguishable as drainage features by their location topographically and the vegetation present within it. Some agricultural drains also run along the field boundaries in the north of the development site.

The nearest wetlands, as identified within the Narrandera LEP 2013 mapping, are shown to occur approximately 3.2 kilometres to the north of the northern-most PPU (PPU 1), and 5.8 kilometres to the east of the north-eastern PPU (PPU 2).

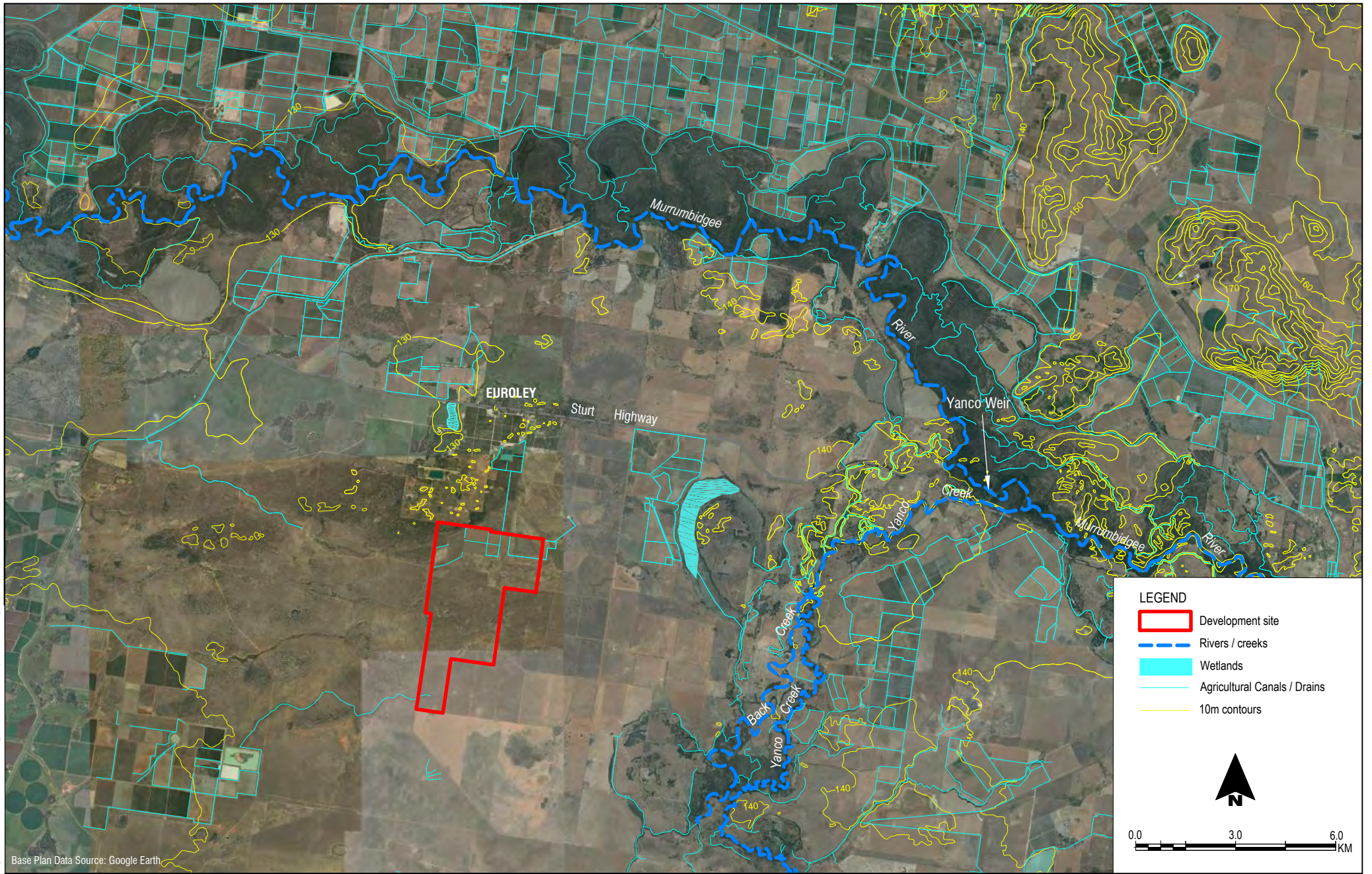
Regional surface water features are illustrated on **Figure 6.5**, and the topography within the development site is illustrated on **Figure 6.6**.

Mainstream Flooding

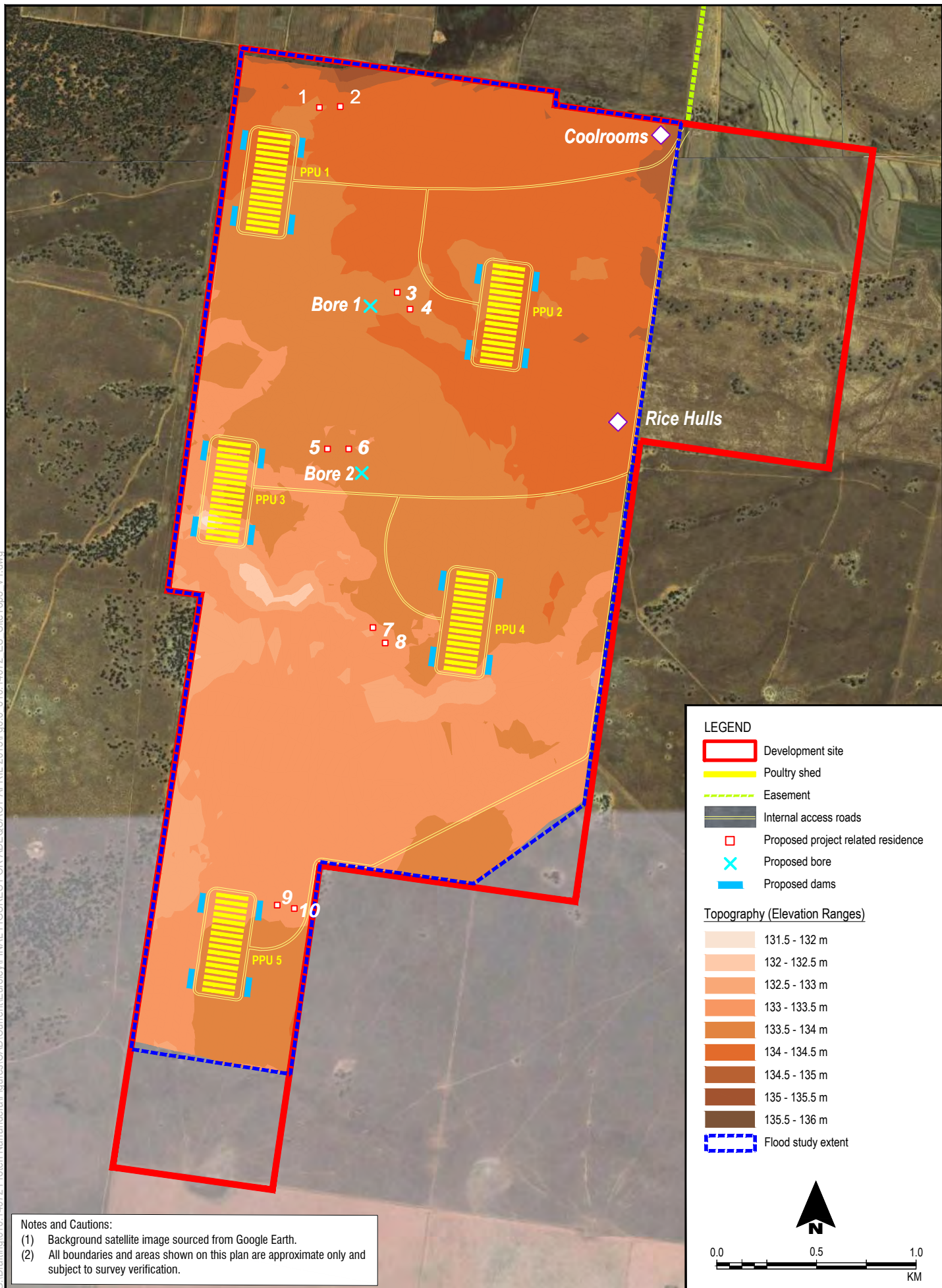
Council's existing flood mapping developed as part of the Narrandera Flood Study (SKM, 2000) terminates at Yanco weir, therefore flood extents for Murrumbidgee River and Yanco Creek have not been defined adjacent to the development site.

A review of the Narrandera Flood Study is currently being undertaken by Lyall & Associates for Narrandera Shire Council, who provided flood mapping developed as part of the review to SLR to assist in the preparation of this EIS. Lyall & Associates' flood model boundary does not extend to the development site, and so does not map flood extents within the site. However, based upon observations during the site walkover, the flood extent mapping (Lyall & Associates, 2015) and historical flooding anecdotal evidence, the development site is considered unlikely to be flooded as a result of the Murrumbidgee River or Yanco Creek floodplain at Dry Lake overtopping its banks in events up to and including the 100 year Annual Recurrence Interval (ARI) event. Notwithstanding, the flood risk to the development site from two zones where floodwater is shown to extend to the model boundary was assessed by SLR, as described below. These zones are the southern portion of Dry Lake, and the model extent at Euroley north of the development site.

As detailed in **Appendix H**, site observations indicate that an overland flow route does not exist between the Extreme Flood extent at Dry Lake and the development site.



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Notes and Cautions:
 (1) Background satellite image sourced from Google Earth.
 (2) All boundaries and areas shown on this plan are approximate only and subject to survey verification.

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A conservative quantitative assessment was undertaken to assess the potential flow rate of floodwater associated with the zone of Murrumbidgee River Extreme Flooding at the Lyall & Associates flood model boundary near Euroley, and hence assess the potential for overland flows from this Extreme Flood extent to flow onto the development site. The Extreme Flood flow within this zone was predicted using Manning's equation and the Extreme Flood Map (Lyll & Associates, 2015), and was found to be less than 1% of the predicted Probable Maximum Flood (PMF) local overland flood flow rate and less than 10% of the 100 year ARI local overland flow rate. It is therefore considered that mainstream flooding presents a lower flood risk to the development site than local overland flooding. Due to the size of the Murrumbidgee catchment, main stream extreme events will not coincide with the local overland flooding events. Measures to manage local overland flooding (as detailed in **Section 6.5.5**) will therefore safeguard the development from main stream flooding.

Local Overland Flooding

Flood modelling, including RORB hydrological modelling and one dimensional (1D) hydraulic modelling in HEC-RAS, was undertaken by SLR to assess flood levels and velocities across the development site during the 100 year ARI and PMF flood events.

Full details of the modelling procedure are provided within **Appendix H**. Predicted flood levels at key locations are provided in **Table 6.12** below.

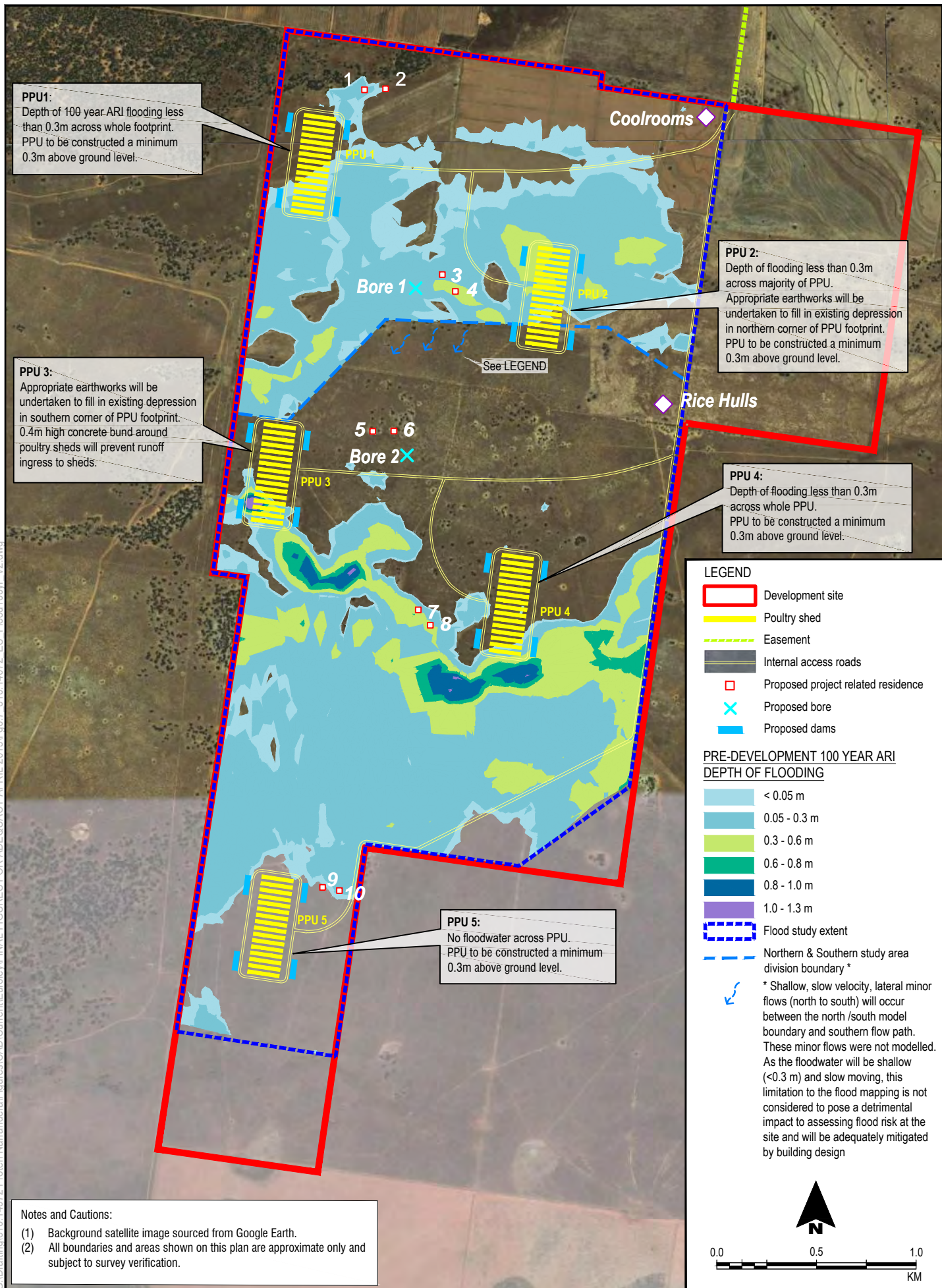
Table 6.12 Flood levels at the PPU locations

PPU	100 year ARI Flood Level (mAHD)	PMF ARI Flood Level (mAHD)
PPU 1	134.00	134.34
PPU 2	134.28	134.72
PPU 3	133.13 – 133.63	133.73 – 134.09
PPU 4	133.65	134.37
PPU 5	133.27	133.87

Flood velocities are predicted to range between 0.1 m/s and 0.18 m/s for the 100 year ARI event and 0.23 and 0.38 m/s for the PMF event.

Flood mapping for the 100 year ARI is provided in **Figure 6.7**.

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Historical Flooding

Two large flood events have occurred in the region in recent history; in 1974, and more recently in 2012. The 1974 flood event was estimated to be a 1 in 99 year ARI event (SKM, 2000), and aerial photographs of the 1974 flood event taken within hours of the flood peak and presented in SKM (2000) do not appear to show the development site to be flood affected. Floodwater was identified in areas closer to the waterways. No relevant aerial photographs were available for review of the March 2012 flood event at the time of reporting.

Several road closures occurred during March 2012 event in the Euroley area (Irrigator, 2012). ProTen liaised with local landowners to gain anecdotal accounts of local flood impacts during this event. Anecdotal evidence indicates that the development site itself was not flood affected but floodwater did cut off a section of the Sturt Highway to the east and a section to the west of Main Canal Road for several days. Importantly, access/egress to the site was available during the entire period of flooding from the south.

Flood Warning

SKM (2009) reported that the Murrumbidgee River has a long time to peak flow at Narrandera, which means that Narrandera usually has in excess of one week until a flood may occur. SKM (2009) states that the location of Wagga Wagga upstream will also provide information on warning time as typically the flood peak is 5 days ahead of Narrandera. This flood warning time is also relevant to the development site. Importantly, in the event of an impending flood, ProTen would have sufficient time to stockpile feed and other necessary supplies on site, and also to transport the birds that are close to their required weight off site for processing, prior to flood waters reaching the Narrandera/Euroley area.

6.5.3 Impact Assessment - Surface Water Resources

Many traditional agricultural practices have the potential to impact upon surface resources. Livestock grazing on river flats, cultivating immediately adjacent to waterways and the application of agricultural chemicals can all contribute significant loads of faecal bacteria, nutrients and turbidity to water resources.

The potential for adverse impact to surface water from the development of intensive poultry production farms is very low, with the risk of impact considered far less than traditional agricultural activities. Given the controlled environment in which the proposed poultry development will operate, along with the environmental licensing conditions it will need to comply with, it poses a low risk to local water resources and no detectable impact is expected. Due to the low risk, no water monitoring program is warranted. Points to note in relation to the management of water on site include:

- The proposed poultry development will be a largely dry operation, with no effluent generated as a result of the poultry-rearing itself;
- The development site is removed from any identified watercourses or significant drainage features;
- The poultry shed will have fully sealed concrete flooring and will be surrounded by a 400 mm high dwarf concrete bund wall to prevent rainwater and runoff entering the sheds;
- Appropriate systems for chemical storage, handling and incident response will be implemented; and
- Improved flow from the PPU sites will be managed via an engineered surface water management system, as described in detail in **Section 3.11**, and discussed further below.

The main operational water sources to be managed within the PPU sites will be:

- Wash down water from within the sheds at the end of each eight week production cycle;
- Rainfall runoff from the shed roofs; and
- Rainfall runoff from the ground surfaces surrounding the poultry sheds and additional improvements.

An engineered surface water drainage system will be implemented to manage runoff and wash down water, providing long-term structural controls and management measures to mitigate the impact of surface water runoff throughout the life of the operation.

As described in **Section 3.11**, rainfall runoff from the shed roofs and around the sheds will be directed into grassed swales, which have been conservatively designed to capture a 1 in 100 year rainfall event (refer **Figure 3.7**). The swales will allow infiltration of the water into the topsoil for nutrient uptake by the grass, which will be regularly slashed. During heavy rainfall events, excess water from the grassed swales will be directed to underground pipes and into a catch drain that will be installed around the perimeter of the poultry sheds. The construction of the perimeter catch drain will ensure that all rainfall runoff from the ground surfaces surrounding the sheds is contained within the controlled storm water management system.

Runoff from this catch drain will be directed to four small storage dams, one constructed at each corner of each PPU. The total storage capacity at each PPU will be 28,000 m³, which is equivalent to 170% of the capacity required to prevent runoff escaping the retention dams from a 1 in 100 ARI, 72 hour event. The runoff to be captured in these stormwater dams will predominantly be clean runoff. As already noted in **Section 6.1**, the washdown water that will enter this system may have some level of nutrients, however levels are predicted to be very low as per ProTen's other farms, given that the floors in the sheds are regularly cleaned. An analysis of the nutrient load in the washdown water was prepared by GHD (2007) for another of ProTen's operating farms, where litter is managed in the same way as proposed for the Euroley development. This analysis calculated the typical nutrient concentration of washdown water to be as follows:

- Total Suspended Solids: 2,500 mg/L;
- Total Nitrogen: 65 mg/L;
- Total Phosphorus: 45 mg/L.

The vegetated swale drains around the sheds will provide a very effective means of nutrient removal. The typical annual pollutant load removal efficiencies for vegetated swales according to Engineers Australia (2006) Australian Runoff Quality is as follows:

Table 6.13 Typical Annual Pollutant Load Removal Efficiencies for Vegetated Swales

Pollutant	Typical Removal
Total Suspended Solids	60-80%
Total Nitrogen	25-40%
Total Phosphorus	30-50%

Therefore, when already starting with a very low nutrient level, and with these vegetated swales providing an effective take up of nutrients, there is negligible risk of nutrient high runoff flowing offsite. Further, the swale drains have been designed to conservatively handle a 1 in 100 year rainfall event (refer **Figure 3.7**). The potential for impact to local water resources by runoff of nutrients, chemicals or pathogens is considered negligible. In addition, drilling of a test bore on the development site (refer **Section 6.6**) has confirmed the groundwater standing water level to be 27 metres below ground level (mbgl), so no interaction with groundwater is anticipated from infiltration of washdown water.

Waste Disposal

Stockpiling and/or disposal of waste materials, especially poultry litter, dead birds and chemical containers, can result in leaching of nutrients and pollution to surface waters and groundwater. However, as outlined in **Section 3.10**, appropriate systems will be implemented to ensure that each waste stream generated by the development is effectively managed and disposed of off-site. There will not be any on-site stockpiling or disposal of waste materials.

Waste Water Disposal

The waste water generated by on-site dwellings and staff amenities will be appropriately treated and disposed of via on-site waste water management systems installed and operated in accordance with the requirements of Council and the relevant standards/guidelines. No detectable impact to surface or groundwater quality is anticipated as a result the low volume that will be generated, the on-site system requirements, the available land area and available separation distances.

During Construction

While the proposed PPU sites are removed from any notable drainage features, construction activities could potentially impact upon water resources through changes to groundwater recharge as a result of soil compaction, loss of groundcover and generation of sediment-laden runoff. Given that the proposed PPU sites and associated disturbance footprint will be relatively small at just 8% of the development site, and that activity associated with the development will be largely confined to these areas, changes to the existing runoff/recharge pattern will be relatively minor. No detectable impacts to groundwater levels or yields are expected. The nature of the strata and the depth to the water bearing zones will provide a substantial buffer against infiltration of any potential pollutants, such as turbidity and/or hydrocarbons.

6.5.4 Impact Assessment - Flooding

The potential flooding impacts associated with the Project are summarised in the following dot points and discussed further below:

- Inundation of sheds and dwellings with local overland flood water during large flood events or overland flows from the Murrumbidgee floodplain during extreme flood events;
- Potential isolation of poultry stock and workers due to road closures during a flood event;
- Increase in post development runoff rates from the site which may lead to flooding impacts down gradient of the development site;
- Increase in flood levels within properties downstream as a result of increases in post development runoff rates;
- Reduction in local overland flood storage during large flood events.

