Bourke Small Stock Abattoir — SSD 7268

ENVIRONMENTAL IMPACT STATEMENT

Prepared for CAPRA Developments Pty Ltd | March 2016

VOLUME 1

EMM

CERTIFICATION

For submission of an environmental impact statement (EIS) under Part 4, Division 4.1 of the NSW *Environmental Planning and Assessment Act 1979*

EIS prepared by

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Applicant

CAPRA Developments Pty Limited
307 Anzac Parade
KINGSFORD NSW 2031

Proposed development

Bourke Small Stock Abattoir

Refer to Chapter 2 of this EIS for a description of the proposed development

Land to be developed

Lot 17 DP 753546

Certification

We certify that we have prepared this EIS in accordance with the Secretary's environmental assessment requirements issued for the Bourke Small Stock Abattoir on 29 October 2015 and to the best of our knowledge the information contained in this EIS is neither false or misleading.

Nicole Armit
3 March 2016

Brett McLennan
3 March 2016

Bourke Small Stock Abattoir

Final

Report H15101RP2 | Prepared for CAPRA Developments Pty Ltd | 3 March 2016

Prepared by	**Nicole Armit**	Approved by	**Brett McLennan**
Position	Services Manager- Environmental Assessment & Management	Position	Director
Signature		Signature	
Date	3 March 2016	Date	3 March 2016

This report has been prepared in accordance with the brief provided by the client and has relied upon the information collected at the time and under the conditions specified in the report. All findings, conclusions or recommendations contained in the report are based on the aforementioned circumstances. The report is for the use of the client and no responsibility will be taken for its use by other parties. The client may, at its discretion, use the report to inform regulators and the public.

Document Control

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Executive Summary

CAPRA Developments Pty Ltd (CAPRA) is seeking consent under Part 4, Division 4.1 of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of a small stock abattoir (herein referred to as the project), approximately 14 kilometres (km) north of Bourke in north-western NSW.

CAPRA's primary objective is to develop an abattoir adopting best practice in design, operation and management, to meet the immediate and projected long-term export demand for meat. The abattoir will have the capacity to process up to 6,000 head per day for export, comprising goats, sheep and lambs. The project represents a significant investment in the Bourke region, with a capital investment value of approximately $60 million, and will provide approximately 200 full time equivalent (FTE) positions when fully operational, along with significant associated flow on benefits to the town of Bourke and the Far West NSW region.

ES1 Project Overview

The key aspects of the project are:

- construction of an abattoir with the capacity to process up to 6,000 head per day, comprising goat, sheep and lambs;
- construction and provision of ancillary infrastructure to support the abattoir, including reticulation of power, water and telecommunication services, vehicular access off the Mitchell Highway, heavy vehicle manoeuvring and turning areas, livestock holding yards, car parking, administration office, staff amenities and a wastewater treatment system;
- construction of four water treatment ponds where wastewater will be treated via an aerobic and anaerobic ponding process, and then utilised for irrigation;
- meat products from the abattoir will be chilled to less than 7 degrees Celsius (^{o}C) or frozen for transport;
- no rendering will take place on site with waste products to be transported off site for disposal at licensed facilities;
- employment of approximately 200 FTE personnel when fully operational; and
- operation 24 hours per day, 7 days per week.

Livestock will be principally sourced from the Far West region of NSW and trucked to the development site. The abattoir will meet Halal accreditation requirements and the requirements for an export licence from the Commonwealth Department of Agriculture and Water Resources (DoA), as well as complying with the United States Department of Agriculture (USDA) requirements.

ES2 Predicted impacts, management and mitigation

The potential environmental impacts of the project have been identified and assessed in accordance with the EP&A Act and the Secretary's Environmental Assessment Requirements (SEARs), as well as current industry standards, guidelines and policies. The impact assessment process has involved the following:

- a qualitative risk assessment to identify those issues relating to the project that represent the greatest risk to the local environment and surrounding populace;
- consultation with government agencies, the community, and other stakeholders with an interest in the project to identify any additional issues and concerns;
- technical assessment of the key issues in accordance with current best practice and quantification of the potential environmental impacts, and socio-economic impacts; and
- a commitment to implement a suite of operational mitigation measures and monitoring activities to ensure that residual impacts associated with the project are minimised.

The most significant findings and conclusions of the environmental impact assessment presented in this EIS are summarised in Table E.1

Table E.1 Summary of the predicted impacts of the project

Aspect	Where addressed in the EIS
Air quality and odour	
• The nearest receptors to the project site are two houses located 5.5 km and 5.8 km to the south, along the Mitchell Highway. These houses are unlikely to experience adverse impacts relating to odour, as shown by the results of the dispersion modelling conducted for the project. A worst case 99th percentile odour concentration of 4.4 odour units (OU) is predicted at these houses, below the criterion of 6.0 OU. • A sensitivity analysis was also conducted to investigate the maximum allowable goat emission rate (given the little published data for this emission rate) to remain below the criterion at the nearest receptors. This analysis concluded that the odour criterion at the sensitive receptors would be met by the project as the maximum allowable emission rate of 61.3 OU.m3/s/goat is greater than values presented in literature. • All other air quality parameters, namely PM_{10} dust emissions and nitrogen oxide (NO_x), are predicted to be well below relevant criteria, and subsequently air quality related impacts associated with these parameters during construction and operation of the project are predicted to be negligible.	Chapter 7 and Appendix F
Noise	
• Due to the isolated nature of the project site, the risk of offsite noise impacts is considered to be negligible. Notwithstanding, a conservative, quantitative noise assessment was undertaken with reference to the *Interim Construction Noise Guideline* (DECC 2009), *Industrial Noise Policy* (EPA 2000) and the *NSW Road Noise Policy* (DECCW 2011). • Operational and construction noise levels, as well as day and night time road traffic noise levels, are predicted to meet the relevant criteria at all identified nearest residential locations at all times. • Sleep disturbance goals are also predicted to be met at the nearest residences.	Chapter 8

Table E.1 Summary of the predicted impacts of the project

Aspect	Where addressed in the EIS
Traffic	
• The project will not adversely impact on the local and state road network and complies with all relevant requirements. • The predicted increase in daily traffic movements as a result of the project will generally only be noticeable on the sections of the Mitchell Highway between the project site and the main township of Bourke, where there are low traffic volumes currently using the route in comparison to other major rural highways in NSW. Traffic operations, level of service and traffic safety for the future local and regional traffic using the Mitchell Highway route will remain within acceptable levels. • The project will result in an imperceptible increase of around only 16 road trains per year through Bourke, and a minor increase of approximately 83 road trains per year through North Bourke. • The project will result in a reduction in livestock movements that currently occurs from the Bourke region to other abattoirs in Charleville, Nyngan and Melbourne.	Chapter 9 and Appendix G
Health risk assessment – Q fever	
• An environmental health risk assessment (HRA) was conducted to assess the potential for increased risk from the project in the transmission of Q fever as a result of the transportation, handling and processing of lamb, sheep and goats. The HRA was conducted in accordance with the risk assessment model outlined in the *Guidelines for Assessing Human Health Risks from Environmental Hazards* (enHealth 2012). • The HRA concluded that, provided the abattoir is well managed with suitable controls maintained (refer Table 10.3 in Chapter 10), the potential short and long-term community health risks from Q fever are unlikely to increase from the existing situation for Bourke and North Bourke due to the following key factors: - the change in daily livestock movements though Bourke and North Bourke as a result of the project will be negligible when compared to existing movements; - there are no residents living within 5 km of the proposed abattoir location; and - occupational exposure to abattoir workers and contractors will be effectively controlled by abattoir design and operating procedures. • With no abattoir currently operating around the Bourke region, livestock is currently transported large distances from the existing livestock depots around Bourke to abattoirs in Charleville (Queensland), Melbourne and Nyngan. The project is anticipated to reduce the livestock movements to these other abattoirs, thereby reducing the potential Q fever related health risks to numerous communities along the existing transport routes out of the Bourke area north to Charleville and south to Melbourne and Nyngan.	Chapter 10 and Appendix H
Biodiversity	
• The project site has a history of agricultural land use (grazing), and associated land clearing. • One plant community type (PCT) was identified within the disturbance footprint (biodiversity assessment study area) associated with the project; namely PCT98 Poplar Box – White Cypress Pine – Wilga – Ironwood Shrubby Woodland on red sandy-loam soils in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion. PCT98 occurs in two vegetation zones in the study area; a shrubby woodland and a derived shrubland. • No threatened ecological communities were recorded or are predicted to occur in the study area. In addition, no listed species under the NSW *Threatened Species Conservation Act 1995* or the Commonwealth *Environment Protection Conservation Act 1999* were recorded in the study area. • The project will result in the clearance of 55.3 ha of native vegetation (ie PCT98); comprising 9.6 ha of shrubby woodland and 46.3 ha of the derived shrubland.	Chapter 11 and Appendix I

Table E.1 Summary of the predicted impacts of the project

Aspect	Where addressed in the EIS
• The Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland is estimated at only 20% cleared in the Western Catchment Management Authority (CMA) area where the project is located, with 300,000 ha of this PCT extant. At the bioregion (IBRA) subregion level, the project will only contribute an additional 0.01% clearing of this PCT. • A total of 2,068 ecosystem credits will be required to offset the 55.3 ha of vegetation clearing associated with the project. No species credits are required for the project. The biodiversity offset strategy will be finalised into an offset package in consultation with OEH, DPI-Lands and DP&E within 12 months of obtaining project approval.	
Heritage	
• An Aboriginal cultural heritage assessment (ACHA) was prepared for the project, which included historic research of the project site, desktop database searches for previously recorded sites, formulation of a predictive model for archaeological site location, consultation with the Aboriginal community, and field survey with registered aboriginal groups on 12 January 2016, with a further site visit on 4 February 2016. • Five organisations registered their interest in the project; Muda Aboriginal Corporation, Bourke Aboriginal Health Service, Murdi Paaki Regional Enterprise Corporation, Bourke Aboriginal Community Working Party, and Murrawarri Traditional Council State. • The field survey identified 25 Aboriginal sites within the study area, comprising stone artefacts across a range of sites of varied size, from 1 m^2 to 6,000 m^2. Subsurface deposits are considered of low potential given the soil conditions in the study area. • A majority of the Aboriginal sites identified were assessed to have low archaeological significance; however four out of 25 were assessed as having moderate significance. No sites were assessed to have high significance. • Eighteen Aboriginal sites are either wholly or partially within the disturbance footprint of the project. All of the identified artefacts within the disturbance footprint of the project will be salvaged in consultation with the RAPs by surface artefact collection and detailed recording. The remaining seven identified sites will be avoided.	Chapter 12 and Appendix J
Water resources	
• The project site is located within the catchment of the Darling River. At a local level, no wetlands, rivers or streams, either permanent or ephemeral, occur in the project site. The nearest drainage line is the Darling River, flowing in a south-westerly direction to the east of the site; approximately 2.5 km from the project site at its closest point. • The project site lies outside the Darling River floodplain and is not on flood prone land. Notwithstanding, the abattoir buildings will be constructed 1,450 mm above the natural ground surface, providing further protection against the risk of flooding affecting the site. • Given the absence of surface water drainage lines in and surrounding the project site, no impacts to surface water resources are anticipated. • Around 38 ha of land will be irrigated with treated effluent within the project site (see wastewater below). An effluent management study has been completed (Envirowest 2016) and recommendations made to ensure irrigation is carried out in a manner to ensure impacts on water resources do not occur. The irrigation method will ensure droplet size is controlled to reduce spray drift and irrigation scheduling will ensure irrigation only occurs when the soil and crop require moisture, minimising the potential for runoff from the area. A 15 m wide vegetative buffer zone consisting of grasses, shrubs and trees will be maintained immediately downslope of the irrigation area to slow down and capture any runoff that occurs from the irrigation area. As such no offsite impacts on water resources as a result of the irrigation area are anticipated. • The size of the irrigation area has also been calculated to ensure an appropriate soil nutrient balance is maintained, with nitrogen being the limiting factor.	Chapter 13

Table E.1 Summary of the predicted impacts of the project

Aspect	Where addressed in the EIS
• Subsurface investigations were undertaken as part of the effluent management study (Envirowest 2016, refer Appendix K). Five boreholes were drilled within the project site to a depth of 8.8 m or drill refusal due to rock. No free groundwater was encountered. Groundwater is therefore understood to be at greater depths than 8.8 m in the project site. • During construction, excavation will be required for construction of the wastewater treatment ponds; however this excavation will not exceed 3 m. No interception of groundwater is anticipated. • Further, all wastewater produced by the abattoir will be contained in the closed wastewater collection system. The wastewater treatment ponds will also be lined with an impermeable EPDM synthetic rubber liner. No impacts on groundwater are therefore anticipated as a result of the project.	
Wastewater	
• Approximately 700 kL of wastewater will be produced by the abattoir per day, which will be treated onsite in a specifically designed automated wastewater treatment system. The treatment plant will be designed to handle a peak instantaneous flow rate of up to 100 kL/hour. The process will include coarse screening, dissolved air flotation (DAF), and the use of settlement and aerobic and anaerobic treatment ponds. • The effluent treated by the onsite wastewater treatment system will be classified as low to moderate strength effluent according to *Use of Effluent by Irrigation Environmental Guidelines* (DEC 2004). Hydraulic and nutrients balance models calculated nitrogen loading as the limiting factor for irrigation. The required irrigation area is 38 ha. • The irrigation application area was assessed by Envirowest (2016) (refer Appendix K), and found to be suitable for the reuse of effluent by irrigation. Site limitations will require adoption of mitigation measures to reduce the impact of effluent irrigation. Mitigation measures include irrigation scheduling, maintenance of vegetation and annual application of gypsum or lime.	Chapter 14 and Appendix K
Visual	
• The project site is situated within a remote rural area in the Bourke LGA, approximately 5.5 km from the nearest residence. This distance represents the limit of eye sight at ground level when views are unobstructed. Given intermediate trees located between this residence and the project site, no views of the project will be possible. • The only viewpoint that could be impacted by the project is the Mitchell Highway. However, given the abattoir will be setback 500 m from the highway and users are typically travelling at high speeds, the potential impact on visual amenity from this viewpoint is considered to be negligible.	Chapter 15
Greenhouse Gas	
• The total operational greenhouse gas (GHG) emissions for the project are estimated to be 19,314 tonnes CO2-e per year. Of this, only 5,445 t $CO_{2\text{-}e}$ are direct (Scope 1) emissions, which will be associated with the consumption of liquefied natural gas and the production of methane during the wastewater treatment process. • The predicted GHG emissions are minimal when compared to the emissions from the state of NSW as a whole, representing just 0.01% of the GHG emissions from NSW. • Key elements in the design of the abattoir have ensured that GHG emissions will be minimised where possible, in particular the incorporation of the energy efficient glycol refrigeration system.	Chapter 16 and Appendix L

Table E.1 Summary of the predicted impacts of the project

Aspect	Where addressed in the EIS
Hazardous and offensive development	
• A preliminary risk screening of the project was conducted to screen the development against the dangerous goods criteria in Applying SEPP 33 (NSW Department of Planning (DoP) 2011). • The dangerous goods to be stored onsite are ammonia, chlorine and liquefied natural gas. The quantities of these substances to be transported and stored at the project site will be below the threshold quantities in DoP (2011). The project is therefore not a potentially hazardous or offensive industry.	Chapter 17
Socio-economic	
• A broad socio economic profile of the Bourke LGA and the town of Bourke has been conducted, which identified the ongoing trend of population decline and increases in unemployment in the town of Bourke. • This trend is consistent with other relatively isolated rural areas in NSW, where population decline and unemployment increase has been compounded by the Millennium Drought, restructuring of the farming sector, and reductions in employee numbers in the public sector as general population declines. • The project is anticipated to be in full operation by its third year of operation. At this time, the ongoing total annual economic contribution to the LGA and local region from the abattoir operations is estimated as follows: - regional output in the order of $150 million; - value added in the order of $40.6 million; and - 534 FTE jobs. • These impacts are significant for the local regional and will have significant positive benefits for both the Bourke LGA and town. • The key socio economic benefits of the project as a result of employment and expenditure are considered to be: - enhancement of the local and regional economies; and - assisting to arrest predicted local and regional population decline, diminishing availability of services and facilities in the region and declining community sustainability.	Chapter 18

ES3 Conclusion

There is a sound and broadly based justification for the project. It will realise a number of opportunities with respect to both the goat and sheep markets, thus providing a social and economic benefit to the region. It will provide substantial stimulus to a region in need and with few equivalent economic opportunities.

The potential environmental impacts of the project have been identified and assessed against relevant regulatory requirements, standards and guidelines. A careful site selection process has ensured environmental impacts of the project have been either avoided or minimised. The project site (the subject of this EIS) was chosen on the basis that it is situated within the source area for rangeland goats in western NSW, is removed from urban areas with no residences within 5 km, has been subject to a history of agricultural activities, has appropriate topography and soil structure for construction, is in a region with a diminishing availability of services and facilities thereby having labour capacity to service the development, is located on a major State highway, and is able to access the required power and water to service the development.

A range of commitments are proposed in this EIS to minimise and address impacts of the project. Through the commitments made in this EIS and operational practices, the project will enable the orderly and logical use of natural, physical and human resources existing in the area and region. Enhanced outcomes will result from greater investment and employment, while minimising potential environmental and social impacts.

The benefits of the project are significant and it is considered to be in the public interest for it to be positively determined.

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1 Introduction

1.1 Background

CAPRA Developments Pty Ltd (CAPRA) is seeking consent under Part 4, Division 4.1 of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act) for the construction and operation of a small stock abattoir (herein referred to as the project), approximately 14 kilometres (km) north of Bourke in north-western NSW, as shown on Figure 1.1.

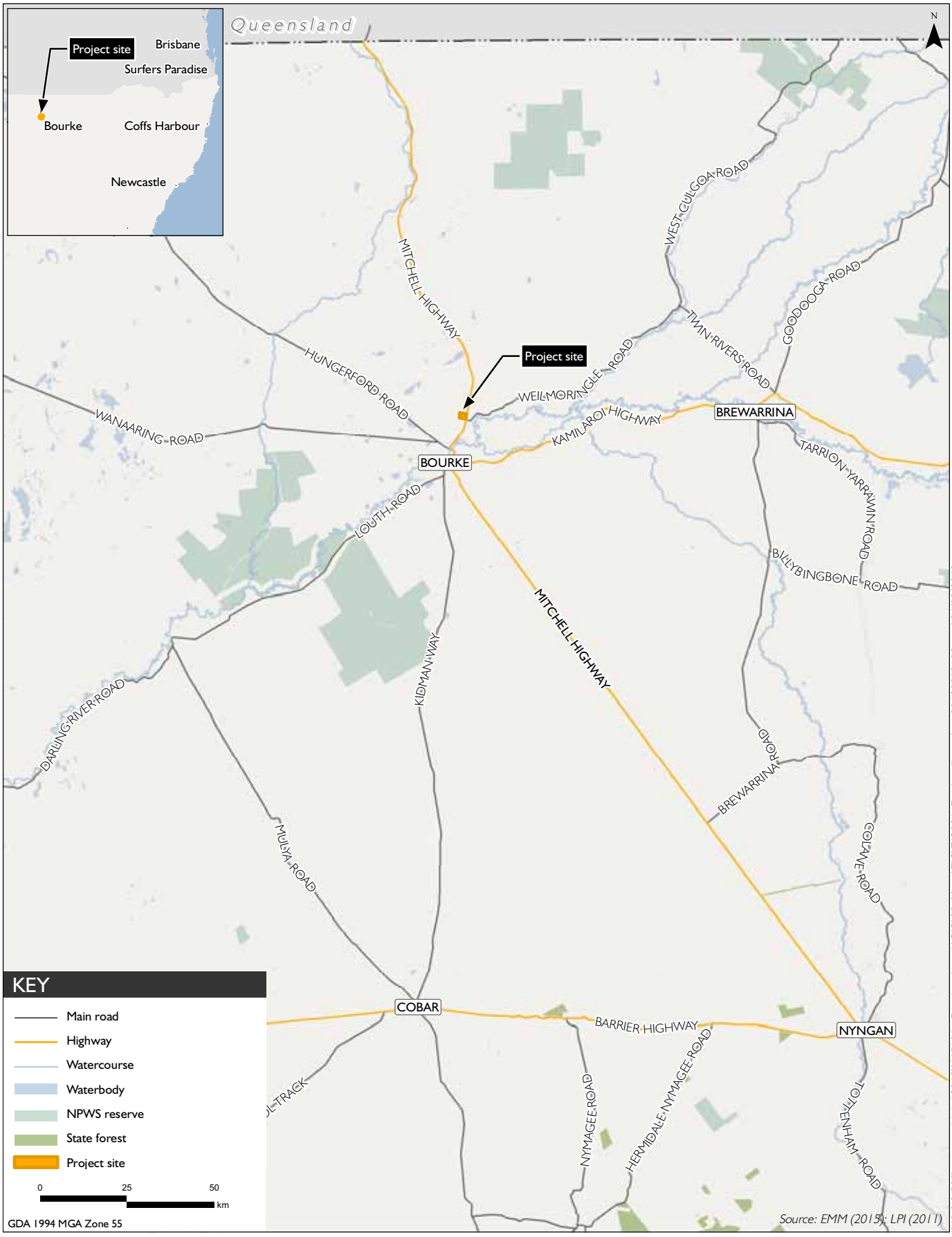
CAPRA's primary objective is to develop an abattoir adopting best practice in design, operation and management, to meet the immediate and projected long-term export demand for meat. The abattoir will have the capacity to process up to 6,000 head per day for export, comprising goats, sheep and lambs. The project represents a significant investment in the Bourke region, with a capital investment value (CIV) of approximately $60 million, and will provide approximately 200 full time equivalent (FTE) positions when fully operational, along with significant associated flow on benefits to the town of Bourke and the Far West NSW region.

1.2 Project overview

A full project description is provided in Chapter 2. In summary, the project involves:

- construction of an abattoir with the capacity to process up to 6,000 head per day, comprising goat, sheep and lambs;
- construction and provision of ancillary infrastructure to support the abattoir, including reticulation of power, water and telecommunication services, vehicular access off the Mitchell Highway, heavy vehicle manoeuvring and turning areas, livestock holding yards, car parking, administration office, staff amenities and a wastewater treatment system;
- livestock will be principally sourced from the surrounding region and trucked to the development site;
- meat products from the abattoir will be chilled to less than 7 degrees Celsius (^{o}C) or frozen for transport;
- construction of four water treatment ponds where wastewater will be treated via an aerobic and anaerobic ponding process, and then utilised for irrigation;
- no rendering will take place on site with waste products to be transported off site for disposal at licensed facilities;
- employment of approximately 200 FTE personnel when fully operational; and
- operation 24 hours per day, 7 days per week.

The disturbance footprint associated with the project (comprising the abattoir, ancillary infrastructure and wastewater treatment ponds) will be approximately 17.3 ha, as well as an irrigation area of around 38 ha.



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Regional locality plan

Bourke Small Stock Abattoir
Environmental Impact Statement

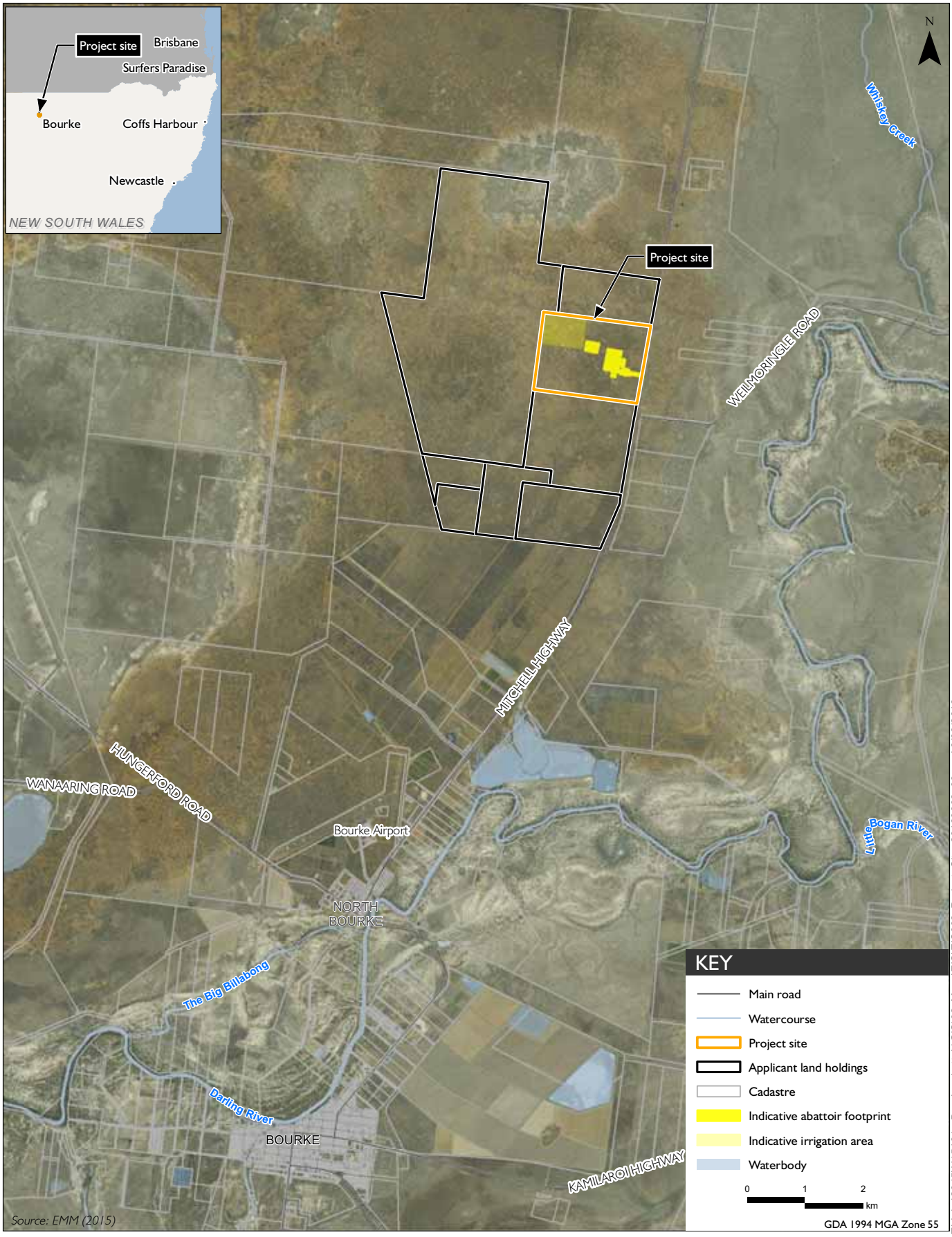
Figure 1.1

1.3 Project site

The project site comprises 246 hectares (ha) of rural land, approximately 14 km north of Bourke, which has been significantly modified by historic land clearing and agricultural activities (refer Photograph 1.1). It is positioned off the Mitchell Highway and is identified as Lot 17 in Deposited Plan (DP) 753546 within the local government area (LGA) of Bourke.

CAPRA has entered into a conditional contract to purchase approximately 2000 ha of land, known as the Artesian Block, comprising the project site (Lot 17 DP 753546) as well as Lot 19 DP 753546, Lot 6297 DP 768182, Lot 2 DP 753547, Lot 100 DP 753547, Lot 102 DP 753547, Lot 4 DP 753547, and Lot 3 DP 753547, as illustrated on Figure 1.2.

Photograph 1.1 The project site



Project site

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 1.2

1.4 Purpose of this document

The project is a State Significant Development (SSD) pursuant to Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional Development SEPP). Accordingly, approval is required under Part 4, Division 4.1 of the EP&A Act.

This environmental impact statement (EIS) has been prepared by EMM Consulting Pty Ltd (EMM) on behalf of the applicant, CAPRA, to support the SSD application for development consent under Section 78A (8A) of the EP&A Act for the project. It has been prepared to the form and content requirements set out in Clauses 6 and 7 of Schedule 2 of the NSW *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).

The primary objective of this EIS is to inform government authorities and other stakeholders about the project to enable consideration of the implications of proceeding with the development. It addresses the specific requirements provided in the Secretary's environmental assessment requirements (SEARs) issued by the NSW Department of Planning and Environment (DP&E), as well as the recommendations of other consulted agencies and relevant stakeholders. The SEARs are provided in Appendix A, with a table identifying where each requirement has been addressed in the EIS provided below in Section 1.5. The EIS has also been prepared with input from a number of technical specialists, as described in Section 1.6.

In addition to describing the project, this 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, the existing characteristics of the proposed development site and the legislative framework under which the project is to be assessed and determined.

1.5 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 (DA) for the project was submitted to DP&E in September 2015. The SEARs were subsequently issued by DP&E on 29 October 2015. Table 1.1 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 the EIS. The SEARs are contained within Appendix A.

Table 1.1 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements	Where addressed
General requirements	
... the EIS must include:	
• detailed description of the development, including:	Chapter 2 and Chapter 20
- 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 operations in the vicinity of the site;	
- plans of any proposed building works including details of the classification of all structures that may require an approval/certification under the Building Code of Australia; and	Appendix B
• consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments;	Chapter 4

Table 1.1 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements	Where addressed
• risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment;	Chapter 6
• detailed assessment of the key issues specified below, and any other significant issues identifies in this risk assessment, which includes: - a description of the existing environment, using sufficient baseline data; - an assessment of the potential impacts of all stages of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes; and - a description of the measured that would be implemented to avoid, minimise and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage any significant risks to the environment; and • consolidated summary of all the proposed environmental management and monitoring measured, highlighting commitments included in the EIS.	Chapter 6
The EIS must also be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (as defined I clause 3 of the Environmental Planning and Assessment Regulation 2000) of the proposal, including details of all assumptions and components from which the CIV calculation is derived; • a close estimate of the jobs that will be created by the development during the construction and operational phases of the development; and • certification that the information provided is accurate at the date of preparation.	Provided separately to the DP&E
Key Issues	
The EIS must address the following specific matters:	
• Q fever – including: - the potential for increased risk in the transmission of Q fever as a result of the transportation, handling and processing of lamb, sheep and goats; and - an Environmental Health Risk Assessment (HRA) using the risk assessment model outlined in the Guidelines for Assessing Human Health Risks from Environmental Hazards, published by enHealth in 2012. The HRA should address the potential risks of Q fever associated with but not limited to: the design of the abattoir, dust suppression, waste disposal, workplace health and safety, water security, and community exposure through livestock transportation.	Chapter 10
• Air quality and odour – including: - an assessment of all potential air quality and odour sources from construction and operation of the abattoir and its wastewater treatment system, including details of air quality and odour impacts on private properties, in accordance with the relevant Environment Protection Authority (EPA) guidelines; - details of mitigation, management and monitoring measures for preventing and/or minimising both point and fugitive emissions; and - an assessment of the effectiveness of the proposed air quality and odour mitigation measures	Chapter 7
• Wastewater – including: - a detailed description of the wastewater treatment requirements for the development including details of the volume of wastewater generated, treated, reused/recycled, or stored on site - details of the key pollutant concentrations of the wastewater before and after treatment with reference to relevant water quality guidelines;	Chapter 14

Table 1.1 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements	Where addressed
- details of the proposed irrigation area, including baseline data on soil characteristics and a technical assessment of the suitability of the soil to sustain on-going wastewater irrigation; - an Irrigation Management Plan that details proposed irrigation practices and includes a detailed soil nutrient and water balance; and - a detailed assessment of wastewater management strategies in accordance with relevant guidelines.	
• Soils and water – including:	
- a description of the water demands of the development including details of adequate and secure water supply;	Section 2.8.2
- a detailed water balance, including water demands, sources (surface and groundwater), disposal methods and storage structures;	Section 2.8.2
- a description of the measures to minimise water use;	Section 13.5
- a description of the water licensing and approval framework;	Section 4.3.2
- a description of the surface and stormwater management system, including on site detention, and measures to treat or reuse water;	Chapter 14
- an assessment of potential surface and groundwater impacts, including impacts on licensed water users, landholder rights and groundwater dependent ecosystems;	Chapter 13
- details of impact mitigation, management and monitoring measures;	Chapter 19
- an assessment of any potential existing soil contamination; and	Section 4.2e
- a description of the erosion and sediment controls during construction and operation.	Section 13.5
• Noise and vibration – including: - description of all potential noise and vibration sources including construction, operational, on and off-site traffic noise; - an assessment of the likely noise and vibration impact including a cumulative noise impact assessment in accordance with the NSW Industrial Noise Policy and other relevant EPA guidelines; and - details of noise and vibration mitigation, management and monitoring measures.	Chapter 8
• Waste management – including: - details of the quantities and classification of all waste streams generated on site; - details on waste storage, handling and disposal; and - details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste Avoidance and Resource Recovery Strategy 2007 and the draft NSW Waste Avoidance and Resource Recovery Strategy 2013-2021.	Section 2.9
• Traffic and transport – including:	
- a traffic impact study prepared in accordance with the methodology set out in Section 2 of the Guide to Traffic Generating Developments (RTA 2002);	Chapter 9
- details of the vehicular access locations and treatments, including safe intersection site distance;	Section 2.7
- all traffic and transport demands likely to be generated during construction and operation;	Section 2.6

Table 1.1 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements	Where addressed
- a description of haul routes, vehicle types and daily trip numbers;	Section 2.6
- details of any utility services which will need to be located within or across the Mitchell Highway; and	Section 2.8
- detailed plans of the proposed layout of the internal road network and parking on site in accordance with the relevant Australian standards.	Chapter 9, and detailed plans in Appendix B
• Biodiversity – including: - 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 dependent ecosystems, and any potential for offset requirements; and - 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 and the NSW Office of Environment and Heritage Offset Policy.	Chapter 11
• Social and community – including: - consideration of the increased demand on local community services and facilities; and - an assessment of local housing availability and affordability to accommodate the increased workforce.	Section 18.4
• Land use safety – including: - a preliminary risk screening completed in accordance with Applying SEPP 33 - Hazardous and Offensive Development Application Guidelines (DoP 2011). Should the screening indicate that the development 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). The PHA should estimate the cumulative risks from the existing and proposed development.	Chapter 17
• Food safety – in relation to meat handling and processing and how NSW Food Authority standards and requirements will be met.	Section 2.12
• Animal welfare, biosecurity and disease management - including: - details of how the proposed development would comply with the relevant codes of practice and guidelines; - details for 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 outbreak.	Section 2.11
• Visual – including: - a description of the visual catchment and visual impacts including lighting impacts, as seen from the Mitchell Highway and any other publicly accessible vantage points or residences; and - an appraisal of visual impact mitigation measures.	Chapter 15
• Greenhouse gas – including: - an assessment of the potential greenhouse gas emissions of the development, including an assessment of the potential impacts of these emissions on the environment; and - a detailed description of the measures that would be implemented on site to ensure that the development is energy efficient.	Chapter 16

Table 1.1 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements	Where addressed
• Heritage – including: - Aboriginal and non-Aboriginal heritage items and values of the site and surrounding area, taking into account the NSW Heritage Manual and Assessment Heritage Significant Guidelines.	Chapter 12

1.6 EIS study team

EMM has prepared this EIS on behalf of CAPRA. A number of technical specialists were also engaged to undertake specialist technical assessments of the project and to provide relevant input into the EIS. The study team is presented in Table 1.2.

Table 1.2 EIS study team

Role	Organisation	Person	Qualifications
Lead consultant			
Project Manager, EIS author	EMM	Nicole Armit	M Env Law, BEng (Env)(Hons)
Project Director	EMM	Brett McLennan	BTP (Hons)
GIS	EMM	Katherine Lynch	BSc (Hons)
Technical Specialists			
Ecology	EMM	Katie Whiting	BSc, Masters wildlife management
Heritage	EMM	Pamela Kottaras	BA (Hons Archaeology)
	EMM	Ryan Desic	BA (Hons Archaeology)
	EMM	Pamela Chauvel	BA (Hons Archaeology)
Traffic and transport	EMM	Tim Brooker	PhD, BEngSc
Hazard and risk	EMM	Mark Roberts	BEnvSc, GradDip (Env St), GradDip (Bushfire)
Soil and effluent irrigation	Envirowest	Paul Flitcroft	BSc
Air quality	SLR	Alison Radford	PhD, BSc (Hons)
Greenhouse gas	SLR	Alison Radford	PhD, BSc (Hons)
Environmental health risk assessment	SLR	Craig Simpson	PhD, Master of Science (Environmental Toxicology), BAppSc

1.7 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.

2 The project

2.1 Overview

CAPRA is seeking development consent under Division 4.1 of Part 4 of the EP&A Act to develop a small stock abattoir approximately 14 km north of Bourke, with the capacity to process up to 6,000 head per day, comprising goats, sheep, and lambs. Figure 2.1 shows the conceptual layout of the proposed abattoir development with a detailed description provided in the sub-sections below.

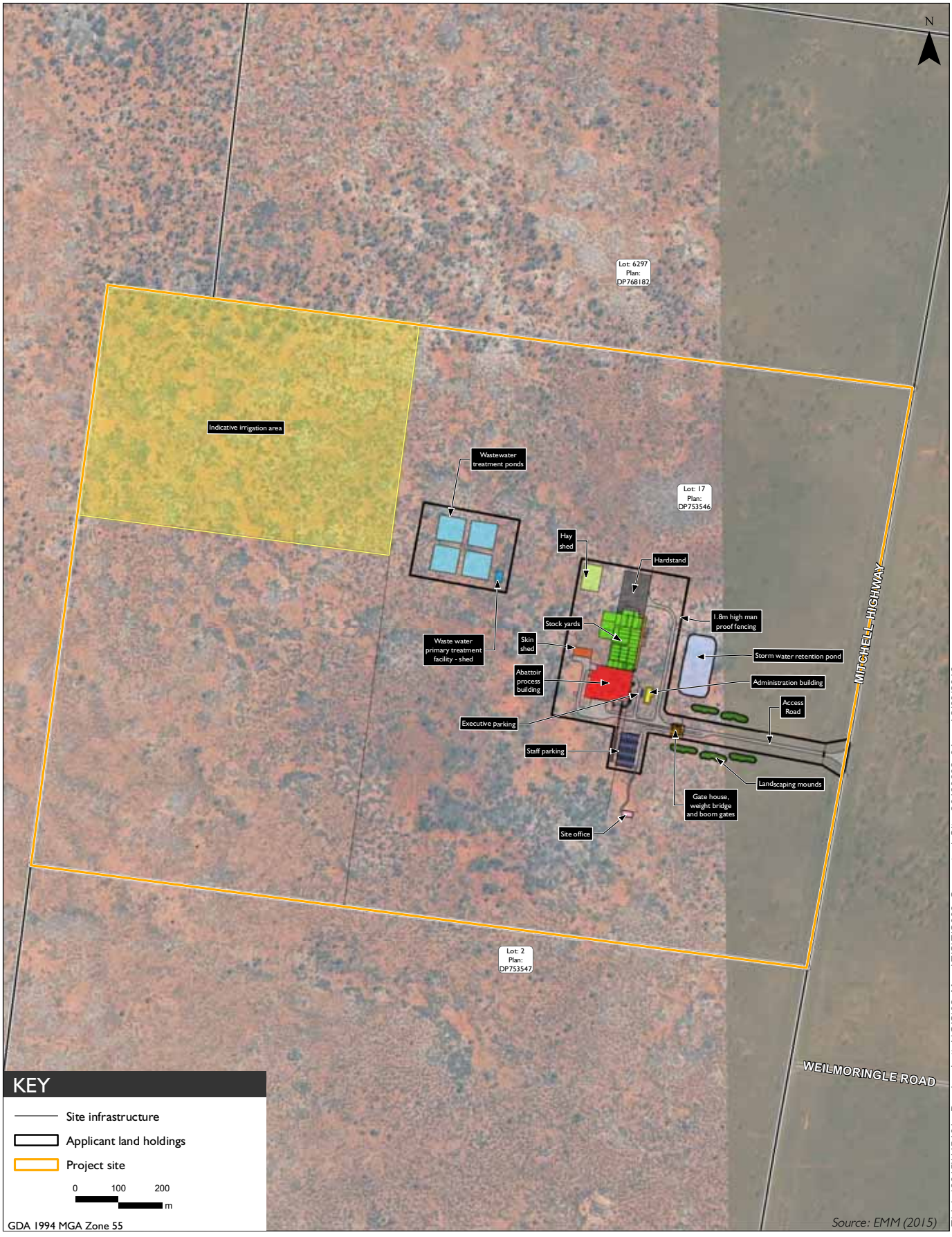
The project has been designed to realise a number of opportunities with respect to both the goat and sheep markets, whilst providing benefits to Bourke and the farming community. In particular, there is a significant supply of rangeland goats in NSW, predominantly in the north-western region of the state, and a current deficit in processing capacity with respect to both the supply of goats and the international demand for goat meat. With only one dedicated goat abattoir currently operating in Australia, the construction of another facility with the ability to process goats will assist in addressing this deficit, whilst providing a boost to the emerging goat meat industry and its associated contribution to the NSW economy.

The agricultural grazing sector has invested heavily in broadening and diversifying the sheep base to include goat farming over recent years, providing vital income in times of difficult climatic conditions such as drought. The project will add a significant participant in the goat meat processing market to stimulate a more sustainable market for their production.

The abattoir will also process sheep and lambs, supporting producers in NSW by providing an additional processing facility and access to a global market place. The abattoir has been designed to meet Halal and Chinese accreditation requirements, as well as complying with the United States Department of Agriculture (USDA) requirements.

Ancillary infrastructure will support the abattoir, including reticulation of power, water and telecommunication services, vehicular access off the Mitchell Highway, heavy vehicle manoeuvring and turning areas, livestock holding yards, car parking areas, administration office, staff amenities and a wastewater treatment system and reuse of treated effluent via irrigation.

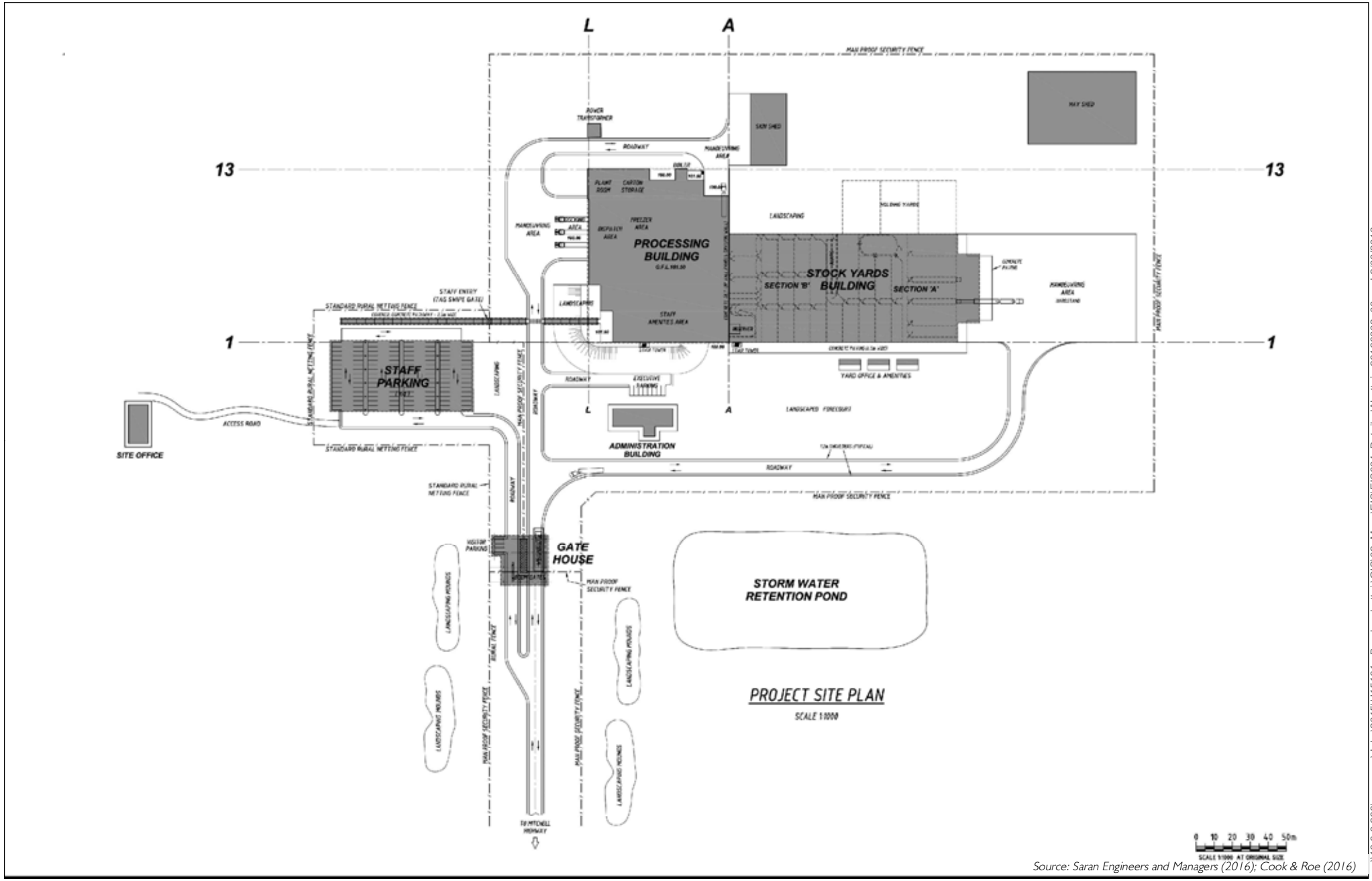
A summary of the key aspects of the project is provided in Table 2.1. A detailed plan of the abattoir layout is presented in Figure 2.2, with design drawings provided in Appendix B.



Abattoir conceptual layout

Bourke Small Stock Abattoir
Environmental Impact Assessment

Figure 2.1



Source: Saran Engineers and Managers (2016); Cook & Roe (2016)

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Detailed abattoir layout

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 2.2

Table 2.1 Summary of project

Aspect	Description
Livestock processing	Small stock (goat, sheep and lamb).
Daily livestock processing capacity	Up to 6,000 head of livestock.
Operating hours	24 hours per day.
Operating days	Seven days per week (excluding public holidays).
Employees	Approximately 200 FTE positions when operating at full capacity.
Product	Transported via refrigerated containers on trucks for export via ports. The ports through which product is exported will vary depending on market demand; however will predominantly be via ports in NSW such as Port Botany.
On-site livestock enclosure	Covered stockyards for short-term containment prior to processing. Additional fenced holding yards will be provided adjacent to the stockyards for short term overflow containment of livestock.
By-products management	All waste products will be transported off site to appropriately licensed facilities with the exception of treated effluent, which will be re-used for irrigation of crops within the project site, and manure, which will be spread on paddocks within the project site. No rendering will take place on site.
Water supply	Council reticulated town water supply and via Council's water access licence from the Darling River.
Daily water requirement	Approximately 770 kilolitres (kL).
Daily wastewater generation	Approximately 700 kL.
Wastewater management	Treated on site in wastewater treatment system, which will include a dissolved air flotation unit, and settlement and anaerobic treatment ponds. Treated effluent will be utilised for on-site irrigation of paddocks within the project site.
Power supply	Reticulated electricity will be the principal source of energy. Electricity needs will be met via a new connection to the reticulated electricity network, with a 3,000 kVa connection to the existing 66kV powerline along the Mitchell Highway.
Average daily heavy vehicle movements to/from the site	Approximately 14 heavy vehicles (28 vehicle movements).
Vehicle access	Access will be from the Mitchell Highway, with a new intersection to be constructed into the development site. Construction of onsite car parking and heavy vehicle manoeuvring areas will also be required.

2.2 Processing capacity and animal supply

The abattoir will have the capacity to process up to 6,000 head per day comprising goats, sheep, and lambs. The goats will be primarily sourced from rangeland NSW which has an abundant supply, containing 75% of the Australian rangeland goat population which was 2.95 million in 2011 (DEDI 2012).

Aerial surveys of goat population numbers last conducted in Australia as reported in DEDI (2012) found the rangeland goat population in Australia grew from 1.4 million in 1997 to an estimated 3.3 million in 2010, peaking at 4.1 million in 2008. An increasing proportion of Australia's rangeland goat population occurs in NSW (DEDI 2012). It is generally accepted that with the absence of human influence or control, a population has the potential to double in size every 1.6 years.

There are currently four existing systems for the sale of goats in Australia; by open public auction, private treaty, auction sale by description, and through co-operatives. The main source of supply for the abattoir will be via private treaty, direct from farm. Under this system, goats are sourced from goat depots, which act as independent collecting stations for farmers who catch rangeland goats on their properties and deliver them to the depots as an additional source of income. Five goat depots currently exist around Bourke, with others in Broken Hill, Cobar, Hungerford, Eulo, Blackhall, Longreach and St George.

The location of the abattoir in Bourke, within the source area for rangeland goats, ensures that transport distances, and associated freight costs, will be minimised. With the absence of an abattoir in the far west region of NSW, goats and livestock harvested around Bourke are currently transported long distances to Charleville (Queensland), Nyngan or to Melbourne in Victoria.

The abattoir will also be situated within the sheep and lamb production region of NSW, and will therefore be able to readily process sheep and/or lambs when required.

When operating at full capacity, the abattoir will process approximately 22,500 tonnes (t) of goat meet per annum. In 2014 Australia exported 35,780 t (shipping weight (swt)) of goat meat (MLA 2015). Based on 2014 figures, product from the abattoir will therefore represent a significant proportion of total Australian goat meat exports.

2.3 Products

The abattoir will produce three types of goat meat products as demanded by the serviced export markets, as follows:

- whole bone-in carcass with skin on;
- whole bone-in carcass with skin off; and
- six way cut of carcass in cartons (skin off and skin on).

Edible offal products, such as the brain, heart, kidney, liver, tongue, tripe, pancreas, spleen and runners, will also be sold to markets (primarily export) from the abattoir.

2.4 Process description

Livestock will be transported to the abattoir in semi-trailers, B-doubles or road trains and off-loaded at ground level into receival yards adjoining the abattoir building. Animals will be mustered into a series of covered holding yards, during which time they will be watered. When ready for slaughter, the livestock will be taken upstairs to the holding pens and then to the kill floor. An overflow outside holding yard will also be provided adjacent to the stockyards for the short term containment of livestock in times of peak production, as shown in Figure 2.1. A detailed layout plan of the abattoir is shown in Figure 2.2.

After slaughter, stock to be sold as skin on will go to the de-hairing process, with the remainder proceeding to the processing area for skin removal. All stock will then move through the evisceration area and, if being sold as a whole carcass, chilled to below 7 ^{o}C ready for transport. Stock to be processed as a six way cut of carcass will be transferred to the cutting area, packed in cartons, palletised and refrigerated for transport.

The products of the evisceration process (edible offal) will also be packed and chilled for transport off site for sale.

2.5 Hours of operation

The abattoir will operate 24 hours a day, seven days per week. However, activities during the hours of 11 pm – 6 am, and during the day on weekends, will generally involve stock delivery and product dispatch, regular maintenance and cleaning, and operation of the wastewater treatment plant.

2.6 Traffic generation

The primary operational activities that will generate traffic to and from the project site will be:

- delivery of livestock in semi-trailer and/or B-doubles or road trains;
- delivery of livestock feed (as needed) in semi-trailers;
- removal of meat products from the abattoir in refrigerated containers on semi-trailers for distribution;
- removal of meat waste products in enclosed semi-trailers for off-site processing;
- removal of skins in rigid trucks for off-site treatment;
- removal of general garbage in rigid trucks;
- servicing/tradesman visits in utes/vans; and
- staff visits by cars.

A summary of the project generated traffic is provided in Table 2.2. Access to and from the project site will be via the Mitchell Highway, as described further in Section 2.7.

Table 2.2 Daily traffic volumes to be generated by the project

Activity	Type of Vehicle	Daily traffic (vehicles)	Daily traffic (vehicle movements)
Delivery of livestock	Road trains	5	10
Delivery of consumables	Semi trailers	1	2
Dispatch of meat products	Semi trailers or B Doubles	3	6
Removal of waste products	Rigid truck	3	6
Removal of general garbage	Rigid truck	1	2
Maintenance vehicles	Rigid truck	1	2
Sub total heavy vehicles	**All trucks**	**14**	**28**
Staff	Car or other light vehicle	130	260
Trades visitors	Car or other light vehicle	2	4
Sub total light vehicles	**All light vehicles**	**132**	**264**
Total all vehicles	**All vehicles**	**146**	**292**

2.7 Vehicular access and parking

Access to the abattoir will be via the Mitchell Highway, which is a two lane sealed road in the vicinity of the project site, with marked edge lines but minimal sealed shoulders. A new intersection on the highway will be constructed to enable safe access into the site. The intersection will be constructed approximately 700 m north of the Bourke – Collerina (Weilmoringle) Road intersection with the highway (refer Figure 1.2). The alignment of the Mitchell Highway is straight and level at this location, as shown in Photographs 2.1 and 2.2. The internal access road from the Mitchell Highway will be approximately 560 m long (refer Figure 2.1), and will be gravel, with the exception of the first 50 m from the highway which will be sealed.

Photograph 2.1 The Mitchell Highway in the vicinity of the project site access, looking south

Photograph 2.2 The Mitchell Highway in the vicinity of the project site access, looking north

The site access intersection off the Mitchell Highway will be designed to comply with the relevant Austroads intersection traffic capacity and safety design standards. There are unlikely to be significant future traffic conflicts at this location on the Mitchell Highway for through traffic movements and the future site traffic using the intersection, as there are currently generally low traffic volumes using the Mitchell Highway. The existing traffic volumes and the implications of the project on these volumes are described in detail in Chapter 9.

Due to the low existing traffic volumes on the Mitchell Highway in the vicinity of the project site, only minor works involving sealed shoulder widening will be required so as to accommodate left and right turning traffic movements by the appropriate design vehicle (which is a road train in this locality) into the project site. With sealed shoulder widening in place, the site access intersection design will be acceptable without the requirement for formal additional right or left turning traffic lanes. Further information on intersection design is provided in Chapter 9.

A car parking area will be constructed as part of the abattoir complex and will be used for all staff and visitor car parking needs associated with the abattoir. This car park will accommodate up to 150 cars and will be sealed. While there will generally be limited requirement for heavy vehicle parking, particularly for any length of time, adequate area will be available to ensure that any heavy vehicle parking requirements can be met within the project site. At no time will it be necessary to park heavy vehicles on the adjoining Mitchell Highway.

All internal access roads and manoeuvring areas will be appropriately designed to carry the anticipated heavy vehicle movements.

Prior to exiting the site, all stock trucks will be washed down via a truck wash installed in the unloading bay, so as to ensure that all animal waste is cleaned off the trucks before driving back out to Mitchell Highway.

It is anticipated that the vast majority of light vehicles accessing the project site will travel to and from Bourke, with most employees likely to reside in Bourke.

Access will be tightly controlled into the abattoir site, with only abattoir employees and approved visitors and contractors allowed into the site. This will be achieved via a guarded boom gate on the access road and a separate staff entry with an electronic access system.

2.8 Servicing

2.8.1 Electricity

Reticulated electricity will be principal source of energy. Electricity needs will be met via a connection to the reticulated electricity network, with a 3,000 kVa connection. As shown on Figure 2.3, a HV power line will be installed adjacent to the 560 m long internal access road. This will feed off the existing HV power line that currently runs adjacent to the Mitchell Highway, and will feed into the site transformers designed to meet on site power requirements.

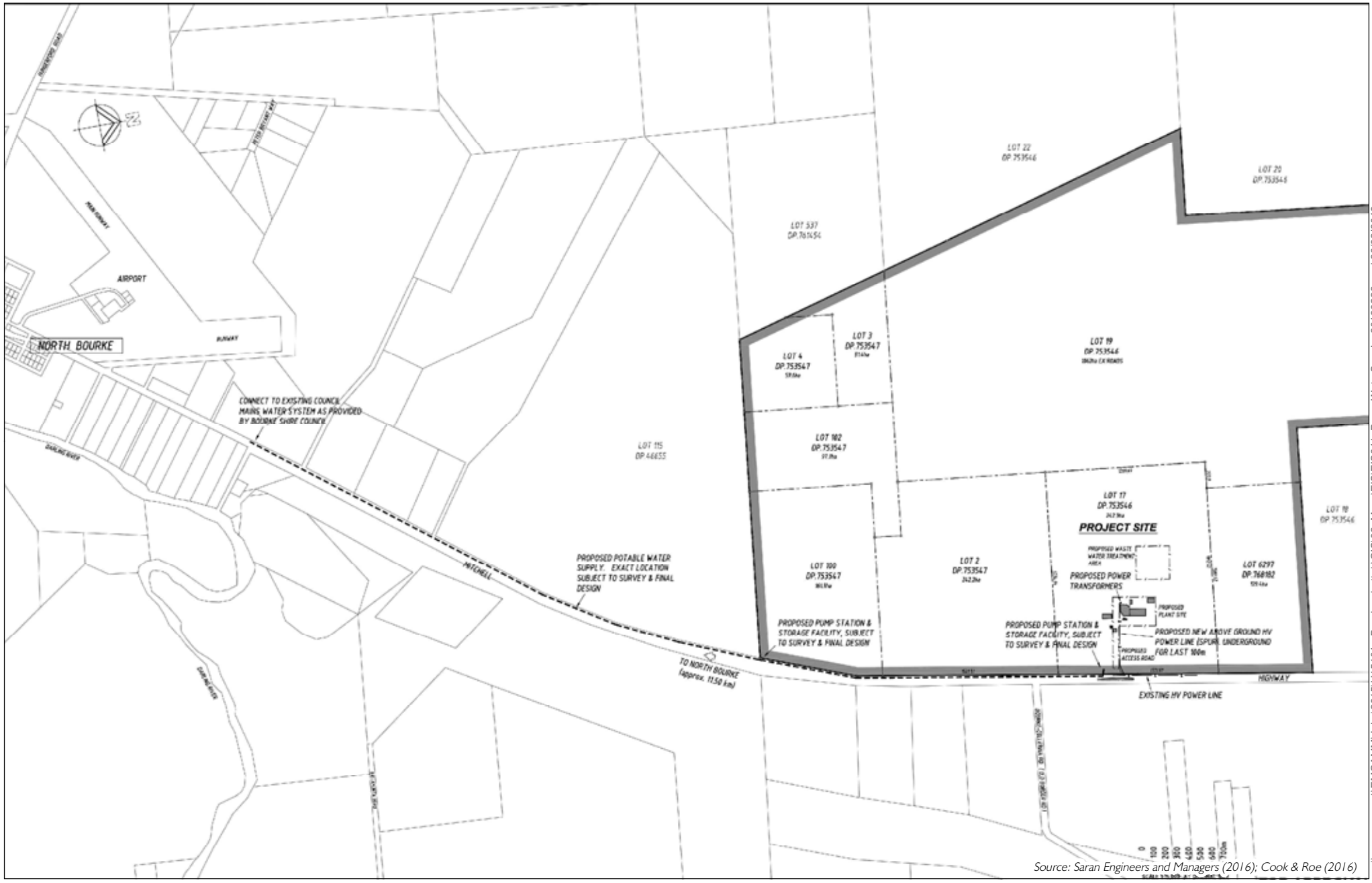
2.8.2 Water supply and security

The water requirements of the project will include livestock watering, meat processing, wash down, dust suppression and staff amenities, and have been calculated at approximately 770 kL per day, and up to 1 ML. This equates to around 250 to 365 ML per year, depending on the number of days worked in the year. As described in Chapter 5, consultation has been undertaken with Bourke Shire Council (BSC), confirming that Council has adequate capacity to supply the required 770 kL per day, and up to 1 ML daily.

The water demands of the project will therefore be serviced by both a raw water connection via BSC's water access licence from the Darling River, and through a connection to Council's filtered reticulated water supply system from North Bourke, as shown on Figure 2.3. BSC provided a letter to CAPRA confirming the availability of water supply for the project, which is attached in Appendix C. The capacity and specification of each of these connections is contained in Table 2.3.

Table 2.3 Water supply infrastructure specifications

Type	Flow rate	Pressure	Daily flow	Pipe size
Filtered water	11 L/s	40 psi	950,400 L	150 mm
Raw water	6 L/s	40 psi	518,400 L	100 mm



Source: Saran Engineers and Managers (2016); Cook & Roe (2016)

EMM

Power and water supply

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 2.3

BSC currently holds a licence for 3,500 ML annually for its town water supply. BSC advise that the current level of usage is approximately 1,500 ML per annum, leaving 2,000 ML spare capacity based on existing usage. There is therefore sufficient capacity in the system to accommodate the additional 250 to 365 ML for the project. In relation to the supply of filtered water, whilst the Bourke Water Treatment Plant has a capacity of 3.3 ML per day, it currently produces a maximum of 1.5 ML over the summer months, and a yearly average of around 1 ML per day. The maximum daily production combined with the additional production for the abattoir will be 2.5 ML per day, and as such the water treatment plant has capacity to provide the water required.

As described in detail in Appendix C, BSC has also considered its ability to meet the demands of the project under drought conditions. The impact on the town supply during drought conditions combined with the abattoir operating at full capacity was modelled based on the following assumptions:

- that the town weir will stop flowing on December 1 to allow for predictions on evaporation to be made in relation to the hottest seasonal conditions;
- that the current drought management plan will remain in place;
- the abattoir will require up to 5 ML per week;
- no automatic pumping from the additional weir pool 19 km downstream; and
- inflow from Walkden's bore is included (this bore, which BSC is in the process of commissioning, is an emergency water source for Bourke and will have a capacity of 1 ML per day).

In consideration of the above conservative assumptions, the modelling confirmed that water can be provided to the abattoir at full demand levels during drought.

2.8.3 Sewage

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

2.9 Waste management

Appropriate systems will be implemented and maintained to ensure all waste streams generated by the project will be effectively and appropriately disposed of. Waste will be managed in accordance with the objectives of the *NSW Waste Avoidance and Resource Recovery Strategy 2014* (EPA 2014), which are underpinned by the waste hierarchy of avoid and reduce waste, reuse waste, recycle waste, recover energy, treat waste, dispose of waste, as described below.

1. Avoid and reduce waste – waste from the slaughter of livestock will be minimised through the recovery of the majority of each animal and sold as product, with the exception of heads, trotters, lungs, blood and paunch. Wherever possible non-edible bi-products will be put to a beneficial use, as described below.

2. Reuse or recycle waste – bi-products of the abattoir process will be re-used/re-processed wherever possible; for example skins from the 20% of animals sold as skin off will go to a skin processor in Blayney for processing and sale, manure will be composted and spread in areas used for agricultural purposes within the project site and surrounding landholdings, and treated effluent will be re-used onsite to irrigate crops.

3. Treat waste – an effluent management study has been undertaken (refer Chapter 14), to ensure wastewater produced by the abattoir will be treated appropriately for its re-use in irrigation in accordance with the *Use of Effluent by Irrigation – Environmental Guidelines* (DEC 2003).

4. Disposal of waste – all waste produced by the abattoir that cannot be re-used will be stored in enclosed containers and taken offsite by licensed contractors for disposal at an appropriately licensed facility.

Specific waste streams will be managed as described below, with indicative volumes to be produced on an annual basis provided in Table 2.4.

- General daily waste - day to day general waste will be placed into enclosed skips and removed from the site by a licensed contractor on a regular basis for disposal to landfill.

- Manure - the undercover stockyards will be dry cleaned (ie racking or scraping), with the collected manure regularly removed and stockpiled on site for reuse.

- Raw meat waste products - raw animal waste products from the abattoir (offal, bone, blood, fat and trimmings) will be collected by a licensed contractor for transport to an off-site licensed facility.

- Dead on arrival - any dead on arrival stock will be stored in the onsite chillers and collected by a licensed contractor (along with the raw meat waste products) for transport to an off-site licensed facility.

- Skins - animal skins from the abattoir will be collected, stored on site in a skin shed, and transported to an off-site skin processor in Blayney.

- Chemical containers - a chemical supply company will be engaged to provide a chemical delivery and pickup service direct to the project site. At each delivery of new chemical supplies, all empty chemical containers will be retrieved by the company for reuse, recycling or appropriate disposal.

Table 2.4 Indicative volumes of waste to be produced by the project

Waste stream	Annual quantity	Destination	Comment
Non edible waste	3,300 t	Licensed facility offsite	Heads, lungs and trotters
Hair	500 t	Licensed facility offsite	Approx 2 t per day produced
Dead animals	150 t	Licensed facility offsite	Assume 0.5% loss rate
Skins	375,000 skins	Skin processor in Blayney	25% animals sold with skin off
Manure	75 t	Dried and spread on-site	0.05 kg per head
Paunch	750 t	Licensed facility offsite	0.5 kg per head
Blood	4.5 ML	Licensed facility offsite	Removed from site by tanker
Wastewater	175 ML	Irrigation on-site	Treated in onsite wastewater treatment plant
Wastewater solids	750 t	Licensed facility offsite	

2.10 Wastewater and stormwater management

The project will produce two water streams to be managed;

- wastewater - which is defined as water potentially contaminated with by-products of the animal processing operation, and will be generated by the abattoir process, including wash down of the stockyards; and

- stormwater - which is rainfall/runoff collected from the roof of buildings and from the sealed trafficable areas around the perimeter of the abattoir buildings.

Their management is described in the sub-sections below.

2.10.1 Wastewater

All operational wastewater generated by the project will be treated on-site in a specifically designed automated wastewater treatment system. The treatment plant will be located next to the wastewater treatment ponds as indicated on Figure 2.1, and has been designed to handle a peak instantaneous flow rate of up to 100 kL/hour. The process will include coarse screening, dissolved air flotation (DAF), and the use of settlement and anaerobic treatment ponds.

Up to 700 kL per day of wastewater from the abattoir will be directed through coarse screens to remove materials such as hair, paunch, manure and floating solids. The solid waste captured by the screens will be dewatered and the solids stored in a screenings bin for removal from site to a licensed landfill facility. The screen will be periodically washed via an automated washing system comprising a high pressure pump connected to a 500 L tank with a hot and cold water supply.

After screening, the wastewater will flow into the DAF unit, which is designed to remove total suspended solids (TSS), biochemical oxygen demand (BOD), and oils and greases from the wastewater stream. In the DAF, dissolved air is injected into the wastewater under pressure, releasing the air at atmospheric pressure in a flotation tank basin. The released air forms tiny bubbles which adhere to the suspended matter/contaminants, causing the contaminants to rise to the surface of the water and form a floating bed of material. This material is then removed by a skimming device and put into a sludge hopper, from where it is pumped to a tank and periodically removed from site in a tanker to be disposed of at a licensed facility. To reduce the volume of sludge produced, a decant valve will be installed on the sludge tank to allow excess water to be drained from the tank and returned to the screen to be re-processed.

Ferric chloride will also be added as a coagulant aid that will trigger the agglomeration of oil and grease, blood and other precipitates. A flocculent aid will then be dosed to bind these particles which will be skimmed off within the flotation chamber of the DAF. The biological process will include anaerobic, aerobic and anoxic treatment functions.

Effluent from the DAF will then be directed to a series of four wastewater treatment ponds (refer Figure 2.1). The first will be an anaerobic treatment pond, which will be managed to produce a sealed crust for odour mitigation (refer Section 7.5). The second pond will be an aerobic pond, which will be 4 m in depth to allow for optimum efficiency of nitrogen removal, and to ensure the pond dust not dry out. Thirdly, the effluent will pass through a maturation pond where further disinfection by sunlight will occur. And finally the treated effluent will be stored in a fourth holding pond from which it will be pumped for irrigation.

Each pond will have a capacity of around 12 ML (measuring 60 m by 60 m by around 3-4 m deep), equating to a total capacity in the ponds of around 48 ML. Subject to detailed design, it is anticipated the ponds will be lined with an impermeable EPDM synthetic rubber liner, to eliminate the risk of any seepage into the ground, and will be constructed as 'turkey's nest' dams using a combination of fill and excavation in construction.

Treated effluent from the ponds will be reused via spray irrigation of paddocks within the project site. A soil and effluent irrigation assessment was prepared by Envirowest (2016) as part of the EIS to determine the suitability of the site for irrigation, as well as the appropriate area required to irrigate and the required irrigation schedule to ensure an appropriate nutrient balance is maintained (refer Chapter 14 and Appendix K).

In accordance with the recommendations in Envirowest (2016), the treated effluent will be irrigated over a 38 ha area, as shown on Figure 2.1, with nitrogen being the limiting factor for irrigation. Phosphorus levels will also require the effluent to be irrigated over 38 ha. Within this area crops will be rotated according to the season, with both summer and winter crops to be planted. Soil, effluent, groundwater and vegetation monitoring will be undertaken as per the monitoring program detailed in Section 14.4.1 to ensure appropriate nutrient balances are maintained in the soil.

Suitable crops for the summer, autumn and spring months in Bourke that are not salt sensitive include sorghum and millet. Winter cereal crops such as wheat, barley and oats are suited to the cooler months. The crops will be harvested and transported off-site. Further detail on the soil and effluent irrigation assessment is provided in Chapter 14.

2.10.2 Stormwater

Stormwater collected from the roof of the abattoir buildings and from the sealed trafficable areas around the buildings will be directed into a stormwater retention pond, as shown on Figure 2.1. This pond has been designed to capture a 1 in 10 Average Recurrence Interval (ARI) event, and will have a capacity of approximately 2.8 ML accordingly. Water from the dam will be reused to irrigate the landscaping along the access road and around the abattoir buildings.

2.11 Animal welfare, biosecurity and disease management

2.11.1 Animal welfare

The conditions under which livestock will be managed during their transportation, holding and slaughter will be in accordance with relevant government and industry endorsed codes of practice designed to safeguard animal health and welfare.

Under section 104 of the NSW *Food Act 2003* (Food Act), a person who carries on any food business or activity for which a licence is required by the NSW *Food Regulation 2015* (Food Regulation) is required to obtain a licence from the NSW Food Authority. Under the Food Regulation, activities requiring licensing include abattoirs. As such, CAPRA will be required to obtain a licence.