Overland and Mainstream Flooding

As detailed in **Section 6.5.2**, mainstream flooding is not considered to pose a significant risk to the development site. Overland flooding has been considered through the development of a 1D hydraulic model, with modelling indicating that floodwater will be slow moving and shallow across the majority of the site with deeper flooding occurring within existing topographical depressions.

It is firstly relevant to note that the NSW Government's Floodplain Development Manual (DIPNR, 2005) states that an appropriate flood planning level for a residential development is generally the 1 in 100 year event, however "*the decision on appropriate levels for commercial and industrial developments relates more to economic benefits versus costs...therefore, there is greater potential for flood planning levels for these developments to be based on events more common than the 1% Annual Exceedance Probability [AEP] flood.*" The potential impacts associated with the 1% AEP flood (100 year ARI event) have been assessed for the proposed poultry development, and as such represent a conservative consideration with respect to flooding for such a development.

As illustrated on **Figure 6.7**, the 100 year ARI flood depth over the existing (pre-development) surface within the disturbance footprints of PPU 1, 4 and 5 is predicted to be less than 0.3 m. The PPUs will all be constructed above the 100 year ARI event flood depth as shown in **Table 6.12**, at a minimum of 0.3 m above the existing surface, and with concrete perimeter bund walls 0.4 m high around each poultry shed, as well as swale drains established between the sheds. On this basis, the ingress of floodwaters during a 1 in 100 year ARI event is not anticipated. Whilst topographical depressions exist in the northern corner of the PPU 2 disturbance footprint and in the southern corner of PPU 3, appropriate earthworks will be undertaken to fill in these depressions during shed construction to ensure the risk of floodwater ingress is minimised. The construction of 0.4 m high concrete bund walls around each shed will further mitigate the risk of floodwater ingress.

The farm managers' houses will all be constructed at a minimum of 0.5 m above the existing ground surface. As shown on **Figure 6.7**, the predicted pre-development flood depth within the footprint of the residences, with the exception of houses 4, 7 and 8, is below 0.3 m. The predicted flood depth at houses 4, 7 and 8 is below 0.5 m above existing ground surface elevation and as such, all farm managers' houses will be constructed above the 100 year ARI event flood depth.

The proposed buildings will act as a barrier to overland flow during flood events potentially causing hydraulic impacts including flood afflux and flood velocity increases. Hydraulic modelling (refer to **Appendix H**) was undertaken to assess the hydraulic impact of the current development layout. The modelling indicates that the 100 year ARI flood level will be raised by less than 150 mm locally upstream of the buildings and the PMF flood level will be raised less than 300 mm. However, the modelled onsite flood afflux impacts are highly conservative, and are considered to be already accounted for within the bounds of conservatism applied in the modelling of the pre-development scenario. No flood afflux impacts were shown to occur downstream of the western PPUs. Flood velocities generally decreased, with the maximum velocity increase predicted to be 0.08 m/s.

There are no existing buildings or infrastructure on neighbouring properties that are likely to be affected by the construction of the proposed PPUs and associated infrastructure, or any associated infilling earthworks.

The predicted flood depths (<2 m) and flood velocities during a PMF event (<0.4 m/s) are unlikely to damage any light structures based upon the criteria set out in the NSW Floodplain Development Manual (DIPNR, 2005).

Isolation during a flood event

Local flooding during minor and major events is known to block several roads in the area. The blocking of roads could lead to the poultry complex being isolated for several days until floodwaters subside. This in turn could lead to the entire food supply for birds being consumed and / or birds which are ready for processing offsite having to remain onsite. Isolated workers also risk running out of food although the State Emergency Service (SES) are likely to be able to service isolated workers during an emergency.

The risk of these consequences occurring as a result of flooding and isolation is considered low however due to the flood warning the site will be afforded, and the capacity to store significant food supplies on the site. In addition, given the size of the catchment and local topography, the depth of floodwaters across the majority of the development site (with the exception of localised topographical depressions) are likely to reside to safe levels relatively quickly (within hours).

As discussed in **Section 6.5.1**, the Murrumbidgee has a long time to peak at Narrandera, usually having in excess of a week before a flood would occur. This warning would allow ample time for further food supplies to be stockpiled on site (which will have the capacity to store at least eight days' supply of feed) and to remove birds who are close to their processing weight. Notwithstanding, a flood management plan has been prepared to ensure the potential flood related risks to the development site are effectively managed and mitigated, as described in **Section 6.5.6** below.

Post development runoff

The construction of the poultry sheds, farm residences and ancillary infrastructure will increase the impervious footprint onsite. An increase in the impervious footprint could increase the peak flow rate and volume of runoff discharged offsite which could potentially lead to localised downstream flooding impacts. However, it is noted that the impervious footprint associated with the development is very small relative to the size of the development site at less than 8 percent. In addition, a stormwater drainage system has been designed to manage runoff from impervious and disturbed areas. Four retention dams (one on each corner of the shed) will be constructed at each PPU to collect runoff. The combined dam capacity per shed is estimated to be 28,000 m³ which is approximately 170% of the storage required to capture the predicted runoff volume from contributing areas for a 1 in 100 year ARI, 72 hour storm event. The proposed retention storage is therefore of sufficient capacity to prevent overflows from the dams occurring for events up to and including the 100 year ARI event and therefore prevent an increase in offsite discharge rates for events.

6.5.5 Mitigation Measures

The following best management practices and mitigation measures will be implemented to safeguard local water resources and/or minimise and manage potential adverse impacts:

Surface Water

Construction

- All clean extraneous surface water from upslope will be diverted around areas of disturbance.
- Temporary erosion and sediment control structures, such as hay bales and silt fencing, will be used to prevent soil loss and sediment-laden runoff, and will be constructed in accordance with the Blue Book.
- Disturbed areas will be promptly rehabilitated and revegetated (see **Section 3.12**) to a stable landform.
- A regular maintenance program will be implemented to ensure the continued integrity of the temporary erosion and sediment control structures.

Development Design

- Each poultry shed will be fully enclosed and have concrete flooring.
- Each poultry shed will be surrounded by a 400 mm dwarf concrete bund wall to prevent rainwater and runoff entering the sheds and to allow for the controlled discharge of wash down water from the sheds.

Operation and Maintenance

- Appropriate systems will be implemented to ensure that each waste stream generated by the development is effectively managed and disposed of off-site (see **Section 3.10**). There will not be any on-site stockpiling or disposal of waste materials.

Surface Water Management

- An engineered surface water management system will be constructed, as described in **Section 3.11** to provide long-term structural controls and management measures to mitigate the impact of surface water runoff throughout the life of the operation.

Chemical Use

- Staff members will be instructed in the proper use and handling of all chemicals used on-site. If appropriate, this will include completion of training such as SMARTtrain or ChemCert (or similar).
- All chemical use will be undertaken in full compliance with the relevant statutory requirements, including the *Pesticides Act 1999*.
- Where appropriate, chemicals used will be approved by the Australian Pesticide and Veterinary Medicine Authority as safe and fit for that particular use.

Environmental Complaints and Incidents

- The Complaints and Incidents Management Strategy contained within **Appendix C** will be implemented to ensure that all complaints and incidents relating to the poultry operation are promptly and effectively addressed. Appropriate documentation of complaint/incident handling will assist in identifying and implementing measures to negate the possibility of future re-occurrence.

Flooding

Building Design

- Habitable finished floor levels of the farm managers' and assistant managers' houses will be set at a minimum of 0.5 m above adjacent ground level to reduce the likelihood of floodwater ingress to buildings.
- Finished floor levels of the sheds will be set at a minimum of 0.3 m above adjacent ground level to reduce the likelihood of floodwater ingress to buildings, and will be constructed above the predicted flood depths associated with a 1 in 100 year ARI event.
- Concrete bund walls 0.4 m high will be constructed around each of the poultry sheds to prevent rainwater and runoff entering the sheds and to allow for the controlled discharge of wash down water from the sheds.

Engineered Surface Water Drainage and Management System

An engineered surface water management system will be constructed, as described in **Section 3.11**, to provide long-term structural controls and management measures, mitigating both the impact of surface water runoff throughout the life of the operation and to minimise the risk of flood ingress. This includes 0.4 m high concrete bunds around each of the poultry sheds and engineered swale drains which have been conservatively designed to capture a 1 in 100 year rainfall event.

Safe Refuge / Evacuation for Personnel

All farm workers should act in accordance with the SES Narrandera Flood Plan (SES, 1994) which outlines the processes for flood warning, safe refuge and evacuation during a flood event in the area.

Designated safe egress routes from building exits to onsite safe refuge areas will be provided for each of the buildings onsite to ensure safe passage to less flood affected portions of the site during local overland flood events where less warning time may be available. Site occupants should remain within the safe refuge areas until floodwaters recede. Given the size of the catchment and local topography, the depth of floodwaters across the majority of the site (with the exception of localised topographical depressions) are likely to recede to safe levels relatively quickly (within hours). All safe egress routes and refuge areas will be documented in the Site Operational Flood Management Plan (refer to **Section 6.5.6**). Safe egress routes and refuge areas will be selected based upon the Local Overland Flooding PMF map (refer to **Appendix H**) and the criteria set out in **Table 6.14** below.

Velocities during a PMF event are predicted to be less than 0.4 m/s. Therefore the following pedestrian wading and vehicle movement safe egress criteria is considered to be appropriate for identifying safe egress routes and safe flood refuge areas for all buildings onsite.

Table 6.14 Safe Access and Egress

Egress Method	Safe flood depth for route to safe refuge area	Reference
Pedestrian	0.7 m	Based upon safe child wading depth documented in the Floodplain management in Australia, best practice principles and guidelines (CSIRO, 2000)
Vehicle	0.3 m	Based upon small vehicle safe driving depth documented in the Floodplain management in Australia, best practice principles and guidelines (CSIRO, 2000)

6.5.6 Site Operational Flood Management Plan

To ensure the risk of flooding is appropriately planned for, a site-specific flood management plan has been developed for the development site. The plan is described below.

Purpose and Objectives

The purpose of the operational flood management plan is to ensure the safety of farm workers, the survival of the birds onsite that are too young for processing, and the safe removal of birds offsite if they are of appropriate age for processing.

The objectives of the flood management plan are to:

- Provide processes for collection and storage of surplus food onsite for birds and workers where a flood event is anticipated;
- Identify operational policies to reduce the rate of bird growth during a flood event (and thereby need to be transported offsite for processing); and
- Provide egress routes to processing centres during a flood event.

On-site feed storage

As discussed in **Section 6.5.1**, flood warnings are likely to be available several days prior to a flood event occurring at Euroley. If a flood warning is issued, extra feed will be brought to site and stored in a large 'rice hull' shed to be constructed on site, as shown on **Figure 1.3**, and/or stored under alternative cover on the farm. The rice hull shed will be capable of holding 3272 m³ of feed which, including silo capacity, will provide at least eight days of feed.

If food supplies are exhausted, then birds will be transported offsite as detailed below.

Operational processes

The following modifications to the operational procedures will be implemented during a flood event:

- The environmental conditions within the sheds will be altered to reduce the food consumption rate and thereby bird growth; and
- Feeding frequency and duration will be altered to reduce the rate of bird growth.

Transport of birds offsite

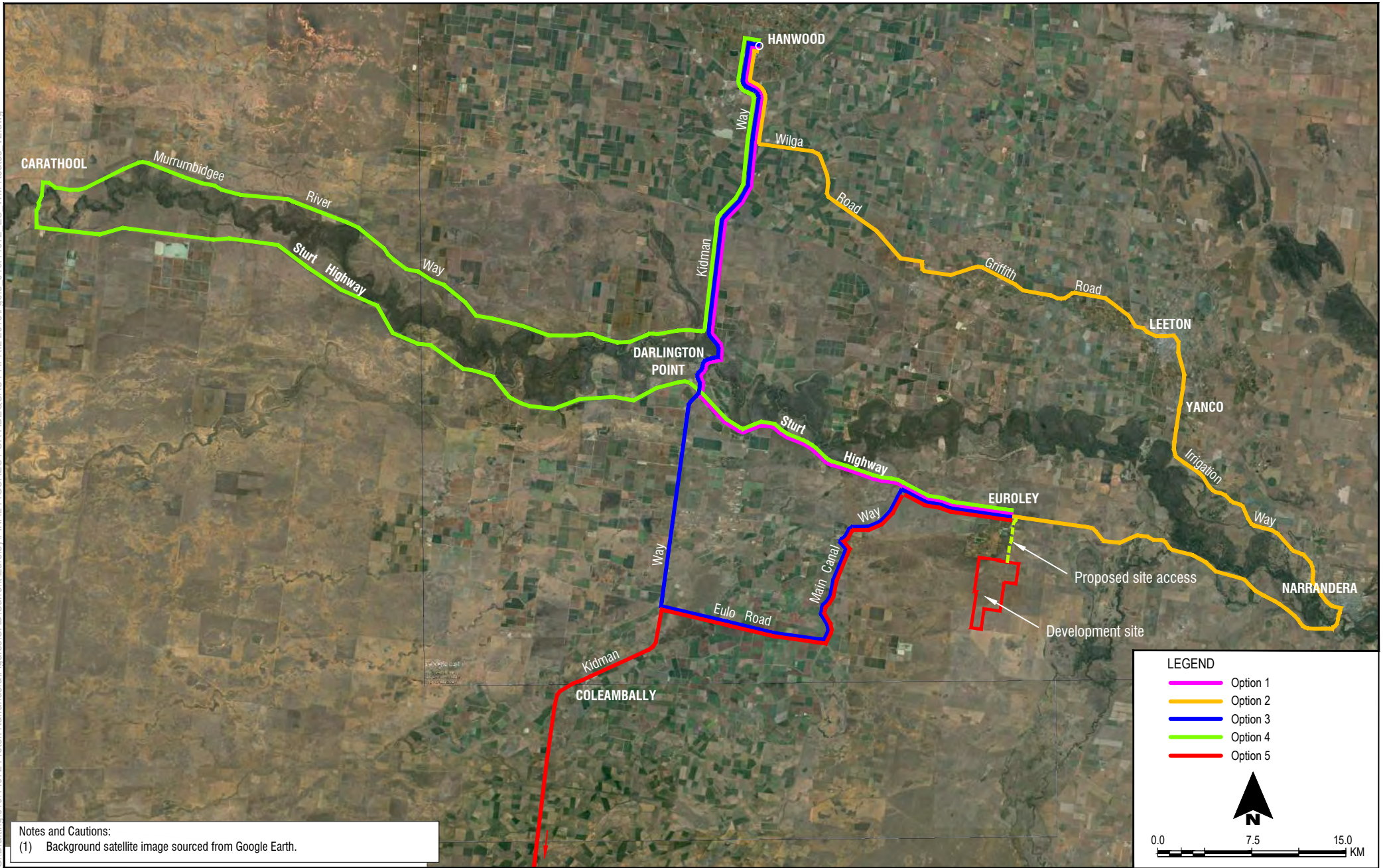
A number of transport route options exist for the transportation of birds from the development site to processing facilities. Each option is shown on **Figure 6.8** and described below.

Under normal conditions birds will be transported to the processing centre in Hanwood via Option 1 detailed below. Subsequent route Options 2 to 6 will be implemented where required, subject to road closures in the area. It is noted that Option 5 was available during the entire 2012 flood event and is therefore considered the most reliable egress route during a large flood event.

- **Option 1;** travel via Darlington point to the Hanwood Processing centre. Travel west on the Sturt Highway and then north on Kidman Way towards Hanwood.
- **Option 2;** travel via Narrandera and Leeton to the Hanwood Processing centre. Travel east on the Sturt Highway to Narrandera then north-west towards Leeton and continue north-west towards Hanwood.
- **Option 3;** travel via north Coleambally and Darlington Point to the Hanwood Processing centre. Travel west via Sturt Highway, then south via Main Canal Road, then west via Eulo Road and north via Kidman Way towards Hanwood.
- **Option 4;** travel via Carrathool to Hanwood Processing centre. Travel west on the Sturt Highway then cross the river towards Carrathool and continue east via Murrumbidgee River Road and then north via Kidman Way to Hanwood.
- **Option 5;** travel south to alternative processing facilities in Victoria or South Australia. Start on Sturt Highway driving east and then south on Main Canal Road, west on Eulo Road, then onto Kidman Way continuing south.
- **Option 6;** travel west beyond Narrandera towards Wagga Wagga before travelling north and then west back towards Hanwood.

It is likely that roads along due east routes (Option 2) will be blocked first during a flood event, but may become available again as floodwaters recede whilst routes due west (Option 2, 3 and 4) are still blocked.

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Notes and Cautions:
 (1) Background satellite image sourced from Google Earth.

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Transport Options During a Flood Event

FIGURE 6.8

Removal of dead birds during a flood event

This Project will have substantial capacity for the storage of dead birds prior to removal for processing in the purpose built chiller room to be constructed (refer **Figure 1.3**). The Euroley complex will have triple the amount of cool room capacity for the storage of birds in comparison to other ProTen farms. This will enable the storage of dead birds for an extended period of time.

If normal access (Option 1) is still restricted during an extreme flood event when the chiller room is at full capacity then the travel options listed above would be put into practice.

It is also noted that in the event a flood warning is received (which is likely to be several days before flood waters reach the Narrandera/Euroley area) ProTen will ensure the chiller room is emptied so that maximum storage capacity is available should access from the farm be restricted as a result of flooding.

Onsite Safe Egress and Refuge Areas

Designated flood egress routes from building exits to onsite safe refuge areas will be provided for each of the buildings onsite. Egress routes and refuge areas will be selected and established prior to the commencement of the operational phase of the development based upon the criteria set out in **Section 6.5.5**.

Review of Flood Management Plan

The flood management plan will be reviewed and updated as required after any major flood event to account for any unforeseen flooding impacts which affect the adopted procedures.

6.5.7 Conclusion

Based upon the 100 year ARI flood map (Lyll & Associates, 2015), aerial photographs of the 1974 flood event and information in SKM (2000), the development site is unlikely to be flood affected during mainstream flood events up to and including the 1 in 100 year ARI event. In addition, based upon the Narrandera Flood Study Review (Lyll & Associates, 2015), and observations by an SLR hydrologist it is considered unlikely that the site will be flood affected by Murrumbidgee River or Yanco Creek out of bank flows during an extreme flood event such as the PMF.

Importantly, flood warnings are likely to be available via the NSW SES at least several days prior to a mainstream flood occurring. Where a flood warning is issued, the flood management plan documented in **Section 6.5.6** will be implemented to effectively manage the flood risk to the development.

The risk of overland flooding across the development site has also been considered by the Flood Assessment (SLR, 2015a). All PPUs will be constructed above the predicted flood depth associated with a 1 in 100 year ARI event. Concrete bund walls 0.4 m high will also be constructed around each of the poultry sheds, as well as swale drains designed to safely convey a 1 in 100 year ARI event. In addition, designated safe egress from buildings onsite to safe refuges will be documented in the flood management plan to ensure safe egress during a PMF event.

With regards to stormwater management, a drainage system has been designed for the development, with the total storage on site equivalent to 170% of the storage capacity required to contain runoff from a 1 in 100 ARI, 72 hour event.

6.6 Groundwater

6.6.1 Existing Environment

Regional Hydrogeology

The development site is located in the Lower Murrumbidgee Groundwater Management Area (GMA), which lies within the eastern Riverine Plains province of the Murray Geological Basin. The GMA is located between the towns of Narrandera, Booligal, Balranald and Jerilderie and is bounded by Billabong Creek and the Edwards River in the south, the Lachlan River to the northwest and exposed Palaeozoic bedrock to the east (**Figure 6.9**). It covers an area of approximately 33,000 km² (3.3 million hectares).

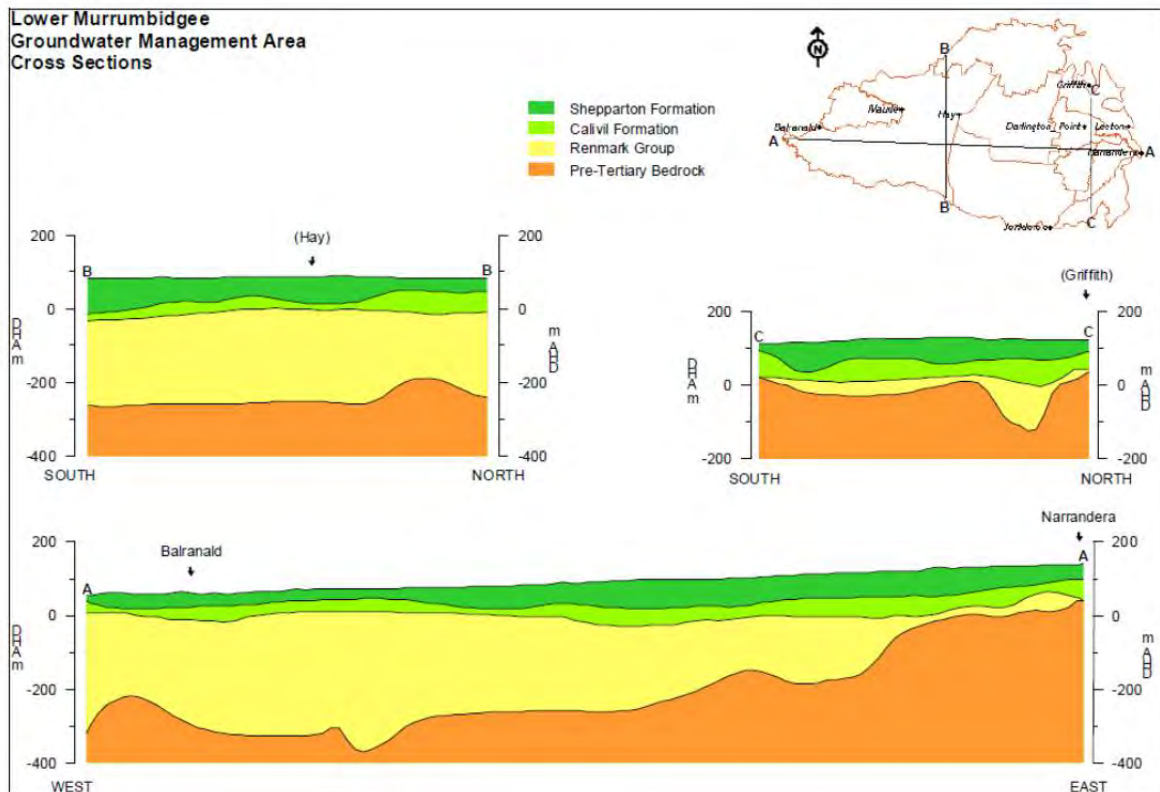
The term “groundwater sources” as used in this section, refers to the Shepparton and Calivil/Renmark aquifers more commonly known as Shallow and Deep Sources. The Shallow Source is defined as extending to the depth of 40 metres or to the bottom of the Shepparton Formation whichever is the greater. The Deep Source is defined as extending from the bottom of Shepparton Formation down to the bedrock. It is the Deep Source which is the subject aquifer of the Project, relating to the Calivil Formation.