Clause 83 of the Food Regulation requires that the operation of an abattoir comply with the standards specified in Australian Standard AS 4696:2007 *Hygienic production and transportation of meat and meat products for human consumption.* As the title suggests, the main objective of the standard is to ensure food safety, however, it also includes an animal welfare component. The abattoir will be operated in accordance with this standard.

The Australian Meat Industry Council (AMIC) also developed its own *National animal welfare standards for livestock processing establishments* (AMIC 2009) ensuring abattoirs are designed to hold and move animals throughout the facility in a calm, quiet and low stress manner. Specifically, the industry standards cover six areas that influence animal welfare at processing. These are:

1. Standard operating procedures to prevent risks to animal welfare.

2. Design and maintenance of facilities and equipment to ensure minimal interference or stress to livestock.

3. All staff required to handle livestock are competent.

4. Livestock that are weak, ill or injured are identified and promptly treated.

5. Livestock are managed to minimise stress and injuries.

6. Restraint, stunning and slaughter procedures are carried out humanely and effectively.

By incorporating these standards into their standard operating procedures, abattoirs are able to demonstrate that they meet regulatory requirements as well as good practice in terms of animal care and welfare. The abattoir will operate in accordance with the AMIC (2009) standards in conjunction with adopting Halal slaughter techniques in accordance with Halal accreditation requirements.

Transport of livestock from the depots around Bourke to the abattoir will be undertaken in accordance with the *Australian Animal Welfare Standards and Guidelines Land Transport of Livestock* (DAFF, 2012). Most stock will travel from the Far West NSW region to the abattoir due to the presence of a number of depots in the area (refer Figure 9.1 in Chapter 9). Livestock are currently transported from these depots to abattoirs in Charleville, Nyngan and Melbourne, and therefore travel significant distances. The majority of livestock currently being transported out of the Bourke region to these destinations are likely to instead go to the Bourke abattoir when fully operational. The project will therefore provide a positive benefit in relation to animal welfare, reducing travel times for around 1.5 million head of livestock annually from source to abattoir.

Upon arrival at the abattoir livestock will be watered, and management of the animals will be arranged so that where possible, stock will be slaughtered within 24 hours of arrival. Any production delay will see livestock held at the depots, rather than transported and held on site at the abattoir. If stock is held for longer than one day, they will be fed and watered in resting paddocks.

2.11.2 Biosecurity and disease management

As well as affecting animal health and welfare, disease can significantly reduce production efficiency. There is therefore a major economic incentive for CAPRA to ensure livestock are kept disease free. CAPRA will place a high importance on maintaining health through operational hygiene and biosecurity measures such as strict inspection regimes both at source when harvested and upon arrival at the project site. These biosecurity measures, along with the high standards set by the NSW Food Authority and the Commonwealth Department of Agriculture (DoA), will provide significant protection against disease entering the operation.

In the unlikely event of a major disease outbreak, the NSW Environment Protection Authority (EPA) and the NSW Department of Primary Industries (DPI) would be contacted as soon as the breakout is suspected. Upon confirmation that it is an exotic disease outbreak and immediate slaughter of stock is necessary, the abattoir would be placed into quarantine with no more stock accepted onsite until the diseased animals are slaughtered and removed. The options for mass disposal of animal carcasses in the event of a disease outbreak include transportation to an offsite licensed facility, or mass on-site disposal.

The most appropriate disposal option in the event of a mass mortality at a livestock processing facility depends on a number of factors including the scale of the outbreak, the ability of a licensed facility to accept large volumes of carcasses, the logistics and cost associated with transportation of carcasses off-site, and the suitability of the site for burial.

In consideration of these factors, the preferred option for disposal of carcasses in the unlikely event of an emergency disease outbreak at the abattoir will be via on-site mass burial within the project site, or within the larger CAPRA landholdings surrounding the project site. This is due to the significant distances of the site from licensed facilities that could accept such large volumes of carcasses, and the subsequent prohibitive transport costs. In contrast, the carcasses could be disposed of quickly and relatively inexpensively with the large area (around 2,000 ha) of land available in and around the project site.

Mass disposal would be carried out under appropriately qualified supervision to confirm the suitability of the underlying geological conditions and groundwater. In such an event the DPI would likely provide supervision to ensure appropriate quarantine control and standard operating procedures are implemented in line with the relevant AUSVETPLAN disease strategy. An appropriate synthetic liner(s) would also be used to seal and enclose the burial pits, as well as the application of lime during burial to reduce the likelihood of soil dispersing. As described in Chapter 13, there is no shallow groundwater in the site, with groundwater not intercepted during drilling to 8.8 m within the project site.

If CAPRAs preferred option of disposal on site is not selected by the DPI as the preferred disposal method following an emergency disease outbreak, the second option for mass animal disposal would be transportation to a licensed facility for treatment and disposal under the supervision of the DPI. Carcasses would be transported in appropriate trucks disinfected on exit from the project site.

2.11.3 Q fever

Q fever is a zoonosis (exotic disease that can pass from animals to humans) caused by *Coxiella burnetii*. Goats, sheep, cattle, cats, dogs, birds and some wild animals such as many species of feral rodents, are natural reservoirs. Transmission is usually through airborne dissemination of the organism in dust particles but also through direct contact with contaminated material, ingestion of contaminated placentas or ingestion of milk. Ticks may also be involved in transmission of the organism. Due to the potential for goats and sheep to carry C. *burnetti*, the risk of the spread of Q Fever has been considered in this EIS.

With regards to transport, Meat and Livestock Australia state that 6.1 million sheep and 1.99 million goats were transported in 2012 to an abattoir in Australia for slaughter. Animal husbandry practice over recent years has seen the producers spending more time in preparing animals for transport, including drying the animals out, to reduce the risk of effluent aerosol. In accordance with this current practice, goats for transport to the project site will be dried out prior to transport to minimise the risk of Q Fever transmission from goat effluent during transport.

The careful management of waste products generated by the abattoir is also an important aspect of minimising the risk of Q fever transmission. Animal waste products (non-edible waste, dead animals and blood) will be sent to an appropriately licensed facility or disposal. Non-edible waste products will be directed to dedicated bins within the abattoir, which will be collected on a daily basis and off-site in enclosed trucks for disposal. Blood will be directed to a purpose built tank and also transported to a licensed facility. All stock trucks will also be required to be washed down prior to leaving the project site.

In addition to the above best practice measures, all regular contractors and employees of the abattoir will be required to undergo Q fever screening and vaccination by a General Practitioner prior to working at the site. A register of vaccinated personnel with also be maintained at the abattoir.

A qualitative environmental health risk assessment on Q fever has been prepared for the project. The full technical study is contained in Appendix H and the outcomes and mitigation strategies summarised the Chapter 10 of this EIS.

2.12 Food safety

2.12.1 Overview

As mentioned above in Section 2.11, in accordance with Part 6 of the Food Regulation, all red meat abattoirs in NSW are required to comply with the Australian Standard for the *Hygienic Production and Transportation of Meat and Meat Products for Human Consumption* (AS 4696:2007). The abattoir will require a licence from the NSW Food Authority, as well as a licence from the Commonwealth DoA for the export of meat and meat products, and will operate in accordance with the strict requirements associated with these licences.

2.12.2 Meat safety inspectors

In accordance with NSW Food Authority requirements, accredited meat safety inspectors will be employed on-site at all times during ante-mortem and post mortem inspections. CAPRA will ensure these inspectors are assessed and approved by the NSW Food Authority before commencing inspection duties, and will ensure inspections comply with the requirements of AS 4696:2007.

2.12.3 Food safety program

A Food Safety Program (FSP) will be developed, documented and submitted to the NSW Food Authority for approval for the abattoir, which is required before a licence from the NSW Food Authority can be issued. This FSP will comply with AS4696:2007. The FSP will be reviewed for adequacy at least every 12 months, and audited by a food safety auditor. Copies of all written reports relating to food safety audit results will be kept for the previous four years on site for inspection by a food safety auditor or authorised officer, if requested. In addition, records of actions taken demonstrating compliance with the FSP will also be retained.

2.13 Operational environmental management plan

Following project approval, and prior to commencing operation, a site-specific Operational Environmental Management Plan (EMP) will be developed for approval by the DP&E, and implemented to ensure that the commitments made within the EIS, along with the conditions imposed by the development consent and an environment protect licence (EPL), are fully implemented and complied with.

The EMP will establish the framework for managing and mitigating the potential environmental impacts of the development, as well as a system for the management of complaints, over the life of the operation.

2.14 Construction works and timeline

Pending project approval, construction is anticipated to commence in mid 2016, with operation of the abattoir planned for early to mid 2017. Design drawings are contained in Appendix B for the proposed new buildings, and will be submitted to BSC as required as part of the construction certificate application.

Construction works will include the following:

- delineation and marking of areas to be cleared;
- installation of temporary erosion and sediment controls;
- construction of the new site access and intersection with the Mitchell Highway, as per the design recommended in the Traffic Impact Assessment (EMM 2016a) and described in Chapter 9;
- construction of the car park on the southern side of the abattoir and vehicle manoeuvring areas;
- connection of site services to BSC's reticulated water supply and to the electricity network, as described in Section 2.8;
- construction of the wastewater treatment plant and four wastewater treatment ponds;
- construction of the abattoir buildings; and
- landscaping works around the abattoir buildings, car park and access road.

The anticipated equipment required during construction is summarised in Table 2.5.

Table 2.5 Indicative construction equipment to be used

Equipment type	Number	Estimated weeks
Grader	1	16
Scraper	1	6
Dozer	1	8
Excavator	1-2	16
Tip truck	4	16
Backhoe	1	25
Concrete trucks	2-4	20
Concrete pump	1	5
General cargo trucks	3	35
Mobile crane	1	20

2.15 Project alternatives

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.

A number of important factors need to be considered when looking for a site suitable for the development of an abattoir such as that proposed, as follows:

- access to a suitable water and electricity supply;
- proximity to major regional and state transport routes;
- proximity to livestock supply, thereby both minimising transport costs and improving animal welfare outcomes;
- appropriate land use zoning; and
- compatible existing land uses in and surrounding the project site, particularly with regard to potential odour impacts. Finding a site already subject to an agricultural land use limits the amount of clearing required for construction activities and is therefore advantageous from a biodiversity perspective.

Finding a site that meets all of the above criteria is very difficult. CAPRA identified the project site after an extensive search involving consideration of six potential properties. The project site (the subject of this EIS) was chosen on the basis that it is situated within the source area for rangeland goats in western NSW, is removed from urban areas with no residences within 5 km, has been subject to a long history of agricultural activities, has appropriate topography and soil structure for foundations, is in a region with a diminishing availability of services and facilities thereby having labour capacity to service the development, is located on a major State highway, and is able to access the required power and water to service the development. On this basis, once the project site was found, no other sites were considered further.

In addition, some alternatives with regard to the siting of the abattoir footprint were considered in the detailed design process. The initial abattoir location was placed south of the current proposed location; however was moved north to avoid a higher condition area of shrubby woodland, and as a result of a more favourable site layout and soil structure.

The consequences of not proceeding with the project have been evaluated and are listed below.

- There is a significant supply of rangeland goats, particularly in the north-western region of NSW, and a current deficit in processing capacity with respect to both the supply of goats and the international demand for goat meat. This deficit will continue if the project does not go ahead.
- When fully operational the project will result in an annual regional output in the order of $150 million (refer Section 18.3). This significant economic benefit to the local and regional economy will not be realised if the project does not go ahead. This would be a particularly negative impact in Bourke; a region where unemployment continues to increase and services and facilities decline, a situation that has been compounded by the Millennium Drought and restructuring of the farming sector.

- Goat meat exports from Australia are currently valued at $145 million, mostly exported through South Australia, Victoria and Queensland ports (ABS 2012/13). This project will result in the growth of Australian goat meat exports by approximately 70% within three years of commencement, and will be substantially through NSW ports. Again, this significant boost to the NSW export economy will not be realised if the project does not proceed.

- The project is estimated to create 200 FTE positions when fully operational. These additional employment opportunities and flow-on benefits will be lost if the project does not proceed. Again, this would be a particularly negative impact in a regional area like Bourke where unemployment continues to increase and population declines.

In consideration of the above, the 'do nothing' option was not considered further.

3 Site and surrounds

3.1 Overview

The project site occupies 246 ha of rural land approximately 14 km north of Bourke in the far western region of NSW (refer Figure 1.1). The site is positioned off the Mitchell Highway and as discussed in section 1.3 is identified as Lot 17 in DP 753546 within the Bourke LGA. Lot 17 is one of eight lots for which CAPRA has entered into a conditional contract to purchase, known as the Artesian block. The Artesian block totals approximately 2,000 ha, comprising the project site (Lot 17 DP 753546) as well as Lot 19 DP 753546, Lot 6297 DP 768182, Lot 2 DP 753547, Lot 100 DP 753547, Lot 102 DP 753547, Lot 4 DP 753547, and Lot 3 DP 753547 (refer Figure 3.1).

The project site has a long history of disturbance including land clearing and agricultural activities. The visual amenity of the site has been significantly modified as a result, and is largely devoid of wooded vegetation. One plant community type (PCT) was identified in project site during field surveys conducted for the biodiversity assessment (refer Chapter 11, EMM 2016b), and that is PCT98 Poplar Box – White Cypress Pine – Wilga – Ironwood Shrubby Woodland. This PCT exists primarily as a derived shrubland in the project site, with some areas consisting of a shrubby woodland.

Photograph 3.1 The project site, from the Mitchell Highway access point.

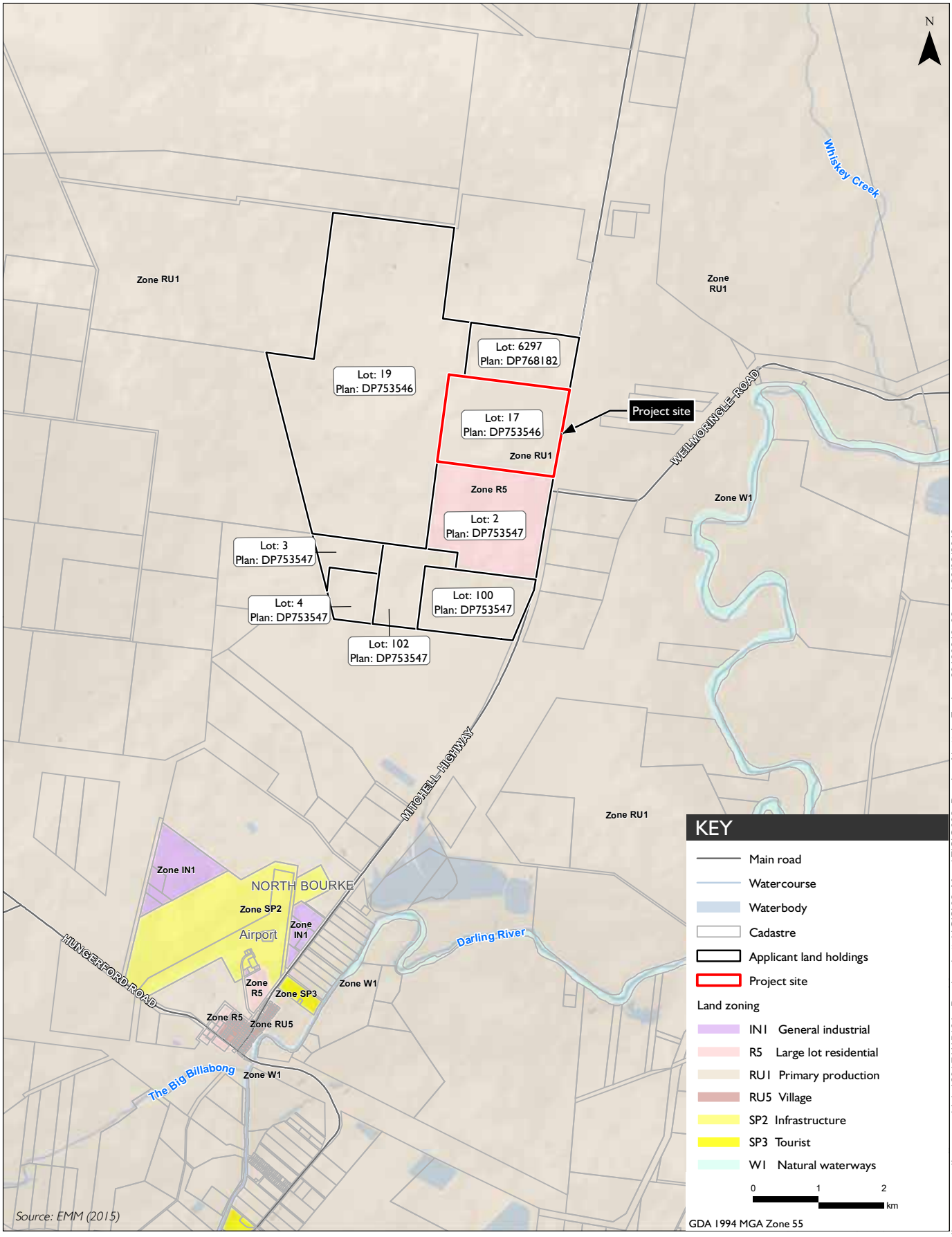
Access to and from the project site will be via the Mitchell Highway; a two lane bitumen sealed carriageway servicing the rural properties in the locality and western NSW travellers. The highway is a major link for inner NSW towns and runs from Bathurst in NSW through to Augathella in central Queensland.

Photograph 3.2 The project site

3.2 Land use zoning and surrounding land use

The project site is zoned RU1 Primary Production under the *Bourke Local Environmental Plan 2012* (Bourke LEP). In accordance with the LEP, rural industries (such as abattoirs) are permissible with development consent within the RU1 Primary Production zone. Further discussion on permissibility is provided in Chapter 4.

The land use zone of the project site and surrounding lands is show on Figure 3.1.



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EMM

Land zoning
Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 3.1

As is evident on Figure 3.1, the vast majority of land surrounding the project site is also zoned RU1 Primary Production, with no major nearby development. The one exception to the RU1 Primary Production zoning is Lot 2 DP 753547 adjacent to the project site, which is zoned R5 Large Lot Residential. No residential development exists on this lot, which is part of the larger Artesian landholdings that CAPRA have entered into a conditional contract to purchase pending approval.

The Bourke airport and the village of North Bourke are located to the south of the project site, approximately 9 km and 10 km away respectively (refer Figure 1.2). Figure 1.2 also illustrates the isolated nature of the site and surrounding agricultural land use.

3.3 Topography and hydrology

The topography of the project site is generally flat, varying in height by approximately 3 m across the site between reduced level (RL) 111 m and 114 m Australian Height Datum (AHD).

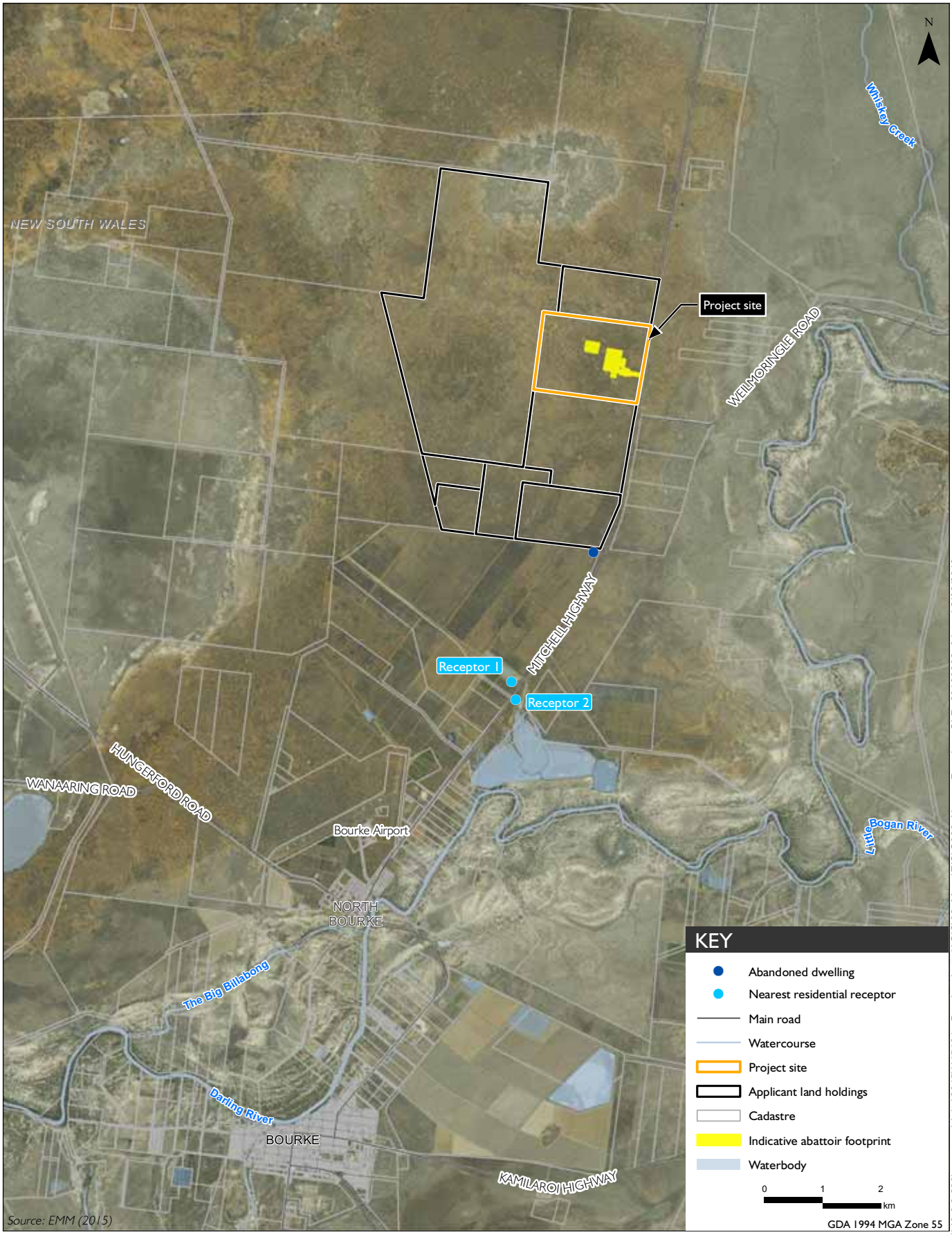
The project site is located within the catchment of the Darling River, which is around 2.5 km to the east at its closest point. It is situated outside the Darling River floodplain, and is between 4-7 m in elevation above the River. The Darling River flows through the township of Bourke, flowing in a south-westerly direction through western NSW to its confluence with the Murray River at Wentworth.

No drainage lines exist within the project site. Further discussion on water resources and flooding is contained in Chapter 13.

3.4 Surrounding residences

There are no residences in the immediate vicinity of the project site, consistent with its remote rural setting. The nearest receptors to the project site have been identified as two houses; one approximately 5.5 km to the south of the proposed location of the abattoir buildings (receptor 1), and another 5.8 km also to the south (receptor 2), as illustrated on Figure 3.2.

The nearest urban areas are the village North Bourke (approximately 10 km away), followed by the main town of Bourke, 14 km to the south.



Nearest receptors

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 3.2

3.5 Meteorology

3.5.1 Overview

The climate of the region is largely influenced by latitude, topography and elevation. The climate regime in the local Bourke region is generally characterised by hot and dry weather. Highest temperatures occur in the summer months as expected, with rainfall generally evenly distributed throughout the year. Lowest temperatures are experienced during the winter months, whilst the lowest rainfall season generally varies.

Representative climatic data for use in both the Air Quality Impact Assessment (SLR 2016a) and noise assessment (refer Chapter 8) was sourced from the Bureau of Meteorology (BoM) website (http://www.bom.gov.au/climate/data/) for the Automatic Weather Station (AWS) at Bourke Airport (station number 048245), located approximately 9 km south-south west of the project site. This station has been recording climatic data since 1998.

3.5.2 Temperature and rainfall

Mean maximum temperatures recorded at Bourke Airport range from 18.4°C in July to 37.1°C in January. Mean minimum temperatures range from 4.1°C in July to 22.2°C in January.

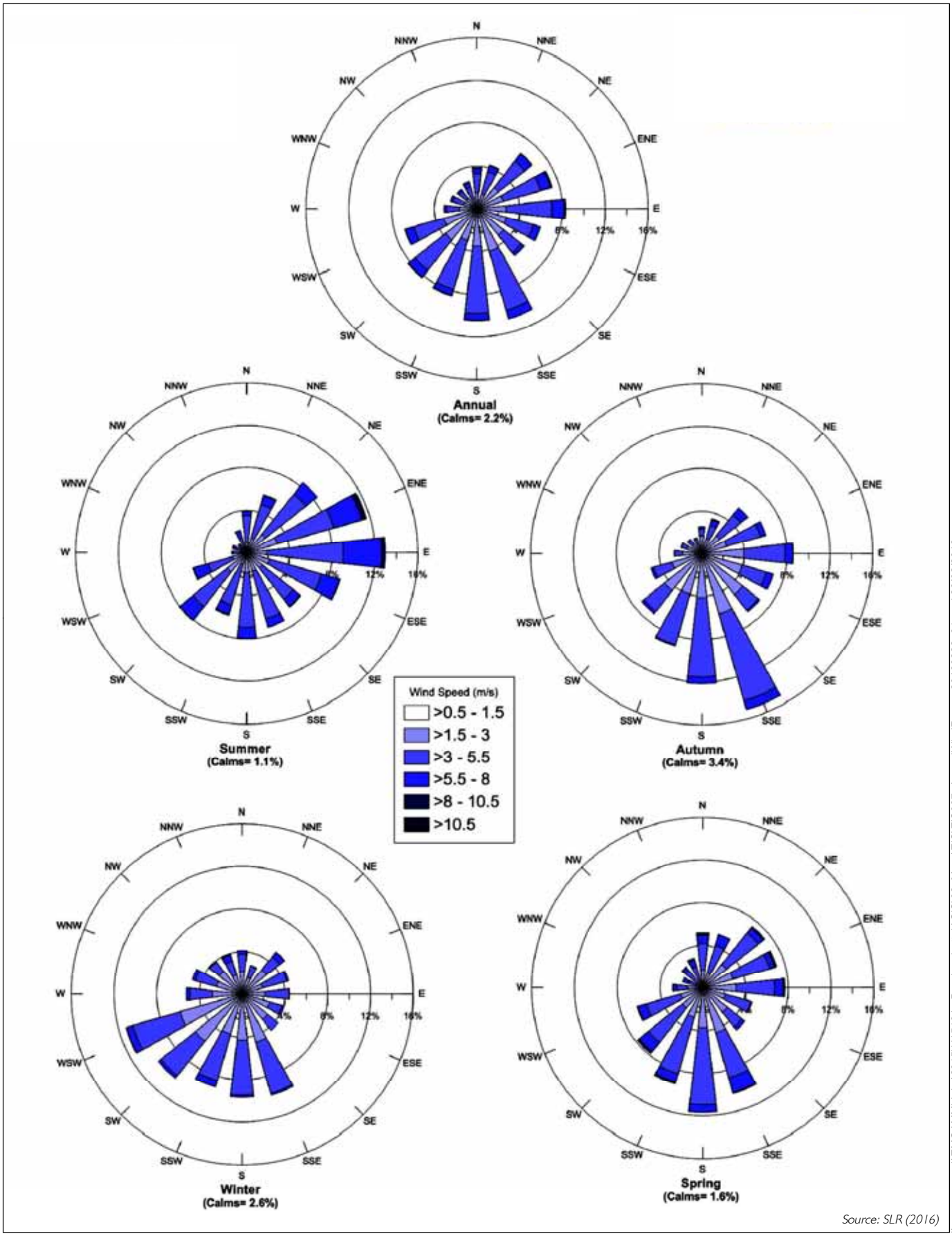
Mean annual rainfall is 327.9 mm with the highest rainfall in March, November and December. August is the driest month, with an average rainfall of 11.9 mm.

3.5.3 Wind speed and direction

Annual and seasonal wind roses were produced for use in the Air Quality Impact Assessment (SLR, 2016a) based on data from the BoM AWS at Bourke Airport during 2012, and are presented in Figure 3.3. Discussion on the representativeness of 2012 meteorology data is provided in Section 7.3.2.

On an annual basis, the dominant wind direction is southerly to south-south-easterly, with calms occurring 2.2% of the time. During summer, winds from the east predominate. By autumn, the south-south-easterly winds persist. Winds in winter swing further from the west to south-westerly directions, reflecting the frequent passage of cold fronts and general westerly flow, while in spring a transition occurs again with increasing easterly flows.

The low frequency of winds (<4% annually) from the north mean that there is very low potential for wind to blow from the abattoir towards the nearest sensitive receptors which are located to the south.



Source: SLR (2016)

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Annual and seasonal wind roses

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 3.3

4 Statutory and regulatory framework

This section describes the statutory and regulatory framework under which the project will be assessed and determined. It also provides a summary of the project's compliance with environmental planning instruments (EPIs) relevant to the project.

4.1 Commonwealth legislation

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places which are defined as matters of national environmental significance (MNES).

MNES, as defined under the EPBC Act, include:

- world heritage properties;
- national heritage places;
- wetlands of international significance;
- listed threatened species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;
- nuclear actions (including uranium mining); and
- a water resource in relation to coal seam gas development and large coal mining development.

Under the EPBC Act, actions (or developments) that may have a significant impact on a MNES are deemed to be 'controlled actions' and can only proceed with the approval of the Commonwealth Minister for the Environment. An action that potentially has an impact on a MNES is required to be referred to the Minister for the Environment for determination as to whether or not the action is a controlled action.

Assessments undertaken as part of this EIS demonstrate that the project will not have a significant impact on MNES. As such, approval from the Commonwealth Minister for the Environment under the EPBC Act is not required.

4.1.2 Export Control Act 1982

Section 7 of the Commonwealth *Export Control Act 1982* (EC Act) states that a livestock exporter must hold a livestock export licence issued under the Commonwealth *Australian Meat and Live-stock Industry Act 1997* and the Commonwealth *Australian Meat and Live-stock Industry (Export Licensing) Regulations 1998* (Meat and Livestock Regulations). The Commonwealth Department of Agriculture and Water Resources is responsible for issuing a livestock export licences if an application for a licence meets criteria for issue that are set out in the Meat and Livestock Regulations. This criteria includes:

- preparation of an operations and governance manual;
- preparation of a financial statement; and
- obtaining an Australian Federal Police criminal check.

CAPRA will make an application for a livestock export licence during the construction phase of the project.

4.2 NSW legislation

i Planning approval pathway

The EP&A Act and the EP&A Regulation provide the regulatory framework for planning approval and environmental assessment in NSW. Implementation of the EP&A Act is the responsibility of the Minister for Planning, statutory authorities and local councils. It contains three parts that impose requirements for planning approvals:

- Part 4 which provides for control of 'development' that requires development consent from the relevant consent authority. A division of Part 4 (Division 4.1) provides for control of SSD where the Minister for Planning (or delegate) is the consent authority;
- Part 5 which provides for control of 'activities' that do not require approval or development consent under or Part 4; and
- Part 5A which provides for control of State significant infrastructure that do not require approval or development consent under Part 4.

The requirement for development consent is set out in EPIs; state environmental planning policies (SEPPs), regional environmental plans (REPs) or local environmental plans (LEPs).

ii State significant development approval process

Section 89C(2) of the EP&A Act states that:

> ... State environmental planning policy may declare any development, or any class or description of development, to be State significant development.

Schedule 1 of the State and Regional Development SEPP identifies what constitutes SSD, with one form being development for the purpose of an agricultural produce industry. As the project is of a kind described within Schedule 1 of the State and Regional Development SEPP (ie agricultural produce industry), it meets the requirements for SSD (see below for further information).

Under section 89D of the EP&A Act, the NSW Minister for Planning is the consent authority for SSD. However, pursuant to section 23 of the Act, the Minister may delegate the consent authority function to the Planning Assessment Commission (PAC), the Director-General or to any other public authority.

A DA for SSD must be accompanied by an EIS, prepared in accordance with the EP&A Regulation. Before preparing an EIS, an applicant must request SEARs (which are essentially terms of reference and were previously known as Director-General's requirements) which specify what must be addressed in an EIS. The SEARs for the project were issued on 29 October 2015, are included with this EIS in Appendix A. The sections of this EIS where the SEARs have been addressed are identified in Section 1.5.

Upon finalisation, the EIS will be lodged with the DA and supporting documentation with the DP&E for public exhibition. The EIS will be placed on public exhibition for a minimum of 30 days by DP&E and submissions will be sought from BSC, government agencies and the community. Any submissions received by DP&E will be reviewed and forwarded to CAPRA to consider and respond to (via a response to submissions (RTS) report).

Following receipt of the RTS report, DP&E will prepare its assessment report considering this EIS, all submissions received during the exhibition process and the RTS report. This report is forwarded to the consent authority (Minister or PAC) for consideration before determining the DA.

iii Matters for consideration

When assessing a DA for SSD, the consent authority (ie Minister for Planning or delegate) is required to take into consideration the matters outlined in section 79C of the EP&A Act. This states:

> (1) Matters for consideration – general
>
> In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:
>
> (a) the provisions of:
>
> (i) any environmental planning instrument, and
>
> (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Director-General has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and
>
> (iii) any development control plan, and
>
> (iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F, and
>
> (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and
>
> (v) any coastal zone management plan (within the meaning of the *Coastal Protection Act 1979*),

that apply to the land to which the development application relates,

(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,

(c) the suitability of the site for the development,

(d) any submissions made in accordance with this Act or the regulations,

(e) the public interest.

Despite the above, clause 11 of the State and Regional Development SEPP states that development control plans (DCPs) do not apply to SSD.

The matters for consideration that apply to the project are discussed below.

iv Approvals not required or which cannot be refused

Under section 89J of the EP&A Act, the following authorisations are not required for SSD:

(a) the concurrence under Part 3 of the *Coastal Protection Act 1979* of the Minister administering that Part of that Act;

(b) a permit under Section 201, 205 or 219 of the *Fisheries Management Act 1994*;

(c) an approval under Part 4, or an excavation permit under Section 139, of the *Heritage Act 1977*;

(d) an Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974*;

(e) an authorisation referred to in Section 12 of the *Native Vegetation Act 2003* (or under any Act repealed by that Act) to clear native vegetation or State protected land;

(f) a bush fire safety authority under Section 100B of the *Rural Fires Act 1997*; and

(g) a water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000*.

Further, under section 89K of the EP&A Act, the following authorisations cannot be refused and are to be substantially consistent with a development consent for SSD:

(a) an aquaculture permit under Section 144 of the *Fisheries Management Act 1994*,

(b) an approval under Section 15 of the *Mine Subsidence Compensation Act 1961*,

(c) a mining lease under the *Mining Act 1992*,

(d) a production lease under the *Petroleum (Onshore) Act 1991*,

(e) an environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (for any of the purposes referred to in Section 43 of that Act),

(f) a consent under Section 138 of the *Roads Act 1993*,

(g) a licence under the *Pipelines Act 1967*.

v Environmental planning instruments

The following EPIs are relevant to the project:

- State and Regional Development SEPP;
- *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33);
- *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP 44);
- *State Environmental Planning Policy No 55 – Remediation of Land* (SEPP 55); and
- Bourke LEP.