Figure 6.9 The Lower Murrumbidgee Groundwater Management Area



The GMA is underlain by semi-consolidated to unconsolidated flat lying Cainozoic sediments of mainly continental origin. Deposition of these sediments began some 50 million years ago (middle Miocene to early Paleocene). The maximum thickness varies from 170 metres in the east (at Narrandera) to about 400 m at Balranald (western end of GMA). The sediments overlie Paleozoic and Mesozoic rocks that form the basement. Within the GMA the sedimentary deposits have been subdivided into three main units or layers. These are Shepparton Formation, Calivil Formation and the Renmark Group. **Figure 6.10** shows geological sections across the GMA.

Figure 6.10 Geological cross sections in the Lower Murrumbidgee GMA (NOW, 2009)



The Renmark Group forms the basal confined aquifer. It is characterised by dark grey to black carbonaceous clay and dark brown lignite. It also contains thick sequences of grey, medium grained quartz sand which commonly comprise 30-50 % of the entire unit. Its thickness is variable and peaks at 366 m within the GMA.

The Calivil Formation is semi-confined to confined middle aquifer deposited during 5-15 million years ago (Late to Middle Miocene). It is dominated by pale grey, coarse quartz sand with lenses of pale grey to white kaolinitic clay. The higher proportion of sand, typically 50-70%, makes it the most productive aquifer within the GMA. Its thickness ranges between 50 to 70 m in the eastern part of the management area (ie within the Narrandera – Euroley area) with a maximum of about 90 m. The Calivil is described (Wooley 1991 as cited in CSIRO, 2002) as a poorly consolidated pale grey, poorly sorted coarse to granular quartz sand conglomerate with white kaolinitic matrix. The formation includes thick intercalations of kaolin, with thin lenses of carbonaceous clay.

The Shepparton Formation, which is of Late Pliocene to Pleistocene age, directly overlies the Calivil Formation. It is a complex assemblage of clays, silts and sands that were deposited in a fluvio-lacustrine environment. The proportion of sand is highly variable but mostly about 20-30%, with most occurring in the top 30%. The thickness of sediments is variable and averages around 65 m.

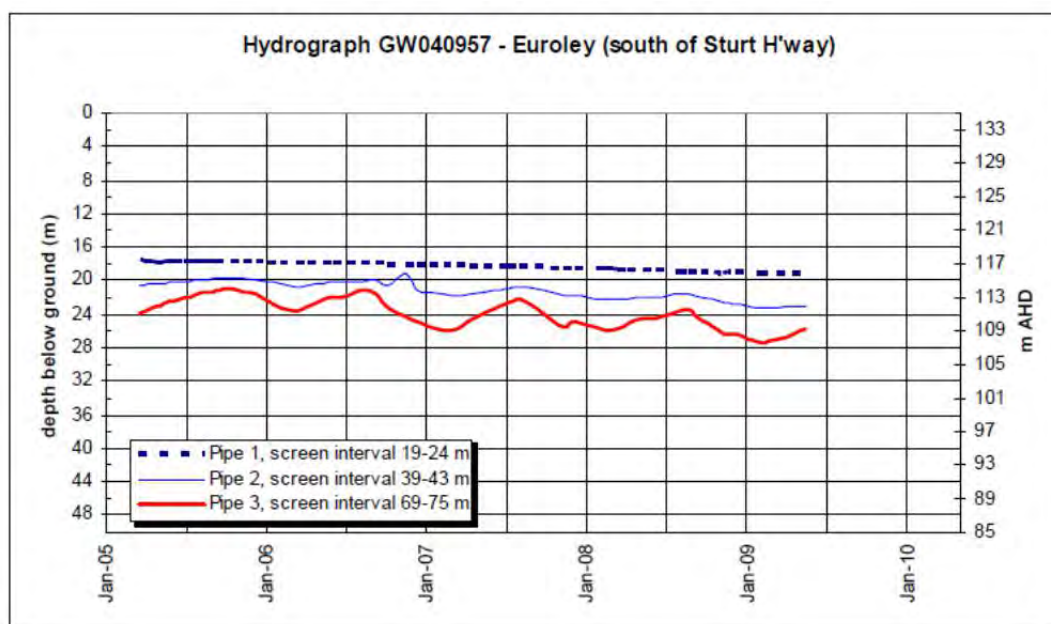
The characteristics of both the shallow and deep groundwater sources are summarised below in **Table 6.15**.

Hydrographs have been recorded in many wells across the GMA, and the hydrograph shown in **Figure 6.11** is taken from a well at Euroley in the region of the proposed site (NOW, 2009). Groundwater pressure levels (in deep confined to semi confined aquifer) and depths to water table (in the shallow unconfined aquifer) are presented as depths in metres below ground surface and metres above Australian Height Datum (or metres above mean sea level).

Table 6.15 Properties of the Lower Murrumbidgee GMA (NOW, 2009)

Description	Shallow (Shepparton)	Deep (Calivil/Renmark)
Age of water (years)	up to 3,000	2,000-20,000
Water Quality (mg/L)	Variable, generally 1,500-7,000, fresher quality closer to river and within irrigation areas.	Generally less than 1,000 in eastern parts, approximately over 40% of GMA.
Yields (L/s)	Variable, generally between 0.1 – 10, occasionally >10.	Variable, generally 50 - 350 occasionally >350.
Groundwater flow direction	generally east to west	generally east to west
Hydraulic gradient	1:4,300 (eastern part of GMA) 1:5,000 (western part of GMA)	1:1,900 (eastern part of GMA) 1:7,200 (western part of GMA)
Estimated rate of flow (m/yr)	0.04-0.20	0.1-11.5
Hydraulic conductivity (m/d)	0.5-2.0 (groundwater model)	2.0-60.0 (groundwater model)
Specific Yield/Storage Coefficient	0.10-0.25 (groundwater model)	1.00E-05 to 5.00E-03 (groundwater model)
Average thickness	65 m	100m in the eastern parts, >100 in the west
Volume of groundwater in storage (x1,000 GL)	532.5 (assuming a porosity of 0.25)	1,515.6 (assuming a porosity of 0.25)
Recharge to storage ratio	1:1,400	1:6,000
Volume of fresh groundwater in storage (x1,000 GL)	19.8 (assuming 37% of aquifer only)	330.0 (assuming average aquifer thickness of 100 m in recharge areas and 40% of aquifer only)

Figure 6.11 Hydrograph for groundwater monitoring site GW040957



The Eastern portion of the GMA is described as an area where little groundwater pumping occurs. The hydrograph above show a gently declining trend in both shallow and deep aquifers. Small seasonal fluctuations, generally less than 5 metres, are observed due to some nearby pumping. The pressure levels in the deeper aquifer is lower than levels in the shallow aquifer indicating a downward vertical hydraulic gradient and that recharge to the deep aquifer in this area occurs predominantly through vertical leakage. The similar water level behaviour in the pipes indicates some hydraulic connection between the deep and intermediate aquifers.

Local Hydrogeology

Hydrogeology

The Project will access groundwater from the Calivil Formation. The local hydrogeology has been assessed by means of drilling a test well within the development site at the location where the production bore will be installed (labelled 'bore 1' on **Figure 1.3**). This bore was drilled to a depth of 78m BGL, encountered the sandy Calivil Formation at 36m BGL and records a standing water level at 27m BGL. This bore provides a useful description of the soil conditions. The lithological log from the test well is provided below in **Plate 14**.

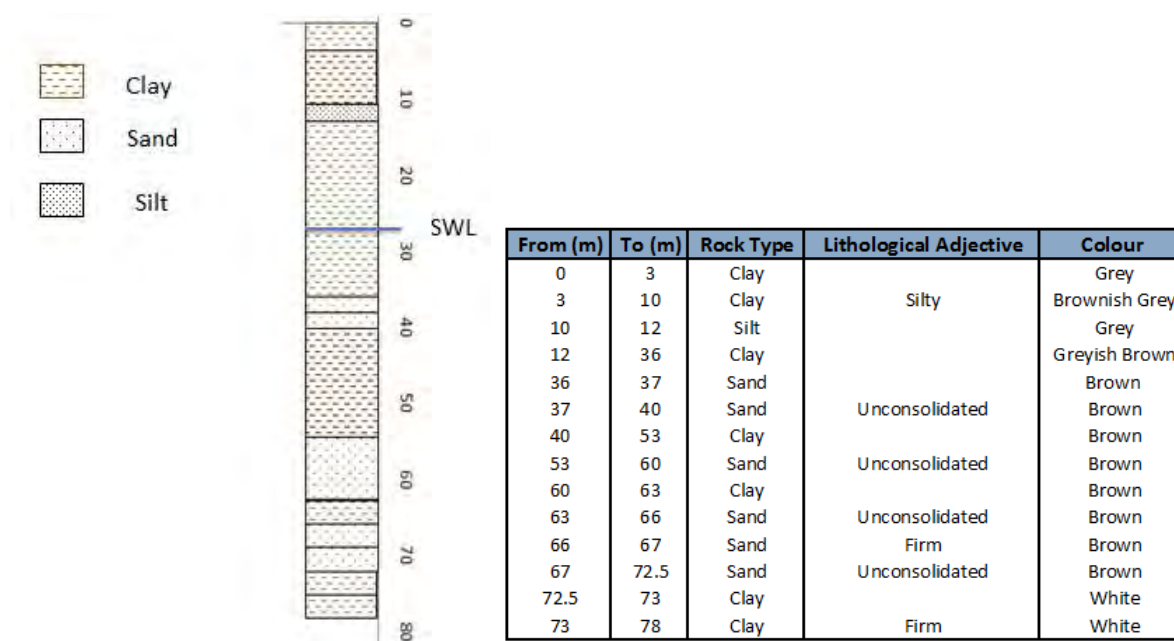


Plate 14 – Lithological log from test well drilled within the development site

The local hydrogeology from this on-site well is similar to the conditions ribed from a well located approximately 4km to the east of the proposed development site in Lot 52 DP 750906, which was drilled in 1998 by Watson Drilling and which remains operational. The original well log shows the geology - the upper 42m of the well are composed of generally sandy CLAY material, with occasional clay interbeds – which correlates with the regional geological description of the Shepparton Formation. From 42m below ground level (BGL) to the base of the well (at 93m BGL) the log generally describes formation as a SAND or clayey SAND, which corresponds to the Calivil Formation. The initial water level within the well was recorded at 29.2m BGL.

It is understood that the well has been pumped at rates of 20ML/day for discrete periods of time, indicating that the Calivil Formation in the Euroley area can produce yields in the range of 200l/s. This is within the range of yields (50-350 l/s) indicated from the NOW Groundwater Status Report (2009) for this formation. The well construction indicates the thickness of the Calivil Formation to be at least 50m in this area, although it is noted that the formation may be as thick as 100m (NOW, 2009)

As noted above, it is from this well that the WAL will be transferred to the new wells to be constructed as part of the Project.

Groundwater Quality

A water sample was taken from the recently constructed on-site well and has been tested by a NATA accredited laboratory indicating generally good quality water. In summary, the groundwater testing indicates pH 7.4, electrical conductivity 155 $\mu\text{S}/\text{cm}$, total dissolved solids 332 mg/l and a suite of metals which were tested below detection limits.

Based on desk study information, the groundwater quality of the Calivil Formation is generally of good quality, with electrical conductivity less than 1,000 μS , and water generally being suitable for domestic and stock irrigation purposes – the principal water usages in the region. Groundwater testing undertaken during 2014 at the adjacent above-mentioned bore in Lot 52, DP 750906 has found that most test results for groundwater parameters were below detection (primarily set for ANZECC fresh water criteria), and the water quality was acceptable for domestic water use.

The GMA plan identifies the following beneficial water quality uses for the two water sources:

- ecosystem protection and agricultural water for shallow source, and
- raw water for drinking, ecosystem protection and agricultural water for deep source.

Under the plan water quality decline is deemed unacceptable if extraction causes water quality to decline to a lower beneficial use class. The most recent published groundwater resource assessment report (NOW 2010) indicates that “there are no reported or observed changes to the beneficial use class”.

The soils described within the onsite well and also the well on Lot 52 DP 750906 indicate predominantly clayey soils from surface to approximately 40m BGL, which indicate a cover layer above the Calivil Formation aquifer, reducing the vulnerability of the aquifer to potential impacts from surface developments.

Local Abstraction

A search of the Bureau of Meteorology Australian Groundwater Explorer indicates that there are around 24 bores recorded within a five kilometre radius of the development site. Groundwater within the area is primarily used for monitoring, irrigation, and stock and domestic uses.

The bore summaries for these 24 bores contain little information and are largely incomplete, however they indicate that 16 of the 24 bores are utilised for monitoring and the majority are located to the north-west, north and north-east of the development site. The minimum water bearing zone for these bores is not available in the groundwater summaries, however bore depth ranges from 21.5 metres to 138.6 metres with an average of 62.7 metres.

Groundwater Regulations

Water Sharing Plan

The Lower Murrumbidgee groundwater sources have been managed under *the Water Management Act 2000* (WMA 2000) since the commencement of the Water Sharing Plan for the Lower Murrumbidgee Groundwater Sources 2003 (hereafter referred to as the Plan) on 1 October 2006. The Plan sets the framework for managing these groundwater sources until the end of June 2017.

At the commencement of the Plan groundwater entitlements in the Deep groundwater source were reduced from approximately 515,000 ML to 270,000 ML. The Plan provides access to groundwater in addition to the portion of recharge available for extraction to assist users to progressively adjust down to this level.

Access to groundwater for basic landholder right's needs, which include domestic and stock rights and Native Title rights, are also provided for in addition to the portion of recharge available for extraction. That is, these supplies are accounted for against the volume of groundwater in storage.

Access licences

Four categories of groundwater access licenses are held in the Lower Murrumbidgee groundwater sources. These are:

- local water utility,
- domestic and stock,
- aquifer (sub categories community and education, town water supply), and
- supplementary water access licences.

The Local Water Utility Licences are held by local governments for town water supply purposes. The share component of these licences is for a specified volume of groundwater. The share components of Domestic and Stock Access Licences, Aquifer Access Licences and Supplementary Water Access Licences are issued for a specified number of unit shares. These are summarised in **Table 6.16** **Table 6.15**.

Table 6.16 Water Access Licences held in the Lower Murrumbidgee Groundwater Source

Existing Access Licences	Shallow Source	Deep Source (ML)
Basic Landholder Rights (ML/yr)	3,000	1,000
Local Water Utility Access Licences (ML)	0	2,210
Domestic and Stock Access Licences (shares)	0	324
Aquifer Access Licences (shares) Community and Education Licences	0	3
Town Water Supply Licences	0	20
Aquifer Access Licences	5,201	267,777
Supplementary Water Access Licences (shares)	n/a	41,196

Proposed Groundwater Abstraction

As mentioned in **Section 3.8.3**, the Project will require a total water supply of around 460 ML/year. This includes water supply for shed ventilation, bird consumption, shed cleaning, landscaping and staff requirements. This water will be sourced from two well locations to be developed within the development site (labelled 'bore 1' and 'bore 2' on **Figure 1.3**), each with two wells (a production well and a backup well at both locations).

A Water Access Licence (WAL 11788) for abstraction on Lot 52 DP 750906 (located approximately 5 kilometres north-east of the development site, refer **Figure 1.2**), which permits the abstraction of 488 ML/year will be transferred to the proposed development site to allow extraction of water from the new wells to be constructed. It is proposed that these wells will be installed within the Calivil Formation (Deep Source) in accordance with the current WAL conditions and will be capable of a maximum pump rate of 7 ML/day.

6.6.2 Impact Assessment

Conceptual Hydrogeological Model

Based on the regional and local hydrogeology, a conceptual hydrogeological model is described herein, along with the results of the model. The abstraction of groundwater will be undertaken from wells installed within the Calivil Formation (Deep Source) at the development site. The wells will be licenced to abstract a maximum of 488 ML/year, and will be installed with pump capacity to produce a maximum yield of 7 ML/day.

The Calivil Formation is overlain by the Shepparton Formation (composed of sandy Clays and clay soils) which afford a reduction in vulnerability of the lower Calivil Formation from potential surface impacts. There is vertical interaction (ie leakage) from between the Shepparton and Calivil Formations. The majority of aquifer recharge is due to rainfall (and irrigation).

The Calivil Formation is composed of essentially sandy soil and is reported to have yields ranging from 50-350 L/s, hydraulic conductivities from 2.0-60 m/d and storage coefficients of 1.00E-05 to 5.00E-03. The Calivil Formation is reported to be approximately 100m thick in this part of the GMA (and is known to be in excess of 50 metres from the on-site test well drilled and the well log from Lot 2 DP 750906). The groundwater quality is suitable for domestic, irrigation and stock usages.

Analysis of Potential Groundwater Abstraction and Drawdown

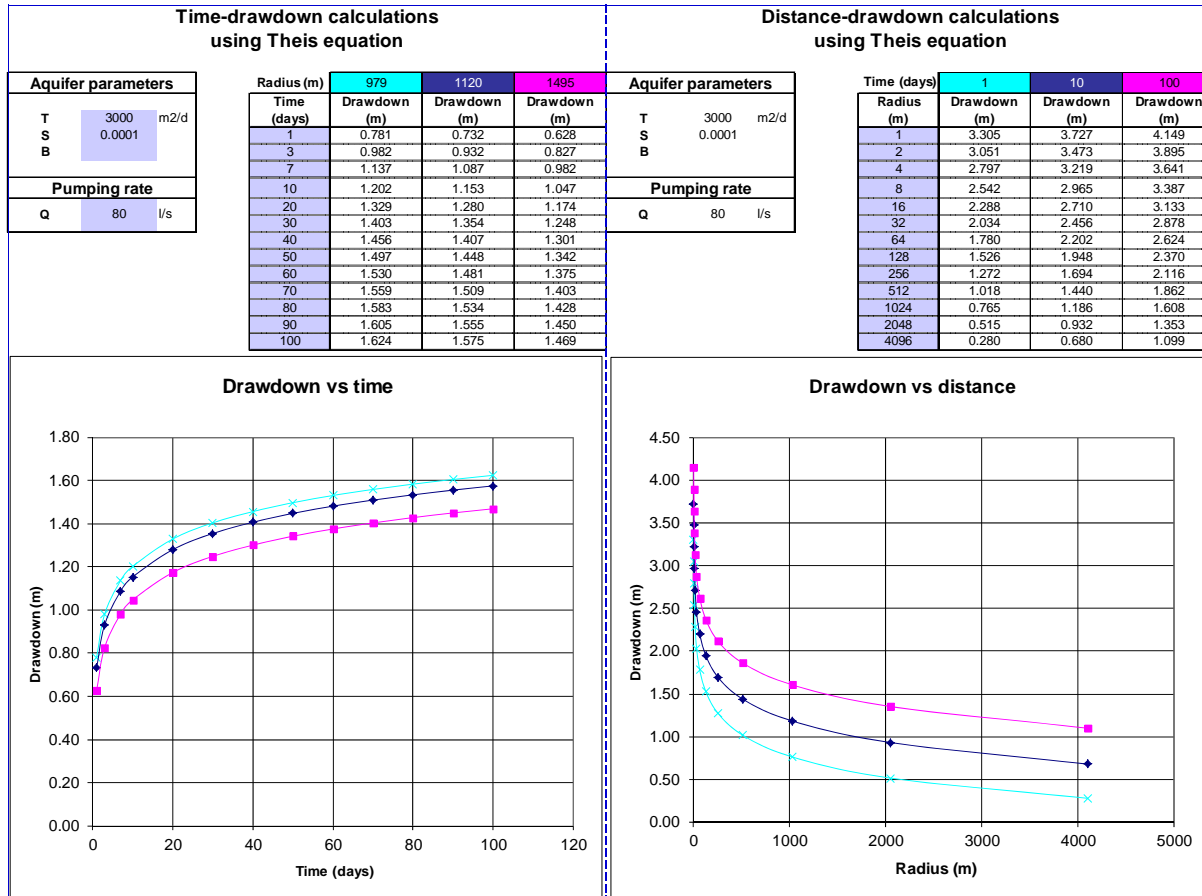
To assess the potential impact of the proposed abstraction rate from the wells, a spreadsheet analysis was developed. The analysis is based on the Thies equation and enables assessment of drawdown against time and drawdown against distance from the abstraction well. The calculation is based on the following equation pair:

$$s = \frac{Q}{4\pi T} W(u)$$

$$u = \frac{r^2 S}{4Tt}$$

where s is the drawdown (change in hydraulic head at a point since the beginning of the test), u is a dimensionless time parameter, Q is the discharge (pumping) rate of the well (volume divided by time, or m³/s), T and S are the transmissivity and storativity of the aquifer around the well (m²/s and unitless, respectively), r is the distance from the pumping well to the point where the drawdown was observed (m), t is the time since pumping began (seconds), and $W(u)$ is the "Well function" (called the exponential integration).

An analysis has been undertaken assuming a confined aquifer with aquifer transmissivity of 3000m²/day (thickness 100 metres), storativity of 0.0001 and a pumping rate of 70 l/s (the maximum abstraction rate proposed). Snapshots of the model are shown below.



With regards to the minimal impact considerations in the NSW Aquifer Interference Policy (NOW, 2012) for a Highly Productive Water Source, such as the Lower Murrumbidgee Deep Groundwater Source, drawdown is predicted to be less than 2 metres at the nearest groundwater bores. The nearest production well to the proposed location of bore 1 within the development site is an irrigation bore 2.4 kilometres to the north. The analysis conducted indicates that a 2 metre drawdown will occur within approximately 500 metres of the proposed extraction wells. Outside of this 500 metre radius the drawdown is predicted to be less than 2 metres. No groundwater wells exist within 500 metres of the proposed well locations within the development site, and as such, based on current knowledge of the aquifer, drawdown is predicted to be below the minimal impact criteria for aquifer interference activities at the nearest water supply work, as specified in the NSW Aquifer Interference Policy.

The abstraction of 460 ML/year will have no net impact on the sustainable yield of the Calivil Formation in any case, as the WAL will simply be transferred from another property to this proposed development site.

Groundwater Dependent Ecosystems

The GMA Plan prohibits the construction of a new or replacement works (bore) within 200 metres of high priority groundwater dependant ecosystem, or any creek or river for those exercising basic landholder rights and within 1,000 metres for extraction authorised under other access licences unless:

- the bore only draws water from an aquifer at depth, and
- has an impermeable seal constructed within the annulus of the bore to isolate aquifers,
- preventing water ingress from the restricted aquifer.

According to the NOW 2010 report, the vegetation communities in the GMA are believed to rely mainly on rainfall and periodic flooding from the Murrumbidgee River thus having a low dependency on groundwater. The wetlands within the GMA are known to depend mainly on surface water. The Deep Source is not known to support any ecosystems, and there is lack of information on any terrestrial fauna that may exist and have any dependency on groundwater (NOW 2010).

The Biodiversity Assessment Report (SLR, 2015b) completed for the Project (refer **Section 6.7**) notes that a patch of White Cypress Pine, which has a moderate potential of being a groundwater dependant ecosystem (GDE), is present adjacent to the Sturt Highway, approximately 4.8 kilometres north of bore 1. The drawdown is predicted to be less than 2 metres at this location, as shown in the results presented above, and therefore significant impact is not anticipated.

6.6.3 Mitigation Measures

Groundwater Well Construction and Management

The installation of the proposed groundwater wells should be designed by a suitably qualified engineer or hydrogeologist, and the design and construction should be undertaken in accordance with the *Minimum Construction Requirements for Water Bores in Australia* (National Uniform Drillers Licensing Committee, 2012). The installation of the wells should include normal development practice, including a commissioning test on the well. ProTen will undertake a pump test on the proposed site wells to refine well design and to verify assumptions made in the planning stage.

The groundwater well locations and design of pumping equipment should be undertaken by an appropriately qualified engineer or hydrogeologist, and should include sufficient redundancy in the system to enable both operational abstraction backup in the case of pump failure and also appropriate spacing of wells so as to avoid on-site drawdown effects.

Groundwater Monitoring

Monitoring of wells should comply with the existing WAL conditions.

6.6.4 Conclusion

The Project contemplates transferring the existing water access licence (WAL 11788) from another property in Euroley (Lot 2 DP 750906) to the proposed site. The proposed abstraction of up to the licensed 460 ML/year will not create any additional impact on the sustainable yield of the Calivil Formation (Deep Source). In addition Groundwater Dependent Ecosystems (GDEs) are not known to exist in the Deep Source, and therefore no impact is anticipated on GDEs.

The abstraction of 460 ML/year will require installation of well pump systems to a maximum rate of 7ML/day (approximately 80 L/s). Analysis of the impact of this pumping rate has been undertaken and indicates that impact on adjacent bores will not significantly impact the aquifer. The proposed extraction will also meet the Aquifer Interference Policy minimal impact considerations for a Highly Productive Groundwater Source, with the associated drawdown not exceeding 2 metres at any nearby extraction well. The abstraction of 460 ML/year will have no net impact on the sustainable yield of the Calivil Formation, as the WAL will simply be transferred from another property to this proposed development site.

6.7 Biodiversity

6.7.1 Introduction

SLR undertook an assessment of the biodiversity values of the development site in accordance with the requirements of the Framework for Biodiversity Assessment (FBA) and with respect to the Project. A copy of SLR's Biodiversity Assessment Report (BAR) (2015b) is contained within **Appendix I**, and a summary of the key findings provided below.

Survey and assessment of native vegetation and threatened species was conducted in January and February 2015 and involved investigations over the development site and the area of land that includes the proposed access road alignment and adjoining land south of the Sturt Highway. Hence, the BAR is based on assessment and mapping of this wider 'study area', which extends beyond the development footprint of the access road and the development site. The boundary of the study area is shown on **Figure 6.12**.

6.7.2 Existing Environment

Native vegetation

Whilst the majority of the study area has been historically cleared and used for agricultural purposes, patches of native vegetation are present. Three native plant community types (PCTs) were identified, mapped and assessed within the study area, as follows:

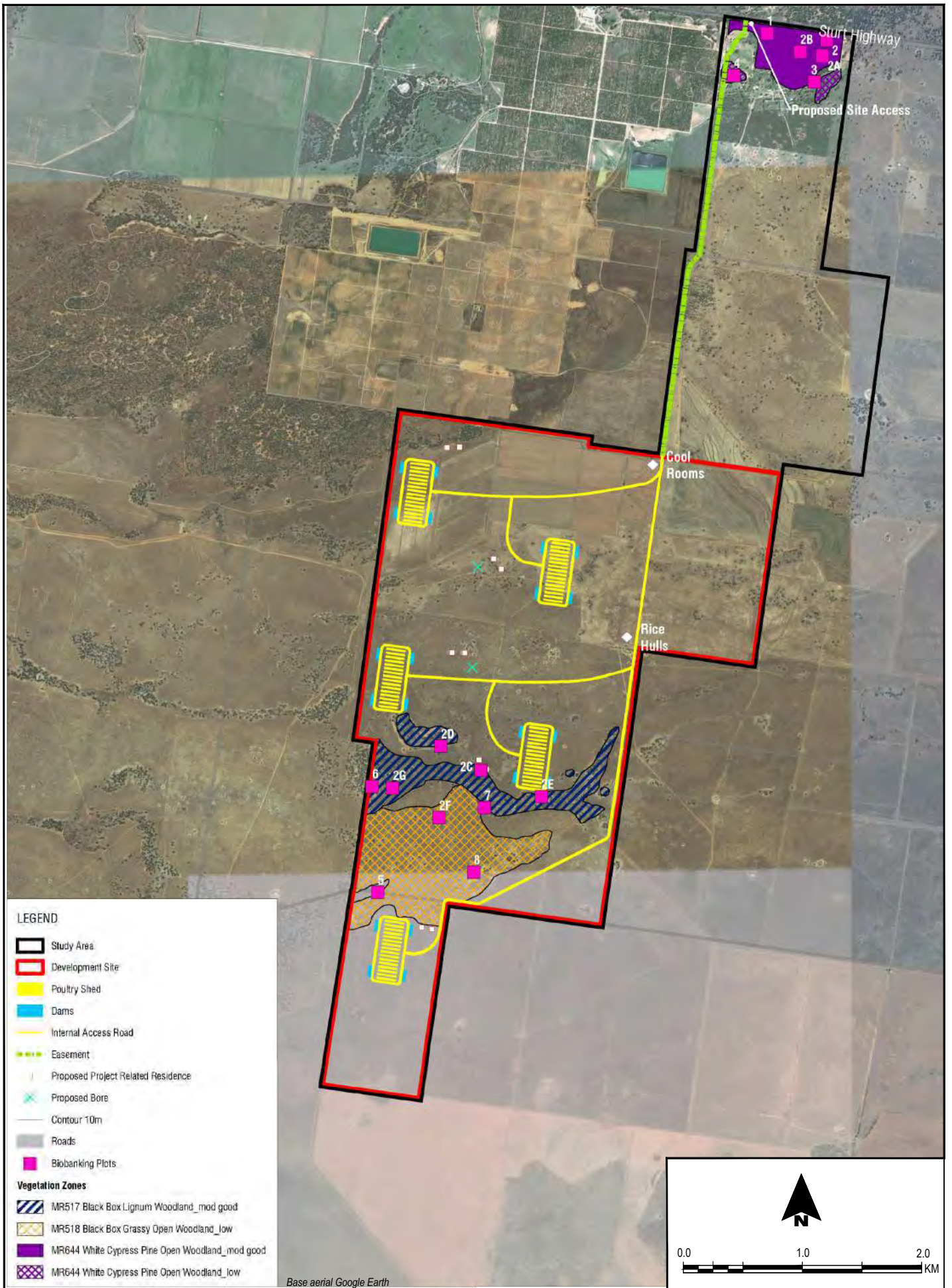
- Black Box Grassy Open Woodland, which occurs across the majority of the development site. This vegetation is subject to sheep grazing and is an open woodland with grassy understory, degraded by grazing and exotic grasses;
- Black Box Lignum Woodland, which occupies slightly lower lying land in the central parts of the development site; and
- White Cypress Pine Open Woodland, which occurs as a distinct patch in the northern parts of the study area and is bounded by the Sturt Highway to the north.

These PCTs were further subdivided into vegetation zones, using the Biobanking condition classes of 'low' and 'moderate to good'. The mapped area of each zone is listed in **Table 6.17** and their distribution across the study area is presented in **Figure 6-12**.

Table 6.17 Vegetation zones mapped within the study area

Code	Vegetation Zone	Area (ha)
MR517	Black Box Lignum Woodland – moderate to good condition	59.31
MR518	Black Box Grassy Open Woodland – low condition	109.68
MR644	White Cypress Pine Open Woodland – moderate to good condition	29.43
MR644	White Cypress Pine Open Woodland – low condition	5.78

'Black Box - Lignum woodland of the inner floodplains in the semi-arid (warm) climate zone (Benson 13)' is positioned on inner floodplains and on alluvial plains mostly in depressions that are frequently flooded. On the development site this community is generally in moderate to good condition and includes characteristic species Black Box *Eucalyptus largiflorens*, Lignum *Duma florulenta* (syn. *Muehlenbeckia florulenta*), Thorny Saltbush *Rhagodia spinescens*, Black Rolypoly *Sclerolaena muricata* and Quena *Solanum esuriale*. This plant community type does not constitute an Engendered Ecological Community (EEC).



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'Black Box grassy open woodland of rarely flooded depressions, south western NSW (Benson 16)' is located on alluvial plains. Within the development site this community includes characteristic species; Black Box *Eucalyptus largiflorens*, Thorny Saltbush *Rhagodia spinescens*, Black Rolyoly *Sclerolaena muricata* var. *muricata* and *Oxalis perennans*. Most of this vegetation had been subject to substantial amounts of disturbance for agricultural production (clearing for grazing and cropping) and is considered to be in 'low' condition. This plant community type does not constitute an EEC.

'White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone (Benson 28)' occurs on prior streams, source bordering sand dunes and sand plains in south-western NSW. Within the Study Area this community includes characteristic species White Cypress Pine *Callitris glaucophylla*, *Maireana enchylaenoides*, *Dissocarpus paradoxus*, Speargrass *Austrostipa scabra* subsp. *scabra* and *Calotis hispidula*. Most of this vegetation has been subject to substantial amounts of disturbance (including clearing; construction of tracks, grazing and tilling for crop production). This plant community type constitutes an EEC known as 'Sandhill Pine Woodland in the Riverina and Murray-Darling Depression Regions and NSW Western Slopes bioregions'. The White Cypress Pine Open Woodland is also considered to have moderate potential to be a groundwater dependent ecosystem in the Murrumbidgee catchment.

Threatened Biota

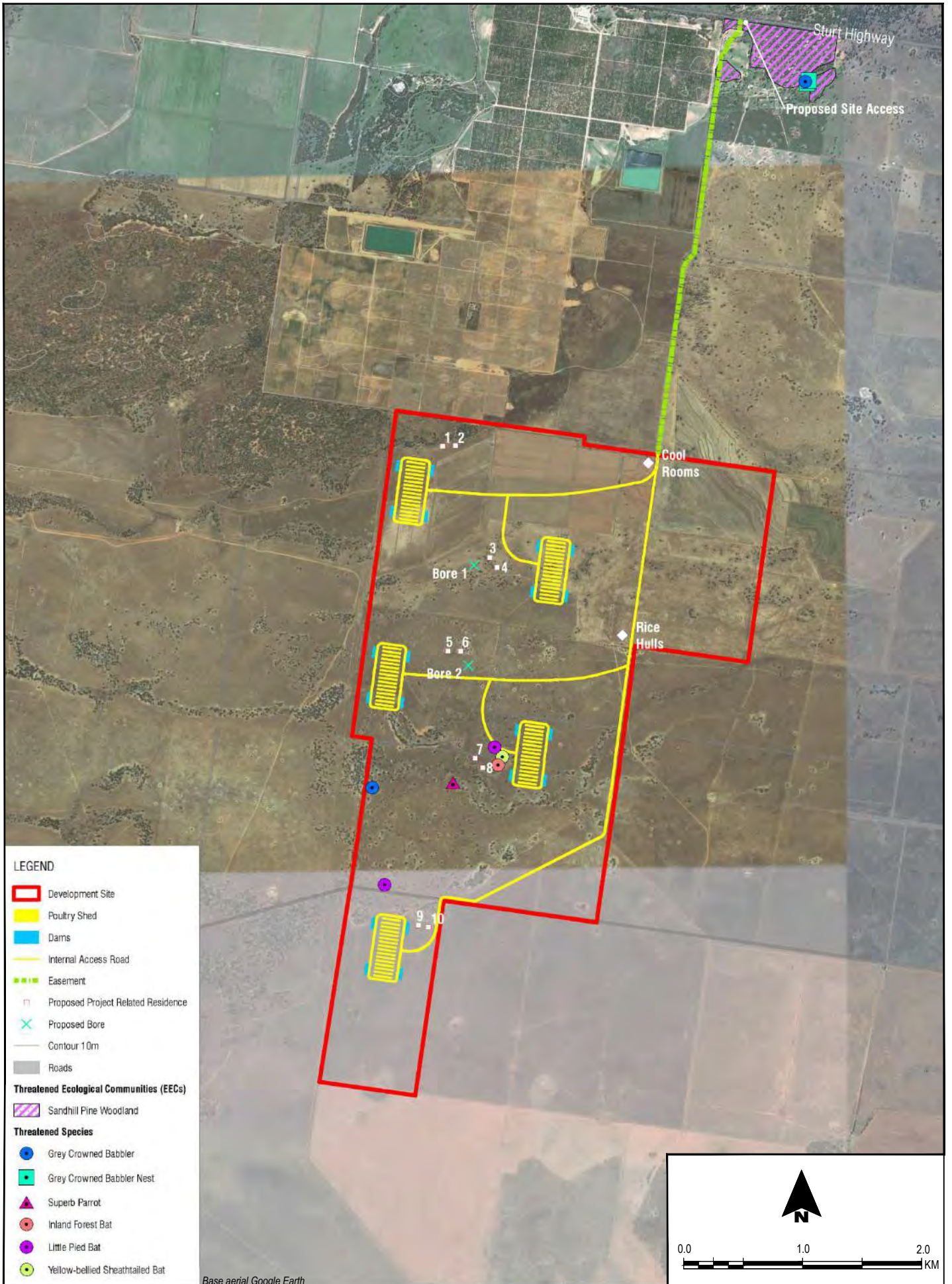
Threatened biota of potential relevance to the study area and which were considered in the assessment include:

- One EEC, Sandhill Pine Woodland, which is present in the northern parts of the study area, as noted above and as shown on **Figure 6-13**.
- One endangered population, being the Glossy Black Cockatoo population of the Riverina region. The site does not contain suitable foraging habitat for this species and so this population is assessed as unlikely to occur.
- Several threatened species, a selection of which were recorded on the site, but most of which are deemed unlikely to occur on the site owing to the degraded condition of the habitats present.

A list of 'candidate species' of potential relevance to the study area was compiled using a combination of the Biobanking Credit Calculator (predicted threatened species), the SEARs (OEH species for consideration in the EIS) and the NSW Wildlife Atlas (previous records within the locality). This list comprises 38 threatened species and one endangered population. This assemblage of threatened species consists of nine plants, 24 birds, four mammals and one amphibian. Additionally four endangered ecological communities have been identified as potentially occurring.

Five threatened species were detected within the study area (see **Figure 6-13**), including two threatened birds and three threatened microchiropteran bat species, as follows:

- Grey-crowned Babbler, listed as 'vulnerable' on the TSC Act;
- Superb Parrot, listed as 'vulnerable' on the TSC Act;
- Inland Forest Bat, listed as 'vulnerable' on the TSC Act;
- Little Pied Bat, listed as 'vulnerable' on the TSC Act; and
- Yellow-bellied Sheath-tail Bat, listed as 'vulnerable' on the TSC Act.



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Threatened Ecological Communities and Threatened Species Recorded on the Site

FIGURE 6.13

6.7.3 Impact Assessment

Vegetation Removal and Habitat Loss

The final development footprint will involve the following direct impacts:

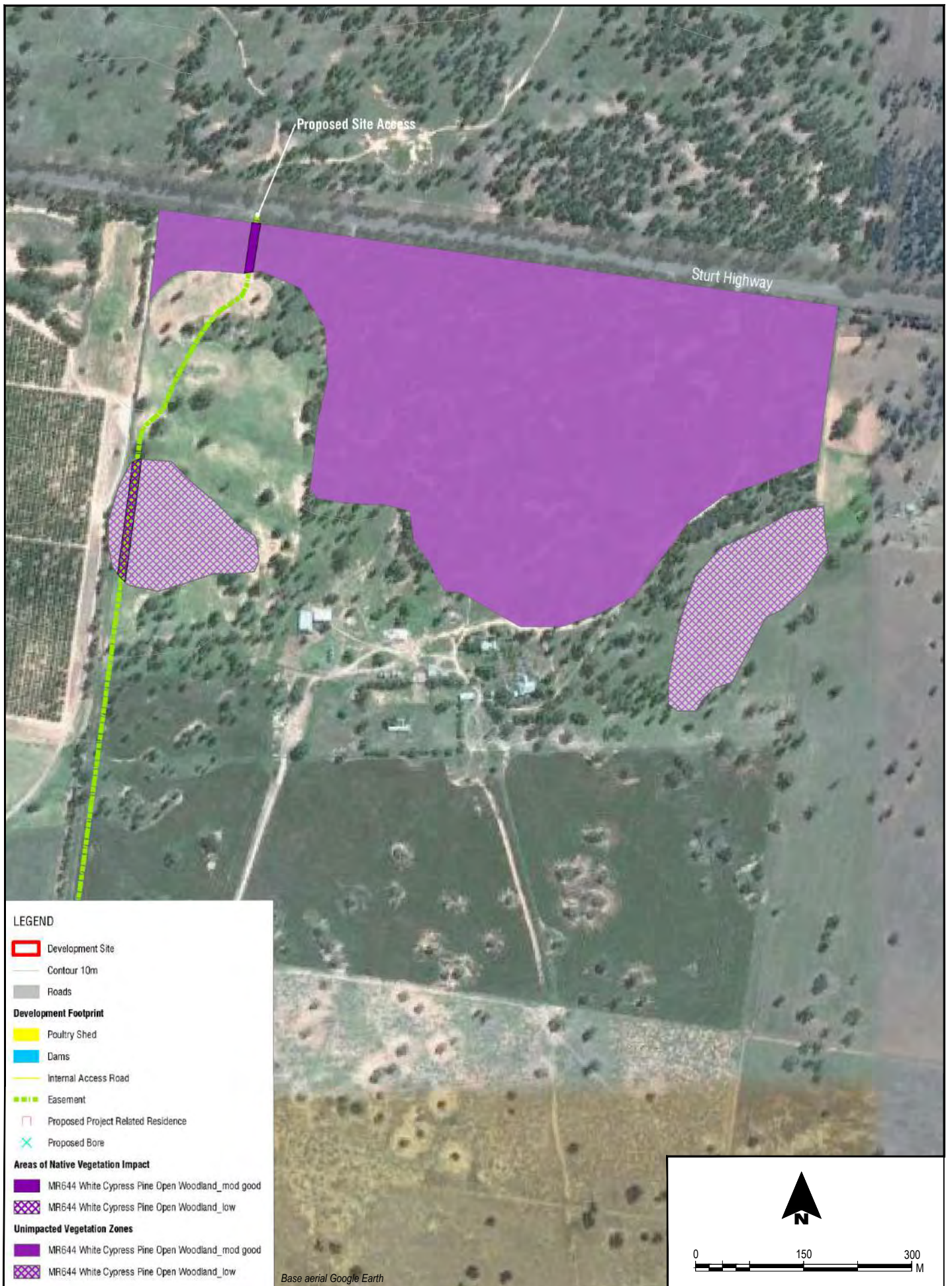
- clearing of native vegetation, involving clearing of a small amount of EEC vegetation;
- loss of hollow-bearing trees, some of which may provide potential roost sites for birds and microchiropteran bats;
- removal of low condition open woodland habitat that represents potential nesting habitat for the Grey-crowned Babbler; and
- removal of a small portion of potential fauna foraging habitat, in particular for threatened microchiropteran bats species, the Grey-crowned Babbler and the Superb Parrot.

Whilst the areas of native vegetation to be cleared have been carefully considered and reduced where possible the Project will impact a small area of White Cypress Pine Open Woodland (EEC) to facilitate the proposed access road off Sturt Highway. This includes mainly EEC vegetation in low condition.