The relevant provisions of the above instruments to the project are discussed in the following sections.

a. State Environmental Planning Policy (State and Regional Development) 2005

The State and Regional Development SEPP, among other matters, defines certain development that is SSD. Clause 8 of the SEPP states:

> (1) Development is declared to be State significant development for the purposes of the Act if:
>
> (a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and
>
> (b) the development is specified in Schedule 1 or 2.

Schedule 1 of the State and Regional Development SEPP defines a range of general SSDs, including agricultural produce industries. Clause 3 of Schedule 1 states:

> Development that has a capital investment value of more than $30 million for any of the following purposes:
>
> (a) **abattoirs** or meat packing, boning or products plants, milk or butter factories, fish packing, processing, canning or marketing facilities, animal or pet feed production, gelatine plants, tanneries, wool scouring or topping or rendering plants,
>
> ...
>
> **(emphasis added)**

The project is a development for the purposes of an abattoir and will have a capital investment value exceeding $30 M. In addition, the project is not permissible without development consent (ie is permissible with development consent) under the Bourke LEP.

The project meets both the requirements of clause 8 of the State and Regional Development SEPP as it is not permissible without development consent and is development specified in Schedule 1. Therefore, the project is SSD for the purposes of the EP&A Act.

b. State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

SEPP 33 requires the consent authority to consider hazard potential of proposed activities including the location of the development, the way in which it is to be carried out, and the storage of dangerous goods. It links the permissibility of a proposed development 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 (PHA) in accordance with the current circulars or guidelines published by the DP&E (known as *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (DP&I 2011) (Applying SEPP 33)) and submit the analysis with the development application.

A preliminary risk screening of the project was undertaken for the project (refer to Chapter 17). This found that a PHA is not required as the project does not satisfy the thresholds to qualify as potentially hazardous or offensive industry.

c. State Environmental Planning Policy No. 44 – Koala Habitat Protection

SEPP 44 encourages the conservation and management of koala habitats, to ensure permanent free-living koala populations will be maintained over their present range. SEPP 44 requires the consent authority to consider if the land in the development application is ‘potential koala habitat’ or ‘core koala habitat’.

The biodiversity assessment prepared for the project (EMM 2016b) included an assessment of potential and core koala habitat. This assessment concluded that there is no likelihood of occurrence of core or potential koala habitat. Although some Bimble Box is present, it does not comprise greater than 15% of the canopy and only occurs very sparsely in the project site. Additionally, no koala scats were found during spot assessments. This assessment therefore determined the project site does not contain any potential or core koala habitat (refer Appendix I).

d. State Environmental Planning Policy No 55 – Remediation of Land

SEPP 55 was enacted to provide a state-wide approach to the remediation of contaminated land for the purpose of minimising the risk to human health and the environment. No contaminated lands have been identified within the project site that would be disturbed by the construction and operation of the abattoir. Should contaminated sites be encountered during construction and operation of the project, these sites would be assessed and treated as required.

e. Bourke Local Environmental Plan 2012

As stated above, under the Bourke LEP, the project site is zoned RU1 Primary Production. Within this zone, rural industries are permissible with development consent.

Under the Bourke LEP, rural Industry is defined as:

> ... the handling, treating, production, processing, storage or packing of animal or plant agricultural products for commercial purposes, and includes any of the following:
>
> (a) agricultural produce industries,
>
> (b) livestock processing industries,
>
> (c) composting facilities and works (including the production of mushroom substrate),
>
> (d) sawmill or log processing works,
>
> (e) stock and sale yards,
>
> (f) the regular servicing or repairing of plant or equipment used for the purposes of a rural enterprise

Under the Bourke LEP, a livestock processing industry is defined as:

> ... a building or place used for the commercial production of products derived from the slaughter of animals (including poultry) or the processing of skins or wool of animals, derived principally from surrounding districts, and includes abattoirs, knackeries, tanneries, woolscours and rendering plants.
>
> **Note**. Livestock processing industries are a type of rural industry—see the definition of that term in this Dictionary.

Accordingly, the proposal, which will be a building or place, used for the commercial production of goat and lamb meat derived from the slaughter of goats, sheep and lamb, is permissible with development consent.

The objectives of zone RU1 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.

The project is considered to be consistent with these objectives.

vi Planning agreements

One of the matters of consideration under section 79C of the EP&A Act is the relevant provisions of any planning agreements. Section 93F of the EP&A Act relates to planning agreements, which:

> ... is a voluntary agreement or other arrangement under this Division between a planning authority (or 2 or more planning authorities) and a person (the developer):
>
> (a) who has sought a change to an environmental planning instrument, or
>
> (b) who has made, or proposes to make, a development application, or
>
> (c) who has entered into an agreement with, or is otherwise associated with, a person to whom paragraph (a) or (b) applies, under which the developer is required to dedicate land free of cost, pay a monetary contribution, or provide any other material public benefit, or any combination of them, to be used for or applied towards a public purpose.

Section 93F enables the applicant (or proponent) of a development to enter into a voluntary planning agreement (VPA) or another arrangement with planning authorities in lieu of a section 94 contribution. CAPRA propose to progress discussions with BSC on potential involvement in or support towards relevant community programs that provide material public benefits.

vii Environmental Planning and Assessment Regulation 2000

As previously stated, a DA for SSD must be accompanied by an EIS, prepared in accordance with the EP&A Regulation. Schedule 2 of the EP&A Regulation stipulates:

- requirements of the Director-General and approval bodies in relation to EISs (ie the SEARs); and
- general provisions relating to EISs.

The general provisions specify the form (clause 6) and the content (clause 7) of an EIS. Clause 6 states:

> An environmental impact statement must contain the following information:
>
> (a) the name, address and professional qualifications of the person by whom the statement is prepared,
>
> (b) the name and address of the responsible person,
>
> (c) the address of the land:
>
> (i) in respect of which the development application is to be made, or
>
> (ii) on which the activity or infrastructure to which the statement relates is to be carried out,
>
> (d) a description of the development, activity or infrastructure to which the statement relates,
>
> (e) an assessment by the person by whom the statement is prepared of the environmental impact of the development, activity or infrastructure to which the statement relates, dealing with the matters referred to in this Schedule,

(f) a declaration by the person by whom the statement is prepared to the effect that:

(i) the statement has been prepared in accordance with this Schedule, and

(ii) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and

(iii) that the information contained in the statement is neither false nor misleading.

Clause 7 states that an EIS must also include each of the following:

(a) a summary of the environmental impact statement,

(b) a statement of the objectives of the development, activity or infrastructure,

(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure,

(d) an analysis of the development, activity or infrastructure, including:

(i) a full description of the development, activity or infrastructure, and

(ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and

(iii) the likely impact on the environment of the development, activity or infrastructure, and

(iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and

(v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out,

(e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv),

(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).

Note. A cost benefit analysis may be submitted or referred to in the reasons justifying the carrying out of the development, activity or infrastructure.

The above requirements and where they are addressed in the EIS are set out in Table 4.1 below.

Table 4.1 Schedule 2 requirements for an EIS

Requirement	Where contained in the EIS
Name, address and professional qualifications of the person(s) who prepared the EIS	Certification page at the front of this EIS
Name and address of the responsible person (the applicant)	Certification page at the front of this EIS
Address of land	Section 3.1
Description of development	Chapter 2
Assessment of the environmental impact	Chapters 7-17
Declaration that the EIS has been prepared in accordance with this Schedule, contains all available information that is relevant to the environmental assessment of the development and that the information contained in the statement is neither false nor misleading	Certification page at the front of this EIS
Summary of the EIS	Executive summary
A statement of the objectives of the development	Section 1.1
An analysis of feasible alternatives, having regard to its objectives, including the consequences of not carrying out the development	Section 2.15
A full description of the development	Chapter 2
A general description of the environment likely to be affected by the development	Chapter 3
The likely impact on the environment of the development	Chapters 7 -18
A full description of the measures proposed to mitigate any adverse effects of the development	Chapters 7-18
A list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out	Section 4.5
A compilation of the measures referred to in item (d) (iv)	Chapter 19
The reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development	Chapter 20

viii Likely impacts of the development

This EIS comprehensively describes the likely impacts of project, including environmental impacts on both the natural and built environments, and social and economic impacts in the local area, region and State. It also describes commitments proposed by CAPRA to mitigate and manage these impacts. These descriptions are based on technical studies prepared by specialists, which are appended to this EIS. The technical studies were prepared using the most recent and accurate scientific data relevant to the project in consideration of current policies and legislation. In addition, the technical studies adopted conservative assumptions to enable the upper limit of likely impacts to be assessed.

ix Suitability of the site for the development

It is considered that the site of the project (the project site) is suitable for an abattoir for a number of reasons which are detailed in Chapter 20.

Principally, the project site has been carefully selected in consideration of a number of factors including location proximate to a regional centre for the provision of relevant goods and services, appropriate distance from residences to avoid amenity impacts of odour and noise, availability of power and water supply, as well as the location both on a major transport route (the Mitchell highway) and importantly, close to the source of rangeland goats.

Locating the abattoir within the harvesting region of rangeland goats has a number of benefits; it significantly limits the transport distances from the source to the abattoir, both reducing the potential for animal stress associated with long distance travel and reducing the risk of Q fever infection potentially associated with transport, as well as providing savings in transport costs subsequently contributing to the economic viability of the proposal.

x Submissions

As previously stated, this EIS will be placed on public exhibition for a minimum of 30 days by DP&E and submissions will be sought from BSC, government agencies and the community. Any submissions received by DP&E will be reviewed and forwarded to CAPRA to consider and respond to (via a RTS report).

Following receipt of the RTS report, DP&E will prepare its assessment report considering this EIS, all submissions received during the exhibition process and the RTS report.

xi Public interest

To assist the consent authority in determining whether the project is in the public interest, this EIS provides a justification for the project (refer to Chapter 20), taking into consideration its potential environmental impacts, and the suitability of the site. It also considers the proposal against the principles of ecologically sustainable development (ESD). The consent authority will also be required to consider all submissions received during the public exhibition of the EIS.

4.3 Other NSW legislation

4.3.1 Protection of the Environment Operations Act 1997

The NSW *Protection of the Environment Operations 1997* (POEO Act) is the principal NSW environmental protection legislation which is administered by the EPA. Schedule 1 of the POEO Act lists the 'scheduled activities' which are to be regulated by an EPL which includes criteria and monitoring requirements for environmental pollution.

Clause 23 of Schedule 1 of the POEO Act relates to 'livestock processing activities', including the slaughtering or processing of animals. It states that activities which have the capacity to slaughter more than 750 t live weight of animals per year, are scheduled activities. The project would slaughter more than 750 t live weight of animals per year.

Therefore, the project is scheduled activity under the POEO Act, for the purposes of a livestock processing activity. If development consent is granted, the EPL for the project is to be issued in terms that are substantially consistent with the development consent, in accordance with section 89K of the EP&A Act.

4.3.2 Water Act 1912 and Water Management Act 2000

The NSW *Water Act 1912* (Water Act) has historically been the main legislation for the management of NSW water resources. However the Water Act is progressively being repealed and replaced by the NSW *Water Management Act 2000* (WM Act) on a water source by water source basis as water sharing plans (WSPs) commence.

As described in Chapter 2, the water needs of the project will be met via a connection to BSC's municipal water supply. The project will therefore not require licensing under the Water Act or WM Act.

4.3.3 National Parks and Wildlife Act 1974

The NSW *National Parks and Wildlife Act 1974* (NPW Act) provides for nature conservation in NSW including the conservation of places, objects and features of significance to Aboriginal people and protection of native flora and fauna. A person must not harm or desecrate an Aboriginal object or place without an Aboriginal heritage impact under section 90 of the NPW Act. However, a section 90 permit is not required for SSD approvals by virtue of section 89J of the EP&A Act.

Potential impacts to Aboriginal heritage objects resulting from the project are detailed in Chapter 12.

4.3.4 Threatened Species Conservation Act 1995

The TSC Act aims to conserve biological diversity in NSW through the protection of threatened flora and fauna species and endangered ecological communities (EECs).

The potential impacts of the project on threatened species and EECs listed under the TSC Act are discussed in Chapter 11.

4.3.5 Native Vegetation Act 2003

The NSW *Native Vegetation Act 2003* (NV Act) provides for the promotion, improvement and protection of native vegetation in NSW. Approval to clear native vegetation in NSW is required under the NV Act. Under section 89J of the EP&A Act, SSD is exempt from an authorisation to clear native vegetation under section 12 of the NV Act.

Potential impacts to native vegetation resulting from the project are detailed in Chapter 11.

A property vegetation plan (PVP) approved under the provisions of the NV Act applies to the project site. It applies to the broader property known as 'Artesia', of which the project site forms a very small part. The PVP is an incentive plan which provides monetary incentives for the property owner to remove unmanaged feral goats and improve groundcover through grazing management on land subject to the PVP (including the project site).

In relation to feral goats, the PVP requires the management of unmanaged feral goats. An unmanaged feral goat is defined in the PVP as a goat:

> ... that has been captured from a wild state, has not been born as a result of a managed breeding program, and has not been subjected to any husbandry procedure or treatment.

Notwithstanding the above, the definition of feral goats does not include:

- captured goats that have been marked, ear marked, tagged, joined or treated with any veterinary medicine, drench or other chemical; and
- domestic goats that have been bred in captivity and subsequently escaped or released.

As such, the PVP does not exclude operation of the project because all feral goat would have first been captured, marked or tagged ain then joined for transportation to the abattoir.

In relation to grazing management, the PVP requires that the landholder ensures appropriate grazing management is applied to ensure that the land subject to the PVP has a minimum groundcover depending upon rainfall. The project will reduce the land available for grazing through the development of the abattoir and associated holding pens and infrastructure. As such, the PVP will have to be amended to exclude the project site. This amendment, which would be minor given that the PVP applies to an area of 12,902.62 ha, can be undertaken after development consent has been granted by the Minister, or Minister's delegate.

A copy of the PVP can be seen in Appendix D.

4.3.6 Roads Act 1993

The NSW *Roads Act 1993* (Roads Act) regulates activities that may impact on public roads in NSW. Section 138 of the Roads Act states that

> A person must not:
>
> (a) erect a structure or carry out a work in, on or over a public road, or
>
> (b) dig up or disturb the surface of a public road, or
>
> (c) remove or interfere with a structure, work or tree on a public road, or
>
> (d) pump water into a public road from any land adjoining the road, or
>
> (e) connect a road (whether public or private) to a classified road,
>
> other than with the consent of the appropriate roads authority.

The potential impacts of the project on the existing road network are discussed in Chapter 9, including the access roads connection to the Mitchell Highway.

Connection to the Mitchell Highway would require approvals under section 138 of the Roads Act from RMS. Under section 89K of the EP&A Act, an approval under section 138 of the Roads Act is to be issued in terms that are substantially consistent with a development consent for SSD.

4.3.7 Crown Lands Act 1989

The NSW *Crown Land Act 1989* (CL Act) sets out how Crown land is to be managed. In particular, specific use of Crown land generally needs to be authorised by a lease, licence or permit. The approval of the NSW Crown Land Division would be required under the CL Act for any works on Crown land.

The project site is owned by the Crown and subject to a Western Lands Lease (WLL) under the NSW *Western Lands Act 1901* (WL Act) - see below. A licence will be required from the NSW Crown Land Division under the CL Act for the project. Development consent under Division 4.1 of Part 4 of the EP&A Act is being sought for the project. If granted, a licence for the project will be sought under the provisions of the CL Act.

4.3.8 Western Lands Act 1901

The WL Act establishes an appropriate system for land administration and effective integration with natural resource management of land in the Western Division of NSW. The project site is within the Western Division and held under a WLL granted under the WL Act.

The WLL that covers the project site has been granted mostly for grazing purposes, and includes conditions tailored to the property. However, it also includes a condition that allows uses other than grazing to be carried out, subject to securing the required approvals under environmental and planning legislation.

Development consent under Division 4.1 of Part 4 of the EP&A Act is being sought for the project. If granted, the WLL that covers the project site will be amended to reflect the approved use.

4.3.9 Heritage Act 1977

The NSW *Heritage Act 1977* (Heritage Act) aims to protect and conserve the natural and cultural history of NSW, including scheduled heritage items, sites and relics. Approvals under Part 4 or an excavation permit under section 139 of the Heritage Act are not required for SSD by virtue of section 89J of the EP&A Act.

The potential heritage impacts of the project and the related mitigation measures proposed are discussed in Chapter 12.

4.3.10 Rural Fires Act 1997

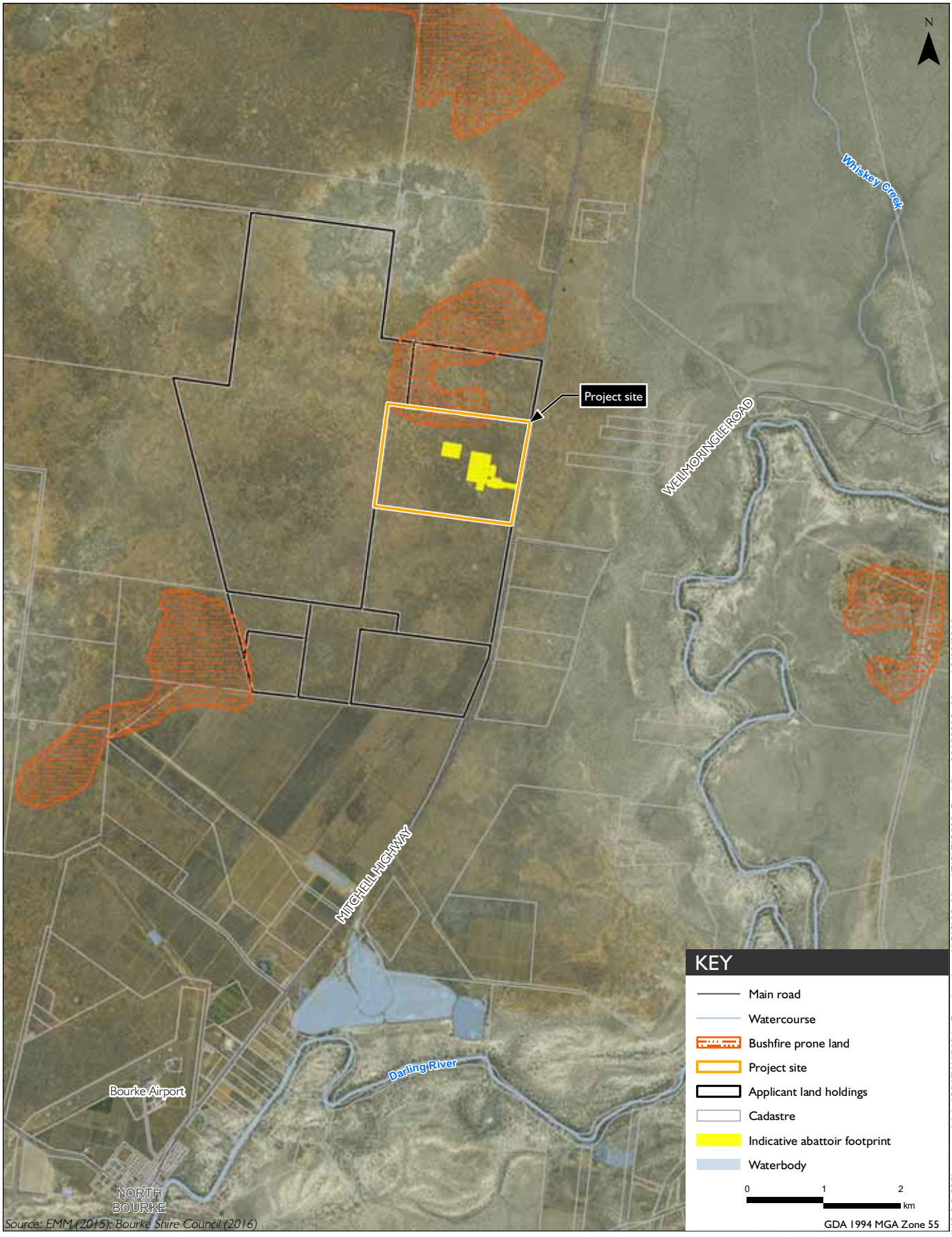
The NSW *Rural Fires Act 1997* (RF Act) aims to among other things, to prevent, mitigate and suppress bush and other fires in LGAs (or parts of areas) and other parts of NSW constituted as rural fire districts, including Bourke.

On 1 August 2002, the EP&A Act and the RF Act were both amended to enhance bush fire protection through the development assessment process. The EP&A Act establishes a system for requiring bush fire protection measures on bush fire prone land at the DA stage. Generally DAs on bush fire prone land must be accompanied by a bush fire assessment report demonstrating compliance with the aim and objectives of *Planning for Bush Fire Protection 2006* (PBFP guidelines) and the specific objectives and performance criteria for the land use proposed.

Bushfire mapping of the Bourke LGA shows that the majority of the project site, including the site of the abattoir is not bushfire prone, as shown on Figure 4.1. Accordingly, a bushfire assessment has not been prepared to accompany this EIS. Nevertheless, CAPRA will install and maintain appropriate fire fighting equipment onsite in accordance with relevant building standards and guidelines. In addition, as described in Section 2.8.2, a secure water supply will be obtained for the development from BSC. Up to 770 kL of water per day will be required to meet the needs of the development. BSC has confirmed there is capacity to supply up to 1 ML per day. There is therefore spare capacity within the water supply infrastructure for fire fighting capabilities.

4.3.11 Dams Safety Act 1978

The NSW *Dams Safety Act 1978* (DS Act) established the Dams Safety Committee to approve and maintain records of 'prescribed dams' in NSW. Prescribed dams are defined in Schedule 1 of the DS Act. Consultation with the Dams Safety Committee would be undertaken by CAPRA to determine if any dams proposed by the project would be deemed to be prescribed dams and require inclusion within Schedule 1 of the DS Act.



Source: EMM (2015); Bourke Shire Council (2016)

\\10.0.0.200\emgamm\Jobs\2015\H15101 - Bourke abattoir\GIS\02_Maps\EIS\EIS008_Bushfire_20160302_03.mxd 2/03/2016

Bourke LGA bushfire map

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 4.1

4.3.12 Pipelines Act 1967

The NSW *Pipelines Act 1967* (Pipelines Act) aims to:

- implement a timely and efficient approvals system to facilitate the construction of cross-country transmission pipelines in New South Wales;
- ensure the effect of a pipeline project commenced under the Act on the environment, landowners and native titleholders is properly considered and managed; and
- ensure pipeline licensees protect the environment, pipeline employees and the public from dangers arising from both pipeline construction and the transmission of potentially hazardous substances.

Not all pipelines are required to be licensed under the Pipelines Act. Predominantly licensed pipelines convey oil, gas and petroleum.

Pipelines constructed as part of the project, particularly the water supply pipeline do not need to be licensed under the Pipelines Act.

4.3.13 Food Act 2003

The Food Act aims to:

(a) to ensure food for sale is both safe and suitable for human consumption,

(b) to prevent misleading conduct in connection with the sale of food,

(c) to provide for the application in this State of the Food Standards Code

Under section 104 of the Food Act, a person who carries on any food business or activity for which a licence is required by the Food Regulation) is required to obtain a licence from the NSW Food Authority. Under the Food Regulation, activities requiring licensing include abattoirs. As such, CAPRA will be required to obtain a licence.

In addition, clause 83 of the Food Regulation states that:

(1) The operation of an abattoir must comply with the following Standards:

(a) in relation to an abattoir at which the slaughtering of meat (other than poultry meat, rabbit meat, ratite meat or crocodile meat) is authorised by the relevant licence—the standards specified in Australian Standard AS 4696–2007, *Hygienic production and transportation of meat and meat products for human consumption*, as in force from time to time,

(b) in relation to an abattoir at which the slaughtering of poultry meat is authorised by the relevant licence—the standards specified in Australian Standard AS 4465–2006, *Construction of premises and hygienic production of poultry meat for human consumption*, as in force from time to time,

(c) in relation to an abattoir at which the slaughtering of rabbit meat is authorised by the relevant licence—the standards specified in Australian Standard AS *4466–1998, Hygienic production of rabbit meat for human consumption*, as in force from time to time,

(d) in relation to an abattoir at which the slaughtering of ratite meat is authorised by the relevant licence—the standards specified in Australian Standard AS 5010–2001, Hygienic production of ratite (emu/ostrich) meat for human consumption, as in force from time to time,

(e) in relation to an abattoir at which the slaughtering of crocodile meat is authorised by the relevant licence—the standards specified in Australian Standard AS 4467–1998, *Hygienic production of crocodile meat for human consumption*, as in force from time to time,

(f) in relation to an abattoir at which the slaughtering of more than one type of meat referred to in the preceding paragraphs is authorised by the relevant licence—the standards specified in each of the relevant paragraphs.

(2) In addition to complying with the requirements of subclause (1), the operation of an abattoir must comply with clause 17 of Part 6 of Australian Standard AS 4696–2007, *Hygienic production and transportation of meat and meat products for human consumption,* as in force from time to time, if poultry meat, rabbit meat, ratite meat or crocodile meat, or any combination of those, is passed at the abattoir as fit for use only as animal food.

(3) For the purposes of this clause, the Standard referred to in subclause (2) is taken to extend to abattoir meat that is poultry, rabbit, ratite or crocodile meat and to meat products derived from such meat.

4.4 Strategic policies

4.4.1 NSW 2021

The *NSW 2021: A Plan to Make NSW Number One* (NSW Government 2011) aims to guide policy and budget decisions over the ten year period to 2021. The plan is based around the following strategies:

- rebuild the economy;
- return quality services;
- renovate infrastructure; and
- strengthen the local environment and communities.

Work has been undertaken to localise NSW 2021 through consultation with local communities to identify local priorities for action at the regional level. A regional action plan for Orana, in which the Bourke LGA and town is located, was prepared in December 2012 (the Orana Regional Action Plan).

The Regional Action Plan was underpinned by community consultation which included holding regional forums to hear directly from communities. These forums were aimed at identifying regional issues and priorities how the State Government could assist in delivering those priorities. The key priorities identified by communities within the Orana Regional Action Plan include:

> **Opportunities to succeed –** Growth in employment, skills and business investment will retain and attract young people to the region and strengthen local industries. The resource and tertiary education sectors will be expanded and existing agricultural industries will continue to flourish.

> **Well maintained infrastructure –** The Orana region will be supported by well maintained water, sewerage and transport infrastructure to underpin the future development of the region's towns. It will be well connected with other areas of NSW which will drive economic investment, growth and tourism in the region.
>
> **Attractive regional lifestyle –** The quality of life and wellbeing of the communities will be enhanced through empowerment of all people, the provision of safe neighbourhoods and co-ordinated support and services for families.

Specifically in relation to opportunities to success, the Orana Regional Action Plan states that support will be provided to primary production in the region to build upon competitive advantages. It states:

> The NSW Government will support primary industries in the region by building on competitive advantage through:
>
> - Building profitable and sustainable cropping, horticulture and livestock industries
> - Research and development targeting resource management including improved water efficiency, managing soils, and developing farming systems that sequester carbon
> - Protecting our primary industries from pests and disease through surveillance programs and educating communities
> - The Rural Support Worker Program to help communities respond to future challenges.

The project is consistent with this strategy, because when developed, it is envisaged that it will become a profitable and sustainable livestock industry that will assist property holders to manage rangeland goats. Employment generated by the project, direct and indirect, will assist the NSW Government achieve other strategies for the region, including growth in employment, skills and business investment.

4.4.2 Orana Regional Plan 2012-2020

The *Orana Regional Plan 2012-2020* (Regional Development Australia, 2012) was prepared in 2012 to identify key priorities for the Orana Region. The region is composed of 13 LGA's including Bourke and, therefore, applies to the project site. The plan recognises the challenges of the region and aims to:

> ... act as a strong conduit to disseminate information and work in partnership with our community, local government and other stakeholders to ensure the long term, innovative and sustainable development of the Orana region.

Some of the key goals and priorities for the region centre around capitalising on its strengths in agriculture. Specifically for the Bourke LGA, it cites that the changing demand for agricultural products, such as the goat industry, will provide opportunities to arrest some of the issues facing the LGA such as a decline in population and services.

The project is consistent with some of the key goals and strategies of the plan, as it would allow the region to partly realise the economic potential and benefits of an abattoir that sources local rangeland goats.

4.5 Summary of licences approvals and permits

Table 4.2 contains a summary of the licences, approvals and permits that are likely to be required for the project.

Table 4.2 Summary of required licenses approvals and permits

Legislation	Authorisation	Consent or approval authority
EC Act	Livestock export licence	Commonwealth Department of Agriculture and Water Resources
EP&A Act	Development consent	Minister for Planning or delegate
	Construction certificate required prior to construction of abattoir	BSC or private certifier
	Occupation certificate required prior to use of abattoir	BSC or private certifier
POEO Act	EPL for livestock processing activities	EPA
Roads Act	Section 138 permit for construction of driveway access to Mitchell Highway	RMS
CL Act	Licence required for use of land as an abattoir	Crown Lands
WL Act	Changes to conditions on WLL	Crown Lands
NV Act	Change to PVP relating to property covering project site	Western Local Land Services
DS Act	Possible listing of water storage dams	Dams Safety Committee
Food Act	Food licence	NSW Food Authority

5 Consultation

5.1 Introduction

During preparation of this EIS, consultation was undertaken with a wide range of stakeholders including various local and State government agencies and the local community. This chapter describes the consultation undertaken for the project, including information on stakeholder identification, methods of communication, and outcomes of the consultation process.

5.2 Stakeholder consultation objectives

The aim of CAPRA's stakeholder consultation activities for the project was to facilitate stakeholder input into the project and to demonstrate open and transparent engagement throughout the EIS preparation and submission of the development application. To achieve this aim, the following objectives were established:

- consult early with key stakeholders to establish points of contact, particularly with BSC;
- identify stakeholders with a potential future interest in the project;
- establish relationships with the Bourke community; and
- identify the aspects of the project that are of most interest to individual stakeholders, and ensure these are addressed in the EIS.

5.3 Stakeholder identification

Three stakeholder groups were identified who may have a direct or direct interest in the project, and hence were included in the consultation for the project. These broad groups were:

1. government – BSC, State and Commonwealth government agencies;
2. community – local businesses, Bourke and North Bourke residents and surrounding residents, livestock depots around Bourke likely to supply the abattoir, service providers, and local media; and
3. Indigenous – registered Aboriginal parties (refer Chapter 12), the local indigenous community and those organisations servicing their interests or representation.

In addition to the above, the SEARs require the following stakeholders be consulted as part of preparation of the EIS:

- NSW EPA;
- Bourke Shire Council;
- NSW Health – Western NSW Local Health District;
- Department of Primary Industries, including DPI Water;

- NSW RMS;
- OEH;
- Rural Fire Service; and
- Local community and other stakeholders.

As previously discussed in Section 4.3.7, the project site is owned by the Crown and subject to a WLL under the NSW WL Act. DPI – Lands were therefore also consulted during the preparation of the EIS.

5.4 Consultation activities and outcomes

The methods of engagement with identified stakeholders, the purpose of engagement, and outcomes of the consultation, is provided in Table 5.1.

Table 5.1 Stakeholder consultation

Stakeholder	Date	Method of engagement/purpose	Outcome/comment
State government			
Dept. of Planning & Environment	1/10/2015	Planning Focus Meeting in Bourke	
	14/1/2016	Phone call to provide project update, discuss timeline for submission and book pre-lodgement meeting	
	11/2/2016	Pre-lodgement meeting	Discussed the preliminary findings of the technical studies, and outlined consultation completed, and to be done, prior to lodgement of the EIS.
NSW Health	1/10/2015	Planning Focus Meeting in Bourke	
	18/11/2015	Phone call to discuss approach to Health Risk Assessment (HRA)	Confirmed teleconference to discuss approach to the HRA.
	25/11/2015	Teleconference to discuss proposed methodology of the HRA with SLR and CAPRA representatives	Purpose of the teleconference was to achieve agreement on the approach to the HRA. Subsequent emails between NSW Health and EMM confirmed the approach; that the HRA would be able to qualitatively assess the potential risk of Q fever transmission along transport routes, as well as addressing occupational risks.
	25/02/2016	Teleconference to discuss outcomes of HRA (draft HRA provided to NSW Health on 19/02/2016)	NSW Health requested two additional pieces of information to be included in the HRA; firstly further information on water security for the project, and secondly the addition of pregnant does as an agent of transmission during transport, acknowledging this would be a low to very low risk if screening procedures were put in place to screen out pregnant does from transport.
NSW Roads and Maritime Services	1/10/2015	Planning Focus Meeting in Bourke	

Table 5.1 Stakeholder consultation

Stakeholder	Date	Method of engagement/purpose	Outcome/comment
NSW Dept. of Primary Industries	1/10/2015	Planning Focus Meeting in Bourke	
	18/02/2016	Phone call with DPI Agriculture to discuss the lot zoned RU5 large lot residential adjacent to project site, and mass disposal strategy.	EMM advised that the lot zoned RU5 adjacent to the project site is part of 2000 ha for which the applicant has entered into a conditional contract to purchase, pending project approval. Upon approval, this lot will therefore be owned by the applicant, eliminating the risk of land use conflict with the project and this lot. The preferred option of mass disposal on site in the event of an emergency disease outbreak was also discussed.
	18/02/2016	Phone call with DPI Water to discuss water resources related assessment requirement	DPI water advised key issues to address in the water resources assessment were water supply and security, the risk of flooding on the site and the risk of site to affect flood regime, and the existing understanding of the groundwater environment.
NSW Office of Environment and Heritage	1/10/2015	Planning Focus Meeting in Bourke	
	13/11/2015	Phone call to discuss approach to archaeology assessment	OEH provided additional archaeological reports to investigate and some key archaeological issues including proximity to the creek, remnant paleo landscapes and the dynamic and erosional landscapes of this area.
	12/2/2016	Phone call to discuss proposed offset requirement	Setup teleconference to discuss offsets
	15/2/2016	Vegetation profile summary and credit report provided ahead of teleconference to discuss offset requirement	
	22/02/2016	Teleconference to discuss outcomes of biodiversity assessment and offset strategy	OEH advised key issues to address in the biodiversity report, including ensuring documentation of avoidance measures undertaken, and justification behind strategy for finalising offset strategy. Discussed commitment to finalise offset strategy post approval, and OEH's in-principle support (pending review of EIS and biodiversity report) for this approach.

Table 5.1 Stakeholder consultation

Stakeholder	Date	Method of engagement/purpose	Outcome/comment
Environment Protection Authority	1/10/2015	Planning Focus Meeting by phone	
	22/10/2015 & 11/11/2015	Letter outlining proposed methodology for air and noise assessments provided to the EPA	
	11/10/2015, 12/11/2015, 24/11/2015	Phone calls and emails regarding EPA advice about the air quality assessment methodology	Agreement reached on approach to air and noise assessments, including a semi-quantitative approach to noise in recognition of the isolated nature of the site, and the use of a literature review and sensitivity analysis to assess goat odour, in recognition of a lack of published data on the issue.
	14/1/2015	Project update provided by CAPRA. Discussed requirement for an EPL and requirements of the irrigation study	
	11/2/2016	Pre-lodgement meeting to outline methodology and outcomes of air, noise and irrigation assessments	EPA agreed to undertake 'adequacy' level review of the air noise and irrigation
	12/2/2016	Email to provide drafts of air, noise, and irrigation assessments for adequacy review	EPA provided adequacy comments on the noise, air quality and irrigation studies, which were addressed prior to submission of the EIS for exhibition.
NSW Rural Fire Service	21/1/2016	Phone call to discuss proposal and bush fire prone land in the area.	Advised to contact BSC to obtain bushfire mapping and discuss requirements of Council in relation to bushfire
DPI Lands	22/02/2016-25/02/2016	Given the project site is owned by the Crown, DPI-Lands were provided a draft copy of the EIS to review prior to submission to the DP&E. DPI-Lands also provided landowners consent for the project.	Following their review, DPI-Lands requested additional details on weed management, offsets (a commitment to consult with DPI-Lands in the preparation of the offset strategy has been subsequently included in Chapter 11), and obtaining lessee consent (which was obtained and separately provided to DP&E).

Table 5.1 Stakeholder consultation

Stakeholder	Date	Method of engagement/purpose	Outcome/comment
Local government			
Bourke Shire Council	1/10/2015	Planning Focus Meeting in Bourke	
	7/12/2015-8/12/20i5	Attended series of meetings with CAPRA - Business House meeting and Aboriginal organisations meeting	Refer below
	8/12/2015	Closed Council meeting with CAPRA in Bourke to discuss the project	CAPRA used this meeting to provide a project update, clarify prior council advice, and allow attendees to ask questions concerning the project. CAPRA discussed the progress made on the EIS, approach to community consultation, funding, water supply, and use of local business. Queries raised in response by the Council included plans for soil testing (refer section Chapter 14) and acquisition of skilled workforce and training opportunities (refer Chapter 18).
	21/1/2016 – 18/02/2016	Phone call and emails regarding bush fire prone land map, updates on EIS progress and discuss flooding information available	Bushfire mapping provided, confirming the project footprint is not in bush fire prone land. Flood information also provided, including history of flood heights, and flood imagery from the 1998 flood.
Local community			
Community meeting	8/12/2015	Community meeting held in Bourke to provide a project briefing and answer community questions on the development	A number of questions and issues were raised about the project by attendees at the meeting. These issues, and where they have been addressed in the EIS, are summarised below: • Waste reuse (Section 2.8 and 2.10); • Employment sources and training (Chapter 18); • Land ownership (Section 3.2); • Operating hours (Section 2.5); • Water supply (Section 2.8.2); • Stock access during drought (Section 2.11); and • Housing availability (Section 18.4).

Table 5.1 Stakeholder consultation

Stakeholder	Date	Method of engagement/purpose	Outcome/comment
Aboriginal stakeholders			
Aboriginal organisations meeting	8/12/2015	Meeting held in Bourke with Aboriginal organisations to provide a project briefing, assess aboriginal heritage values of the area, and answer any community questions on the development.	Representatives from the Department of Aboriginal Affairs, Department of Education, Maranguka, Bourke High School, Office of Environment and Heritage, and Bourke Shire Council attended this meeting. CAPRA provided a project briefing and update, and provided opportunity for attendees to ask questions. Issues discussed and where they are addressed in this EIS include: • Sustainability of the abattoir business (Section 18.3); • Water supply and security (Section 2.8.2); • Employee numbers, sourcing, and training (Section 18.4); • Cost of living in Bourke (Section 18.3); and • Cultural issues (Chapter 12).
	Nov 2015 – Feb 2016	Consultation process with RAPs in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*	A total five Aboriginal groups registered interest in the Project. Further information on Aboriginal consultation is provided in Chapter 12 and Appendix J.
Other key stakeholders			
Bourke Business House Group	7/12/2015	Meeting held in Bourke to provide a project briefing and answer questions on the development, particularly in relation to opportunities for local businesses to get involved in the project.	The representative for CAPRA presented a project briefing and provided members the opportunity to ask questions about the project. Issues discussed at the meeting, and where they are addressed in the EIS, are as follows: • Skilled labour and employment from within the local community (Section 18.4); • Housing for additional employees and families(Section 18.4); • Plans for disposal of waste (Section 2.10); • Water supply and security (Section 2.8.2); • Size of the facility and future expansion (Chapter 2); • Operating hours and shift types (Section 2.5); and • Adequate supply of goats (Section 2.2).
Livestock depots around Bourke	Nov 2015 – Feb 2016	Discussions regarding current livestock movements to assist in characterising the existing traffic environment for input into health and traffic assessments.	Indicative livestock movements in and around Bourke was provided to EMM for use in the relevant technical studies.

6 Risk assessment

6.1 Identification of issues

The key development-related issues warranting detailed assessment and reporting were identified through:

- the existing environmental context of the project site and surrounding locality (refer Chapter 3);
- the legislative framework applicable to the development (refer Chapter 4);
- the outcomes of consultation to be undertaken with government agencies and other relevant stakeholders (refer Chapter 5); and
- technical studies completed as part of the preparation of the EIS (refer Chapters 7-18).

In addition to the above, and as required by the SEARs, a risk assessment of potential environmental impacts of the project was also conducted and, in conjunction with the above, enabled identification of key issues for further assessment. The risk register produced by the risk assessment is contained in Appendix E, and the outcomes summarised below.

6.2 Pre-project environmental risk assessment

A pre-project risk assessment was completed by EMM 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 within the EIS.

A qualitative risk assessment methodology in accordance with the requirements of the Australian Standard AS/NZS 31000:2009 *Risk Management Principals and Guidelines* was utilised to provide a consistent and reliable approach. Where the individual risk(s) was considered unacceptable, or where a knowledge gap was identified, technical studies were commissioned and additional mitigation measured and/or management responses nominated.

The risk register contained in Appendix E was prepared to document the findings and outcomes. The various issues considered, in no particular order, were:

- land use conflict;
- air quality (odour and dust);
- noise;
- traffic;
- visual amenity;
- biodiversity;

- water resources;
- Q fever;
- heritage;
- greenhouse gases;
- waste management; and
- chemicals and dangerous goods.

The risk assessment did not identify any high risk issues (Level 15-25). This can primarily be attributed to the location of the project site, which was identified through a careful site selection process as discussed in Section 2.15, including the substantial distance to residences, urban areas and other development, the nature of the existing environment, and the management practices and mitigation measures to be employed. Six medium risks (Level 5-14) were identified; odour, Q fever, biodiversity, heritage, waste and traffic noise. Specialist consultants were engaged to assess these (and other) aspects of the development. The studies prepared, their findings, and mitigation measures recommended are detailed in the following chapters (Chapters 7-18).

7 Air quality

7.1 Introduction

The SEARs require an assessment of the potential air quality and odour impacts as a result of the project. An air quality impact assessment, including an odour assessment, was undertaken by SLR. The assessment was undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Department of Environment and Conservation (DEC) 2005) and *Assessment and Management of odours from Stationary Sources in NSW* (DEC 2006).

The full technical report is provided as Appendix F (SLR 2016a), and the key findings and recommendations summarised in the sub-sections below.

7.2 Existing environment

The project site and surrounding area is relatively flat, with the elevation of the project site varying between 111 m and 114 m. On an annual basis, the dominant wind direction is southerly to south-south-easterly, with calms occurring 2.2% of the time. Further information on the meteorology of the area, including wind speed and direction, temperature, rainfall and humidity, is described in Section 3.7. Background air quality and sensitive receptors is discussed below.

7.2.1 Background air quality

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

In order to gain an understanding of the air quality in the area and what pollutant levels may be, SLR (2016a) looked at PM_{10} data collected by the Tamworth air quality monitoring station (AQMS), which is the closest monitoring station to the project site and the background sources are likely to be similar in nature. Detailed justification on the use of this Tamworth data is provided in Section 5.2 of SLR (2016a) (refer Appendix F).

It is standard practice to use background monitoring datasets taken from the same year as the meteorological dataset chosen for use in the dispersion modelling assessment. However, Tamworth is a more urbanised area than Bourke and the concentrations are likely to be elevated due to its low-lying location receiving emissions of wood smoke in overnight, cold air drainage flows towards the Peel River.

Therefore in order to provide a conservative, yet realistic assessment of background concentrations of particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), the average of the maximum 24-hour concentrations and annual average concentrations measured at Tamworth over the 2010 – 2014 period reviewed were used as follows:

- a 24-hour average background PM_{10} concentration of 49.8 micrograms per cubic metre ($\mu g/m^3$); and
- an annual average background PM_{10} concentration of 14.7 $\mu g/m^3$.

The background level of nitrogen oxide (NO_X) as nitrogen dioxide (NO_2) was assumed to be negligible given the lack of contributing industries in the immediate area. The assessment assumed that all NO_X emissions are in the form of NO_2, which is a conservative assumption that would account for any residual background concentration of NO_X. The background level of odour was also assumed to be negligible given lack of contributing industries in the immediate area.

7.2.2 Sensitive receptors

As described in Chapter 3 and evident on Figure 3.2, the project site is in an isolated rural area, with the nearest receptors identified as two houses located about 5.5 km and 5.8 km from the proposed abattoir location (receptor 1 and receptor 2 respectively). These receptors are well beyond the 500 m buffer distance recommended for abattoirs by the Victorian EPA in *Recommended Separation Distances for Industrial Residual Air Emissions* (Victorian EPA 2013), and referenced by the NSW EPA.

The next nearest receptors are in North Bourke, approximately 10 km from the project site, and the main town of Bourke, around 14 km away.

There is also a house located approximately 3 km south of the project site; however it is abandoned and therefore not classified as a receptor for the purposes of the air quality and noise assessments.

7.2.3 Surrounding industrial sources of airborne pollutants

Industrial sources of airborne pollutants in the Bourke region were identified by looking into sites regulated by the EPA and those that are required to report to the National Pollutant Inventory (NPI). A search was conducted for the Bourke LGA and postcode "2840" which returned the following existing industries in the vicinity of the project site:

- Caltex Energy NSW Bourke Depot (15 km SSW of project site);
- Shell Bourke Airport (9 km SSW of project site);
- Bourke Shire Council sewerage treatment (10 km SSW of project site);
- Lorraine Lewis mineral mining (70 km NNW of project site);
- Naomi Cotton Co-operative Ltd (15 km SW of project site); and
- P.J and J.M Harris Pty Ltd (15 km SSW of project site).

The limited industrial activities in the locality demonstrate the predominantly agricultural nature of the area.

7.3 Methodology

7.3.1 Construction phase

A qualitative risk-based construction phase air quality impact assessment was undertaken by SLR (2016a) to identify and assess the potential for adverse impacts on air quality at sensitive receptor locations during the construction phase of the project. This assessment was conducted using the Institute of Air Quality Management (IAQM) document, *Guidance on the assessment of dust from demolition and construction* (IAQM, 2014) developed in the United Kingdom.

The AIQM method uses a four step process for assessing dust impacts and impacts to human health from PM_{10} concentrations from construction activities. The assessment required gathering available and relevant information relating to the project, including but not limited to: identified sensitive receptors, confirmed construction activities that have the potential to generate air pollution, local weather characteristics, and natural shelters.

Step 1 involves screening based on the distance to the nearest receptor. IAQM guidance suggests screening out any assessment of impacts from construction activities where sensitive receptors are located more than 350 m from the boundary of the site and 50 m from the route used by construction vehicles on public roads more than 500 m from the site entrance.

Step 2 assesses the risk of effects from activities based on the scale and nature of work, and residual sensitivity of the area. Step 3 determines the site specific mitigation for activities with greater than negligible effects. The significance of these activities when these mitigation methods are applied is then assessed in step 4.

7.3.2 Operational phase

i Dispersion modelling

An operational air quality impact assessment was also undertaken for the project by SLR (2016a) to assess impacts on air quality resulting from the operation of the abattoir, particularly odour, and traffic-related dust and exhaust emissions.

The Air Pollution Model (TAPM), CALMET and CALPUFF dispersion modelling suites were used to infer predicted concentrations of air quality pollutants and odour arising as a result of the project. Modelling conservatively assumed continuous emissions from all sources within the project site.

Meteorological data was prepared for the dispersion modelling using TAPM, developed by CSIRO. The model predicts airflow important to local scale air pollution, such as terrain induced flows, against a background of larger scale meteorology provided by synoptic analyses. A meteorological dataset for 2012 was created using meteorological information and terrain data inherent to TAPM. TAPM v4 was run with surface observations from Bourke Airport BoM AWS. Data from 2012 was chosen for inclusion in the modelling following a review of the most recent five years of historical surface observations at Bourke Airport AWS (2010 to 2014 inclusive) to determine the most representative year. Examination of the data found the following:

- None of the five years of data appear to be outliers against the long term average.

- Low wind speeds are associated with less effective plume dispersion. Therefore, any year indicating higher than the longer term average wind speeds would provide less conservative model results. Of the 24 monthly wind speeds recorded at 9 am and 3 pm, 2013 has eight above the long term average. 2011 follows with five above the long term average, 2014 with four occurrences and 2011 with two. The 3 pm January 2012 wind speed is the only occasion when 2012 data is higher than the long term average. Given that wind speed plays a significant role in dispersion, the selection of model year draws heavily on this result.

- 2010 and 2011 show higher than average relative humidity, especially in the summer months.

Consequently, 2012 was selected as a suitably representative year of meteorology, this being a conservative approach because low wind speeds are associated with less effective plume dispersion.

The CALMET/CALPUFF modelling system was used to conduct dispersion modelling for each scenario to predict the ground level concentrations for all relevant particulate matter and odour emissions. CALMET is a meteorological pre-processor, which uses the meteorological inputs in combination with land use and geophysical information to predict metrological fields for the region. 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.

ii Odour emission rates

Consultation was undertaken with the NSW EPA regarding the proposed methodology for the air quality impact assessment, as described in Chapter 5. A main point of discussion with the EPA was the issue of goat specific odour emission rates, and the lack of published data on goat odour in Australia.

A literature search was therefore conducted by SLR (2016a) to find published goat odour emission rates. Two rates were identified; 42 $OU.m^3/s$/goat published by one study (Ektimo 2015), and a second study from the Netherlands (Pagans et. al. 2012) quoted 18.8 $OU.m^3/s$/goat. To enable a conservative assessment to be undertaken, the highest goat emission rate, ie 42 $OU.m^3/s$/goat, was used in the odour model.

A sensitivity analysis was then conducted on the goat odour emission rate to provide context around the odour predictions at the nearest receptors. The CALPUFF model was used to estimate the maximum allowable goat odour emission rate that would maintain compliance with the NSW EPA odour criterion at the nearest sensitive receptors, and this was compared to the published data identified above. The result of the sensitivity analysis is present in Section 7.4.2.

7.3.3 Air quality criteria

The EPA has established ground level air quality impact assessment criteria for key air pollutants to achieve appropriate environmental outcomes and to minimise associated risks to human health as published in the document *Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods) (DEC, 2005). A summary of the impact assessment criteria specified in the Approved Methods for the pollutants relevant to the project is provided in Table 7.1.

Table 7.1 Air quality impact assessment criteria

Pollutant	Averaging period	Concentration (µg/m^3)	Source
PM_{10}	24-hours	50	NEPC (1998)
	Annual	30	EPA (1998)
$PM_{2.5}$	24-hours	25	NEPM (2003)
Total suspended particulate (TSP)	Annual	90	NHMRC (1996)
NO_2	1-hour	246	NEPC (1998)
	Annual	62	NEPC (1998)
Pollutant	**Averaging period**	**Concentration (mg/m^3)**	**Source**
Carbon monoxide (CO)	15-min	100	WHO (2000)
	1-hour	30	WHO (2000)
	8-hour	10	NEPC (1998)
Pollutant	**Averaging period**	**Incremental increase/total (g/m^2/month)**	**Source**
Deposited dust	Annual	2 / 4	NERDDC (1988)
Pollutant		**Impact assessment criteria for complex mixtures of odours (OU)**	**Source**
Nuisance odour	Nose-response time	6.0	EPA (2001)

As noted above in Table 7.1, the odour criteria for the project is stated as 6.0 odour units (OU). The detectability of an odour is a sensory property that refers to the theoretical minimum concentration that produces an olfactory response or sensation in 50% of the population. This point is called the *odour threshold* and defines 1 odour unit. An odour goal of 1 OU would theoretically result in no odour impact being experienced. The character of a particular odour can only be judged in practice by the receiver's reaction to it, and preferably only compared to another odour under similar social and regional conditions. Based on the literature available, the level at which an odour is perceived to be a nuisance can range from 2 OU to 10 OU depending on a combination of factors including, population sensitivity, background level, public expectation (considered offensive or easily tolerated), source characteristics (ie emitted from a stack or general area) and health effects. In general:

- 1 OU is the detection threshold for odour (by definition);
- 5 OU is a typical concentration for a faint odour; and
- 10 OU is a typical concentration for a distinct odour.

A summary of the impact assessment criteria given for various population densities, as drawn from the Approved Methods, is provided in Table 7.2.

Table 7.2 Impact assessment criteria – complex mixtures of odorous air pollutants

Population of affected community	Impact assessment criteria for complex mixtures of odours (OU, nose-response-time average, 99th percentile)
Urban area (≥2,000)	2
~500	3
~125	4
~30	5
~10	6
Single residence (≤2)	7

There are two residences approximately 5.5 km and 5.8 km respectively from the proposed abattoir building footprint. These residences were assessed to determine if they may be impacted by odours emitted from the project site. Therefore, the total population considered is the 4 to 6 permanent residents at receptors 1 and 2. An impact assessment criterion of 6.0 OU was therefore applied in the assessment.

7.4 Potential impacts

7.4.1 Construction phase

All residential receptors in the vicinity of the project site, receptors 1 and 2, are located greater than 350 m from the boundary of the site, are greater than 50 m from roads used by construction traffic, and are more than 500 m from the site entrance. According to the IAQM methodology, receptors which meet these screening criteria do not require further assessment. This indicates that there is a negligible risk of adverse air quality impacts occurring at these receptor locations even if no mitigation was to be applied during the construction activities. Suitable mitigation measures will still be applied during construction.

7.4.2 Operational phase

i Odour

The predicted ground level odour concentrations at the nearest receptors are summarised in Table 7.3. A contour plot of these predictions is provided in Figure 7.1.

Table 7.3 Peak 1-second average (99th percentile) odour concentrations predicted at sensitive receptors

Receptor ID	Coordinates (MGA, m)		Odour concentration (99th percentile, nose-response time) (OU)	
	X	Y	All sources except goat odour	All sources including goat odour
1	401,381	6,678,643	1.2	4.4
2	401,453	6,678,340	1.2	4.4
Guideline OU			6.0	6.0

Table 7.3 shows the predicted 99th percentile peak 1-second average odour concentrations for the project. When contribution from goats is excluded, odour concentrations at receptors 1 and 2 are predicted to be just over 1 OU. An odour at a concentration of 1 OU would not normally be detected outside the controlled environment of an odour laboratory by the majority of the population.

When the contribution from goats is included, the highest 99th percentile odour concentration predicted at receptors 1 and 2 is 4.4 OU, which is below the impact assessment criterion of 6.0 OU. Given that 5 OU is a typical concentration for a faint odour, odours of such intensity to be recognised or considered offensive are unlikely to be detected.

ii Sensitivity analysis results

As noted above the cumulative impact of all sources excluding goat odour predicted at the most impacted receptor location was 1.2 OU at receptor 1. The maximum allowable incremental impact from goat odour is therefore the difference between the odour criterion of 6 OU and the odour concentration due to other sources at receptor 1 of 1.2 OU, which is 4.8 OU. This gives a maximum acceptable contribution from goat odour of 4.8 OU at receptor 1 (99th percentile ground level concentration). This translates to a maximum allowable emission rate for goat odour of 61.3 OU m^3/s/goat. Based on the goat odour emission rates of 42 OU m^3/s/goat and 18.8 OU m^3/s/goat presented in literature (refer Section 7.3.2), it is unlikely that the maximum allowable emission rate for the project site of 61.3 OU m^3/s/goat would be exceeded. Therefore, it is concluded that the odour emission criterion at the nearest residences would be met by the project.

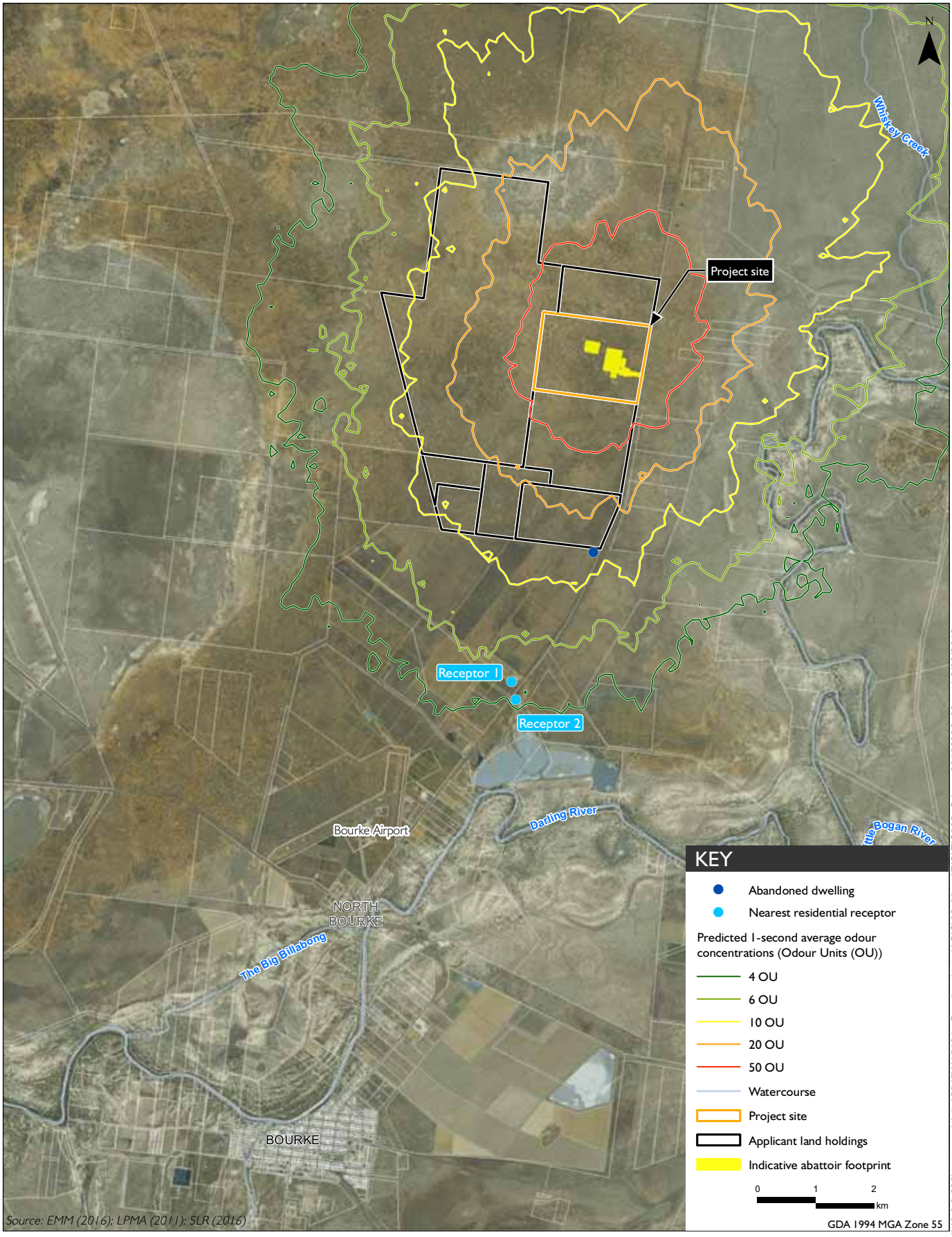
iii Particulate matter

The annual average and maximum 24-hour average PM_{10} concentrations predicted at the sensitive receptors due to emissions from the gas fired boilers are presented in Table 7.4, with and without the contribution from background air quality. Emissions of total particulate matter from the boilers were all modelled as PM_{10} to provide a conservative approach.

No exceedances of the relative PM_{10} criteria are predicted, with the modelling results showing the abattoir to be an extremely small contributor of PM_{10} levels in the area. The predicted annual average PM_{10} concentrations reach a maximum of <0.1 µg/m^3 at either receptor, which is below the 30 µg/m^3 criterion. Inclusive of background air quality contributions of 14.7 µg/m^3, the criterion is still met. The maximum 24-hour average PM_{10} concentration of 0.13 µg/m^3 was predicted at Receptor 1 and was predicted to be below the 50 µg/m^3 guideline. With the background air quality contribution of 49.8 µg/m^3, the appropriate criterion is met.

Table 7.4 PM_{10} concentrations predicted at sensitive receptors

Receptor ID	Incremental		Background		Cumulative	
	Annual average (µg/m^3)	24-hour average (µg/m^3)	Annual average (µg/m^3)	24-hour average (µg/m^3)	Annual average (µg/m^3)	24-hour average (µg/m^3)
1	<0.1	0.1	14.7	49.8	14.7	49.9
2	<0.1	0.1	14.7	49.8	14.7	49.9
Guideline	30	30	-	-	30	50



Predicted odour ground level concentrations

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 7.1

iv Nitrogen dioxide

Nitrogen dioxide will result from the gas fired boilers. Full oxidation of the NO_x to NO_2 was conservatively assumed in the assessment, whereas in reality, it is more likely to be approximately 20% to 40% at the sensitive receptor locations. These predictions are therefore considered to overestimate actual downwind NO_2 concentrations.

Table 7.5 shows the annual average and maximum 1-hour NO_2 concentrations predicted at the sensitive receptors due to emissions from the gas fired boilers. The predicted annual average NO_2 concentrations are less than 0.1 µg/m^3 at both receptors, which is far below the 62 µg/m^3 criterion. The maximum 1-hour average NO_2 concentration of 5.9 µg/m^3 was predicted at Receptor 2 and is far below the 246 µg/m^3 guideline.

Table 7.5 Predicted NO_2 concentrations at sensitive receptors

Receptor ID	Coordinates (MGA, m)		NO_X as NO_2 average (µg/m^3)	NO_X as NO_2 maximum 1-hours average (µg/m^3)
	X	Y		
R1	401,381	6,678,643	<0.1	5.7
R2	401,453	6,678,340	<0.1	5.9
Guideline			62	246

7.5 Mitigation and management

7.5.1 Construction

Construction activities will be managed so that the works are conducted in a manner that minimises the generation of air emissions, and additional measured are implemented where required. Mitigation measures may include:

- ensuring vehicles entering/exit the site are covered to prevent escape of materials during transport; and
- reducing truck speeds on site to reduce wheel generated dust.

Construction contractors will undertake regular environmental inspections of their works and worksite. The daily environmental inspections will include the below observations, with remedial or corrective actions noted (as appropriate). Any remedial or corrective actions will be reported to the Site Manager as soon as is practicable.

- Visual inspection of dust generation.
- Inspection of the erosion and sediment controls and removal of built up material if required.
- Inspection of the waste storage areas.
- Ensure the Mitchell Highway in the vicinity of the site is kept free of soil, and soil tracking onto the road network is prevented.
- Ensure all hazardous goods, including fuel and oil, are adequately stored or bunded.
- Ensure spill kits are appropriately located and stocked.

7.5.2 Operation

It is understood that air quality issues are directly related to site operation, with good management practices playing an important role in reducing the potential for emissions. Importantly for this project, most air quality issues associated with abattoirs revolve around rendering. No rendering will be undertaken on site.

The following best practice mitigation measures will be implemented during the operation of the project to minimise the odour propagated from sources and activities:

- regular cleaning of holding yards, including regular dry cleaning and washing of the yards once a week;
- prompt removal of any potential odour-generating material from site;
- waste to be transported around the site in enclosed systems;
- proper maintenance of the wastewater treatment system to avoid odour generation, including crust formation on the anaerobic ponds;
- controlling of the irrigation droplet size by preventing excessively high pressure in the system design, so as to minimise spray drift;
- non-enclosed systems to be accessible for regular clean down;
- spill management procedures to include immediate clean up of any spill/leakage;
- installation and operation of the boilers in accordance with manufacturer's instructions, including regular maintenance and tuning to minimise pollutant emissions and to optimise the fuel efficiency;
- construction and maintenance of the unsealed access roads to minimise wheel generated dust; and
- maintenance of an odour complaint logbook on site and, in the event of a complaint, immediate investigation of any unusual odour sources within the site boundary and appropriate action taken to mitigate these sources.

7.6 Conclusion

The qualitative screening assessment of construction impacts found overall the risk of air quality impacts due to fugitive dust emissions from earthworks, construction of infrastructure, and track-out of dust onto public roads was negligible, given the distance between the project site and the nearest sensitive receptors.

As described in this section, the nearest permanent residents to the project site (receptors 1 and 2) are unlikely to experience adverse impacts relating to odour, as shown by the results of the dispersion modelling conducted for the project. A worst case 99th percentile odour concentration of 4.4 OU is predicted at receptors 1 and 2, below the criterion of 6.0 OU. In addition, sensitivity analysis provided further confirmation that the odour criterion at the sensitive receptors would be met by the project, as the maximum allowable emission rate of 61.3 OU.m^3/s/goat that would translate to odour levels at the criterion at the nearest receptor is greater than values presented in literature.

All other air quality parameters, namely particulate matter dust emissions and NO_x, are predicted to be well below relevant criteria, and subsequently air quality related impacts associated with these parameters during construction and operation of the project are predicted to be negligible.

8 Noise and vibration

8.1 Introduction

A noise impact assessment has been undertaken by EMM to identify potential noise impacts associated with both construction and operation of the project. The SEARs require the following in relation to noise and vibration, which are addressed in this section of the EIS:

- description of all potential noise and vibration sources including construction, operational, on and off-site traffic noise;
- an assessment of the likely noise and vibration impact including a cumulative noise impact assessment in accordance with the *NSW Industrial Noise Policy* (INP) (EPA 2000) and other relevant EPA guidelines; and
- details of noise and vibration mitigation, management and monitoring measures.

The primary sources of noise from the project will include on-site livestock (which has conservatively been assumed to be up to 11,000), mobile plant and equipment, and heavy vehicle movements. The site is proposed to operate 24 hours per day, seven days a week.

Due to the isolated nature of the project site, the risk of offsite noise impacts is considered to be negligible. Notwithstanding, a conservative, quantitative noise assessment has been undertaken with reference to the *Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change 2009), INP and the *NSW Road Noise Policy* (RNP) (Department of Environment, Climate Change and Water (DECCW 2011).

8.2 Existing environment

8.2.1 Ambient noise

The nearest noise sensitive receivers to the project site are located in an isolated rural environment approximately 5.5 km to the south and are remote to any urban or suburban area (refer Figure 3.2).

For the purpose of the noise assessment it has been assumed that the minimum background noise level (RBL) of 30 dB would apply as provided in the INP and, given the isolated nature of the project site, that the level of noise from existing industry in the general area is negligible.

8.2.2 Meteorology

Wind has the potential to increase noise at a receiver when it is light and stable and blows from the direction of the source of the noise. Further, temperature inversions, when they occur, have the ability to increase noise levels by focusing soundwaves.

A conservative approach has been adopted for the purpose of this noise assessment and noise-enhancing meteorological conditions have been considered.

8.3 Methodology

8.3.1 Project specific noise criteria

i Operational noise criteria

Noise from industrial sites in NSW is regulated by the local council, DP&E and/or the EPA and such sites usually have an EPL and/or development consent with conditions stipulating noise limits. These limits are normally derived from operational noise criteria applied at assessment locations. They are based on INP guidelines (EPA 2000) or noise levels that can be achieved at a specific site following the application of all reasonable and feasible noise mitigation.

With respect to noise criteria, the INP states:

> They are not mandatory, and an application for a noise producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development.

The objectives of noise assessment criteria for industry are to protect the community from excessive intrusive noise and to preserve amenity for specific land uses. To ensure these objectives are met, the EPA provides two separate criteria: intrusiveness criteria and amenity criteria. The fundamental difference being intrusiveness criteria apply over 15 minutes in any period (day, evening or night), whereas the amenity criteria apply to the entire assessment period (day, evening or night).

Noise criteria for the project have been established in accordance with the INP and are based on the minimum background noise level of 30 dB and the assumption that existing industrial noise in the area is negligible. As such, the intrusiveness criterion is the limiting criteria for the project. Therefore, the project specific noise criterion for the proposed development is $L_{Aeq(15\text{-}min)}$ 35 dB for all proposed periods of operation (ie day, evening and night).

ii Sleep disturbance criteria

Assessment of sleep disturbance has been undertaken with reference to the INP and associated application notes.

The INP Application Notes (last updated June 2013) recognise that the current sleep disturbance criteria is not ideal. Assessment of the potential for sleep disturbance is complex and poorly understood and the EPA believes that there is insufficient information to determine a suitable alternative criteria.

In the interim, the INP suggests that an $L_{A1(1min)}$ level of 15 dB above the RBL is a suitable screening criteria for sleep disturbance for the night-time period. This infers a project specific sleep disturbance screening criteria of $L_{A1(1\text{-}min)}$ 45 dB. The INP application notes also state that the EPA will accept analysis based on either the $L_{A1(1\text{-}min)}$ or L_{Amax} parameter.

Guidance regarding potential for sleep disturbance is also provided in the RNP. The RNP calls upon a number of studies that have been conducted into the effect of maximum noise levels on sleep. The RNP acknowledges that, at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance. However, the RNP provides the following conclusions from the research on sleep disturbance:

- maximum internal noise levels below L_{Amax}50 to 55 dB are unlikely to awaken people from sleep; and

- one or two noise events per night, with maximum internal noise levels of L_{Amax}65 to 70 dB, are not likely to affect health and wellbeing significantly.

It is commonly accepted by acoustic practitioners and regulatory bodies that a facade including a partially open window will reduce external noise levels by 10 dB. Therefore, external noise levels in the order of L_{Amax}60 to 65 dB calculated at the facade of a residence are unlikely to cause sleep disturbance affects.

iii Construction noise criteria

The EPA released the ICNG in July 2009. This policy sets out noise management levels for residential and other noise-sensitive receivers and how they are to be applied.

The policy suggests restrictions to the hours of construction that apply to activities that generate noise at residences above the 'highly affected' noise management level. A summary of the noise management levels applicable to this assessment are contained in Table 8.1.

Table 8.1 ICNG – noise management levels, residences

Time of day	Management level ($L_{Aeq,15\text{-}min}$)	How to apply
Recommended standard hours Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work Sundays or public holidays	Noise affected 40 dB (RBL[1]+10 dB)	The noise affected level represents the point above which there may be some community reaction to noise: • Where the predicted or measured $L_{Aeq(15\text{-}min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB	The highly noise affected level represents the point above which there may be strong community reaction to noise: • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: - times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences. - if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Table 8.1 ICNG – noise management levels, residences

Time of day	Management level ($L_{Aeq,15\text{-}min}$)	How to apply
Outside recommended standard hours	Noise affected 35 dB (RBL[1]+5 dB)	A strong justification would typically be required for works outside the recommended standard hours: • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.