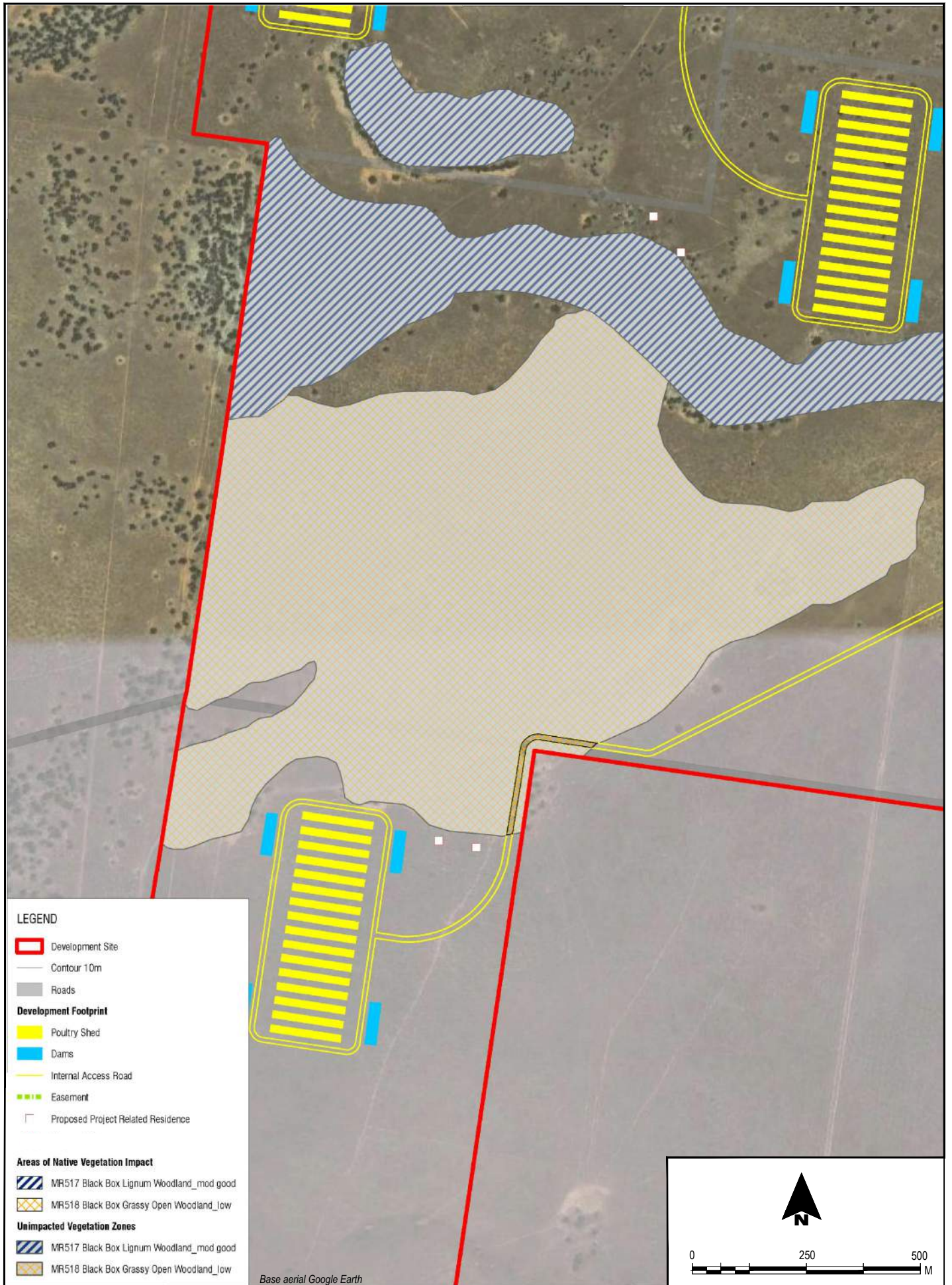
The total area of mapped vegetation removal required for construction and operation of the Project is 0.74 hectares, which represents 0.4 % of the total area of mapped native vegetation on the development site and 0.06 % of the study area. These areas of native vegetation will be replaced with built infrastructure for the Project and therefore impacts on native vegetation (and associated habitats) will be permanent (and unavoidable). Areas of native vegetation impacts (or clearing) are listed in **Table 6.18** and shown on **Figure 6.14** and **Figure 6.15**.

Table 6.18 Native Vegetation Impacts (clearing areas for vegetation zones)

Code	Vegetation Zone Name	Clearing Area (ha)
MR518	Black Box Lignum Woodland - moderate to good condition	0.00
MR518	Black Box Grassy Open Woodland – low condition	0.46
MR644	White Cypress Pine Open Woodland - moderate to good condition	0.08
MR644	White Cypress Pine Open Woodland – low condition	0.20
Total native vegetation clearing area		0.74



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Threatened Species

No local populations of threatened species that generate species credits are likely to occupy the vegetation on the site on other than a transient basis. One species credit species, the Superb Parrot, was recorded on the site. However, the site does not provide nesting resources for this species and so the occurrence of the Superb Parrot is likely to be transitory over the site (during dispersal through the landscape and/or during foraging activities).

Additionally, several orchids and other threatened plants that also generate species credits were also considered in the assessment; however, the degraded condition of the ground layer across most of the site and the historic and ongoing use of the site for sheep grazing precludes the occurrence of these species.

Accordingly, the creation of species polygons for the Superb Parrot or other species credit species is not considered appropriate for this assessment. Therefore there are no species credit polygons that require offset as part of the Project.

Biodiversity Credit Requirement

All vegetation zones mapped within the site have current site value scores of over 17 and represent habitat for at least some threatened species; hence any clearing in these vegetation zones would require an offset. Of the three PCTs mapped within the site, no clearing will be required within the Black Box Lignum Woodland PCT. Accordingly, the PCTs within which clearing will occur and which require an offset are:

- MR518 Black Box Grassy Open Woodland; and
- MR644 White Cypress Pine Open Woodland.

The Biobanking Credit Calculator has been used to calculate the impacts of the Project and potential offset requirements, in accordance with Section 8 of the FBA. A total of 16 ecosystem credits will be required to offset the clearing of native vegetation as part of the construction and operation of the Project. The types of ecosystem credits required for offsetting of native vegetation (and associated habitat) impacts are listed in **Table 6.19**.

Table 6.19 Vegetation zones requiring offset and credits required

Code	Vegetation Zone Name	Mgt Area (ha)	Current Site Value Score	Future Site Value Score	Ecosystem Credits
MR517	Black Box Lignum Woodland_mod_good	0.00	54.67	54.67	0
MR518	Black Box Grassy Open Woodland_low	0.46	40.00	0	6
MR644	White Cypress Pine Open Woodland_mod_good	0.08	45.31	0	3
MR644	White Cypress Pine Open Woodland_low	0.20	38.02	0	7
Total		0.74			16

Groundwater Dependent Ecosystems

The potential for adverse impact to surface water and groundwater resources from the development of intensive poultry farms is very low, with the risk of impact considered far less than those associated with traditional agricultural activities.

While the proposed PPU sites are removed from any notable drainage features, construction activities could potentially impact upon water resources through changes to groundwater recharge as a result of soil compaction, loss of groundcover and generation of sediment-laden runoff. Given that the proposed PPU sites will be relatively small and the commercial activity associated with the development will be largely confined to these areas, changes to the existing runoff/recharge pattern will be relatively minor. No detectable impacts to groundwater levels or yields are expected. The nature of the strata and the depth to the water bearing zones will provide a substantial buffer against infiltration of any potential pollutants, such as turbidity and/or hydrocarbons.

The Project will have limited impact on those GDE terrestrial vegetation types within and adjoining the development site, with a small band of the White Cypress Pine vegetation requiring clearing for the access track. It is not likely that any significant impact on GDEs would ensue as a result of the development (refer **Section 6.6.2**).

EPBC Act matters

Matters of national environmental significance listed on the EPBC Act, that are of potential relevance to the study area include:

- Listed threatened species;
- Listed threatened ecological communities; and
- Listed migratory species.

The development site does not contain EPBC Act threatened ecological communities, but could provide habitat for some listed threatened species, such as bird and bats.

Thirteen threatened species (and/or their habitats) listed under the EPBC Act are predicted to occur within the locality. Of these, one, the Superb Parrot, was recorded on the development site. Individuals were recorded within woodland habitats in the central parts of the site and it is possible that this species utilises the site as part of its wide ranging foraging activities.

With regard to the EPBC Act listed species that are not listed on the TSC Act, SEARs or Credit Calculator, such as the Koala, Malleefowl and Australian Bittern – habitat for these species is not present in the development site. Similarly, there are no watercourses available on the subject site for threatened fish species, namely the Silver Perch, Murray Cod and Macquarie Perch.

Taking into consideration all stages and components of the Project, and all related activities and infrastructure, there is the potential for impacts, including indirect impacts, on matters of national environmental significance, being mainly loss of a small area of degraded habitat for mobile threatened fauna species. However, it is highly unlikely that any of such species will be adversely impacted by the Project.

Eight migratory species (and/or their habitats) are predicted to occur within the locality, none of which are likely to inhabit the development site.

6.7.4 Mitigation Measures

On-site mitigation measures to reduce direct and indirect impacts include before, during and after construction measures as outlined in **Table 6.20**.

Table 6.20 Mitigation measures to be implemented before, during and after construction

Action	Outcome	Timing	Responsibility
Before Construction			
Protection of native vegetation	Delineate construction zone (to ensure no impacts on adjoining native vegetation)	Prior to and for the duration of any works	Construction contractor
Erosion and sediment control measures	Install and maintain erosion and sediment control measures in accordance with the requirements of the 'Blue Book'	Prior to and for the duration of any works	Construction contractor
During Construction			
Fauna management	Supervision of tree felling to rescue and recover any fauna (as necessary)	During clearing	Construction team/ProTen
Weed management	Vehicle wash-down Site maintenance program	Ongoing	Construction team
Rubbish management	Rubbish (such as food scraps and building waste) are to be properly managed during construction and must not be stockpiled on areas of native vegetation	Ongoing	Construction team
Exposed soil surface management	Revegetation – using re-use of topsoil layers and seeding of pasture grasses and legumes (refer Section 3.12)	Immediately following soil disturbances	Construction team
Traffic management	Speed limits of 60km/hr are proposed, reducing the likelihood of animal strikes Educate workers on possibility of animal strike through construction management program	Ongoing	Construction team
After Construction			
Traffic management	Speed limits of 60km/hr are proposed, reducing the likelihood of animal strikes	Ongoing	Site operator
Weed management	Limit spread of weeds along with landscape maintenance program	Ongoing, half-yearly minimum	Site operator
Increased artificial light	Each luminaire will be aimed downwards and only switched on during loading-unloading and servicing activities outside of daylight hours and during heavy fog.	Ongoing	Site operator
Waste management	Appropriate systems will be implemented to ensure that each waste stream generated by the development is effectively managed and/or disposed of off-site (see Section 3.10). There will not be any on-site stockpiling or disposal of waste materials.	Ongoing	Site operator
Surface water and run-off	An engineered surface water drainage and management strategy is to be prepared and implemented (see Sections 3.11 and 6.5).	Ongoing	Site operator

6.7.5 Biodiversity Offset Strategy

As described above the assessment completed as part of the BAR determined that a biodiversity offset is required in accordance with the FBA and the *NSW Biodiversity Offsets Policy for Major Projects* (the 'Offsets Policy'; NSW Government and OEH 2014). As documented in **Table 6.19**, a total of 16 ecosystem credits are required to offset the Project impacts. No species credits are required as part of the offset.

A summary of the available offsetting options for the Project in accordance with the FBA, listed in order of priority, are summarised in **Table 6.21**.

Table 6.21 Ecosystem credits required for offset and matching credit types

Option	Offset Option	No. Credits	Offset Options/Comments
1a	Purchase and retire matching (like-for-like) ecosystem credits	16	<ul style="list-style-type: none"> Like-for-like ecosystem credits comprise: <ul style="list-style-type: none"> Those of same PCT; or A PCT from the same vegetation class that has equal or higher percentage cleared value for the CMA. See list of matching credit types in Table 17 in the BAR. number and type of credits must be available on credit register, or will become available prior to construction (or during timeframe specified in in the Conditions of Approval for the SSD project application)
1b	Purchase land and create required credits through a Biobanking Agreement	16	<ul style="list-style-type: none"> Requires proponent to find suitable properties for sale in the IBRA subregion, purchase property (or properties) and then generate a Biobanking Agreement on the land; Biobank site should contain matching credit types and number as in in Table 17 of the BAR; Proponent retires their own credits to offset project, using only Part A costs (ie management costs of biobank per credit).
2	Variation rules - Purchase and retire other credits within same vegetation formation	TBC	<ul style="list-style-type: none"> Apply variation rules when matching credit types in Table 17 of the BAR is not available; For MR 644 credits, find ecosystem credits for PCTs that fall within 'Semi-arid woodlands' formation, with >80% cleared value for CMA; For MR518 credits, find ecosystem credits for PCTs within 'Grassy Woodlands' formation, with > 60% cleared value for CMA.
3	Supplementary measures	N/A	<ul style="list-style-type: none"> Apply FBA variation rules Apply when suitable credits and/or biobank site unavailable or cannot be secured within BOS and construction timeframe Use interim method to calculate monetary contribution for supplementary measures Could be combination of credit purchase and land purchase

A discussion on each of these options is presented below.

Like for like credits (Options 1a and 1b)

These credits are currently not available on the Biobanking Credit Register, and no applicable expressions of interest are currently published showing an availability of these credit types within the Riverina IBRA region. Given that no credit trades have, to date, occurred in the Murrumbidgee IBRA region, and that there are currently no published expressions of interest (EOIs) for these credit types on the Biobanking site register, it is unlikely that suitable like-for-like ecosystem credits will become available on the credit market in the near future. Accordingly, purchase of like-for-like credits (Option 1a) is not presently available to ProTen.

ProTen may also choose to create a Biobanking Agreement over a portion of land in order to generate the required like-for-like credits and retire these to fulfil the offset obligation. However, as described in detail in the BAR (refer **Appendix I**), this option is also not available to ProTen for the following reasons:

- ProTen has entered into a lease agreement with the current landowner that will allow continued use of the land within the development site surrounding the PPU's for an agricultural use such as grazing. This proposed future use of the surplus land within the development site is not compatible with management of a portion of the study area for biodiversity conservation under a Biobanking Agreement;
- The 16 credits required equates to around 2 hectares of land area. As this offset requirement is small, the cost of securing a biobank, and its ongoing management, would be disproportionate to its size. The creation of a biobank on a parcel of land this small would not be economical.
- Similarly, the purchase of other properties is not feasible for the small offset required. Searches of real estate sources within the Griffith-Narrandera district reveal that potential suitable rural properties are much larger than the required offset area. Suitable offset sites of the size required and containing the ecosystem credits required are not currently available. Similarly, the subdivision and purchase of a portion of one of the large rural properties would be disproportionate to the offset required. Given the rural land use of the majority of the IBRA subregion, the purchase of a 2 hectare property (or larger) and converting it into a biobank would not be feasible or economical.

Hence, whilst reasonable steps have been taken to obtain a suitable like-for-like offset, Option 1b is not available to ProTen. Accordingly, the 'variation rules' can be applied in accordance with Appendix A (Section 1) of the Offset Policy. That is, where the required credits are not available, proponents can apply the variation rules for matching ecosystem credit.

Apply variation rules (Option 2)

According to the variation rules, the consent authority may approve a variation of the offset rules for matching ecosystem credits, by allowing ecosystem credits created for a PCT from the same vegetation formation as the required ecosystem credit to be proposed as part of the BOS. However, at the time of writing, no ecosystem credits within the required vegetation formations are available on the credit register or through the EOI web page.

Supplementary measures (Option 3)

Where a proponent can demonstrate that all reasonable steps have been taken to obtain like-for-like credits or a suitable offset site (as per the steps listed above), they can choose to use 'supplementary measures'. Where the entire offset requirement is proposed to be fulfilled using supplementary measures, they "must negotiate the amount to be spent" with the consent authority, with the advice of OEH.

Finalising the Offset Strategy

In view of the above discussion, the following actions will be undertaken in consultation with OEH and the DP&E to finalise an appropriate offset package for the development:

- Uploading an EOI for the required ecosystem credits on the 'Credit Wanted' register of the Biobanking Credit Register;
- Monitor the availability of matching ecosystem credits during the six month advertisement period (as required by OEH), including regularly checking the credit register for ecosystem credits that match the required type and number of credits, including 'variation credits' from the same vegetation formations;
- Consult with the OEH Biobanking Team and the Albury office of OEH (during the EOI period) on the availability of suitable credits or offset sites;
- During, or at the end of, the advertisement period, either:
 - Purchase like-for-like credits or if not available purchase 'variation credits'; or if both credit types not available, then:
 - Apply supplementary measures, and calculate suitable monetary fund deposit.

Should supplementary measures be required, the following actions will be completed:

- Consult with OEH on suitable measures that would benefit the plant community types (ie ecosystem credits) impacted by the proposed development;
- Conduct research into current regional and local conservation programs that benefit the plant communities affected, including reference to:
 - NSW Priority Action Statements under the TSC Act;
 - Relevant Recovery Plans, threat abatement plans, or Final Determinations (for Sandhill Pine Woodland EEC);
 - Plans of managements for local and regional conservation reserves that are relevant to the offset entities; and
 - Scientific literature.
- Use the results of the research and consultation with OEH and DP&E to agree and determine a suitable supplementary offset and then calculate agreed monetary deposit to fulfil the project's offset requirements.

These actions and the final outcome will be documented in an addendum to the BOS. This will be completed within 12 months of obtaining Project Approval.

6.7.6 Conclusion

The development site has been chosen to, *inter alia*, avoid or minimise impacts on biodiversity and was chosen in part, as it contains large expanse of cleared land. As described further in **Section 8.2**, the site represents the preferred option of several considered and the culmination of a site selection process that has considered a range of criteria (including economic, social and environmental), not least of which is biodiversity.

Unavoidable impacts on native vegetation are minor and include impacting a small area of Sandhill Pine EEC in the north of the study area to allow construction of the internal access road and a small area of low condition Black Box Grassy Open Woodland in the south of the development site (to allow access to the southernmost PPU). These impacts and other potential indirect impacts will be reduced by the mitigation measures proposed. In addition appropriate biodiversity credits and offsetting are provided to compensate for vegetation and habitat loss.

Application of the Credit Calculator in accordance with the FBA reveals that the impacts of the Project correlate to a small requirement of 16 ecosystem credits, comprising 6 Black Box Grassy Open Woodland credits and 10 White Cypress Pine Open Woodland credits. No species credits are required for the Project.

ProTen will continue consultation with OEH and DP&E to finalise the offset strategy and fulfil offset obligations under the SSD approval process within 12 months of obtaining Project Approval. Taking into consideration all stages and components of the Project, and all related activities and infrastructure, there is the potential for impacts, including indirect impacts, on matters of national environmental significance listed under the EPBC Act, being mainly loss of a small area of degraded habitat for mobile threatened fauna species. However, it is highly unlikely that any of such species will be adversely impacted by the Project and hence there is no likelihood of the Project imposing 'a significant impact' on any matters of national environmental significance listed under the EPBC Act.

6.8 Aboriginal Heritage

6.8.1 Introduction

OzArk Environmental and Heritage Management (OzArk) undertook an assessment of the potential Aboriginal archaeological impacts of the Project. The assessment included:

- Historic research of the development site;
- Desktop database searches for previously recorded sites; and
- Formulation of a predictive model for archaeological site location;
- Consultation with Leeton and District Local Aboriginal Land Council (L&DLALC); and
- Field survey on 10-11th February 2015.

The assessment was undertaken in accordance with the *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010) and the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (ACHCRs) (DECCW, 2010). Further information on the consultation undertaken with the Aboriginal Community is provided in **Section 5.3**.

A copy of OzArk's Aboriginal Archaeological Assessment (2015) is contained within **Appendix J**, and a summary of the key findings provided below.

6.8.2 Existing Environment

Aboriginal History of the site

The development site is located within the southern boundaries of the territory of the Wiradjuri tribal and linguistic group (Tindale 1974, as cited in OzArk, 2015). The Wiradjuri tribal area is situated within the Murray Darling Basin and extends across three general geographical regions: the highlands or central tablelands in the east, the riverine plains in the west, and the transitional western slopes zone in-between. Within this region, the presence of Aboriginal people in the Darling Basin has been dated to 40,000 years ago (Hope 1981 as cited in Haglund 1985) with a spread east into the mountains thought to have occurred between 14,000 to 12,000 years ago.

Although no systematic, regional based archaeological study has been undertaken of the area, some development-driven studies have been undertaken which provide a useful context for the site and help inform the predictive model.

Table 6.22 summarises the findings of the desktop database searches, identifying any previously recorded sites within and surrounding the development site. The OEH administered Aboriginal Heritage Information Management System (AHIMS) database lists 43 sites, eight of which are within 10 kilometres of the site. Of these, none are within 3 kilometres and all are to the north and west, nearer to the Murrumbidgee River. Four of the eight sites within 10 kilometres of the proposed development site contain a culturally scarred tree only. Three sites are open artefact scatters only and one site is a scarred tree with stone artefacts.

Table 6.22 Desktop-Database Search Results

Name of Database Searched	Date of Search	Type of Search	Comment
Commonwealth Heritage Listings	9 February 2015	Narrandera LGA	No places listed on either the National or Commonwealth heritage lists are located within the development site
National Native Title Claims Search	9 February 2015	Narrandera LGA	No Native Title Claims cover the development site
OEH AHIMS	5 February 2015	36km by 16km centred on the Study Area*	No sites are within the development site
Local Environment Plan (LEP)	9 February 2015	Narrandera LEP of 2013	None of the Aboriginal places noted occur near the development site

* The search area encompasses an associated development not assessed in this report (see OzArk 2015).

Landscape Context

The proposed development site is within the Riverina Bioregion and with regard to the OEH Bioregion Overview (2011) the landscape context of the site is characterised as follows:

- Topography is flat ranging between AHD 133m and 138m with a more undulating landscape toward the Sturt Highway;
- Soils are reddish brown and almost dune like in the undulating areas, with no rock outcrops or gravels;
- There are no named water courses with the Murrumbidgee River approximately 9 km to the north. There are some shallow wide ephemeral floodways;
- Vegetation has been largely cleared with some stands of mature black or grey box trees concentrated around ephemeral water bodies. Cypress pines are common on the northern fringe;
- Mean minimum temperature of 3.1 degrees Celsius and mean maximum of 33.2. Rainfall is evenly spread throughout the year with a mean total of 435.8mm; and
- The site has been subject to intensive agriculture.

In the context of Aboriginal archaeological assessment the site represents a marginal landscape with limited reliable water resources and a lack of distinctive landscape character. The site also lacks stone resources for artefact manufacture and grinding. Mature trees are present but sparse and have appropriate bark structure for practical use.

Predictive Model for Archaeological Site Location

Across Australia there is a high correlation between the permanence of a water source and Aboriginal occupation. The presence of other natural resources such as plant and animal foods also affect site location, as does the impact of erosion and historic farming practices which can disturb sites from their original context.

In consideration of this, the environmental context of the development site and regional archaeological record, the following predictions can be made:

- Due to the distance from reliable water, the high levels of existing disturbance and the absence of distinctive landform features, few or no sites of Aboriginal heritage are expected to occur;

- It is acknowledged that there may have been prior streams carrying reliable water through the development site that are no longer evident on the surface. This would increase the likelihood of sites within 200 metres of them should they exist.
- Scarred trees are the most common site type, particularly in this environmental context. Many mature trees have been cleared, however there are many remnant. Scarred tree sites are likely to have the following characteristics:
 - Scarred tree sites are just as likely to have associated stone artefacts as not; and
 - Scars are most likely to occur on box trees (for practical or socio-cultural purposes) and Cypress pines (for socio-cultural purposes);
- Small open camp sites and isolated stone artefact sites may occur anywhere but are most likely to be adjacent to the ephemeral floodways. However, due to the high level of disturbance this site type, if present, has a high likelihood of being disturbed and/or of low integrity;
- Ground ovens or hearths may occur. If so, they are most likely to occur adjacent to the ephemeral floodways; and
- Burials are possible but very unlikely within the northern fringes where the landscape is undulating and the soils are sandy.