Note: 1. *The INP minimum RBL threshold of 30 dB has been adopted.*

iv Road traffic noise criteria

The principle guidance for assessing the impact of road traffic noise on receivers is the RNP.

The nearest residence assessed in terms of the potential for an increase in road traffic noise associated with the project is located around 5.8 km south of the site on the Mitchell Highway, approximately 150 m from the road (receptor 2). The Mitchell Highway is classified as an arterial road as per the RNP. Table 8.2 presents the road noise assessment criteria, reproduced from Table 3 of the RNP, relevant to this project.

Table 8.2 Road traffic noise assessment criteria for residential land uses

Road category	Type of project/development	Assessment criteria, dB(A)	
		Day (7am to 10pm)	Night (10 pm to 7 am)
Freeway/arterial/sub-arterial roads	Existing residences affected by additional traffic on existing freeway/arterial/sub-arterial roads generated by land use developments.	$L_{eq(15\text{-}hr)}$60 (external)	$L_{eq(9\text{-}hr)}$ 55 (external)

Source: RNP, 2011.

Additionally, the RNP states where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2 dB.

8.3.2 Impact assessment methodology

i Operational noise

Operational noise sources considered as part of this assessment and their relevant sound power levels are provided in Table 8.3. Sound power data has been sourced from an EMM database of similar equipment.

Table 8.3 Operational plant and equipment sound power levels

Plant and equipment (assumed quantity in any 15-minute period)	Sound power level, $L_{Aeq(15\text{-}min)}$ (dB) per unit	Total sound power level, L_{Aeq} (dB)
Trucks manoeuvring (2)	100	103
Trucks unloading livestock (1)	103	103
Compressor room, including condensers (1)	77	82[2]
Forklifts (4)	97	103
Refrigeration unit (1)	92	97[2]
Car parking (1)	63	63
Wastewater treatment plant (1)	90	95[2]
Livestock bleating (11,000 onsite, 5% bleating[1])	88	115
Boiler (2)	93	96
Total sound power level (all sources)		**116**

Notes: *1.It is likely that animals will only make significant noise (bleating) when under stress. It is considered a conservative approach to assume 5% of the possible 11,000 animals in the holding pens would be bleating during any 15-minute period.*

2. Inclusive of 5 dB penalty to account for potentially tonal characteristics.

Maximum noise events from site are likely to be associated with the manoeuvring or unloading of trucks. A maximum sound power level of 115 dB (obtained from an EMM database) has been assumed from this activity for the purpose of predicting the likelihood of sleep disturbance.

Assumptions made in predicting noise emissions from the project site are listed below.

- All acoustically significant plant and equipment were assumed to operate simultaneously. This is unlikely to be the case in reality, and therefore represents a conservative assessment.
- A penalty of 5 dB has been applied to relevant noise sources (refer Table 8.3) to account for any tonality in fan or motor noise.
- Attenuation due to distance (geometric spreading) has been estimated using the equation 20*log(*d*) where *d* is the distance from source to receiver; in this case 5.7 km.
- A conservative +5 dB has been applied to account for potentially noise-enhancing weather conditions. This is based on a conservative interpolation of the information contained within Table D1 of Appendix D of the INP for default temperature inversion conditions for arid regions (ie inversion strength of 8^{o}C/100 m and a 1 m/s source to receiver wind).
- Ground and air absorption has been conservatively considered by applying an assumed 5 dB reduction over the distance between the proposed site and nearest residence (5.8 km). In reality, this reduction is expected to be much greater.

ii Construction noise

Construction noise sources considered as part of this assessment and their relevant sound power levels are provided in Table 8.4. Sound power data has been sourced from an EMM database of similar equipment.

Table 8.4 Construction plant and equipment sound power levels

Plant and equipment (assumed quantity in any 15-minute period)	Sound power level, L_{Aeq} (dB) per unit	Total sound power level, L_{Aeq} (dB)
Grader, CAT12 or similar (1)	109	109
Scraper, CAT621 or similar (1)	111	111
Dozer, D8 or similar (1)	107	107
Excavator, CAT320 or similar (1)	110	110
Tip truck (2)	110	113
Backhoe (1)	100	100
Concrete trucks (2)	107	110
Concrete pump (1)	108	108
Road trucks, delivery of materials (3)	94	99
Mobile crane (1)	102	102
Total sound power level (all sources)		**119**

The assumptions utilised in predicting operational noise have also been applied in predicting construction noise emission levels from the site.

iii Road traffic noise

Existing and project related daily traffic volumes were obtained from the traffic impact assessment prepared for the project (EMM 2016a, refer Chapter 9). The Mitchell Highway in the vicinity of the nearest residence potentially affected by an increase in road traffic noise is predicted to experience an 88% increase in road traffic volume.

In predicting road traffic noise levels the following assumptions were made:

- the entire daily (24 hour) traffic volume is evenly distributed during either the day time period (7 am to 10pm) or night-time (10 pm to 7 am) providing for a conservative assessment of road traffic noise;
- 30% heavy vehicles;
- traffic is travelling at 100 km/h; and
- there is no intervening barriers or topography between the road and the nearest residence.

The predicted road traffic noise levels for existing and project-related traffic volumes are provided in Table 8.5.

Table 8.5 Road traffic noise level predictions

Location	Predicted road traffic noise levels (dB)		Road traffic noise criteria day/night (dB) ($L_{Aeq(15hr)}$/$L_{Aeq(9hr)}$)
	Existing – day/night ($L_{Aeq(15hr)}$/$L_{Aeq(9hr)}$)	Existing + project – day/night ($L_{Aeq(15hr)}$/$L_{Aeq(9hr)}$)	
150 m from Mitchell Highway – south of project site	46/48	49/51	60/55

Results presented in Table 8.5 indicate that noise levels from existing and project-related traffic volumes are predicted to achieve the relevant road traffic noise criteria.

8.4 Potential impacts

8.4.1 Operational noise

Based on the conservative assumptions described in Section 8.3.2, the noise level from operation of the project is predicted to be $L_{Aeq(15\text{-}min)}$ 33 dB at the nearest residence to the site. Hence, operational noise emission levels are predicted to meet the project specific noise criteria of $L_{Aeq(15\text{-}min)}$ 35 dB without the inclusion of additional noise mitigation.

8.4.2 Sleep disturbance

The maximum noise level predicted to occur at the nearest residence during the night-time period, based on the conservative assumptions described in Section 8.3.2, is L_{Amax} 31 dB. This level meets the relevant sleep disturbance screening criteria of L_{Amax} 45 dB and is significantly below levels that are likely to cause awakening reactions.

8.4.3 Construction noise

Construction noise emission from the project site is predicted to be $L_{Aeq(15\text{-}min)}$ 35 dB assuming all equipment operates simultaneously. In reality, it is unlikely that all assumed construction equipment will operate at the same time and so construction noise emission is likely to be less than $L_{Aeq(15\text{-}min)}$ 35 dB for the majority of the time. The predicted construction noise level is below the relevant noise management level of 40 dB for standard construction hours and at or below the relevant noise management level of 35 dB for construction activity outside of standard hours.

8.4.4 Road traffic

Based on conservative noise modelling, road traffic noise levels at the nearest potentially affected residence are predicted to meet the relevant criteria.

8.4.5 Vibration

The main vibration generating equipment to be used at the project site includes trucks and dozers during construction and trucks during operation of the project.

Due to the separation distance between the project site and the nearest sensitive receptor (being approximately 5.5 km), vibration levels from activities at the project site are predicted to be negligible and below levels of human perception at the nearest residences. Consequently, vibration generated at the project site will be significantly below the criteria for “minimal risk of cosmetic damage” at the nearest residences.

8.4.6 Cumulative noise

No other industrial noise sources have been identified in the locality around the project site. The nearest significant noise source identified is the Bourke Airport, approximately 9 km to the south of the project site. The town of Bourke and village of North Bourke are 14 km and 10 km away respectively, also to the south. Given the significant separation distances from any other noise sources and the isolated nature of the project site, there will be no cumulative noise impacts associated with the project and surrounds.

8.5 Mitigation and management

Given the significant separation distance between the project site and the nearest noise-sensitive receptor, the potential noise impacts associated with both construction and operation of the project are predicted to be negligible without the inclusion of additional noise mitigation. Based on the results of conservative noise predictions consideration of noise mitigation options is not necessary for the project site.

8.6 Conclusion

Given the significant separation distance between the project site and the nearest noise-sensitive receptors the potential operational and construction noise impacts are predicted to be negligible. Further, road traffic noise levels inclusive of project-related traffic are predicted to achieve the relevant noise goals at the nearest residence to the Mitchell Highway. Additional noise mitigation and management measures are not predicted to be required to achieve the relevant operational or construction noise goals.

9 Traffic and transport

9.1 Introduction

A traffic impact assessment was prepared by EMM to assess the potential impacts of the project on the local and state road network. The assessment outlined the existing situation in the vicinity of the project site, and assessed the traffic impacts of the project, including the predicted traffic generation and its impact on existing road and intersection capabilities.

A full copy of the technical report is attached as Appendix G (EMM 2016a), with the key findings and recommendations summarised below.

9.2 Existing environment

9.2.1 Road network overview

Bourke is located in an area where three major transport roads meet; the Mitchell Highway running north to Queensland and south to Dubbo and beyond, Kamilaroi Highway from Brewarrina and Walgett, and Kidman Way heading south to Cobar.

The project site is located off the Mitchell Highway, which in the vicinity of Bourke and North Bourke is generally a two lane sealed road which has marked edge lines but minimal sealed shoulders. As the Mitchell Highway route generally has low traffic volumes, additional turning traffic lanes are not normally required at most intersections. The nearest existing intersection to the project site on the Mitchell Highway is at Collerina Road (also known as Weilmoringle Road), approximately 1 km south of the project site. At this intersection, the connecting road is unsealed and there are no additional turning lanes on the Mitchell Highway.

Within the locality of the project site, the general speed limit on the Mitchell Highway is 110 km/hr. This speed limit reduces to 50 km/hr within the urban areas of Bourke and North Bourke and also through the small rural settlement of Enngonia (97 km north of Bourke).

9.2.2 Traffic volumes

Baseline traffic volumes for the Mitchell Highway, 12 km north of Bourke, were recorded by an RMS traffic survey during July 2011. The results of the traffic count are provided in Table 9.1.

Table 9.1 Existing traffic volumes on the Mitchell Highway (RMS)

Parameter	Traffic volumes 12 km north of Bourke 2011[1]
Average daily traffic volume	293 vehicles per day (vpd)
AM peak hour traffic	32 vph (9 am to 10 am)
PM peak hour traffic	25 vph (midday to 1 pm)
Current traffic for expected abattoir AM peak hour	5 vph (6 am to 7 am)
Current traffic for expected abattoir PM peak hour	24 vph (3 pm to 4 pm)
% heavy vehicles	approximately 29%

Note: 1. Volumes are for two-way traffic movements.

The data in Table 9.1 shows that the existing traffic volumes on the Mitchell Highway are low, with approximately 29% of the traffic comprising heavy vehicles. The daily traffic volume of 293 vehicles using the Mitchell Highway in the locality of the project site provides a high level of service with free flowing traffic conditions. The traffic volumes on the Mitchell Highway increase as the route travels towards Bourke, increasing to over 1,200 vehicles per day at the Darling River Bridge and over 2,000 vehicles per day through the main centre of Bourke.

An indication of existing traffic volumes on other major roads in the Bourke area is provided by historic RMS daily traffic volumes survey data. For the western NSW region this was last published in 2005. This data is presented in Table 9.2.

Table 9.2 Daily vehicle movements in Bourke area

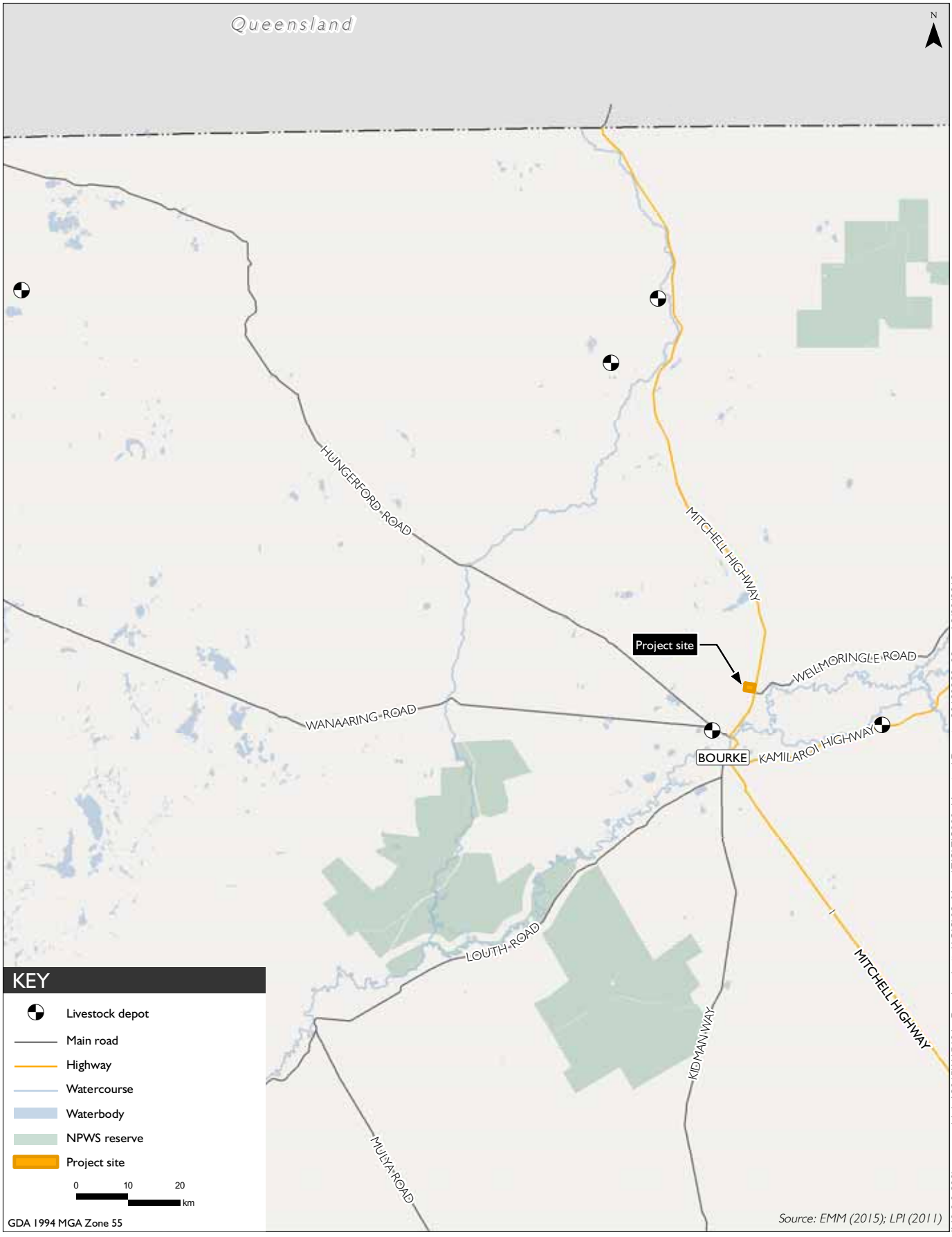
Location	Daily vehicle movements
Kamilaroi Highway, 6 km east of Bourke	337
Kidman Way, at Priory Tank	157
Mitchell Highway, at Queensland Border	170
Mitchell Highway, north of MR 404 Hungerford Road	591
Mitchell Highway, south of MR 404 Hungerford Road	1,215
Mitchell Highway, Bourke north of Anson Street	2,010
Mitchell Highway, 8 km south of Bourke	249
Mitchell Highway, 8 km north of Nyngan	309
MR 404 Hungerford road, west of Mitchell Highway	530
MR 404 Hungerford road, north of Wanaaring Road	68
MR 404 Wanaaring Road, west of Hungerford Road	262

Based on a locality traffic growth rate of +1.0% (or less) annually for most roads in the western region of NSW, the current daily traffic volumes for these routes would be approximately 10% higher than those recorded by RMS in 2005.

The last survey at Collerina Road, east of Mitchell Highway, was taken in 1992. This survey indicated that there were approximately 24 daily vehicle movements on this road.

9.2.3 Existing livestock transport

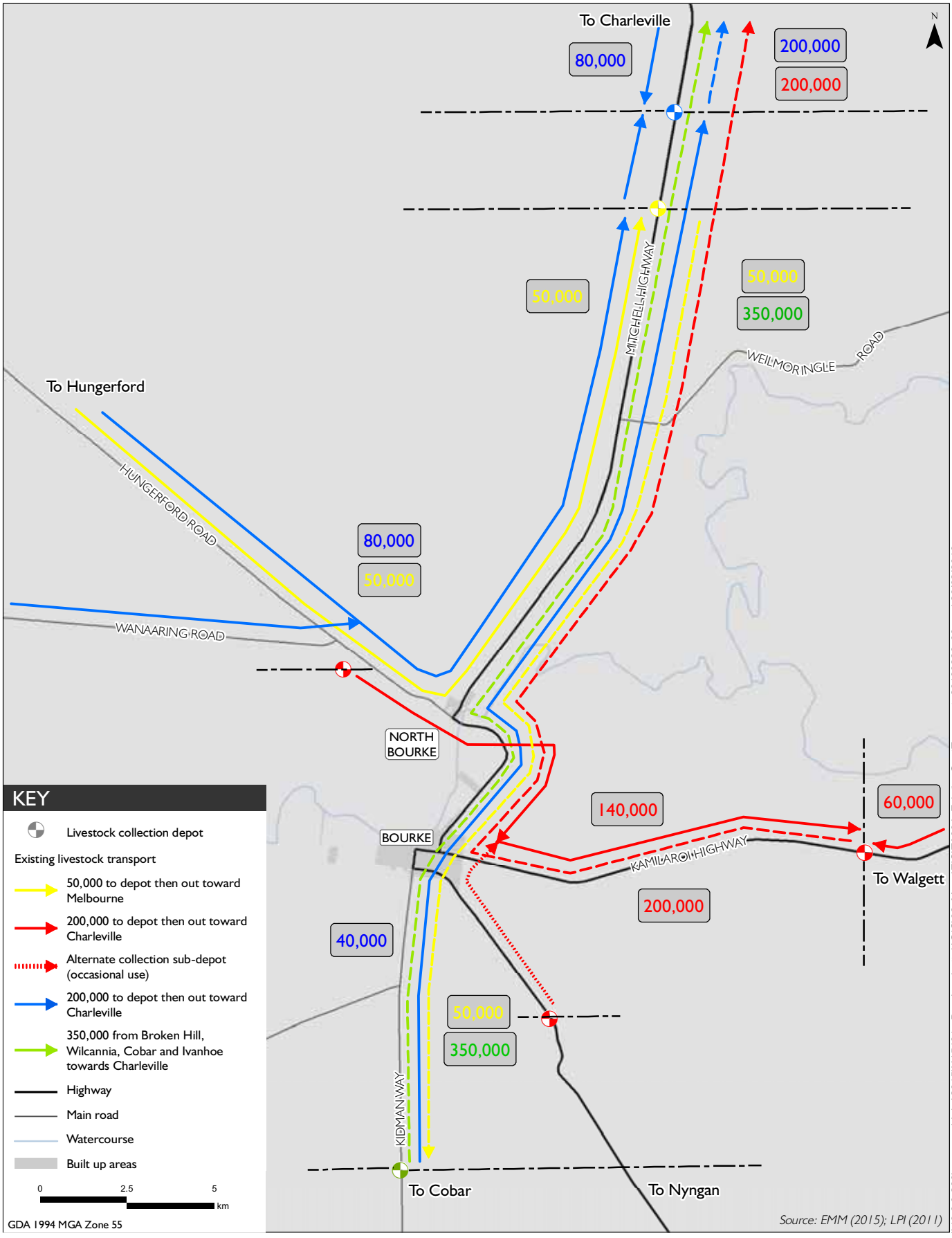
A large number of livestock movements occur in and around the township of Bourke, with five major livestock depots existing in the locality (refer Figure 9.1). Currently around 800,000 head of livestock (generally goats) are transported per year through or around Bourke. Some of these goats are transported through the town in both directions as they are taken firstly to the collection depot outside the town before they are later transported back through the town en route to abattoirs in Charleville (Queensland), Nyngan or Melbourne. Due to the double movements of goats on some of the transport routes, there are actually around 910,000 live goat movements per year through North Bourke and approximately 780,000 live goat movements per year through the main town of Bourke (refer Figure 9.2).



Livestock depots around Bourke

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 9.1



Indicative existing livestock movements around Bourke

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 9.2

The sizes of the vehicles which are used to transport these animals can vary. However, to translate the goat movements to traffic movements, it is assumed road trains are generally used. These vehicles have a capacity of approximately 1,200 goats. Therefore, the indicative existing heavy vehicle movements carrying livestock through Bourke and North Bourke are as follows:

- Bourke – the 780,000 livestock travelling through Bourke equates to 650 road trains per annum, and a daily volume of around 2.6 heavy vehicles for an approximate 250 day per year transport operation.

- North Bourke – the 910,000 livestock travelling through North Bourke equates to 758 road trains per annum, and a daily volume of around 3.03 heavy vehicles for an approximate 250 day per year transport operation.

9.3 Potential impacts

9.3.1 Operational traffic

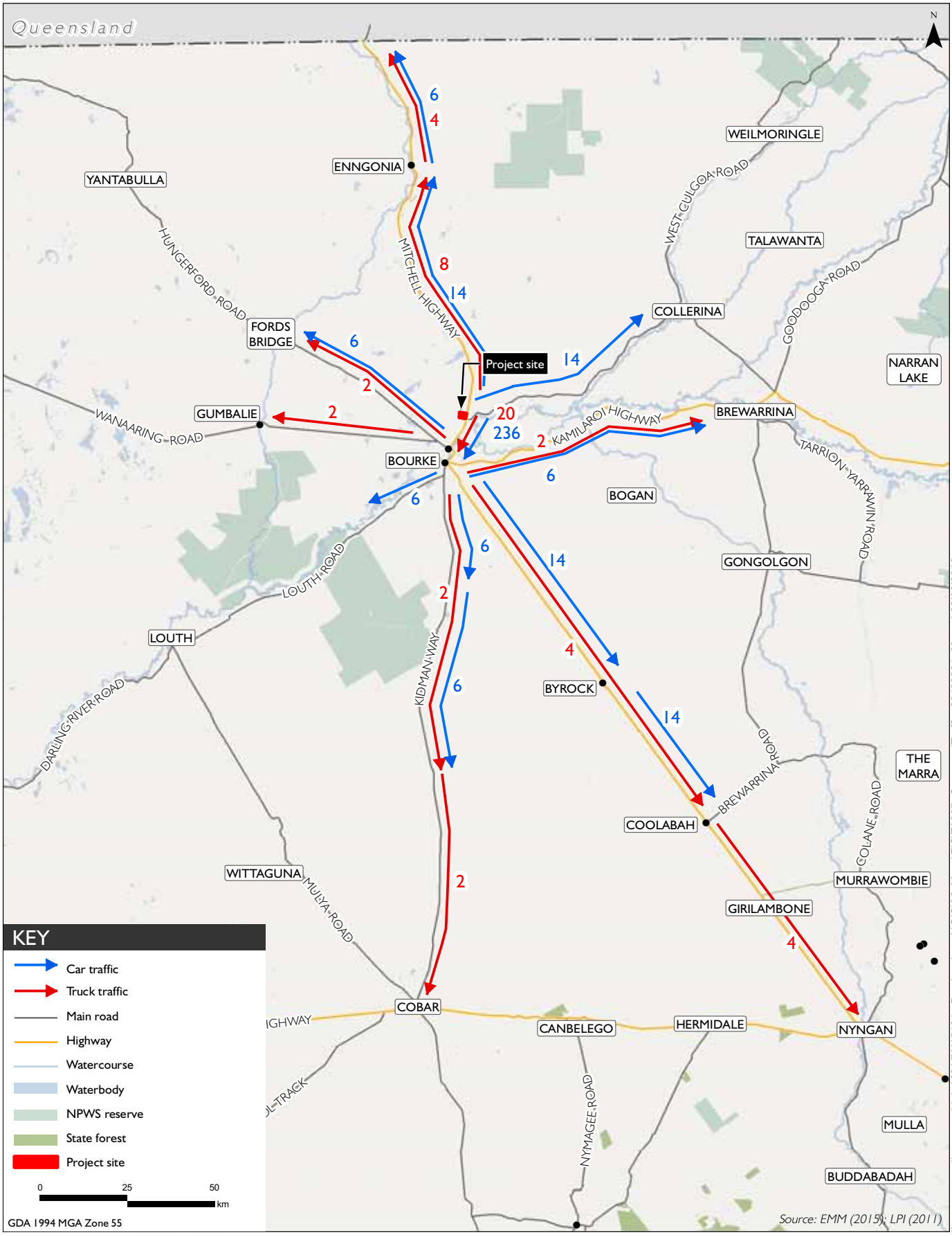
The abattoir is anticipated to employ up 200 FTE staff when fully operational, resulting in project workforce generated daily traffic movements of approximately 130 daily vehicles (260 daily vehicle trips), based on an average vehicle occupancy of 1.54 persons per car. This would be normal for a rural workforce travelling in a rural locality such as Bourke. Based on journey to work information from analysis of 2011 Australian Bureau of Statistics (ABS) journey to work data for persons working in the Bourke LGA, it is anticipated that 80% of the site light vehicle traffic will travel from the townships of Bourke and North Bourke, and will travel via the Mitchell Highway to and from the south of the site.

Approximately 14 heavy vehicles will travel to and from the site on a daily basis for the purpose of livestock delivery, product dispatch, waste transport, maintenance vehicles and delivery of consumables. The majority of these heavy vehicles will travel to and from the south (approximately 70%, equating to 10 vehicles) via the Mitchell Highway to a range of other regional NSW and capital city destinations, and around 30% (4 vehicles) to/from the north. It is noted that around three heavy vehicles already travel through North Bourke currently, transporting goats to and from depots and to market. These three vehicles will continue to travel through North Bourke, however will go to the abattoir instead of heading further north to Charleville. The net effect on heavy vehicle traffic movements through Bourke as result of the project is therefore seven vehicles per day. Further discussion on the implications of the project on livestock movements through Bourke and North Bourke is provided in Section 9.3.2.

All project workforce car travel movements will normally occur within a one hour period at the beginning and end of each working day. The peak hourly heavy vehicle movements will be approximately one tenth of the site daily truck traffic movements, which will typically be approximately three truck movements per hour on an average day. The site livestock truck arrivals will normally occur during daytime hours, with product dispatch and other truck movements occurring throughout the 24 hour period.

The indicative overall distribution of the future site generated daily car and truck traffic movements travelling within the locality of Bourke and surrounding areas is shown in Figure 9.3.

To assess the impact of the project generated traffic on the existing road network, the current traffic volumes have been identified based on a 1% linear growth rate on the latest RMS traffic data (refer Section 9.2.2). The daily traffic volume using the Mitchell Highway in the locality of the project site was surveyed in 2011, as such it is assumed this volume would have increased by approximately 4% in 2015. For the daily traffic volumes on the other roads which were last surveyed in 2005, a 10% traffic growth factor has been applied, and for Collerina Road, which was last surveyed in 1992, a 23% traffic growth factor is applicable to give current year 2015 daily traffic volumes.



Indicative project related daily vehicle movements

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 9.3

A comparison of the existing daily traffic volumes on each of the major roads in the Bourke region, with the anticipated project generated daily traffic volumes is presented in Table 9.3.

Table 9.3 Comparison of the current year 2015 and future project traffic volumes

Traffic generation route	Projected base daily traffic volume (year 2015)	Peak daily traffic from the project, cars + (trucks)	Percentage traffic increase
Mitchell Highway at Queensland border	187	6+(4)	5%
Mitchell Highway immediately north of the project site	305	14+(8)	7%
Mitchell Highway immediately south of the project site	305	250+(20)	88%
Mitchell Highway, North Bourke, north of MR 404	650	236+(20)	39%
Mitchell Highway, North Bourke, south of MR 404	1,337	184+(12)	15%
Mitchell Highway, Bourke, north of Anson Street	2,211	144+(8)	7%
Mitchell Highway, 8 km south of Bourke	274	14+(4)	7%
Mitchell Highway, 8 km north of Nyngan	340	0+(4)	1%
Kamilaroi Highway, 6 km east of Bourke	371	6+(2)	2%
Kidman Way, at Priory Tank	173	6+(2)	5%
MR 404 Hungerford Road, west of Mitchell Highway	583	12+(4)	3%
MR 404 Hungerford Road, west of MR 405	75	6+(2)	11%
MR 405 Wanaaring Road, west of MR 404	288	6+(2)	3%
Collerina Road, east of Mitchell Highway	30	14+(0)	46%

The results in Table 9.3 show that the highest daily traffic volume increase as a result of the project will be on the Mitchell Highway in the immediate vicinity of the project site, where there will be an approximate 88% increase in the daily traffic volumes using the stretch of highway between North Bourke and Bourke. There are low existing traffic volumes using the route currently in comparison to other major rural highways in NSW. Although noticeable, these traffic increases will generally have only minimal future effects on traffic operations, level of service and traffic safety for the future local and regional traffic using the Mitchell Highway route, which will remain within acceptable levels.

Whilst heavy vehicle movements will increase in the vicinity of the project site, the number of heavy vehicles transporting livestock away from the Bourke region to Charleville, Nyngan and Melbourne, as is currently the case, is anticipated to decrease, as discussed below.

9.3.2 Livestock transport

Livestock will be transported to the project site from a wide regional area of north western NSW, either directly, or via one of the existing five depots around town, generally using one of the following transport routes:

- the Kamilaroi Highway, to and from the east, towards Brewarrina and Walgett;
- the Kidman Way, to and from the south, towards Cobar;
- the Mitchell Highway, to and from the north, from the Queensland border direction;
- the Mitchell Highway, to and from the south east, from the Nyngan direction;

- MR 404 Hungerford Road, to and from the north west; or
- MR 405 Wanaaring Road, to and from the west.

The meat products produced at the abattoir will primarily be transported to the major capital cities of the eastern states of Australia, generally using the following transport routes:

- the Mitchell Highway, to and from the south east, for products transported to Sydney for export via Port Botany;
- the Mitchell Highway, to and from the north, for products transported to Brisbane; and
- Kidman Way, to and from the south, for products transported to Melbourne.

Once the abattoir is fully operational it is anticipated that livestock, and in particular goats, that are currently transported from the depots in and around Bourke to abattoirs in Charleville and Melbourne are likely to be transported to the abattoir in Bourke. Therefore, livestock transport movements out of the Bourke region are expected to reduce compared with existing movements. This will be as a result of significantly reduced transport costs for farmers and depots, who will send their livestock to the local abattoir situated within the source area for goats and other small stock, rather than sending their livestock further afield. Rangeland goats are not bred, with their population 'regulated' by the natural environment and the carrying capacity of the land, subject to seasonal fluctuations and other environmental factors. As such, it is expected that the market will necessitate existing abattoirs to source their livestock from other areas such as western Queensland, Broken Hill and Wentworth regions.

To provide further support for the predicted decrease in livestock movements out of the Bourke region, an analysis was conducted by JPAbusiness (2016) into the freight cost differential between the different destination options for livestock harvested around the Bourke region. The following example based on a supplier located 35 km south east of Bourke illustrates the indicative cost differences:

- This supplier would incur approximately $3.30/goat to deliver to Charleville.
- The same supplier would incur approximately $6.20/goat to deliver to Melbourne.
- Once the Bourke small stock abattoir is operating the equivalent freight charge would be approximately $0.80/goat for this same supplier.

This highlights the cost advantage of supplying livestock locally, and as noted above would focus other surrounding abattoirs on seeking supplies from areas closer to their premise location. This may include goats, however it may also include sheep and lambs to supplement their throughout given various economic and market considerations.

Based on the above, the annual live goat transport movements through the townships of Bourke and North Bourke will simplify, with less double movements of goats anticipated, and approximately 27% (400,000 out of a potential annual total of 1,500,000 goats to the site annually) being transported to the project site from the north, without travelling though the urban areas of either Bourke or North Bourke. The predicted annual livestock transport movements associated with the project site are shown in Figure 9.4. In terms of daily road train movements, the effects of the additional goat transport movements through the urban areas of Bourke and North Bourke, will be minimal and are summarised as follows:

- Through Bourke, there will be a negligible increase in the average annual live goat transport movements from around 780,000 goats (2.60 daily loaded road train movements) to around 800,000 (2.67 daily loaded road train movements), which is an increase of 0.07 loaded road train movements per day on average. This increase will be imperceptible in Bourke.

- Through North Bourke, there would also be a minor increase in the average annual live goat transport movements from 910,000 goats (3.03 daily loaded road train movements) to 1,100,000 goats as a result of the project (3.67 daily loaded road train movements), which is an increase of 0.60 loaded road train movements per day on average.

Importantly, heavy vehicles transporting livestock to Charleville is anticipated to be reduced by around 458 road trains (550,000 goats) annually, and transport to Melbourne reduced by approximately 42 road trains (50,000 goats) annually. This has particular relevance for the health risk assessment conducted for the project, as discussed in detail in Chapter 10, which concludes that the project is likely to lead to a reduction in Q Fever risk to townships along the transportation routes to Charleville and to a lesser extent along the transportation routes to Melbourne.

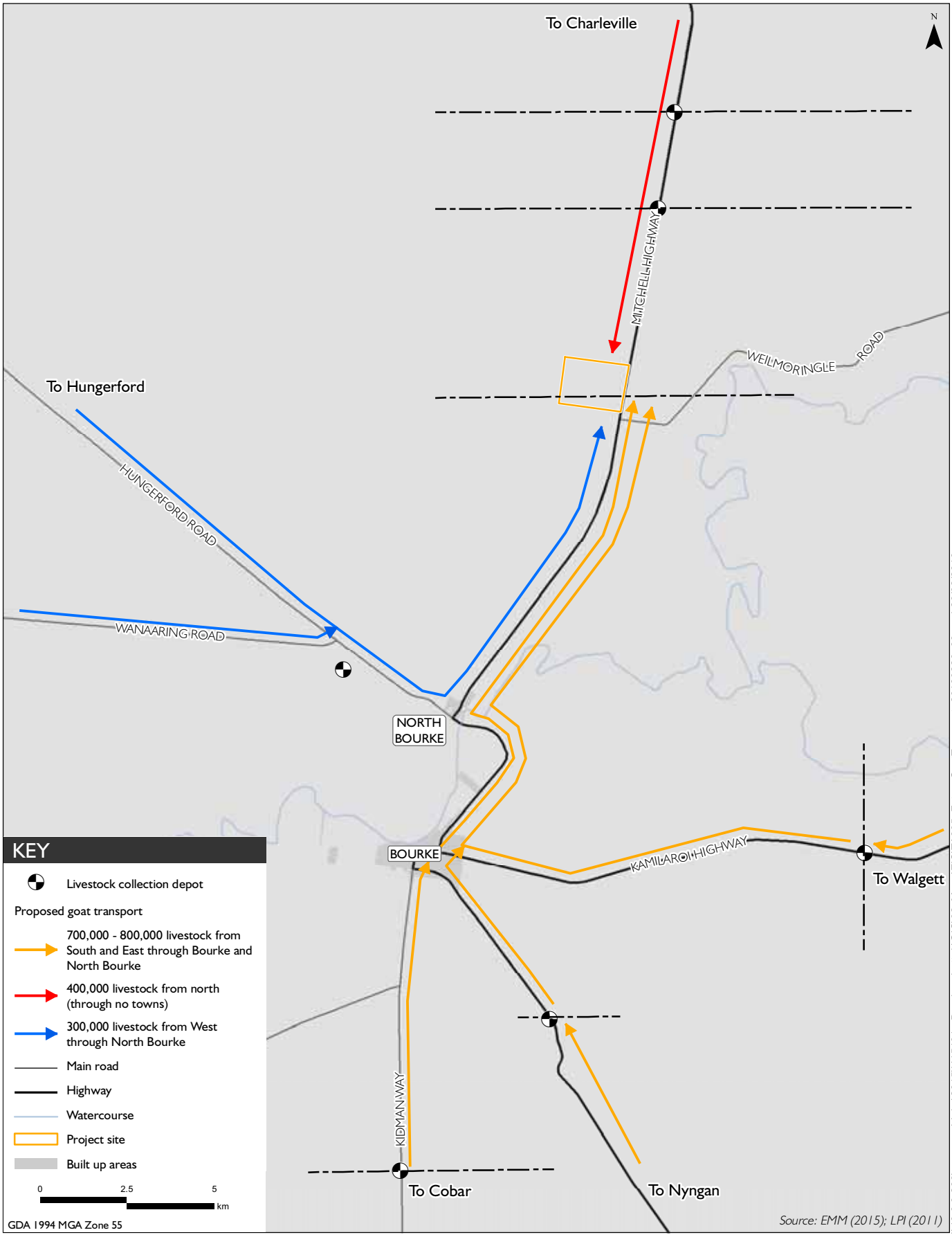
9.3.3 Site access and intersection capacity

A new road will be constructed to provide a single access into the project site off the Mitchell Highway, approximately 14 km north of Bourke and 700 m north of the Weilmoringle (Collerina) Road intersection, as shown on Figure 1.2.

The road will be approximately 560 m long and a minimum 6.5 m wide. The general car parking space will be located on the western side of the access outside the entry gatehouse. In and around the abattoir (ie in the loading and unloading areas), the minimum internal site road width will be in accordance with Australian standards to accommodate turning trucks, including road trains.

In assessing the adequacy of the proposed new access, sight distance and turn lane warrants were considered. The future site access intersection will be designed to comply with the relevant Austroads intersection traffic capacity and safety design standards. The intersection sight distances to the north and the south of the site access entrance point are at least 1 km due to the generally straight and level alignment of the Mitchell Highway in this locality.

Rural intersection operations are assessed from the combination of the peak hourly through and turning traffic volumes which are occurring at each intersection. These volumes should comply with the relevant Austroads Warrant Charts for rural intersection design, depending on the applicable traffic speed.



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Indicative predicted livestock movements

Bourke Small Stock Abattoir
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Figure 9.4

The maximum travel speed on the Mitchell Highway in this locality is 110 km/hr. For this design speed, as long as the peak hourly through traffic volumes remain below approximately 120 vehicle movements (two-way total) on the highway, no additional left or right turn traffic lanes are needed and the basic rural Type BAL and Type BAR intersection designs are appropriate.

The existing Mitchell Highway through traffic volumes are significantly below 120 vehicle movements per hour at any time of day in this locality. At the times of day likely to coincide with the abattoir's peak traffic movements, the existing though traffic on the highway is no more than five vehicles hourly during the morning peak (6 am to 7 am) and 24 vehicles hourly (two way) in the afternoon peak (around 3 pm to 4 pm). As such, the future site access intersection design will be acceptable with sealed shoulder widening to accommodate left and right turning traffic movements by the appropriate design vehicle (which is a road train in this locality) without the requirement for formal additional right or left turning traffic lanes.

A schematic design plan of the future site access intersection design showing the approximate required extent of sealed shoulder intersection widening to accommodate left and right turning traffic movements at the intersection, by the appropriate design vehicle (a road train), is provided in Figure 9.5.

9.3.4 Construction traffic

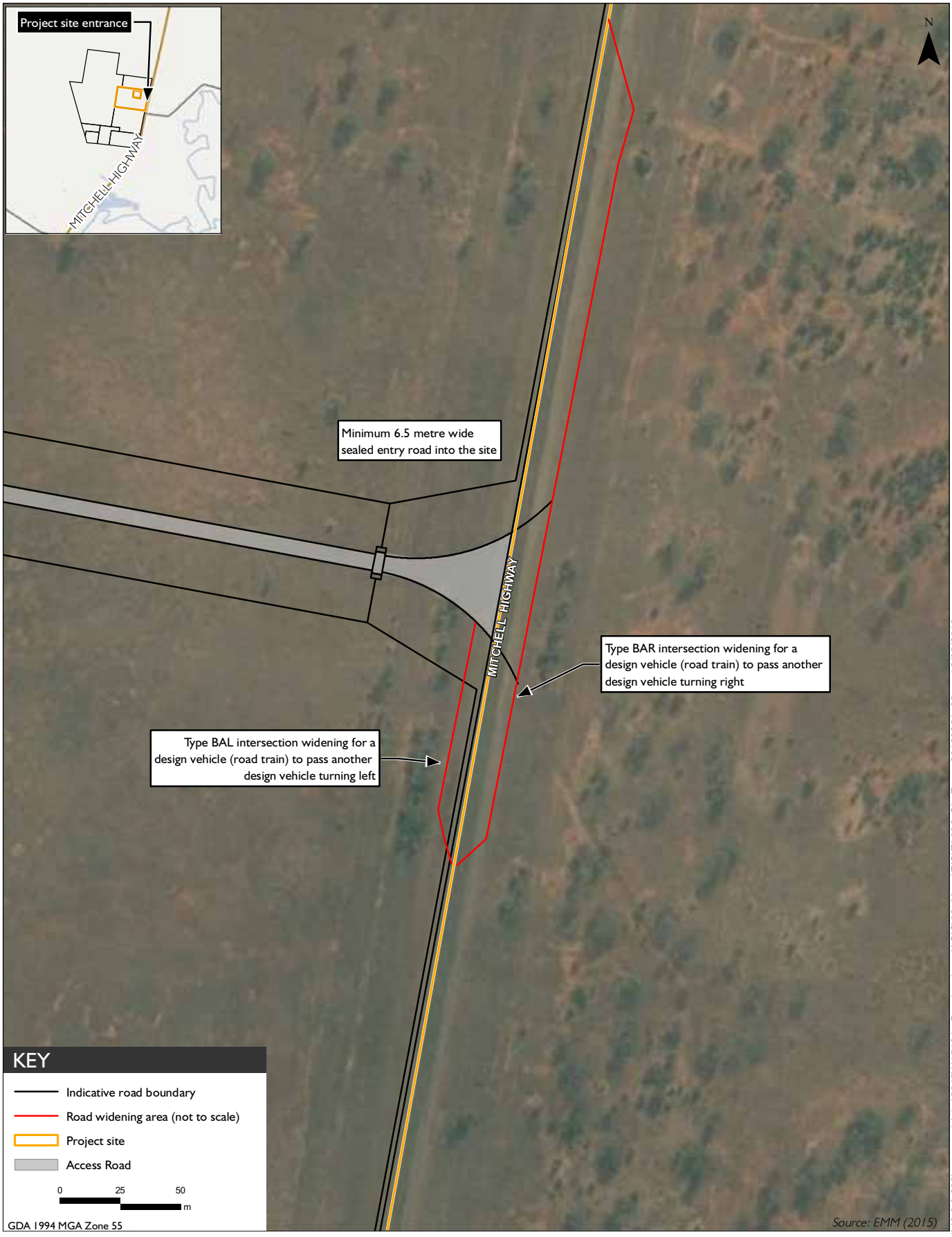
The daily site construction traffic movements will be less that the site generated daily traffic movements during operations and do not therefore require detailed assessment. There may be significant proportions of additional heavy vehicle trips using the Mitchell Highway in the locality during the peak stages of the project construction. However the effects of these heavy vehicle trips will generally not be noticeable on the Mitchell Highway due to the relatively high proportion (29%) of heavy vehicles in existing traffic using the road.

A construction traffic management plan will be prepared as part of the CEMP for the management of the site access (including any access requirements for oversize vehicles) during the project construction stage.

9.4 Mitigation and management

The following measures will be implemented to ensure the appropriate management of traffic associated with the project:

- The site access intersection will be designed to comply with the relevant Austroads intersection traffic capacity and safety design standards.
- Approximately 150 car parks will be provided on-site, with a main car park on the southern side of the access road for abattoir employees and an additional executive and site visitor car park near the administration building. The two sealed car park areas will have appropriate dimensions to accommodate the required number and size of the vehicles using each car park.
- A construction traffic management plan will be prepared and implemented prior to the commencement of construction activities to ensure the impacts of construction activities on the local road network are minimised during construction.
- Internal pedestrian linkages will be included in the design of the on-site car park to direct employees to the staff entrances to the abattoir.



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Project site entrance conceptual design

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 9.5

9.5 Conclusion

The project will not adversely impact on the local and state road network and complies with all relevant requirements.

The predicted increase in daily traffic movements as a result of the project will generally only be noticeable on the sections of the Mitchell Highway between the project site and the main township of Bourke, where there are low traffic volumes currently using the route in comparison to other major rural highways in NSW. These traffic increases will have only minor effects on the actual traffic operations, level of service or traffic safety for the future local and regional traffic using the Mitchell Highway route, which will remain within acceptable levels.

A new intersection will be constructed to provide access into the project site. This entrance will be used by all vehicles accessing the site, and will be designed to comply with the relevant Austroads intersection traffic capacity and safety design standards. No additional left or right turn traffic lanes are needed and the basic rural Type BAL and Type BAR intersection designs will be appropriate due to the very low existing Mitchell Highway through traffic volumes.

Light and heavy vehicle traffic movements to be generated during the project construction, will be significantly lower than during subsequent project operations.

The project will result in an imperceptible increase of only 16 road trains per year through Bourke, and a minor increase of 83 road trains per year through North Bourke. However, the project will result in a reduction in livestock movements away from the Bourke region that currently occurs to Charleville, Nyngan and Melbourne.

10 Health risk assessment

10.1 Introduction

The SEARs require preparation of a Health Risk Assessment (HRA) to assess the potential for increased risk in the transmission of Q fever as a result of the transportation, handling and processing of lamb, sheep and goats. The HRA was prepared by SLR in accordance with Australian guidelines recommended by the Environmental Health Standing Committee (enHealth); *Environmental health risk assessment: - Guidelines for assessing human health risk from environmental hazards* (enHealth, 2012). enHealth is an Australian Government advisory body.

The objective of the HRA was to clarify the information pertaining to the operations of the abattoir and provide an assessment of the risk to human health associated with Q fever. To achieve this objective, the risk assessment:

- identifies the groups of people who may be exposed to Q fever potentially released as part of the operations of the abattoir;
- identifies the health risks associated with exposure should it occur;
- assesses and communicates the identified risks; and
- determines whether there will be an increased risk to the community as a result of the project.

In their input to the SEARs, the Western NSW Local Health District stated that the HRA should address the following areas:

- design of the abattoir, including dust suppression;
- wastewater disposal;
- waste disposal;
- workplace health and safety;
- water security; and
- stock transportation.

The full risk assessment report is provided in Appendix H (SLR, 2015b) with the key findings and recommendations summarised below.

10.2 Q fever

Q fever is a zoonosis caused by the bacteria, *Coxiella burnetii* with a worldwide distribution. Acute infections are characterised by flulike illness, pneumonia, or hepatitis, although 60% of persons with Q fever may be asymptomatic. Chronic Q fever is rare but potentially fatal, mostly occurring in patients with heart valve or vascular anomalies (Hacket, et al 2012).

Q fever is highly infectious and has been identified in a wide range of wild and domestic animal hosts, including arthropods, birds, rodents, marsupials and livestock. Based on the higher potential for human contact, the most important reservoirs as sources for human infections are cattle, sheep and goats (CDI, 2010). Rangeland goats, by the nature of their uncontrolled feral existence, generally have higher levels of Q fever exposure than their domestic counterparts, which generally have much lower levels of Q fever risk due to domestic herd management techniques. Antibodies to Q fever have been reported in 52% of rangeland goats (Parkes, et al., 1996).

The transmission of a disease causing agent from an infected animal in most cases will be via one of four routes:

- aerosol;
- direct contact;
- contaminated water;
- faecal – oral route.

In the case of Q fever infection of humans usually occurs by inhalation of organisms from the air that contain airborne dusts contaminated by dried placental material, birth fluids, and excreta of infected animals (CDC, 2016).

The risk of Q fever transmission is considered to be higher within 5 km of a source, diminishing significantly beyond that. This has been supported by studies such as Hankett, *et al.* (2012) and Schimmer, *et al.* (2010).

10.3 Risk assessment methodology

The methodology adopted in preparation of the HRA was based on the protocols/guidelines detailed in enHealth (2012). Identification and assessment of the potential risks to human health have been undertaken by implementing four prime tasks. These tasks were:

1. Issue Identification – This involved an evaluation of the available information on proposed operations of the abattoir in light of potential for Q fever to be present.

2. Hazard Assessment – This task provided a review of the current understanding of the Q fever in small stock, specifically goats and sheep and identified hazards associated with human exposure to Q fever.

3. Exposure Assessment – This task drew on the evaluation undertaken as part of the "Issue Identification" stage identifying the groups of people who may be exposed to Q Fever and estimating potential exposure.

4. Risk Characterisation – This task provided the qualitative evaluation of potential risks to human health. The characterisation of risk was based on the review of Q fever and the assessment of the potential exposure.

10.4 Exposure pathways and receptors

Three exposure groups relevant to the project were identified:

- Bourke and North Bourke Community;
- Transport Route Communities; and
- Occupational Exposure (abattoir works, contractors, transport operatives).

The risk of windborne transmission of *Coxiella burnetii* from the abattoir to the communities of North Bourke and Bourke is considered negligible due to the significant distance of the Project site from these communities, at 14 km and 10 km respectively.

The nearest residents to the project site are identified as receptor 1 and receptor 2, approximately 5.5 km and 5.8 km from the proposed location of the abattoir buildings respectively, and outside of the 5 km higher risk area.

A summary of the exposure pathways for Q fever to the three identified exposure groups, and factors influencing the control, is provided in Table.10.1.

Table 10.1 Q fever exposure pathways and control measures

Exposure group	Exposure group	Agent of transmission	Factors/controls reducing exposure
Transport	Transport route communities	Urine and faeces from infected livestock	Prior to transport, animals will be rested to "empty out" to reduce urination and defecation during transport.
		Aerosols from urine and faeces	Prior to transport, animals will be rested to "empty out" to reduce urination and defecation during transport. The Project will reduce the number of communities exposed along transport routes as it will reduce vehicle transportation of rangeland goats from the current transport north to Charleville and south to Melbourne.
		Abortion material from pregnant does	Livestock will be sourced from depots with operational procedures in place that include screening out of heavily pregnant does from transport.
Abattoir	Bourke & North Bourke Community	Urine and faeces from infected livestock	Community unlikely to come into direct contact with urine and faeces from infected livestock at the abattoir. Onsite procedures to contain and treat waste onsite.

Table 10.1 Q fever exposure pathways and control measures

Exposure group	Exposure group	Agent of transmission	Factors/controls reducing exposure
		Direct contact with infected animals or animal tissues	Community unlikely to come into direct contact with infected livestock or animal tissues. The site will also be fenced (1.8m high man proof fencing), and access to the site will be controlled by a security gatehouse and boom gate. Onsite procedures to restrict direct contact exposure, such as PPE, good hygiene practise and waste disposal procedures.
		Aerosols from infected livestock, urine, faeces or animal tissues	Community greater than 5km from source so unlikely to come into direct contact with aerosols from infected livestock, urine, faeces or animal tissues. Onsite procedures to restrict escape of aerosols and waste handling procedures.
		Potential for secondary exposure carried off site by abattoir workers with unhygienic practises	Onsite procedures to ensure good hygiene by workers.
Abattoir	Occupational Exposure	Urine and faeces from infected livestock	Onsite design, procedures, vaccination programme and training to ensure safe work practises and good hygiene by workers.
		Direct contact with infected animals or animal tissues	As above
		Aerosols from infected livestock, urine, faeces or animal tissues	

10.5 Risk characterisation and mitigation

Risk characterisation involves the incorporation of the exposure assessment and the hazard assessment to provide an overall evaluation and assessment of risk. To classify potential public health risk into groups, SLR (2015d) used a qualitative method based on the factors considered to influence the likelihood of Q Fever exposure to persons and communities. These factors included the following:

- Proximity of Exposure Groups to the livestock transport routes;
- Proximity of Exposure Groups to the abattoir, with reference to a 5 km radius from the project site;
- Proximity of Exposure Groups to livestock;
- Q Fever transmission routes;
- The possibility of aerosol transmission; and
- The ability of the abattoir design and operational procedures to reduce or eliminate Q fever transmission routes.

The definition of each risk level used in the risk assessment is presented in Table 10.2, with the outcomes of the risk characterisation, including controls to be implemented, presented in Table 10.3.

Table 10.2 Risk rating definitions used by SLR 2016b

Risk level	Definition
Negligible	Health risk is very low given the combination of all known factors including: proximity of Exposure Groups to the livestock transport routes; proximity of Exposure Groups to the abattoir; proximity of Exposure Groups to livestock; Q Fever transmission route; the possibility of aerosol transmission of Q Fever; the ability of the abattoir design and operational procedures to reduce transmission routes.
Very Low	Health risk is greater than "Negligible", but remotely possible given the expected combination of factors described above
Low	Health risk is greater than "Very Low", but possible given the expected combination of factors described above
Medium	Health risk is possible given the combination of factors described above
High	Health risk is likely given the combination of factors described above

Table 10.3 Q fever risk characterisation transport – transmission and controls

Location	Exposure group	Agent of transmission	Risk without controls	Factors/controls reducing exposure	Risk with controls in place
Transport	Transport Route Communities Bourke and Surrounds	Urine and faeces from infected livestock	Low	Prior to transport, animals will be rested to "empty out" to reduce urination and defecation during transport.	**Very low**
		Aerosols from urine and faeces	Low	Prior to transport, animals will be rested to "empty out" to reduce urination and defecation during transport.	Very low
		Abortion material from pregnant does	Medium	Livestock will be sourced from depots with operational procedures in place that include screening out of heavily pregnant does from transport	Very low
	Transport Route Communities to Charleville and Melbourne	Aerosols from urine and faeces	Low	The proposed Project will to reduce the number of communities exposed along transport routes as it will reduce vehicle transportation of rangeland goats from the current transport north to Charleville and south to Melbourne.	Negligible

Table 10.3 Q fever risk characterisation transport – transmission and controls

Location	Exposure group	Agent of transmission	Risk without controls	Factors/controls reducing exposure	Risk with controls in place
Abattoir	Bourke & North Bourke Community	Urine and faeces from infected livestock	Low	Community unlikely to come into direct contact with urine and faeces from infected livestock at the abattoir. Onsite procedures to contain and treat waste onsite. The site will also be fenced (1.8m high man proof fencing), and access to the site will be controlled by a security gatehouse and boom gate.	Negligible
		Direct contact with infected animals or animal tissues	Low	Community unlikely to come into direct contact with infected livestock or animal tissues. Onsite procedures to restrict direct contact exposure, such as PPE, good hygiene practise and waste disposal procedures. The site will also be fenced (1.8m high man proof fencing), and access to the site will be controlled by a security gatehouse and boom gate.	Negligible
		Aerosols from infected livestock, urine, faeces or animal tissues	Low	Community greater than 5km from source so unlikely to come into direct contact with aerosols from infected livestock, urine, faeces or animal tissues. Onsite procedures to restrict escape of aerosols, dust suppression and waste handling procedures.	Very low
	Bourke & North Bourke Community	Potential for secondary exposure carried off site by abattoir workers with unhygienic practises	High	Onsite procedures to ensure good hygiene by workers.	Low to Very Low

Table 10.3 Q fever risk characterisation transport – transmission and controls

Location	Exposure group	Agent of transmission	Risk without controls	Factors/controls reducing exposure	Risk with controls in place
Abattoir	Occupational exposure	Urine and faeces from infected livestock	High	Onsite design, procedures, vaccination programme and training to ensure safe work practises and good hygiene by workers.	Low to Very Low
		Direct contact with infected animals or animal tissues	High	As above	Low to Very Low
		Aerosols from infected livestock, urine, faeces or animal tissues	High	As above	Low to Very Low

10.6 Conclusion

Provided the abattoir is well managed with suitable controls maintained, then potential short and long-term community health risks from Q fever is unlikely to increase from the existing situation for Bourke and North Bourke due to the following key factors:

1. the change in daily livestock movements though Bourke and North Bourke as a result of the project will be negligible when compared to existing movements;

2. there are no residents living within 5km of the proposed abattoir location; and

3. occupational exposure to abattoir workers and contractors will be effectively controlled by abattoir design and operating procedures.

In addition, the Project will reduce the potential health risk relating to Q fever to a number of communities along transport routes out of the Bourke area north to Charleville and south to Melbourne and Nyngan.

11 Biodiversity

11.1 Introduction

EMM undertook a biodiversity assessment of the project site in accordance with the *Framework for Biodiversity Assessment*: *NSW Offsets Policy for Major Projects* (FBA) (OEH 2014). EMM's Biodiversity Assessment Report (BAR) (2016b) is contained within Appendix I. A summary of the key findings are provided below.

The study area for the biodiversity assessment was defined as all areas of disturbance in the project site, as shown on Figure 1.2. The assessment involved a database and vegetation mapping review, including a search of the *NSW Bionet Atlas of NSW Wildlife* and a Protected Matters Search. To verify the desktop review results, detailed field surveys were conducted in January 2016 in all areas of proposed disturbance. Measures were developed to minimise and mitigate potential impacts of the project. Offsets required to compensate for the project's impacts were calculated in accordance with the BioBanking Credit Calculator.

11.2 Existing environment

11.2.1 Native vegetation extent

The surrounding landscape features are illustrated in Figure 11.1.

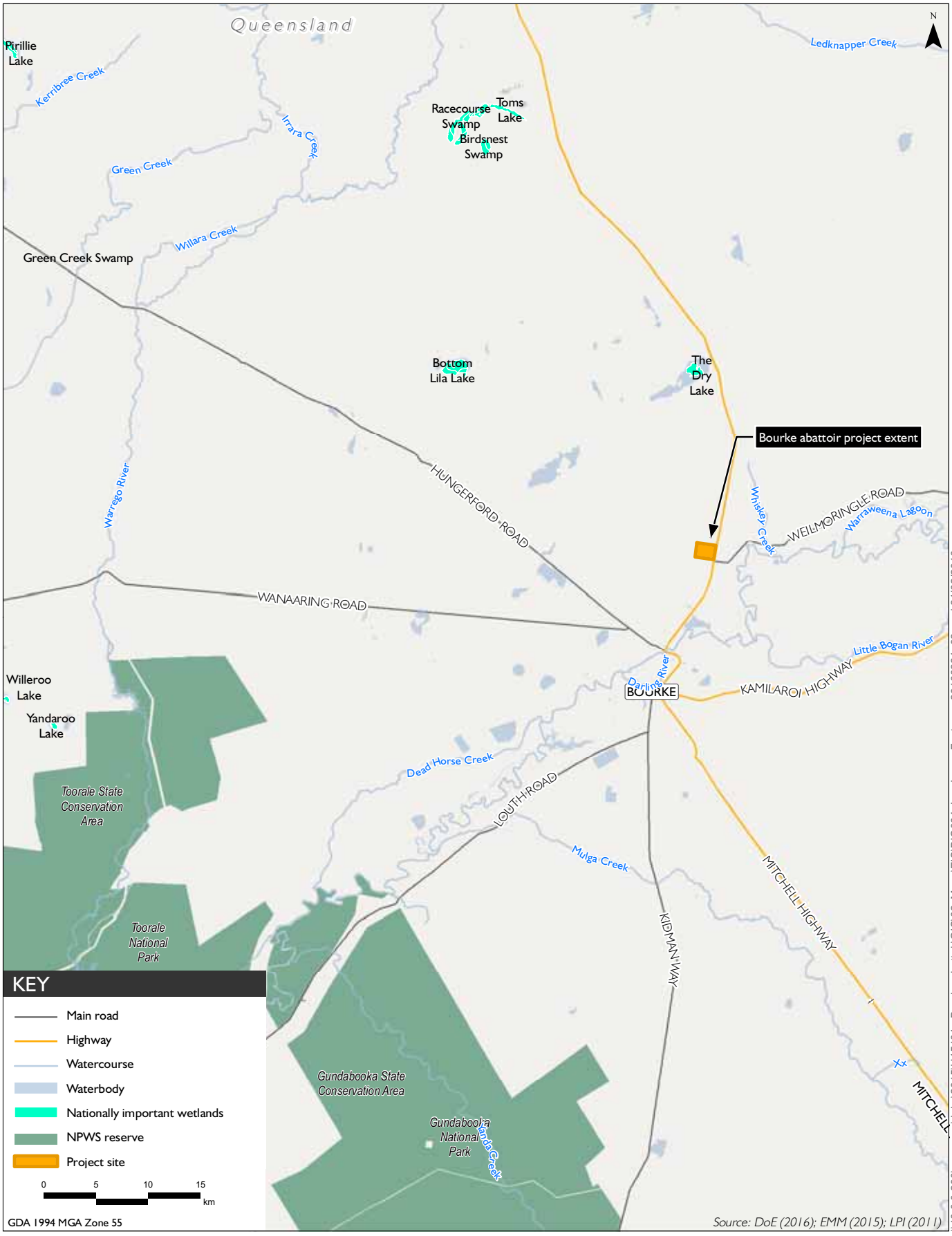
A 200 ha inner assessment circle and 2,000 ha outer assessment circle was placed around the study area and the extent of native vegetation was determined in each. Native vegetation cover is 100% within both the inner and outer assessment circles.

11.2.2 Plant community types

One PCT was identified, mapped and assessed within the study area, namely PCT98 Poplar Box – White Cypress Pine – Wilga – Ironwood Shrubby Woodland on red sandy-loam soils in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion (Poplar Box - White Cypress Pine - Wilga -Ironwood Shrubby Woodland). PCT98 occurs in two vegetation zones in the study area: a shrubby woodland and a derived shrubland (refer Photograph 11.1). The derived shrubland generally lacks canopy species; however has a similar assemblage of understorey species, and many cut stumps. Therefore, it was assumed that it is the same PCT as the woodland, however in a lower condition state.

A summary of the two vegetation zones in the study area is provided in Table 11.1, and the extent of each vegetation type in the project site is shown in Figure 11.2. The required number of plots were completed for both vegetation zones. The vegetation in the project site is characterised by:

- a sparse canopy comprising Bimblebox (*Eucalyptus populnea* subsp. bimbil) and Whitewood (*Atalaya hemiglauca*) (refer Photograph 11.2);
- a sparse shrub layer characterised by Spiny Saltbush (*Rhagodia spinescens*), False Sandalwood (*Eremophila mitchelli*); and
- groundcover characterised by various Sclerolaena species, such as Saltbush (*Atriplex muelleri*), and Bluebush (*Maireana* sp).



Landscape features

Bourke Small Stock Abattoir
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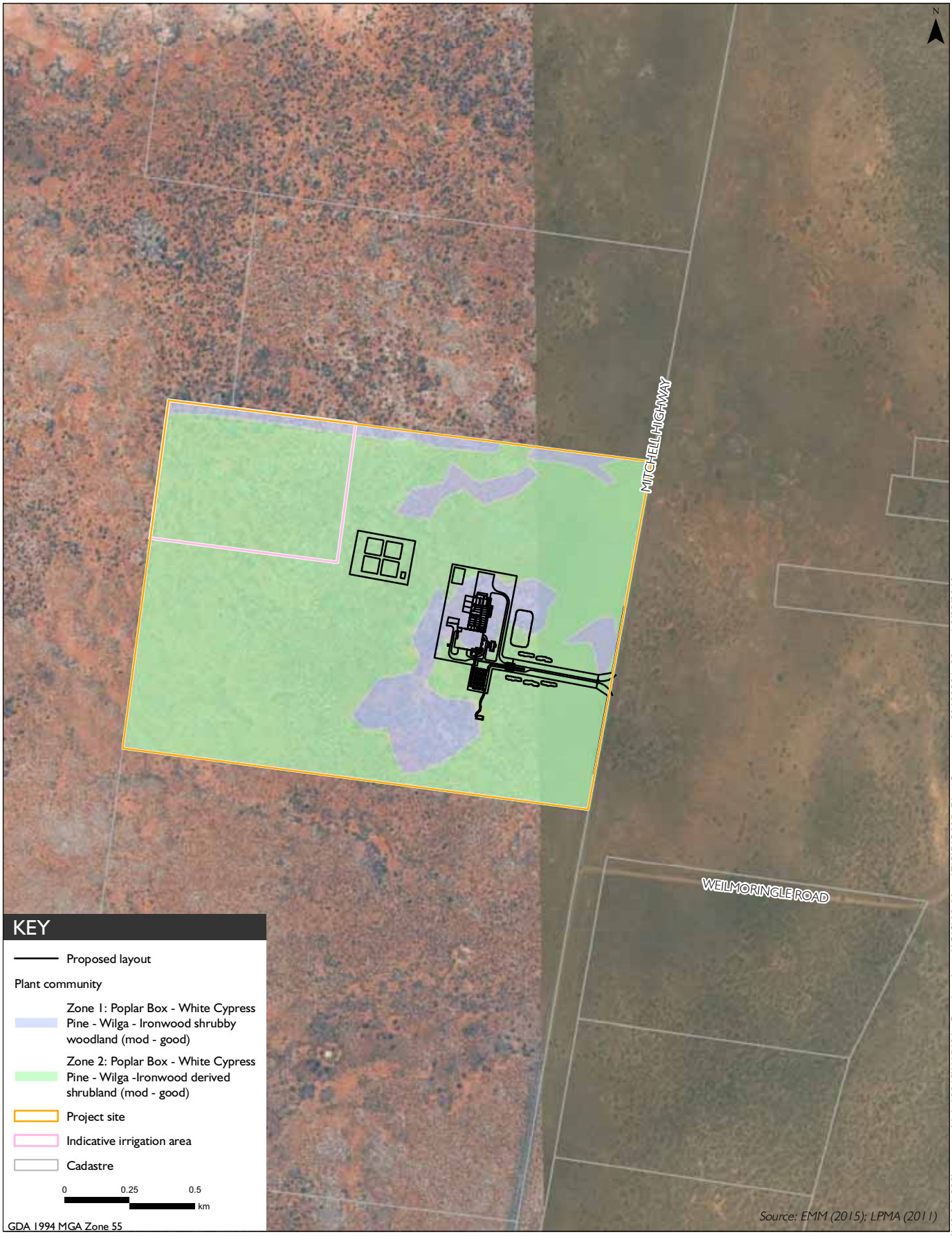
Figure 11.1



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Plant community types

Bourke Small Stock Abattoir
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Figure 11.2

Table 11.1 Vegetation zone summary

Vegetation zone	PCT	BVT	Area (ha)	Condition class	Site value score	Required survey effort	Plots completed
1	Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland (PCT98)	Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland (WE137)	9.6	Moderate - good	76	3 plots	3 plots
2	Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland - derived shrubland (PCT98)	Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland (WE137)	45.7	Moderate - good	38	4 plots	4 plots
Total			**55.3**			**7 plots**	**7 plots**

Notes *1. PCT – plant community type, BVT – biometric vegetation type.*

Photograph 11.1 Shrubby woodland form (left) and derived shrubland form (right)

Photograph 11.2 Whitewood (*atalaya hemiglauca*) trees in the project site

Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland is estimated at only 20% cleared in the Western Catchment Management Authority (CMA) area where the project is located, with 300,000 ha of this PCT extant. The clearing of this 55.3 ha of native vegetation will result in a negligible increase to the clearing of this vegetation community. Approximately 190.7 ha (77.5%) of native vegetation will be retained in the project site. At the bioregion (IBRA) subregion level, this only contributes an additional 0.01% clearing of this PCT.

11.2.3 Threatened ecological species

Threatened ecological communities (TECs) of potential relevance to the study area and which were considered in the assessment include:

- Coolibah - Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregion (listed under TSC Act);
- Brigalow - Gidgee woodland/shrubland in the Mulga Lands and Darling Riverine Plains Biroegions (listed under TSC Act);
- Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions(listed under EPBC Act); and
- Weeping Myall Woodlands (listed under EPBC Act).

Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland does not meet the description of any of these TECs. No TECs were recorded or are predicted to occur in the study area.

11.2.4 Threatened species

A list of species of potential relevance to the study area was compiled using a combination of the BioBanking Credit Calculator, *Atlas of NSW Wildlife*, and the Protected Matters Search Tool. The list comprises two plant and nine animal species predicted by the *Atlas of NSW Wildlife*, seven threatened and seven migratory species predicted by the protected matters search tool. Sixteen ecosystem credit species and three species credit species predicted by the Biobanking Credit Calculator. No listed species were recorded in the study area.

The likelihood that these species would occur in the study area was assessed. Of these species, the following have a low to moderate likelihood to occur in the study area comprise:

- Australian Bustard (*Ardeotis australis*);
- Barking Owl (*Ninox connivens*);
- Brolga (*Grus rubicunda*);
- Bush Stone Curlew (*Burhinus grallarius*);
- Hooded Robin (*Melanodryas cucullata cucullata*);
- Inland Forest Bat (*Vespadelus baverstocki*);
- Little Pied Bat (*Chalinolobus picatus*);
- Major Mitchell's Cockatoo (*Cacatua leadbeateri*);
- Rainbow Bee-eater (*Merops ornatus*);
- Spotted Harrier (*Circus assimilis*);
- Varied Sittella (*Daphoensositta chrysoptera*); and
- Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*).

All other species predicted or previously recorded are unlikely to occur in the study area.

11.3 Potential impacts

11.3.1 Direct impacts

The project will involve the following direct impacts:

- clearing of native vegetation, approximately 9.6 ha of shrubby woodland and 45.7 ha of derived shrubland of Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland;

- loss of hollow-bearing trees in the 9.6 ha of shrubby woodland, which provide potential roosting habitat for threatened bats including the Little Pied Bat, Inland Forest Bat and Yellow-bellied Sheathtail Bat and potential foraging habitat for the Varied Sitella;

- minor loss of potential hunting/foraging habitat for the threatened Barking Owl, Australian Bustard, Hooded Robin, Major Mitchell's Cockatoo, Brolga, Bush Stone Curlew and Spotted Harrier; and

- edge effects, including increased light and a decrease in competition which, in the absence of mitigation, may lead to weed invasion in the shrubby woodland. Without management, the increase in water and nutrients from irrigation of the derived shrubland may also to encourage weed growth.