6.8.3 Impact Assessment

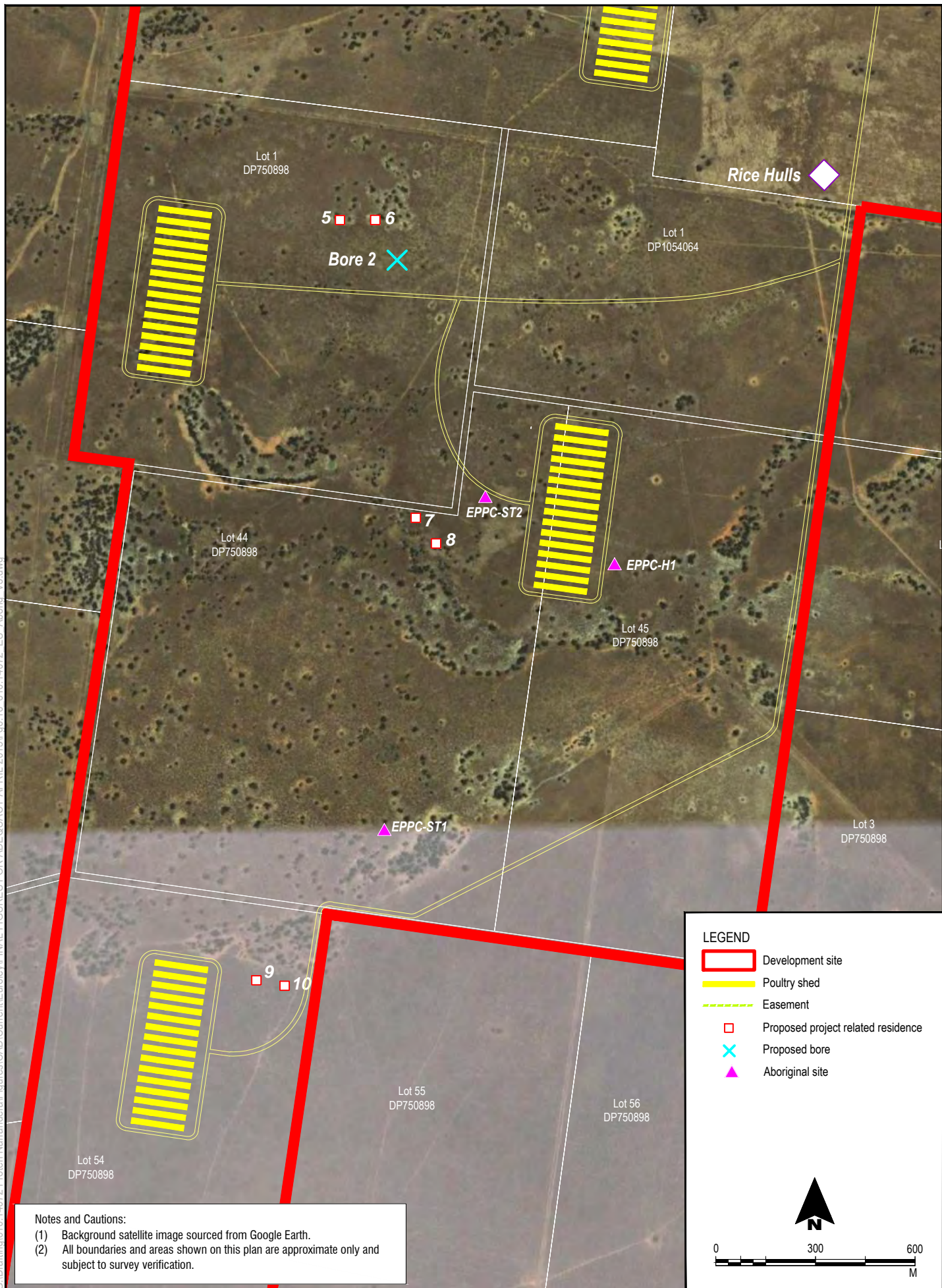
A survey of the development site was undertaken by OzArk with a representative of the L&DLALC, focussing on the entire proposed disturbance footprint of the Project. Following completion of the survey, as a result of consultation with OEH on biodiversity matters the proposed location of PPU 5 was moved slightly south out of the originally proposed treed area into a cropped paddock to avoid clearing of a mapped area of vegetation. Whilst the amended PPU location was not directly surveyed by OzArk, it was witnessed by OzArk from the north during the survey. The archaeology report was amended to reflect this slight change in PPU 5 location, and the report re-sent to the L&DLALC for comment, as mentioned in **Section 5.3** (consultation).

Two sites were identified during the field survey; a scarred tree and a hearth. A third site, another scarred tree, was identified during the ecological survey undertaken for the Project. Importantly, none of the sites identified are within the proposed disturbance footprint of the Project, as shown on **Figure 6.16**. The three sites are illustrated on **Plates 15-17**, and **Table 6.23** provides a description of each site.

Table 6.23 Archaeological Sites Recorded in the Development Site

ID	Type	Description
EPPC- ST1	Scarred tree	This site is a culturally-scarred tree with no observable associated artefacts. The elongated scar is on the south side of a mature Black or Grey box tree. The scar is approximately 1.5m in length and 0.35m in width, with 5cm to 10cm of regrowth. The base of the scar is approximately 0.60m above the ground. The scar is weathered but a possible axe mark is discernible at the southern end of the scar
EPPC-ST2	Scarred tree	This scar is on a Black box tree on grazing land that has been largely cleared of trees. The full details of this scar were not recorded however, a photograph of the site suggests that this is likely a cultural scar.
EPPC-H1	Hearth	The site was recorded within an exposure on the fringe of a cleared paddock that has been ploughed, although the site appears to have escaped ploughing. The hearth consists of a concentration of fired clay nodules within an area of approximately 50cm by 50cm and some outlying nodules up to 1.5m from the main concentration

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LEGEND

- Development site
- Poultry shed
- Easement
- Proposed project related residence
- X Proposed bore
- ▲ Aboriginal site

N

0 300 600
M

Notes and Cautions:
 (1) Background satellite image sourced from Google Earth.
 (2) All boundaries and areas shown on this plan are approximate only and subject to survey verification.

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Plate 15 – Scarred tree within the development site (EPPC-ST1)



Plate 16 – Scarred tree within the development site (EPPC – ST2)



Plate 17 – Hearth within the development site (EPPC – H1)

The results of the survey closely match the expectations of the predictive model in that few sites were recorded. This was expected due to the low archaeological potential of the landscape and the existing high levels of disturbance. The L&DLALC representative was also of the opinion that the site had marginal potential. The sites that were recorded were of a predicted type and condition. Culturally-scarred trees and hearths are common in the region generally.

Table 6.24 summarises the significance of the three sites based on each of the items cultural, scientific, aesthetic and historic value. The three sites have a low archaeological/scientific and historic value as scarred trees and hearths are common in the landscape and these particular sites have no likely association with the history of the area. The scarred trees are prominent in the landscape but are not particularly unique and therefore are considered to have a low-moderate value. The aesthetic value of the hearth is also considered to be low.

The L&DLALC provided comments on the significance of the sites, stating that all sites are significant to Aboriginal people and should be managed as such. In this regard it is noted that all of the sites identified within the development site will be avoided by the Project’s impact footprint. The L&DLALC also noted that the area that was inspected was void of any identifying landscape due to the clearing and farming that had been undertaken over the years. The full statement from the L&DLALC is provided in Section 5.7.2 of the Aboriginal Archaeological Report (refer **Appendix J**).

Table 6.24 Significance assessment

ID	Social or Cultural Value*	Archaeological / Scientific Value	Aesthetic Value	Historic Value
EPPC-ST1	Moderate - high	low	low-moderate	None
EPPC-ST2	Moderate - high	low	low-moderate	None
EPPC-H1	Moderate - high	low	Low	None

*Dependant on function and context

None of the recorded sites will be directly impacted by the Project, as summarised in **Table 6.25**. All sites are within 30 metres of the proposed impact footprint but are not within it. Notwithstanding, measures will be taken to ensure these sites are not impacted by the Project, as detailed in **Section 6.8.4**.

Table 6.25 Impact Assessment

Site Name	Type of Harm (Direct / Indirect / None)	Degree of Harm (Total / Partial / None)	Consequence of Harm (Total / Partial / No Loss of Value)
EPPC-ST1	None	None	No Loss of Value
EPPC-ST2	None	None	No Loss of Value
EPPC-H1	None	None	No Loss of Value

6.8.4 Mitigation Measures

To avoid any unintentional impacts on the identified sites the following management measures will be implemented:

- EPPC-ST1, EPPC-ST2 and EPPC-H1 will be temporarily fenced with a 10 metre buffer for the duration of construction. The fencing will be clearly visible and signed in such a way that it is clear that the sites should not be entered.
- Permanent fencing will be erected at EPPC-H1 for the duration of operation in order to exclude vehicles, pedestrians and animals from the site in the case of accidental impact. The fencing will be sturdy and visible to achieve this purpose.
- The location of the sites will be kept on a register and the farm manager will be made aware of their presence.
- Should impact to the sites become a requirement of the Project or any subsequent alteration to the Project post-approval, then an Aboriginal Cultural Heritage Management Plan (ACHMP) will be required to address the management of the sites.
- If the scarred trees (EPPC-ST1 and EPPC-ST2) naturally fall over, then L&DLALC will be contacted to discuss if further management is required and, if so, what the appropriate management will be.
- Should any Aboriginal artefact be uncovered during construction or operation all works will cease in that locale and the OEH will be notified. Works will only recommence when an appropriate and approved management strategy has been agreed to by all of the relevant stakeholders.

6.8.5 Conclusion

Three Aboriginal heritage sites have been recorded within the development site; two scarred trees and a hearth. These sites are all outside of the disturbance footprint associated with the Project and will not be impacted by the development.

6.9 Hazard and Risk

6.9.1 Introduction

A preliminary risk screening of the Project was undertaken by SLR in accordance with *NSW State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)*, and to satisfy the requirement relating to Land Use Safety in the SEARs.

The preliminary screening assesses the storage of specific dangerous goods classes that have the potential for significant off-site effects. The assessment involves the identification of classes and quantities of all dangerous goods to be used, stored or produced on site, as well as transported to and from the Project Site.

The purpose of an initial SEPP 33 risk screening is to exclude those developments which do not pose significant risk from more detailed studies. Where SEPP 33 identifies a development as potentially hazardous and/or offensive, a Preliminary Hazard Analysis (PHA) is required to determine the level of risk to people, property and the environment at the proposed location and in the presence of controls.

The preliminary risk screening found that the Project is considered potentially hazardous due to the amount of LPG to be transported and stored on site, and therefore in accordance with SEPP 33 a PHA is required.

The specific findings of the preliminary risk screening are discussed below. The full Preliminary Hazard Analysis report (SLR, 2015c) is provided in **Appendix K** with the key findings and recommendations of the PHA also summarised in the below sub-sections.

6.9.2 Preliminary Risk Screening

Dangerous Goods Storage

The classified dangerous goods to be stored at the development site include LPG, sodium hypochlorite and petrol. The most significant of these is LPG which will be used in the heating of the poultry sheds. LPG will be supplied from Griffith and stored on-site in bulk tanks installed at each of the PPU sites. At each PPU there will be eight LPG storage tanks each of 7,500 litres capacity, giving a maximum LPG storage at each PPU of 60,000 litres with overall onsite storage of 300,000 litres.

LPG is classified as a Class 2.1 Flammable Gas. As can be seen in **Table 6.26**, the quantity of LPG required to be stored is above the screening threshold (16m³) and is therefore considered potentially hazardous. In accordance with SEPP 33, a Preliminary Hazard Analysis has been prepared and is summarised in **Section 6.9.3**.

Table 6.26 also lists the quantities of the other dangerous goods to be stored on site and illustrates that they are well below the threshold quantities and are therefore not potentially hazardous.

Table 6.26 Project Dangerous Goods Classes in Storage

Substance	Hazardous Class	Total Storage on Site (tonnes)	Threshold Quantity (tonnes)	SEPP 33 Threshold Level Findings
LPG	Class 2.1	300m ³ (40x7,500L tanks)	16m ³ (above ground storage)	Above
Sodium Hypochlorite (10-30%)	Class 8	7.34 tonnes	50tonnes	Below
Petrol	Class 3	2.5 tonnes	4 tonnes	Below

Dangerous Goods Transport

In applying SEPP 33 a proposed development may be deemed potentially hazardous if the numbers of generated traffic movements for significant quantities of dangerous goods entering and leaving the site are above the cumulative vehicle movements as specified in the SEPP 33 guideline. The dangerous goods to be transported to the development site include LPG, sodium hypochlorite and petrol. The level of maximum proposed movements to the development site per week is provided in **Table 6.27**.

Table 6.27 Dangerous Goods Vehicle Movements

Substance	ADG Class	Maximum Proposed DGs Vehicle Movements (per week)	SEPP 33 Threshold Vehicle Movements (per week)	SEPP 33 Threshold Minimum Quantity (per load)	Load Type (relevant to the facility)	SEPP 33 Threshold Level Findings
LPG	2.1	1	>40	2 tonne	Bulk	Above
Sodium Hypochlorite	8	<1	>30	5 tonne	Package	Below
Petrol	3	<1	>45	3 tonne	Bulk	Below

The quantities of LPG required for each delivery (vehicle movement) will be greater than 2 tonne and above the SEPP 33 Thresholds and therefore the Project is considered potentially hazardous with respect to the transport of LPG. The transport of the other dangerous goods required on site is again well below the threshold vehicle movements.

6.9.3 Preliminary Hazard Analysis

Due to the findings of the preliminary Risk Screening, a PHA was carried out for the Project in accordance with the *Hazardous Industry Planning Advisory Paper No. 4 – Risk Criteria for Land Use Safety Planning, NSW Department of Planning (HIPAP 4)*.

The procedure adopted for assessing hazardous impacts in accordance with HIPAP 4 involved the following steps:

1. Hazard identification;
2. Hazard analysis (consequence and probability estimations); and
3. Risk evaluation and assessment against specific criteria.

One potential hazard was identified for the development site with regard to the storage and transport of LPG, that being for the risk of an LPG fire.

In accordance with HITAP 4 the following risk assessment criteria were identified for the Project:

- Heat-Flux Radiation
- Explosion Over-Pressure for an on-site fire
- Toxic gas exposure
- Toxic release into the biophysical environment

However, the assessment found that various safety features of the Project were sufficient to not warrant any further consequence analysis of each risk criteria. Specifically AS/NZS 1596:2014 *The storage and handling of LP Gas* stipulates a number of safety features for the storage of LPG specifically designed to reduce the overall risk of operations. Some of the project features which reduce this risk are as follows:

- LPG storage will be separated into five areas with associated PPUs and approximately 1 km apart.
- The location and equipment will meet the requirements of AS/NZS 1596:2014 *The Storage and Handling of LP Gas*.
- Each LPG storage facility will be significantly further than the minimum distance required by AS 1596 of 10 metres to a public place and 17 metres to a protected area.
- Above ground storage tanks will be in the open air.
- Adjacent fences, walls, barriers or the like will permit free access and cross ventilation for the tank.
- The maximum tank diameter will be 1.2 metres and adjacent tanks will be 1.2 metres apart.
- The surrounding area is lightly populated with the closest potential residence approximately 2 kilometres from the boundary and the nearest population centre, Narrandera, 26 kilometres away.
- The design and layout of the LPG storage facilities has been undertaken by gas supplier Elgas.
- Rigid transport trucks will be used for the transport of LPG.
- Truck movements for LPG will generally be less than 1 per week.
- Other chemicals stored on site will also be spread among each PPU and are below the SEPP 33 thresholds.

Therefore, while the development is considered to be hazardous in accordance with the screening thresholds in SEPP 33, with suitable engineering controls in place and in consideration of all of the factors listed above, the development does not pose a significant offsite risk and is not considered to be an offensive or hazardous development.

6.9.4 Conclusion

The Preliminary Hazard Analysis concluded that the operation of the Project meets the criteria laid down in *HIPAP 4 Risk Criteria for Land Use Safety Planning*, and would not cause any risk, significant or minor, to the community.

6.10 Visual Amenity

6.10.1 Existing Environment

The visual amenity of the development is that of a rural property that has been significantly modified by historical land clearing and long-term agricultural activities. It is largely devoid of significant vegetation cover and primarily comprises treeless paddocks that have been consistently cropped and/or grazed for many years.

The proposed PPU sites are relatively small and the commercial activity associated with the development will be largely confined to these sites. The footprint of the proposed development, including the PPUs, ancillary infrastructure, associated residences and internal access roads will be approximately 90 hectares, comprising just 8 percent of the total development site.

6.10.2 Impact Assessment

As outlined in **Section 3.9**, the primary source of external lighting will comprise one luminaire mounted at a height of approximately 4 metres over the front and rear loading-unloading areas of each poultry shed. The development site offers several advantages in terms of lighting, including a very low density of surrounding residences and significant separation distances, and therefore no significant impact on surrounding residences as a result of light spill from the development site is anticipated.

The nearest residences to the development site, R5 and R4, are 2.1 kilometres and 2.3 kilometres respectively to the north of the northern-most PPU (PPU 1), as illustrated on **Figure 1.2**. Analysis of the topography reveals that there is a slight change in elevation between the northern PPU and these nearest receptors, which is likely to shield the view from these residences.

6.10.3 Mitigation Measures

While not anticipated to be an issue, ProTen will take reasonable and practicable steps to prevent or minimise light emissions, including the following best management practices and mitigation measures.

Operation and Maintenance

Each luminaire will be aimed downwards and will only be switched on when the loading-unloading areas are in use outside of daylight hours and during times of heavy fog. This is expected to minimise stray lighting from the development, minimise any distraction to passing traffic on the Sturt Highway and minimise harm to wildlife.

Landscaping Strategy

Landscape plantings will be established in accordance with the landscaping strategy described in **Section 3.13** and **Figure 3.8**. In addition to visually screening of the PPU, the plantings will provide a high level of light screening. ProTen will progressively establish the landscape plantings, as practically possible, following bulk earthworks and construction of development infrastructure.

Environmental Complaints and Incidents

The Complaints and Incidents Management Strategy contained within **Appendix C** will be implemented to ensure that any complaints and incidents relating to the poultry operation are promptly and effectively addressed. Appropriate documentation of complaint/incident handling will assist in identifying and implementing measures to negate the possibility of re-occurrence in the future.

6.11 Greenhouse Gas and Energy Efficiency

6.11.1 Sources of Greenhouse Gas Emissions

The primary sources of greenhouse gas (GHG) from the Project are identified as follows.

Soil Disturbance

Soil carbon is both a source and a sink of GHG. Emissions typically occur from soil disturbance during the process of land use change. Estimates of emissions depend on the area of disturbance and the amount of carbon sequestered in biomass and soils, which differs by vegetation type, geography and climate (Australian Greenhouse Office).

The footprint of the proposed PPU's are relatively small and comprises land that is already highly disturbed. The land is devoid of significant vegetation cover and now primarily comprises treeless paddocks that have been consistently cropped and/or grazed for many years. On this basis the value of the soil within the proposed disturbance footprint is considered to be of relatively low value in terms of sequestering carbon.

Fossil Fuel Emissions

The Project will rely on reticulated electricity for running fans, pumps and lights, and LPG for heating sheds. ProTen is constantly endeavouring to reduce costs associated with the construction and operation of their poultry developments, with a reduction in energy consumption translating into lower operational costs. As research and development identifies areas where energy efficiency can be improved, ProTen will endeavour to implement change to achieve cost reductions.

Over recent years, the poultry industry has moved towards new methods of shed construction and operation, with newer developments constructing larger sheds and using materials with higher insulation properties. Tunnel-ventilated fully-enclosed climate-controlled poultry sheds, such as those proposed at the site, improve efficiency by continuously monitoring parameters such as light, temperature, humidity and static pressure and adjusting the ventilation to suit conditions. The Project will therefore require less energy to regulate the internal conditions of the poultry sheds of previous years. Further, it is understood that a series of larger sheds, as proposed, is more efficient and economical to operate than a greater number of smaller sheds.

6.11.2 Mitigation Measures

The following best management practices will be implemented to improve energy efficiency:

Operation and Maintenance

- Low lux internal shed lighting, which has a significantly reduced power demand compared to past lighting practices, will be installed within the poultry sheds.
- External lighting will only be used when necessary during times of low light and/or heavy fog.
- The integrity of the poultry sheds will be regularly checked in order to identify and rectify any air leaks, which place additional load on ventilation fans.
- Automatic control systems will continuously monitor internal shed lighting, temperature, humidity and static pressure, and adjust the ventilation to suit conditions resulting in less energy to regulate the internal shed conditions.
- Ventilation fans and heaters will be regularly maintained and serviced to ensure optimal performance and efficiency.

Landscaping Strategy

- Landscape plantings will be established in accordance with the landscaping strategy described in **Section 3.13**. Approximately 20,000 trees will be planted as part of this landscaping strategy around the PPUs. In addition to screening the PPUs, these plantings may act to offset some of the GHG emissions from the Project. Trees play an important role in the carbon cycle, removing carbon dioxide from the atmosphere and storing it as carbon in plant material and soil (CRC for Greenhouse Accounting). Trees and other plants sequester carbon dioxide from the atmosphere as they grow through the process of photosynthesis. This reduces the concentration of carbon dioxide in the atmosphere and helps reduce the greenhouse effect.

6.12 Poultry Disease

6.12.1 Overview

There is a major economic incentive for ProTen to ensure flocks are kept disease free. As well as affecting bird health and welfare, disease can significantly reduce production efficiency and product quality. If a flock requires depopulating, the economic gain from the flock is immediately lost. In addition there is considerable cost associated with the removal and euthanasia of birds, carcass disposal, shed disinfection and remediation activities. On this basis, ProTen places a high importance on maintaining flock health through vaccination, farm hygiene and biosecurity.

ProTen has demonstrated a strict biosecurity commitment and will implement a range of proven biosecurity measures at the proposed development site (see **Section 3.18**). These biosecurity measures, along with Australia's 'island' status and high standards set by the Federal Department of Agriculture (DoA), will provide significant protection against disease entering the poultry flocks.

Avian Influenza

Avian influenza, also known as bird 'flu, is an infectious disease of birds that attracts widespread media attention. It is important to understand that avian influenza and human pandemic influenza are different diseases, and that avian influenza is not a food-borne disease.

Australia has had five outbreaks of avian influenza (of a different strain to the H5N1 type) in commercial chicken flocks over the past 50 years. The nature of each of these outbreaks suggests that one or more biosecurity deficiency was involved in the spread of the virus within and between properties (Australian Animal Health Council 1999). On each occasion, Australia has been well prepared to quickly spot the infection and to take action to control and eradicate it.

Avian influenza is not currently present in Australia, and the government and poultry industry has rigorous systems in place to keep it that way. The Australian Government has an elaborate emergency animal disease response plan in place that clearly sets out how industry and government agencies would act to isolate farms with the disease and eliminate it while ensuring no further spread occurs.

Newcastle Disease

Newcastle disease is a viral disease of domestic poultry and wild birds characterised by gastrointestinal, respiratory and neurological signs. In response to outbreaks of the Newcastle disease between 1998 and 2002, the Australian Government and the poultry industry jointly developed a National Newcastle Disease Management Plan to provide for long-term management of the disease in Australia. A key element of this Plan is the compulsory vaccination of all commercial domestic poultry flocks across Australia, according to nationally agreed standard operating procedures.

Since the adoption of the National Newcastle Disease Management Plan, the implementation of vaccination and other measures, such as enhanced biosecurity practices, the Australian poultry industry has to date prevented the re-emergence of Newcastle disease in Australia.

6.12.2 Mass Mortality Disposal Procedure

In the unlikely event of a major disease outbreak, the EPA and DPI will be contacted as soon as the breakout is suspected and will likely assume control of the site. Immediate measures will be implemented to isolate the infected PPU site(s), effect strict quarantine procedures to prevent the spread of the disease, and notify all relevant stakeholders. Where permitted, urgent ring vaccination of flocks within the controlled area will be organised.

Upon confirmation that it is indeed an exotic disease or emergency animal disease (EAD) outbreak and immediate slaughter of farm stock is necessary, slaughter will be managed by the DPI in co-ordination with the EPA and technical service units of the poultry industry. The birds will be slaughtered within the poultry sheds.

A number of options exist for the disposal of bird carcasses and fomites. The *Best Practice Guidelines for Meat Chicken Production in NSW – Manual 2 Meat Chicken Growing Management* (DPI, 2012) list the following disposal options for mass-deaths, subject to Council, EPA and DPI approval:

- Rendering (if facilities are available);
- In-shed composting;
- External composting;
- Disposal in a landfill site; and
- Burial on-farm.

The most appropriate option in the event of a mass mortality event will depend on a number of factors, including the scale of the outbreak on farm, the ability of a render facility to accept large volumes of bird carcasses, the logistics and cost associated with transportation of carcasses off-site, and the suitability of the property for burial such as groundwater characteristics.

On-farm burial has traditionally been the predominant disposal option in the industry, due to it generally being the simplest, timely and most cost-effective option. However, this practice is now discouraged on the basis of significant environmental risk such as potential groundwater impacts, and more favourable options becoming available, such as on-farm composting.

Emergency management agencies throughout Australia have now identified composting as a preferred method of carcass disposal. A project investigating the feasibility of on-farm composting and the effectiveness of this disposal method in eliminating avian diseases in carcasses and litter was conducted by the Australian Government's Rural Industries Research and Development Corporation (RIRDC) with the resulting report, *The Biosecurity of Mass Poultry Mortality Composting*, published in January 2014.

The Project validated the technical feasibility of using composting for managing carcass disposal in an EAD outbreak in the Australian broiler industry. In-shed composting effectively restricts the spread of the disease because infected carcasses can be composted in the poultry shed or on the farm using the manure and bedding as the bulking agent. It is possible to use a range of bedding materials and other organic sources commonly available in Australia as co-composting ingredients in this process. Poultry carcasses rapidly decompose (usually within 14 days), and after a further period of composting, the compost can be safely applied to land.

Studies were also conducted on the survival of the V4 vaccine strain of Newcastle disease virus during composting, finding that the virus was killed within the first five days of composting. Conditions monitored during the composting process suggested there is a wide safety margin and that the Newcastle disease virus and other EAD such as avian influenza are unlikely to survive for long (RIRDC, 2014).

It is also noted that the successful implementation of composting as a disposal method during an emergency animal disease outbreak has been repeatedly demonstrated in the USA and Canada (RIRDC, 2014).

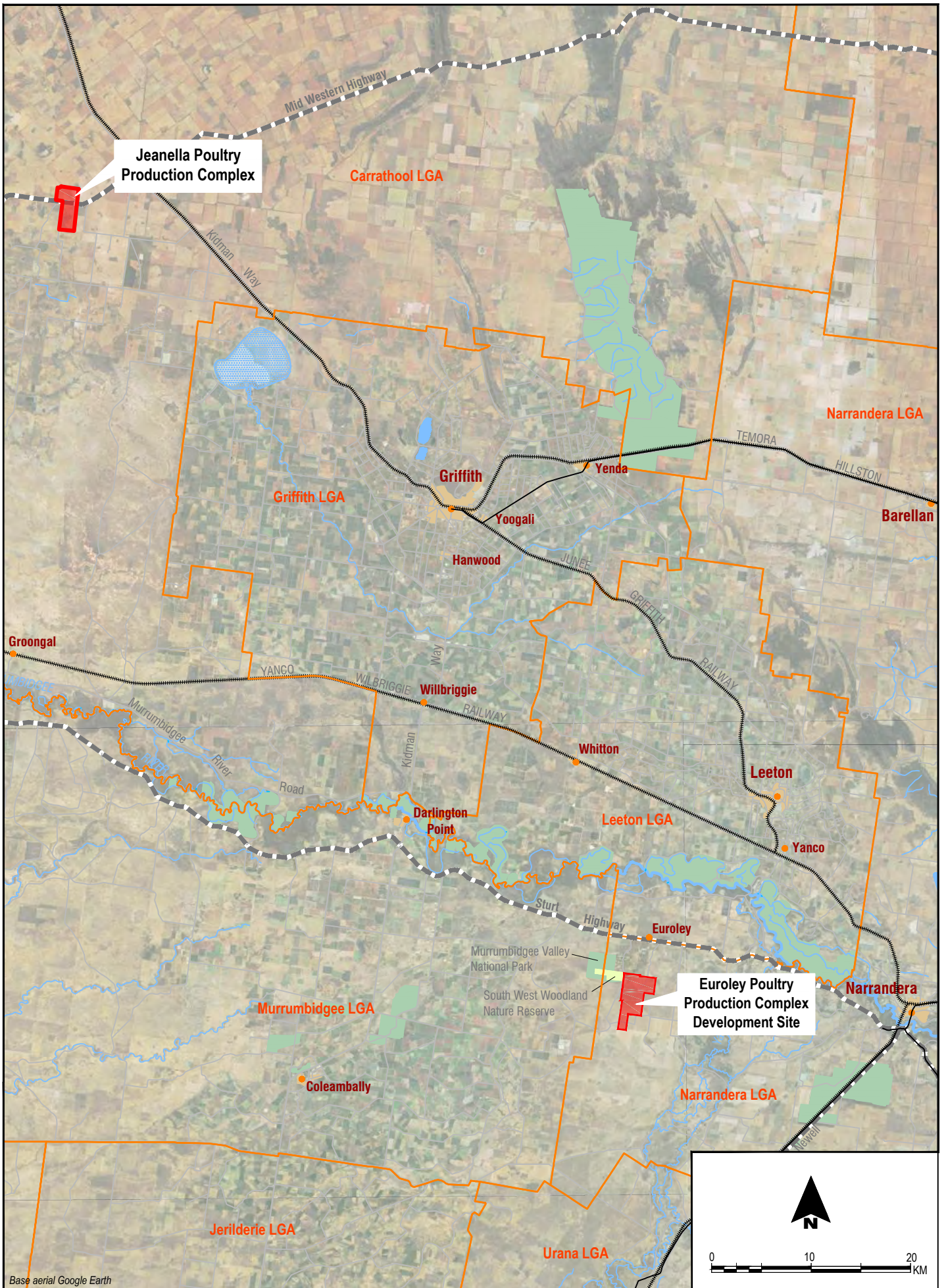
Although composting can be undertaken both inside and outside the poultry shed, in-shed composting is the preferred method since it provides better security and protection from wind, rain and scavengers. In-shed composting also holds an advantage over other options involving sending the bird carcasses off site for processing at a render plant or for burial in that it is a viable option during flooding events where access to and from the farm may be restricted.

Whilst in-shed composting has a significant number of advantages as a mass-mortality disposal option, a disadvantage is that the affected shed can be out of operation for weeks as composting process takes place. This is where rendering as a disposal option has an advantage, enabling the affected shed(s) to be cleaned, decontaminated and brought back into production in a much shorter period of time.

In consideration of the above, and pending the scale of the mass mortality event and advice from the DPI and EPA, the following options in order of preference will be implemented for the disposal of bird carcasses and fomites in the event of an EAD outbreak:

1. Rendering - the preferred option for mass bird disposal will be transportation to Baiada's protein recovery plant, which is part of the processing complex near Hanwood, for treatment and disposal. This would occur under the supervision of the DPI to ensure appropriate quarantine control and standard operating procedures are implemented in line with the relevant AUSVETPLAN disease strategy. Carcasses and fomites will be transported in appropriate trucks disinfected on exit from the development site. The volume of material treated and processed would not exceed the plant's daily processing capabilities. The truck and operator would be independent from normal ProTen and Baiada operations in order to minimise the risk to other poultry operations.
2. In-shed composting – if transportation of the bird carcasses to render is difficult due to the scale of the mortality or environmental conditions such as flooding, the birds will remain in the sheds and composted. Again, this would occur under the supervision of the DPI, and in accordance the *Standard Operating Procedures (SOPs) for Mass Poultry Composting* developed by the RIRDC (2014) in consultation with Biosecurity Victoria and the NSW DPI's Animal Health Branch. It is understood these SOPs are in draft form, and in the event of a mass-death, ProTen will consult with the DPI to ensure the most appropriate SOPs are referenced and implemented.
3. Off-site burial – A third option is transportation of bird carcasses and fomites to ProTen's Jeanella property at Goolgowi for burial. This property is located approximately 50 kilometres from the Murrumbidgee River, and 7 kilometres south-west of the township of Goolgowi, as shown on **Figure 6.17**, and has been chosen due its distance from the River and the favourable groundwater conditions there. This option may be considered where disposal via render is unavailable, and the scale of the mortality is such that in-shed composting would cause the poultry production complex to be off line for a significant period of time. Selection of an appropriate site for burial is critical in this option, with the major environmental constraints for burial site suitability being depth to groundwater, soil profile permeability and separation distances. Where necessary, appropriately qualified personnel would be engaged to confirm the most-favourable site(s) within the Jeanella property in terms of access, environmental constraints and construction requirements. The implementation of this option would therefore require careful consideration of the economic implications of both in-shed composting and off-site burial, the environmental constraints at the burial site, and the logistics of transportation, and would ultimately be determined in consultation with the DPI.

Given the relative proximity of the Euroley development site to the Murrumbidgee River and Yanco Creek, bird carcasses will not be buried on site in the event of a mass-mortality, unless directed to do so in an EAD by the DPI.



6.13 Human Health

It is acknowledged that respiratory problems, such as asthma and allergies, can develop from prolonged exposure to air borne contaminants which may be present in the poultry industry. Dust and other air borne contaminants are affected by factors such as bird health, bedding material condition, ventilation rate, time of day, temperature and relative humidity.

According to the Rural Industries Research and Development Corporation and the Australian Centre for Agriculture Health and Safety (2005), an analysis of Australian workers' compensation data did not reveal any evidence of health effects among poultry industry workers associated with respiratory disease. In addition, ProTen has advised that there has never been a workers' compensation claim from any member of ProTen's farm staff for any type of respiratory disease. Logically, if there is no history of farm staff contracting illness, then the risk to the general populace is negligible.

ProTen understands that air quality issues are directly related to farm operation and management. On this basis, the best management practices and mitigation measures identified in **Section 6.2.5** will be implemented to minimise the risk of any adverse health impacts from dust and particulate matter emissions.

Refer to **Section 6.12** for details regarding poultry disease and disease management.

6.14 Socio-Economic Considerations

6.14.1 Overview

The potential for significant adverse socio-economic impacts as a result of the Project, including upon local land use and amenity, is considered minimal. Points to note in this regard include:

- The Project presents the opportunity for significant and sustained economic activity within the region. The generated economic activity, unlike some other business ventures that are largely seasonal, will be all year round;
- The development site is isolated from any urban areas and there is a very low density of surrounding residences;
- The development will employ best management practices and mitigation measures to minimise the potential for adverse impacts upon the local environmental and surrounding populace;
- The air and noise impact assessments conducted for the Project predict odour, dust and noise levels to all be within the relevant criteria at all of the nearest privately owned receptors; and
- The Complaints and Incidents Management Strategy in **Appendix C** will be implemented to ensure that all complaints and incidents relating to the poultry operation are promptly and effectively addressed. Appropriate documentation of complaint/incident handling will assist in identifying and implementing measures to negate the possibility of re-occurrence in the future.

6.14.2 Economic Activity

Commercial pursuits, regardless of size and by their very nature, increase economic activity within the locality in which they are situated. The poultry industry within the Griffith region is a perfect example of vertical integration, where each of the operations produce a different product or service and these combine to satisfy a common need, providing a very significant contribution to the local and regional economies.

Based on the information in **Section 3.20**, the net economic impact of the Project is anticipated to be one of significant benefit. Benefits include:

- The creation of an additional 30 full-time jobs, comprising five full-time site managers, five full-time assistant farm managers and 20 full time equivalent farm workers. The majority of poultry farm positions require low skill levels, with on-the-job training provided. This translates to up to 30 families receiving a benefit that would otherwise not be available. There will also be flow-on economic benefits into the wider community of this increased employment;
- At full operation, the development will consume around 105,000 tonnes of poultry feed per annum, which is a yearly recurrent cost of around \$33 million (based on the average price of feed at the time this document was prepared); and
- Stimulus to local businesses through development construction activities, consumables and significant flow-on benefits.

It is obvious that there is substantial opportunity for the Project to create significant and sustained economic activity within the region. The generated economic activity, unlike some other business ventures that are largely seasonal, will be all year round.

The Griffith region is well known as a major centre for the chicken meat industry (broiler production and support/service facilities), providing significant employment. The Project will increase the supply of broiler poultry by around twenty million birds per year. This is integral to both ProTen's and Baiada's strategy for continued growth of its operations, and the poultry industry, within both the Griffith region and NSW.

Section 7

Statement of Commitments



7 STATEMENT OF COMMITMENTS

7.1 Summary

ProTen commits to the implementation of the operational mitigation measures, monitoring activities and management strategies outlined in **Section 6** for all activities associated with the Project. **Table 7.1** presents the key commitments proposed in this EIS, in order to effectively mitigate and/or manage the potential environmental and socio-economic impacts of the Project.

Table 7.1 Statement of Commitments

Aspect/Commitment	EIS Section
<p>General</p> <ul style="list-style-type: none"> • ProTen will carry out the development at Euroley generally in accordance with the development application and this EIS report. • The development site will not accommodate more than 3.92 million birds at any one time. • Construction will be undertaken within the hours of: <ol style="list-style-type: none"> a. Monday to Friday, 7.00 am to 6.00 pm; b. Saturday, 8.00 am to 1.00 pm; and c. No construction work on Sunday and public holidays • The poultry development will operate 24 hours a day, seven days a week, with the majority of activities carried out between 7.00 am and 7.00 pm. • The Complaints and Incident Management Strategy contained within Appendix C will be implemented to ensure that all complaints and incidents relating to the poultry operation, if they occur, are promptly and effectively addressed. 	<p>Section 3</p>
<p>Air Quality and Odour</p> <p>During Construction</p> <ul style="list-style-type: none"> • No disturbance will occur outside of the nominated disturbance footprint, and disturbed areas will be promptly rehabilitated and revegetated to a stable landform to minimise dust emissions. • Dust will be minimised by 'wetting' down surfaces being worked or carrying traffic in dry periods. <p>During Operation</p> <ul style="list-style-type: none"> • A meteorological station will be installed within the development site to collect on-going and up-to-date weather data. • The poultry sheds and feed silos will be fully enclosed to reduce the level of moisture and to minimise emissions of dust/particulate matter. • The insides of the poultry sheds and the surrounds will be maintained at all times to ensure a clean and sanitary environment, including regular monitoring and maintenance of the tunnel ventilation systems and bird drinkers to avoid spillage, leaks and uneven distribution. • Stocking densities and bird health within each of the poultry sheds will be regularly checked and, if necessary, appropriate corrective measures will be implemented. • Daily monitoring and maintenance of the bedding material will be undertaken to identify, remove and replace any caked material beneath drinking lines and/or areas with excessive moisture content. • Internal access roads will be appropriately maintained to minimise dust and noise emissions. 	<p>Section 6.2.5</p>

Noise	
<ul style="list-style-type: none"> • A 60 km/hr speed limit will be adopted on the site access road between the development site and the Sturt Highway. • Plant and equipment will be maintained in good repair and operators will be appropriately instructed on how to minimise noise generation at all times. • Noise generating equipment purchased by the operator will comply with relevant occupational health and safety requirements. • Emergency standby diesel generators will only be used when power from the electricity grid is lost and they will be appropriately sited and housed to minimise noise emissions. • A unidirectional traffic movement system, via a one-way circulation road around each PPU site, will be established with appropriate signage to minimise the use of reversing alarms. 	Section 6.3.5
Traffic and Transport	
<ul style="list-style-type: none"> • An intersection between the Sturt Highway and the development site access road will be constructed at the location shown on Figure 1.2, with a basic right turn treatment (BAR) and basic left turn treatment (BAL) intersection in accordance with Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections. • The site access road from the Sturt Highway to the development site will be constructed to a minimum width of 6.5 metres, with a pavement and road surface suitable for B-doubles. • The access road will be bitumen sealed for a minimum length of 50 metres from the Sturt Highway intersection. • Advance signposting on the approach to the Sturt Highway intersection will be erected in both directions warning of trucks turning. In addition, an intersection direction sign opposite the access will be erected to further help identify the access point. • The farm access will meet the minimum requirements of AS 2890.2, to accommodate the turning movements of the largest vehicles generated by the poultry development. • The internal PPU access roads will be constructed as one-way circulation roads (ring roads) around the perimeter of each PPU to enable traffic to enter, exit and manoeuvre in a forward direction. The roads will be constructed as all-weather rural-type roads able to carry the anticipated heavy vehicle movements. • Suitable signage will be erected indicating internal traffic direction and speed limits to ensure the orderly and safe use of the site, as well as to minimise the potential for traffic conflict and noise. • All internal roads will be maintained clear of obstruction and used exclusively for the purposes of transport, loading-unloading and parking. 	Section 6.4.4
Surface Water and Flooding	
<ul style="list-style-type: none"> • Temporary erosion and sediment control structures, such as hay bales and silt fencing, will be used during construction and regularly maintained to prevent soil loss and sediment-laden runoff. • All clean extraneous surface water from upslope will be diverted around areas of disturbance. • The stormwater management system described in Section 3.12 will be constructed and appropriately maintained. • Staff members will be instructed in the proper use and handling of all chemicals used on-site. If appropriate, this will include completion of training such as SMARTtrain or ChemCert (or similar). • All chemical use will be undertaken in full compliance with the relevant statutory requirements, including the <i>Pesticides Act 1999</i>. • Wastewater generated by the on-site staff amenities and accommodation will be appropriately treated and disposed of via on-site wastewater management systems installed and operated in accordance with the requirements of Council and relevant 	Section 6.5.4

standards/guidelines. Flooding	
<ul style="list-style-type: none"> Habitable finished floor levels within farm managers' accommodation will be set at a minimum of 500 mm above adjacent ground level to reduce the likelihood of floodwater ingress to buildings. Finished floor levels of the poultry sheds will be set at a minimum of 300 mm above adjacent ground level to reduce the likelihood of floodwater ingress to buildings. The flood management plan described in Section 6.5.6 will be implemented where necessary. 	Section 6.5.5 and 6.5.6
Groundwater	
<ul style="list-style-type: none"> Groundwater wells will be designed by a suitably qualified engineer or hydrogeologist, and the design and construction will be undertaken in accordance with the <i>Minimum Construction Requirements for Water Bores in Australia</i> (National Uniform Drillers Licensing Committee, 2012). The installation of the wells should include normal development practice, including a commissioning test on the well. Monitoring of wells will comply with the existing WAL conditions. There will be no on-site disposal of bird carcasses or associated waste in the event of a mass-mortality, unless directed to do so by the DPI. 	Section 6.6.3
Biodiversity	
<ul style="list-style-type: none"> No disturbance will occur outside of the nominated disturbance footprint. Erosion and sediment control measures will be installed and maintained to prevent the erosion and sedimentation impact on any areas downstream supporting remnant vegetation. Weed management practices will be implemented to minimise the spread of exotic species into natural areas within the site. A biodiversity offset strategy for the Project will be finalised in accordance with the actions detailed in Section 6.7.5, in consultation with OEH and within 12 months of gaining Project Approval. Landscape plantings will be established in accordance with the Landscaping Strategy contained in Section 3.13, which will increase the total area under vegetation within the locality, create habitat and increase the local biodiversity. 	Section 6.7.5
Aboriginal Heritage	
<ul style="list-style-type: none"> No disturbance will occur outside of the nominated disturbance footprint. The three aboriginal sites identified on site will be fenced during construction activities. The hearth will remain fenced during operation of the poultry production complex. Should any Aboriginal artefact be uncovered all works will cease in that locale and the OEH will be notified. Works will only recommence when an appropriate and approved management strategy has been agreed to by all of the relevant stakeholders. 	Section 6.8.4
Visual Amenity	
<ul style="list-style-type: none"> The luminaires on each poultry shed will be aimed downwards and only switched on during loading-unloading and servicing activities outside of daylight hours and during heavy fog. The landscaping strategy described in Section 3.13 will be implemented and maintained in order to improve the visual and environmental amenity of the poultry development. 	Section 6.10.3
Biosecurity and Poultry Disease	
<ul style="list-style-type: none"> ProTen will meet all standards of care and management for animal health and welfare detailed in the <i>National Animal Welfare Standards for the Chicken Meat Industry</i> (Barnett et al, 2008). ProTen will implement a suite of biosecurity measures in accordance with the <i>National Farm Biosecurity Manual for Chicken Growers</i> (Australian Chicken Meat Federation 2010). A copy of this manual will be kept at the development site and staff will be 	Section 6.12

<p>provided with training in the relevant parts of the Manual.</p> <ul style="list-style-type: none"> • In the unlikely event of a major disease outbreak, the EPA and DPI will be contacted as soon as the breakout is suspected. Immediate measures will be implemented to isolate the infected PPU site(s), effect strict quarantine procedures to prevent the spread of the disease, and notify all relevant stakeholders. Where permitted, urgent ring vaccination of flocks within the controlled area will be organised. • Upon confirmation that it is an exotic disease outbreak and immediate slaughter of farm stock is necessary, slaughter will be managed by the DPI in co-ordination with the EPA and technical service units of the poultry industry. The birds will be slaughtered within the poultry sheds. • If ProTen's preferred option of disposal of infected birds at Baiada's protein recovery plant cannot be realised for various reasons such as quarantine requirements, disposal of diseased poultry via in-shed composting, or offsite burial at Jeanela will be undertaken in consultation with the DPI and EPA. 	
Waste Management	
<ul style="list-style-type: none"> • No on-site stockpiling or disposal of waste materials will occur. • Day to day general waste will be placed into enclosed skips and removed from each PPU site by a licensed contractor on a regular basis. • Chemical Containers - a chemical supply company will be engaged to provide a chemical delivery and pickup service direct to the development site. At each delivery of new chemical supplies, empty chemical containers will be retrieved by the chemical company for recycling or appropriate disposal. • Poultry litter will be promptly removed from the sheds and transported off-site in covered trucks by an approved contractor at the end of each production cycle during the clean-out phase. • Dead birds will be collected from the poultry sheds on a daily basis and stored in on-site chillers for daily removal to Baiada's rendering plant near Hanwood on Kidman Way. 	Section 3.10
Greenhouse Gas and Energy Efficiency	
<ul style="list-style-type: none"> • Low lux internal shed lighting will be installed within the poultry sheds. • External shed lighting will only be used when necessary during times of low light and/or heavy fog. • The integrity of the poultry sheds will be regularly checked in order to identify and rectify any air leaks, which place additional load on ventilation fans. • Ventilation fans and heaters will be regularly maintained and serviced to ensure optimal performance and efficiency. • Automatic control systems will continuously monitor internal shed lighting, temperature, humidity and static pressure, and adjust the ventilation to suit conditions resulting in less energy to regulate the internal shed conditions. 	Section 6.11

7.2 Operational Environmental Management Plan

ProTen will prepare and implement a site-specific Operational Environmental Management Plan (EMP) for the proposed poultry development to ensure that the commitments made within this EIS, along with relevant statutory obligations and the conditions of development consent (including EPL requirements), are fully implemented and complied with.

The EIS Guideline – Poultry Farms (Department of Urban Affairs and Planning 1996) states:

an EMP is a technical document which is usually finalised during or after detailed design of the proposal following approval of the development application.....the level of detail required in an EMP is usually not considered necessary for an EIS.

The EMP will establish the framework for managing and mitigating the potential environmental impacts of the poultry development over the life of the operation. It will be updated as required to respond to any changes to development operations and management and consent conditions.

It is envisaged that the Operational EMP will address the following key components:

Development Consent and Regulatory Approvals

This will include the development consent and EPL, with the conditions of consent and licensing requirements, along with any other statutory requirements and/or considerations.

General Site Maintenance Requirements

This will identify and address the on-going site maintenance requirements under ProTen's standard operating procedures, which are aimed at minimising the potential for adverse environmental impact, extending the life of farm equipment, reducing operating costs and maximising operational efficiencies.

Statement of Commitments

This will comprise the best management practices and mitigation measures listed in **Section 7.1** that ProTen will implement as part of the proposed poultry development to prevent, minimise and/or manage the potential for adverse impacts upon the local environment and surrounding populace.

Environmental Management Strategies

These will include, but may not be limited to, the Surface Water Management Strategy, Landscaping Strategy and Mass On-Site Disposal Strategy.

Environmental Management Requirements

Such requirements will be necessary to validate the success of the EMP, identify any changes required to operational and management regimes, and confirm the continual compliance with environmental performance indicators/targets and commitments.

It is envisaged that the primary requirement in this regard will be the preparation of an Annual Environmental Management Report (AEMR) and submission of this document to the relevant government agencies. At this point in time, and based on the best management practices and mitigation measures to be implemented, no long-term environmental monitoring programs have been identified as warranted.

Environmental Complaints and Incidents Management System

The Complaints and Incidents Management Strategy contained within **Appendix C** will be included within the EMP and implemented to ensure that all complaints and incidents relating to the poultry operation are promptly and effectively addressed. Appropriate documentation of complaint/incident handling will assist in identifying and implementing measures to negate the possibility of re-occurrence in the future.

Section 8

Justification and Conclusion



8 JUSTIFICATION AND CONCLUSION

In accordance with the statutory requirements for the content of an EIS, it is necessary to consider the reasons for carrying out the development in the manner proposed, having regard to biophysical, economic and social considerations and the principles of ESD. The various significant components of the biological and physical environments, as well as economic and social considerations, have been well documented and discussed in the previous sections of this EIS and its appendices.

8.1 Ecological Sustainable Development

ESD has emerged as a primary objective of environmental protection in NSW, being an objective of the EP&A Act. It is defined under Section 6(2) of the POEO Act as:

6(2) For the purposes of subsection (1)(a), ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

- a. the precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation...*
- b. inter-generational equity - namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*
- c. conservation of biological diversity and ecological integrity - namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*
- d. improved valuation, pricing and incentive mechanisms - namely, that environmental factors should be included in the valuation of assets and services....*

The overall objectives of ESD are to use, conserve and enhance natural resources. This ensures that ecological processes are maintained facilitating improved quality of life, now and into the future.

ProTen has shown a commitment to the principles of ESD, through the use of innovative technologies and best practice in the design, operation and management of its various poultry operations. The company understands that social, economic and environmental objectives are interdependent, and acknowledges that a well-designed and effectively managed operation will avoid significant and/or costly impact or degradation. The commitments made in this EIS, in the form of development design, best practice operation and mitigation measures, demonstrate a commitment to environmental due diligence. The Operational EMP (see **Section 7.2**) that will be prepared and implemented following development consent will ensure on-going commitment to the principles of ESD over the life of the development.

8.1.1 The Precautionary Principle

The Precautionary Principle holds that where there are threats of serious or irreversible environmental damage, the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

A detailed understanding of the issues and potential impacts associated with the Project has been obtained via consultation and assessment to a level of detail commensurate with the scale of the proposal, the characteristics of the proposed development site and surrounds and the legislative framework under which the proposal is permitted.

Specialist studies have been undertaken to ensure careful evaluation of the Project and associated impacts in order to avoid, where possible, serious or irreversible damage to the environment. Specialist studies relating to air quality, noise, traffic, cultural heritage, biodiversity, hazard and risk, and groundwater have been conducted. Additional issues including visual amenity, flooding and waste management have also been addressed.

The various consultation activities that have been undertaken (see **Section 5.3**) and the engagement of suitably qualified and experienced specialist consultants have ensured that the environmental impact assessment phase of the Project has been transparent. The contents of this EIS (including appendices), combined with the consultation activities, has enabled ProTen to understand the potential implications of the Project, and therefore identify appropriate mitigation measures and management strategies.

8.1.2 Intergenerational Equity

Intergenerational Equity is centred on the concept that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. There is a moral obligation to ensure that today's economic progress, which will benefit both current and future generations, is not offset by environmental deterioration.

The primary objective of the Project is to establish an intensive broiler production complex, adopting best practice in design, operation and management, within the Griffith region to augment the domestic supply of meat chickens and meet the increasing demand for poultry products within the Australian market. The mitigation measures and management strategies listed in **Section 6** have been identified to minimise the potential for adverse impact upon the local environmental and surrounding populace. Emphasis has been placed on anticipation and prevention of potential impacts, as opposed to undertaking later remedial action.

These actions and initiatives will assist in ensuring that current and future generations can enjoy equal and equitable access to social, environmental and economic resources through the maintenance of the health, diversity and production of the environment.

8.1.3 Conservation of Biological Diversity and Ecological Integrity

The principle of Conservation of Biological Diversity and Ecological Integrity holds that the conservation of biological diversity and ecological integrity should be a fundamental consideration for development proposals.

The assessment undertaken and reported in this EIS includes a relevant evaluation of the existing environment and the likely impacts as a result of the Project. It has been concluded that the proposal is highly unlikely to impact upon the current biological diversity and ecological integrity of the surrounding environment. Points to note in this regard include:

- Significant disturbance of the natural environment within the development site has occurred as a result of historic clearing and long-term agricultural production;

- The location of the PPU's and associated infrastructure has been determined based on the principle of avoidance of tree clearing. Of the 90 hectare disturbance footprint associated with the development, less than 1 hectare of a mapped vegetation community will be cleared as part of the development. An offset strategy has been devised to effectively mitigate this residual impact of the development, as discussed in **Section 6.7.5**.
- A suite of best management practices and mitigation measures have been nominated to minimise the potential for impact to the local environment;
- Landscaping (refer **Section 3.13**) will increase the total area under vegetation within the locality, create habitat and increase the local biodiversity; and
- There will be no on-site stockpiling or disposal of waste materials generated by the poultry operation.

8.1.4 Improved Valuation, Pricing and Incentive Mechanisms

The principle of Improved Valuation, Pricing and Incentive Mechanisms deems that environmental factors should be included in the valuation of assets and services. The cost associated with using or impacting upon an environmental resource is seen as a cost incurred to protect that resource.

The application of this principle remains in its infancy and, to date; there are few widely accepted methods by which monetary values are attributed to environmental factors. However, in terms of the proposed poultry development, ProTen will bear the costs associated with the avoidance, minimisation, mitigation and management of potential environmental and social impacts.

8.2 Analysis of Alternatives

8.2.1 General

It is necessary to consider any feasible alternatives to carrying out the development having regard to its objectives, including a consideration of the consequences of not carrying out the development.

ProTen has made a conscious decision to expand the company's operations in the Griffith region in order to meet the increasing demand for poultry products in the Australian market. The Griffith region is the obvious choice with the necessary support/servicing facilities, including an interdependent hatchery, feedmill and processing complexes. The poultry industry within the Griffith area is a perfect example of vertical integration where each of the operations produce a different product or service and these combine to satisfy a common need. Furthermore, ProTen has found both Narrandera Shire Council and Griffith City Council encouraging of additional development having recognised the employment and economic flow-on opportunities.

The increasing role of the poultry industry within the region plays an ever increasing role in the development of local agri-business. It is widely appreciated that the poultry industry has a good strategic fit and high recognition factor within the Griffith region. Management and labour expertise are available, local transport contractors are geared to the industry, and the community generally understands and accepts the specialist operation.

8.2.2 Alternative Development Sites

The principal siting requirements for a poultry broiler development, such as that proposed, include:

- Proximity to a chicken hatchery facility, such as Baiada's hatchery located on the outskirts of Griffith;
- Proximity to a reliable poultry feed source, such as Baiada's feedmill located near Hanwood just south of Griffith;

- Proximity to a processing facility (including protein recovery plant), such as Baiada's processing complex located near Hanwood just south of Griffith;
- Proximity to major regional and State transport routes, such as the Sturt Highway;
- Adequate separation distances to other poultry farms for biosecurity purposes;
- Appropriate land use zoning and surrounding land use activities; and
- Adequate access to a reliable supply of water and electricity.

Any investigation will reveal that finding a site that is both available and meets all of the above criteria is very difficult. Selection of alternative sites must be mindful of transport access to each of the abovementioned support/servicing facilities. The matter of a reliable water supply is crucial and the cost of satisfying the necessary power requirements is sometimes prohibitive. Finding a site that already has a compatible agricultural land use is also preferable, and limits the amount of clearing required to establish the PPU which is advantageous from a biodiversity perspective.

Prior to proceeding with the development site subject to this development application, ProTen considered a number of alternative sites for the poultry production complex. A site near Goolgowi was initially considered and the environmental impact assessment process commenced. However, consultation with the relevant electricity provider revealed that the necessary power requirements to the site could not be met at the time, rendering the site unviable. A second alternative site was then investigated, this property approximately 20 kilometres west of Narrandera on the Sturt Highway, and 5 kilometres east of the current subject development site. An EIS was prepared for this alternative site and submitted to Narrandera Shire Council, who was the determining authority for the designated development (this Project was of a smaller scale and associated CIV compared to the current application due to a smaller property size, hence was not state significant development). During the assessment and consultation process with Council, EPA, OEH and the DPI, it became evident that, whilst not considered to be an operational risk by ProTen, the presence of a wetland known as 'Dry Lake' approximately 1 kilometre from the site meant that the property was not deemed an optimal location for an intensive poultry operation. The guideline document *Best Practice Management for Meat Chicken Production in New South Wales Manual 1 – Site Selection & Development* (DPI, 2012) states that new poultry farms should be preferentially located 3000 metres away from waterways and wetlands that are used extensively by waterfowl.

ProTen subsequently investigated a third site, being the development site subject of this application. The development site is still within the same wider Griffith region as the previous two sites, however will also have adequate access to power, and is further than 3 kilometres from the nearest wetland, as mapped on the wetlands map in the Narrandera LEP (refer **Section 2.10**). It also meets all of the principle siting requirements listed in the dot points above, and therefore represents an ideal site for the proposed poultry development.

8.2.3 Alternative Development Layout

Consideration of alternative PPU locations within the proposed development site was also considered, and is dependent upon a number of factors including both environmental impact considerations and engineering design requirements. While other locations were considered within the site, the proposed layout is considered optimal in terms of minimising the potential for adverse impact and required earthworks. In particular the proposed layout ensures that tree clearing is minimised, whilst ensuring the required buffer distances between PPUs is maintained. The proposed layout will also ensure that the Project does not deny access to large areas of viable agricultural lands nor significantly reduce the land area available for agricultural production.

An alternate location for the southern-most poultry production unit (PPU 5) was originally considered and included in the draft EIS. As a result of consultation with OEH, the proposed location of PPU 5 was moved slightly south so as to avoid clearing vegetation within a mapped vegetation community. The original PPU 5 location was within an area of low condition Black Box grassy open woodland. PPU 5 and associated access track and houses will now be located within a cleared paddock under long term agricultural use, with just four trees to be removed for construction of the access track. Importantly, changing the proposed location of PPU 5 reduced the mapped vegetation to be cleared for the Project from 13.45 hectares to just 0.74 hectares. As a result, the offset requirement for the Project has also been significantly reduced, decreasing from 185 ecosystem credits to just 16 with the PPU in the revised location.

The alternative location originally considered for PPU 5, compared to the new location is illustrated on **Figure 8.1**.

8.2.4 Consequences of Not Carrying Out the Development

The proposed poultry development will increase the supply of broiler poultry by around 20 million birds per year, have significant capital outlay costs, create 30 full-time equivalent jobs and generate around \$33 million in poultry feed sales annually (based on the average price of feed at the time this document was prepared).

The consequences of not proceeding with the proposal have been evaluated and include:

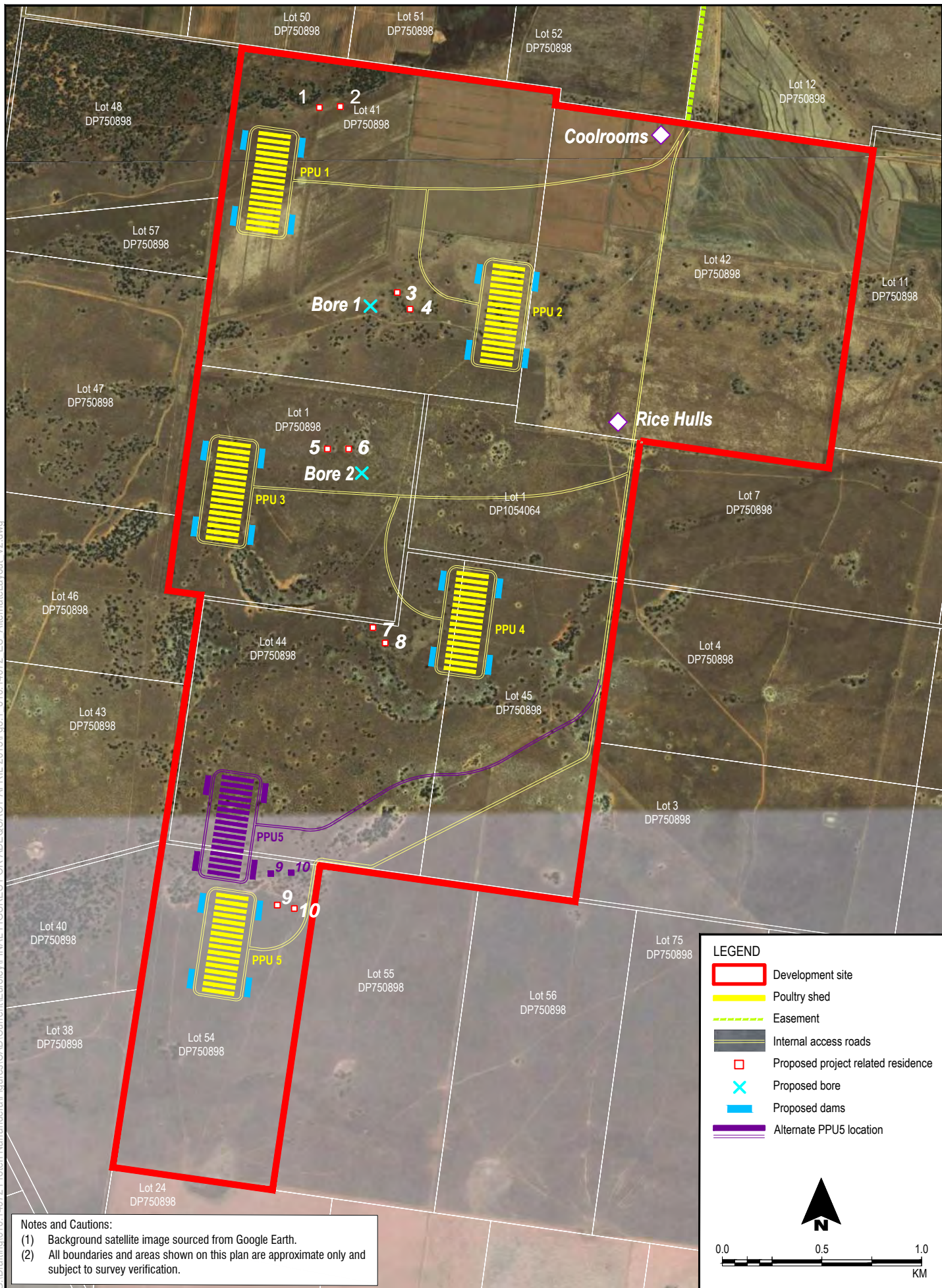
- Adverse economic impacts on regional grain growers as the opportunity to increase the current market generated by ProTen/Baiada would be lost. The Project will see current grain purchases in the region and NSW increase significantly;
- Adverse economic impacts on those local businesses, transport operators and goods suppliers that service the poultry industry;
- No additional employment opportunities or flow-on benefits; and
- Adverse economic impacts on ProTen associated with the need to investigate development opportunities elsewhere, with related problems to the vertical integration of the poultry industry within the Griffith region.

The poultry industry is a ruthless market, and interruptions or gaps in ProTen's operations may expose the company to competitors and result in higher prices being passed on to consumers.

If the development does not proceed, the Griffith region may miss the accompanying economic and social boost, while the proponent may miss the opportunity to establish a broiler production complex adopting best practices in design, operation and management to meet the increasing demand for poultry products within the Australian market.

It is imperative for ProTen that the Project be permitted in order to cater for the immediate and projected long-term demands on its livestock division.

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8.3 Conclusion

Having observed the continuing expansion of the Australian poultry meat market, ProTen's primary objective is to develop an intensive broiler production complex, adopting best practice in design, operation and management, within the Griffith region to augment the domestic supply of meat chickens.

The assessment of ProTen's proposal to establish an intensive poultry broiler production operation within the proposed development site as detailed in this EIS has been multi-disciplinary and involved consultation with various government agencies. Emphasis has been placed on anticipation and prevention of potential environmental and social impacts, with best practice operation and mitigation measures identified to ensure environmental due diligence and minimal potential for adverse impact.

It is considered that the Project can proceed without resulting in significant or long-term adverse impacts to the local environment and surrounding populace. The development will be operated and managed in accordance with a site-specific Operational EMP, which will ensure that the commitments made in this EIS, along with relevant statutory obligations and conditions of development consent (including EPL requirements), are fully implemented and complied with.

Furthermore, the Project is justified in socio-economic terms as a catalyst for significant and sustained economic activity within the Griffith region, including positive employment and flow-on benefits.

Section 9

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9 REFERENCES

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Section 10

Abbreviations, Acronyms and Units



10 ABBREVIATIONS, ACRONYMS & UNITS

ABARE	Australian Bureau of Agricultural and Resources Economics
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
Ambient Air-NEPMs	National Environment Protection Measures for Ambient Air Quality
ARI	Average Recurrence Interval
Baiada	Baiada Poultry Pty Ltd
BoM	Bureau of Meteorology
DAFF	Department of Agriculture, Fisheries and Forestry
DCP	Development Control Plan
DoE	Commonwealth Department of the Environment
DP	Deposited Plan
DP&E	NSW Department of Planning and Environment
DPI	NSW Department of Primary Industries
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
GHG	Greenhouse gas
kg/m ²	Kilograms per square metre
L&DLALC	Leeton & District Local Aboriginal Land Council
LSC	Land and Soil Capability
LEP	Local Environmental Plan

LGA	Local Government Area
LPG	liquid petroleum gas
Narrandera LEP	<i>Narrandera Local Environmental Plan 2013</i>
NSR	Nearest Sensitive Receptor
NES	National Environmental Significance
NHMRC	National Health and Medical Research Council
NOW	NSW Office of Water
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PAC	Planning Assessment Commission
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
PPU	Poultry Production Unit
PHA	Preliminary Hazard Analysis
ProTen	ProTen Holdings Pty Ltd
PSNL	Project Specific Noise Level
RBL	Rating Background Level
RMS	Road and Maritime Services
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SLR	SLR Consulting Australia Pty Ltd
SSD	State Significant Development
TSP	Total Suspended Particulate