11.3.2 Indirect impacts

The project may involve the following indirect impacts:

- generation of higher noise levels during vegetation clearing, construction and operation, which may deter fauna from using retained habitat in the area. It is expected that fauna would acclimatise to the noise over time and recolonise the area;

- a minor increase in fauna strike, particularly for Kangaroos and Wallabies, as result of a minor increase to traffic volume on the Mitchell Highway; and

- attraction of wetland birds to the water treatment ponds, provided that the anaerobic ponding process is effectively managed.

11.3.3 EPBC Act matters

No species listed under the EPBC Act were recorded in the study area. Only one migratory species, the Rainbow Bee-eater, has potential to occur in the study area as it has been recorded to the east along the Darling River, and the species has been known to occasionally use farmland habitats.

An assessment of significance has been prepared for this species (refer to Appendix I). The assessment concluded that a significant impact is unlikely on this migratory species. Impacts to threatened species habitat listed under the EPBC Act will be offset in accordance with the FBA.

Five nationally important wetlands surround the project including The Dry Lake (17 km north), Bottom Lila Lake (26 km east) Birdsnest Swamp, Racecourse Swamp and Toms Lake (35 km north west) of the project site, respectively. As no waterways are present in the study area that connect to these wetlands, and impacts will be confined to the study area, the potential for impacts is low. Downstream impacts to the nationally important wetlands are not expected to result from the project as erosion and sediment controls will be installed and maintained during construction of the project (refer Section 13.5), and nutrients levels will be appropriately managed in the wastewater treatment and irrigation system, provided this is operated in accordance with the recommendations of the effluent management study (refer Chapter 14).

11.4 Avoidance and minimisation

11.4.1 Avoidance

The project's potential impacts to biodiversity were minimised from the outset through a careful site selection process. A number of important factors need to be considered when looking for a site suitable for the development of an abattoir development, comprising:

- appropriate land use zoning;
- compatible existing agricultural land uses in and surrounding the project site. Finding a site already subject to an agricultural land use also limits the amount of clearing required for construction activities and is therefore advantageous from a biodiversity perspective;
- access to a suitable water and electricity supply; and
- proximity to major regional and State transport routes.

Finding a site that meets all of the above criteria is very difficult. CAPRA identified the project site after an extensive process, finding a site that has been subject to a long history of agricultural activities, as well as meeting the required services and transport related criteria listed above. This careful site selection process therefore avoided significant impacts to biodiversity by choosing a site with this existing agricultural land use.

Further, in the detailed design process, CAPRA has also avoided and minimised biodiversity impacts through the following:

- moving the initial abattoir location north to avoid a higher condition area of shrubby woodland; and
- placing the ancillary facilities (ie tracks, car park, water treatment ponds and active cropping and irrigation area) in lower condition areas, containing the derived shrubland.

11.4.2 Management and mitigation

The management and mitigation measures in Table 11.2 will be implemented to minimise impacts of the project on biodiversity values. Further details on specific measures to be implemented are provided in the following sections.

Table 11.2 Biodiversity mitigation measures

Impact	Environmental safeguard	Responsibility	Timing
Direct impact			
Clearing of native vegetation	The clearing limits are to be clearly delineated in the field.	Construction manager	Prior to and during vegetation clearing
Fauna injury and mortality	A clearing procedure will be included in the sediment and erosion control plan to be prepared. The following methods must be implemented during clearing: • felling of hollow-bearing trees in the study area will follow a two-stage clearing protocol, where surrounding non-hollow vegetation is cleared 24 hours prior to the hollow trees to allow fauna time to move.	Construction manager	Prior to and during works
	• a suitably trained fauna handler will be present during hollow-bearing tree clearing to rescue and relocate displaced fauna if found on site.	Construction manager	Prior to and during works
Indirect impact			
Erosion and sedimentation	Appropriate sediment and erosion controls will be implemented through the sediment and erosion control plan to ensure that there are no off-site impacts result from the abattoir, particularly the Darling River.	Construction manager Construction staff	Prior to, during and following completion of works
Nutrient runoff	Operation of the wastewater treatment ponds and irrigation of treated effluent will be managed in accordance with the effluent management study prepared for the project (Envirowest 2016, refer Chapter 14).	Abattoir manager	Operation of the treatment ponds and irrigation

11.5 Biodiversity credit report

The two vegetation zones in the study area have a site value score greater than 17. Several ecosystem credit species were identified as having a low to moderate potential to occur in the study area and therefore have been assumed to be present in accordance with the FBA.

Both the shrubby woodland and derived shrubland have a site value greater than 17 and contain potential habitat for threatened species. Therefore, offsetting is required in accordance with Section 3.3.1.3 of the FBA.

The project would directly impact the following vegetation communities and potential habitat for ecosystem credit species:

- Approximately 9.6 ha of moderate to good condition Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland, in its shrubby woodland form; and
- Approximately 45.7 ha of moderate to good condition Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland, in its derived shrubland form.

The BioBanking Credit Calculator was used to calculate the impacts of the project and potential offset requirements, in accordance with the FBA. A total of 2,068 ecosystem credits are required to compensate for the project's impacts on PCT98 and threatened species habitat. The calculations assume that the vegetation to be impacted contains suitable habitat for the Barking Owl, Australian Bustard, Hooded Robin, Major Mitchell's Cockatoo, Brolga, Bush Stone Curlew, Spotted Harrier, Little Pied Bat, Inland Forest Bat and Yellow-bellied Sheathtail Bat. The species associated with both PCTs with the highest threatened species multiplier was the Barking Owl. The ecosystem credits required for offsetting of native vegetation (and associated habitat) impacts are listed in Table 11.3.

Table 11.3 Ecosystem credits required

Vegetation zone	PCT	Area (ha)	Presence of TEC	Site value score	Ecosystem credit species with the highest multiplier	Credits required to offset impact
1	98	9.6	No	76	Barking Owl	585
2	98	45.7	No	38	Barking Owl	1,483
Total		**55.3**				**2,068**

No species credit species were recorded or are predicted to occur in the study area. Therefore, species credits have not been calculated for the project.

11.6 Biodiversity offset strategy

As described, the BAR determined that a biodiversity offset is required in accordance with the FBA. As documented in Table 11.3, a total of 2,068 credits are required to offset the projects impacts. No species credits are required as part of the offset.

11.6.1 Strategy

The strategy to identify offsets to compensate for the project's impacts will involve the following steps:

1. Identifying if suitable credits are available on the market to meet offset requirements.

2. Finding potential offset sites with the biodiversity values required to compensate for the project's impacts.

3. In the absence of suitable offset credits or properties, applying the variation criteria rules of the FBA and finding suitable offsets to meet the requirements.

Investigations are currently underway to secure a suitable offset for the project. The Biodiversity Offset Strategy will be finalised in consultation with OEH, DP&E and DPI – Lands within 12 months of project approval.

11.6.2 Investigating offset sites

The applicant has entered into a conditional contract (pending receipt of project approval) to purchase the project site and surrounding buffer land on Lot 19 DP 753546, Lot 6297 DP 768182, Lot 2 DP 753547, Lot 100 DP 753547, Lot 102 DP 753547, Lot 4 DP 753547, and Lot 3 DP 753547, as illustrated on Figure 3.1.

Remaining areas of native vegetation on the project site were assessed to determine their feasibility as an offset site. These areas also contain Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland (PCT98) in moderate to good condition. **Error! Reference source not found.** Table 11.4 summarises the likely offset credits the remaining areas will generate.

Table 11.4 Likely offset credits generated by remaining native vegetation on the project site

Vegetation zone	Area impacted (ha)	Credits required	Area remaining following clearing (ha)	Credits per ha[1]	Potential offset credits available on the project site[2]	Credit surplus/deficit
1	9.6	585	26.8	60.9	268.3	-316.7
2	45.7	1,483	164.3	32.5	1,643.3	+160.3
Total	55.3	2,068	191.2	-	1,911.6	-156.4

Notes: *1.Credits per ha calculated by dividing credits required by the area impacted.*

2. Potential offset credits calculated by multiplying the area remaining by a factor of 10.

3. Likely area required calculated by dividing by a factor of 10.

Approximately 1,191 credits are available in remaining native vegetation on the project site. Therefore, an additional 156.4 credits are likely to be required outside the project site.

Offset surveys will be completed in the project site and the surrounding buffer lands (CAPRA landholdings) to inform accurate offset calculations and select a preferred offset site/s and/or mechanism. This Biodiversity Offset Strategy will be finalised into a biodiversity offset package, in consultation with OEH, DP&E, and DPI – Lands that adequately compensates for the project's impacts within 12 months of project approval.

11.6.3 Variation criteria

Under the FBA, the offset rules can be varied to match ecosystem credits, using credits generated by a PCT from the same vegetation formation as the PCT to which the required ecosystem credit relates. Where possible and if needed, the variation rules will be applied to the project and suitable PCTs in the same vegetation class will be identified prior to matching by formation. The application of the variation criteria, if needed, will be completed in consultation with OEH and DP&E.

11.6.4 Offset security

Any property identified for offsetting will be secured under a BioBanking agreement.

11.7 Conclusion

The project site was selected to avoid or minimise impacts on biodiversity. Despite this consideration, unavoidable impacts on native vegetation include clearing approximately 9.6 ha shrubby woodland and 45.7 ha derived shrubland of Poplar Box - White Cypress Pine - Wilga - Ironwood Shrubby Woodland, loss of hollow-bearing trees, minor loss of potential hunting/foraging habitat for threatened species, and edge effects. These impacts and other potential indirect impacts will be reduced by the mitigation measures proposed. In addition, a biodiversity offset strategy is proposed to compensate for the project's impacts. The removal of 55.3 ha of native vegetation represents a minor impact at the project site scale (77.5% of native vegetation will be retained) and a negligible loss of 0.01% of the PCT at the IBRA subregional scale.

A total of 2,068 ecosystem credits are required to offset the project's impacts. No species credits are required for the project. The biodiversity offset strategy will be finalised into an offset package in consultation with OEH, DP&E and DPI – Lands within 12 months of obtaining project approval.

Only one species listed under the EPBC Act, the Rainbow Bee-eater (a migratory species) has potential to occur in the study area. An assessment of significance was completed for the species which concluded that the project was unlikely to result in significant impacts for the Rainbow Bee-eater. Five nationally important wetlands are proximal to the study area, however will not be impacted given their large distances from the proposed abattoir development, the absence of streams that connect to the wetlands through the site, and the restriction of all impacts to within the project site.

12 Heritage

12.1 Introduction

An Aboriginal cultural heritage assessment (ACHA) for the project was prepared by EMM. The assessment included the following:

- historic research of the project site;
- desktop database searches for previously recorded sites; and
- formulation of a predictive model for archaeological site location;
- consultation with the Aboriginal community, including the registered Aboriginal parties and the Nulla Nulla Local Aboriginal Land Council (L&DLALC); and
- field survey with registered aboriginal groups on 12 January 2016, with a further site visit on 4 February 2016.

The full technical report is provided in Appendix J (EMM, 2016c) with the key findings and recommendations summarised below. This section describes the potential impacts of the project on Aboriginal cultural heritage values in the project site and, where impacts are unavoidable, the measures proposed to mitigate impacts. The ACHA was completed with reference to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW 2010).

The study area for the ACHA was defined as all areas of disturbance proposed within the project site (shown on Figure 2.1).

12.2 Registered Aboriginal parties

Invitations to register as a registered Aboriginal party (RAP) for the project were issued in November 2015. Five organisations registered their interest in the project, as listed below:

- Muda Aboriginal Corporation;
- Bourke Aboriginal Health Service (BAHS);
- Murdi Paaki Regional Enterprise Corporation;
- Bourke Aboriginal Community Working Party (BACWP); and
- Murrawarri Traditional Council State.

The RAPs were sent information on the project and the proposed survey assessment method. No comments were received in relation to the survey method proposed. Each RAP was also invited to provide an Aboriginal site officer to participate in the one day survey on 12 January 2016. However, only one Aboriginal site officer, from Murdi Paaki Regional Enterprise Corporation, participated in the survey for part of the morning. On the day of the field survey a local Aboriginal representative, Phillip Sullivan from BACWP, also who gave a brief, local perspective on the site to the survey team (including two archaeologists from EMM).

Murrawarri elder Fred Hooper also conducted a cultural evaluation of the site on 4 February 2016, as he was unavailable to attend the prior survey with EMM archaeologists. This second site visit was also attended by Phillip Sullivan as a representative of the BACWP. Following completion of the site visit Fred Hooper provided a report describing the results of the cultural survey and a number of recommendations for the management of identified sites.

Fred Hooper's report noted that a number of artefacts were identified which confirmed and supported the results of the survey conducted by EMM. His recommendations are included in the management and mitigation measures in Section 12.5, and his full report is included in Appendix A of the ACHA (refer Appendix J). The draft ACHA was also issued to the RAPs for their comments prior to finalisation.

Further details of consultation undertaken, responses received and the outcomes are provided in Appendix J.

12.3 Existing environment

12.3.1 Landscape context

The project site is located at the western edge of the Darling Riverine Plains bioregion in northern NSW and beside the alluvial plains of the mid Darling valley. The region has undergone significant modification since European occupation, with extensive areas cleared. Droughts, overstocking of properties, the spread of weed species and changes to fire regimes have contributed to widespread land degradation. The project site has been historically cleared for agricultural purposes, and has recently been used for grazing.

i Geology and soils

Near Bourke, the confined Darling River channel landscape consists of channels, floodplains, billabongs and slightly-raised, red soil terraces. Geomorphology and surface sediment distribution reflect past climates and different river discharge events (OEH 2011a) which has led to the accumulation or removal of sediment over tens to thousands of years. The archaeological implication of this is it is often difficult to determine exactly the patterns of prehistoric land use both temporally and spatially.

The study area is located on red-brown scalded quaternary alluvium plains (OEH Cartlands Land System, nd.). Soils are deep red acid to calcareous, loamy to sandy soil forming an undulating plain. Reddish-brown cobbles, around 4 to 8 cm in length, are scattered across the study area and are particularly abundant in highly eroded, scalded areas. Split gibber cobbles on site revealed different qualities of original stone, including silcrete, which could be used for stone tool manufacture.

ii Topography and drainage

The topography of the study area consists of a flat stony plain, with frequent scald surfaces. It is slightly elevated above the Darling River floodplains with a gradient slope to 1%, and sparse vegetation. The closest permanent water source is the Darling River, located approximately 2.5 km to the east of the study area at its closest point. In the study area itself there are small depressions with grey cracked clay, evidence of ephemeral waterholes after rain.

iii Climate

Bourke lies within a semi-arid climate zone which is hot and persistently dry. As described in Section 3.5, Bourke Airport AWS records January as the hottest month in Bourke with a mean maximum temperature of 37.1°C, while July is the coldest month with a mean maximum temperature of 18.4°C (mean minimum temperature of 4.1°C). Mean annual rainfall is 327.9 mm.

Based on historic evidence, the climate of the project site for the past 1,000 years would probably have been much the same as present day conditions, providing a habitable environment.

iv Vegetation

Vegetation in the study area is in a disturbed condition, with evidence of clearing and livestock grazing. Vegetation consists of shrubby woodland on red sandy-loam soils. It is characterised by:

- a sparse canopy comprising Bimblebox (*Eucalyptus populnea* subsp. bimbil) and Whitewood (*Atalaya hemiglauca*);
- a sparse shrub layer characterised by Spiny Saltbush (*Rhagodia spinescens*), False Sandalwood (*Eremophila mitchelli*); and
- groundcover characterised by various Sclerolaena species, such as Saltbush (*Atriplex muelleri*), and Bluebush (*Maireana* sp).

12.3.2 Archaeological context

The study area is located within Nulla Nulla Local Aboriginal Land Council boundary. According to Tindale (1974), the study area is located near the boundary of three Aboriginal groups:

- the Murrawari, whose territory extended to the north west of the Darling River, north of Bourke;
- the Baranbinja, who lived on the north bank of the Darling River near Bourke; and
- the Ualarai people, who lived on the east bank of the Darling in the Mulga lands bioregion (OEH 2011b).

In addition, the Ngemba people occupied the east bank of the Darling River near Bourke and Brewarrina.

There are no historic heritage items listed under the Bourke LEP within the project site.

i Aboriginal sites

a. Previously recorded sites

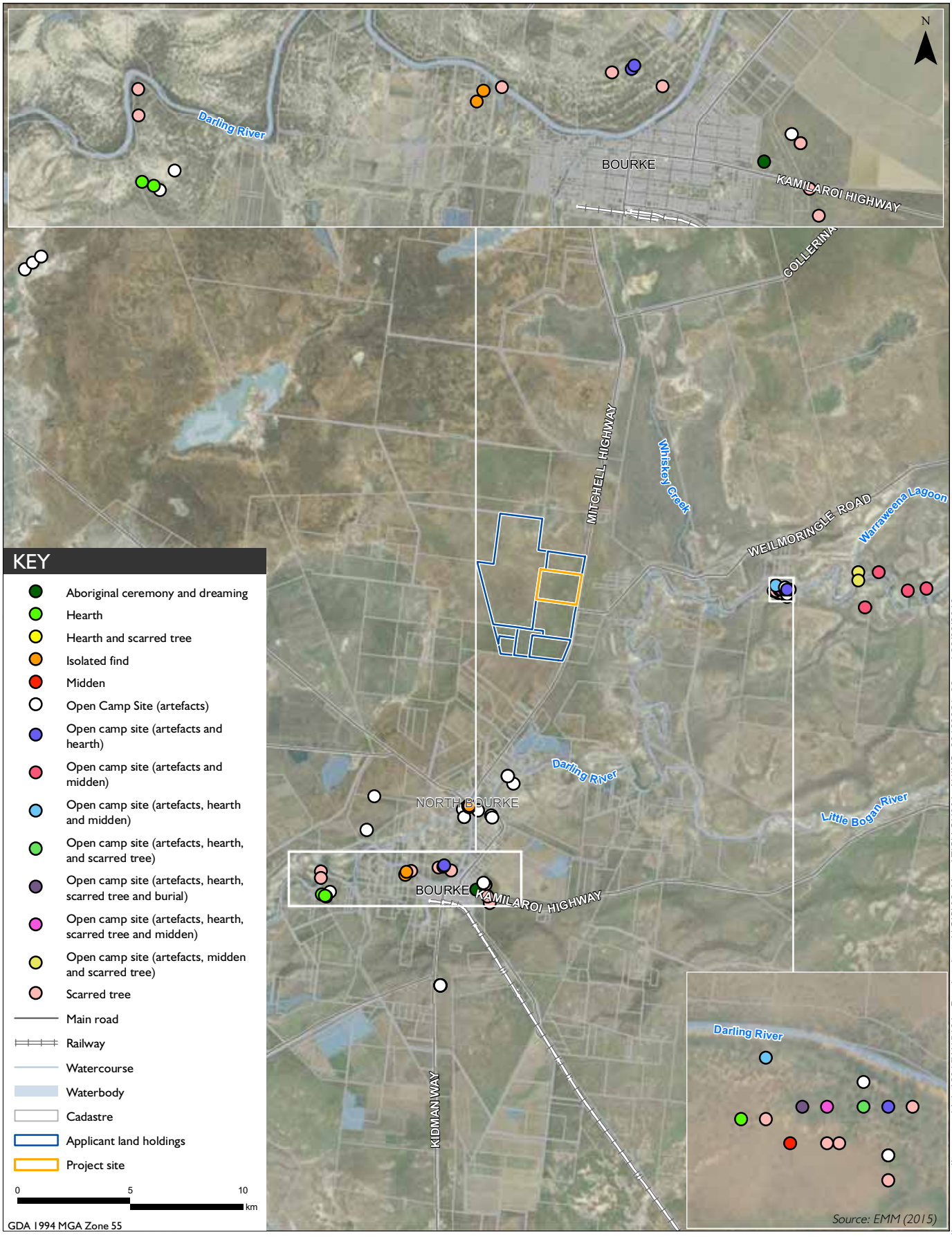
A search of the OEH administered Aboriginal Heritage Information Management System (AHIMS) search was completed on 10 November 2015 for an area within a 30 km radius of the study area. The search covered a large enough area to adequately characterise the local archaeological record, and a wide variety of Aboriginal site types were identified, as shown in Table 12.1. Sites were distributed across multiple landforms but clustered near watercourses. A total of 65 Aboriginal sites were identified within the search area. The AHIMS search results are contained in Appendix B of the ACHA, and the distribution of the sites is shown on Figure 12.1.

Table 12.1 AHIMS registered sites in the search area

Site type	Number of sites	Percentage (%)
Isolated find	9	14
Open camp site (artefacts)	18	28
Open camp site (artefacts and hearth)	3	5
Open camp site (artefacts, hearth and midden)	1	1.5
Open camp site (artefacts, hearth, and scarred tree)	1	1.5
Open camp site (artefacts, hearth, scarred tree and burial)	1	1.5
Open camp site (artefacts, hearth, scarred tree and midden)	1	1.5
Open camp site (artefacts and midden)	4	6
Open camp site (artefacts, midden and scarred tree)	2	3
Hearth	4	6
Hearth and scarred tree	1	1.5
Midden	1	1.5
Scarred tree	18	28
Aboriginal ceremony and dreaming	1	1

As evident in Table 12.1 and Figure 12.1, the most common archaeological sites within 30 km of the study area are open camp sites which comprise nearly half (48%) of the sites in the search area. Scarred trees are present at 24 sites (35%), either alone or in conjunction with middens, artefacts, hearths and a burial. Open camp sites are characterised predominantly by artefacts, however seven open camp sites also contain middens, seven contain oven mounds or hearths and five had scar trees. One open camp site contains a burial.

No sites were found to have previously been recorded in the project site. All the sites previously recorded are in close proximity to the Darling River, except for three sites with artefacts located 27 km north-west of the study area. However, these too are located beside a watercourse. Subsurface deposits are not likely to occur on stony, wind eroded plains located at a considerable distance from reliable water (as per the project site), which is consistent with the findings of the AHIMS search. Instead they are likely to occur where soils have accumulated along floodplains by water or by aeolian winds on dunes and lunettes.



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AHIMS results and previous surveys near project site

Bourke Small Stock Abattoir
Environmental Impact Statement

Figure 12.1

b. Field survey

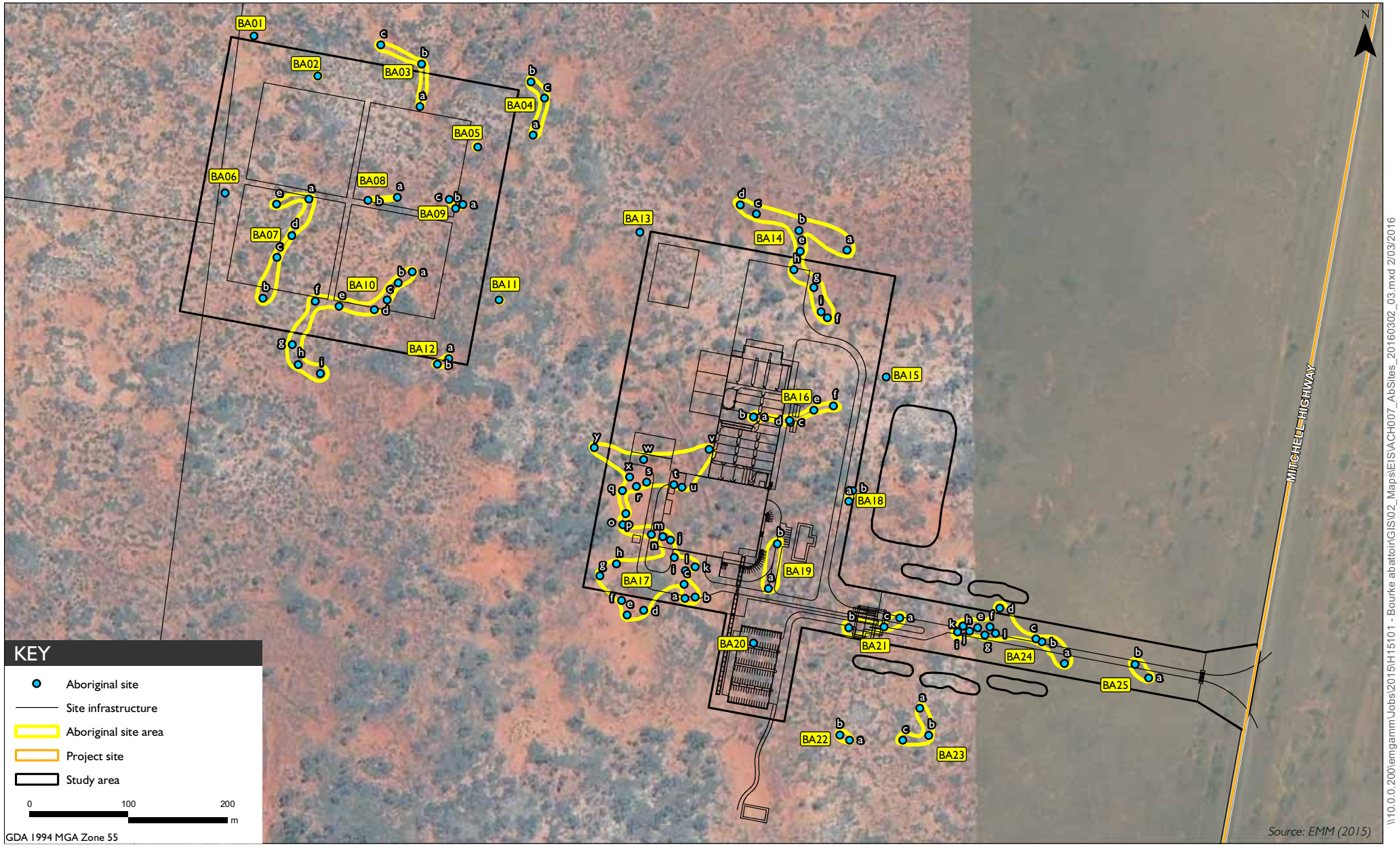
A field survey was conducted on 12 January 2016. The survey team walked a series of survey transects, spaced between 10-20 m apart. This method was considered to be suitable as visibility and exposure were high across the site due to land clearance and erosion. It allowed for approximately 40% of the study area to be covered and provided enough evidence to characterise the archaeological record. The survey team targeted ground exposures such as erosion scalds, and animal tracks, which provided good ground surface visibility for the detection of Aboriginal objects, primarily stone artefacts. All mature trees were inspected for scars of Aboriginal origin.

The survey team identified a total of 184 stone artefacts, divided between 25 individual Aboriginal sites as defined by the presence of one or more Aboriginal objects on the ground surface. The Aboriginal sites ranged in area from 1 m^2 to 6,000 m^2 and all comprised stone artefacts, with 20 consisting of open stone artefact sites and 5 being isolated finds. The Aboriginal site locations are shown on Figure 12.2. AHIMS site cards for all the sites recorded during the survey were submitted to OEH, and are provided in Appendix B of the ACHA (refer Appendix J).

The results of the field survey show that the study area is characterised by a continuous scatter of stone artefacts across the surface of the landscape. This indicates that the area experienced repeated occupation over an extended period of time, and is supported by the availability of raw material (silcrete) for creating flaked stone tools.

Whilst numerous artefacts were found, surface artefact densities do not appear to be indicative of subsurface artefact deposits, as the nature of the soil is skeletal and highly eroded.

Following completion of the field work and during detailed design of the project, the opportunity to beneficially re-use the treated effluent from the wastewater treatment plant to irrigate crops was identified. The irrigation area was not surveyed by EMM or RAPs because initially no ground disturbance activities were proposed in this area. This area will require vegetation clearance and ploughing to support cultivation. Subsequently, the RAPs were sent a letter on 18 February 2016 providing information on the additional ground disturbance, the potential impacts to unknown Aboriginal objects in the irrigation area and appropriate management recommendations that were consistent with those presented in the draft ACHA issued to RAPs on 29 January 2016. Each RAP was also called on 18 February 2016 to inform them of the irrigation area and seek any comments they wished to provide. No issues were raised regarding the proposed management recommendations.



EMM

Aboriginal site results

Bourke Small Stock Abattoir

Environmental Impact Statement

Figure 12.2

Photograph 12.1 **A selection of flaked stone artefacts found within a 10x15 m area on a stony scald exposure (BA03c)**

12.4 Impact assessment

12.4.1 Cultural heritage values

The Australia ICOMOS Burra Charter 2013 defines cultural significance as follows:

> Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups (ICOMOS 2013).

Places which have non-archaeological Aboriginal heritage values (or 'intangible' values) are places which have meaning in accordance with memory or tradition but are not associated with cultural objects. Research and consultation with the Aboriginal community was conducted to determine whether any socio-cultural heritage value relates specifically to the study area regardless of archaeological evidence. Comments were received regarding the cultural significance of the project site from Murrawarri elder Fred Hooper, and Phillip Sullivan (BACWP), who identified a Gurri (wild orange tree) within the study area as an item of socio-cultural significance. This tree is not culturally modified (scared tree) and is therefore not strictly an Aboriginal object, however, this tree retains cultural value to contemporary Aboriginal groups and measures will be taken to avoid impact (refer Table 12.2).

12.4.2 Scientific value

The scientific value of an Aboriginal site is assessed according to the research potential of a site, as well as rarity, integrity and representativeness, and is identified as 'low', 'moderate' or 'high'. The assessment of scientific significance for sites within the study area determined that there are a total of 21 sites of low significance and four sites of moderate significance. No sites of high significance were identified. The full assessment of significance is documented in Table 8.1 in the ACHA report (EMM 2016c, refer Appendix J).

12.4.3 Impacts to sites

Out of the 25 Aboriginal sites identified during the archaeological survey, 12 will experience total loss and six will be subject to partial loss, as can be seen on Figure 12.2. The remaining seven are outside the area of disturbance and will not be affected.

i Measures to minimise harm and alternatives

The archaeological record in the study area is of low to moderate archaeological significance.

Moving the location of the abattoir and associated infrastructure is unlikely to result in a lower impact on Aboriginal sites, given the scale and distribution of stone artefacts across the landscape. Therefore, it is likely that moving the project footprint within the project boundaries would result in a similar level of impacts to Aboriginal sites, as the landscape is largely unchanging within these boundaries.

ii Ecologically sustainable development

Aboriginal heritage management is based on the principle of intergenerational equity which has the intention to ensure present generations consider future generations when making management decisions. This principle is generally the most relevant part of the notion of ecologically sustainable development (ESD) when considering Aboriginal heritage management.

While it is acknowledged that the project will result in some impact to Aboriginal heritage, the proposed management measures describe in Section 12.5 will provide detailed information about the Aboriginal heritage of the project site to ensure all information about the Aboriginal history of the area is not lost. This will help to achieve intergenerational equity by allowing retention of cultural materials for the enjoyment and education of future generations.

iii Cumulative impact within the region

No substantial cumulative impact is identified as a result of the project. The footprint of the project relative to the landscape form, at 55.3 ha, is small.

Taking into account the continuous distribution of artefacts across the area to be impacted, it is reasonable to assume that the archaeological resource in the surrounding area will be comparable. However the area as a whole is under investigated and sites which have been recorded in the area tend to be much closer to the Darling River and alluvial landforms. The management and mitigation of impacted sites through surface collection and consultation with the Aboriginal community will contribute to our understanding of the Aboriginal past in this region.

12.5 Mitigation and management

12.5.1 Preparation of an Aboriginal Heritage Management Plan

An Aboriginal Heritage Management Plan (AHMP) will be prepared for the project in consultation with OEH and the RAPs, and will provide details of:

- all Aboriginal sites identified for the project;
- management measures and their progress towards completion;
- continuing consultation and involvement of registered Aboriginal parties;

- protocols for newly identified sites;
- protocols for suspected human skeletal material; and
- provisions for review and updates of the AHMP.

Avoidance of Aboriginal sites is a preferred management option as it ensures Aboriginal sites and their landscape information will be preserved for future generations. Seven Aboriginal sites; BA01, BA04, BA11, BA13, BA15, BA22 and BA23, will be avoided by the project as they occur outside the project disturbance boundaries. Management of the remaining artefacts within the project footprint is described below.

12.5.2 Salvage of artefacts

While Aboriginal sites cannot be replaced once lost, the salvage of Aboriginal objects that will be impacted by the project will provide a tangible link to these sites. Furthermore, those salvaged materials can be studied to help understand other Aboriginal sites present in the landscape and to add to the growing body of information about past Australian Aboriginal life.

All Aboriginal sites in the project disturbance footprint subject to impact will be collected by a qualified archaeologist and RAPs, the procedure for which is detailed in the ACHA (Appendix J). This will involve surface collection of stone artefacts of the Aboriginal sites subject to total loss and partial loss. It is recommended that surface collection of the sites be conducted only within the boundary of the study area (even if the Aboriginal site extends beyond the study area). This is because artefacts are consistently scattered throughout the landscape and it is likely that Aboriginal site boundaries could extend well beyond the study area. It is preferable to avoid disturbance to Aboriginal sites where possible and for this reason, only artefacts within the study area will be collected. Accordingly, 12 complete sites will be collected: BA02, BA05, BA06, BA07, BA08, BA09, BA16, BA18, BA19, BA20, BA21, BA25; and six sites partially collected: BA03, BA10, BA12, BA14, BA17, BA24 (refer Figure 12.2).

Subsurface testing is not recommended by the ACHA (EMM 2016c) as the flat stony plains of the study area are characterised by soils that are eroded and skeletal and as such, have a low potential for subsurface deposition.

In the event that known or suspected human skeletal remains are encountered during the activity, the procedures detailed in the ACHA will be implemented (Appendix J).

12.5.3 Aboriginal keeping place

A keeping place is a designated secure area with the express purpose of storing and curating Aboriginal cultural materials and their associated documentation. With the agreement of the RAPs, a dedicated storage facility will be established within the on-site offices of the project as a keeping place. Murrawarri Traditional Council State have supported the establishment of a keeping place (refer Section 12.5.4) and recommended that a selection of the collected stone artefacts is put on display within the on-site keeping place.

This facility will store all Aboriginal stone artefacts collected from the project. All associated reports and records in a bound hard copy and digital form will be stored in close proximity to the artefacts. All materials will be held in a locked cabinet (both those objects on display and those in storage) with access managed by a nominated senior staff member.

12.5.4 Recommendations by Murrawarri elder Fred Hooper

As described in Section 12.2, Fred Hooper provided a report in which a number of recommendations were made regarding the management of Aboriginal sites in the project's disturbance footprint. These recommendations will be implemented by CAPRA, and are summarised in Table 12.2.

Table 12.2 Recommendations of Murrawarri elder Fred Hooper

Recommendation	Response
The access road be moved south slightly to avoid the Gurri tree (also known as a wild orange tree – *Capparis mitchellii)*	The access road was surveyed with a 10 m buffer so that adjustments could be made. The Gurri tree will now be avoided.
That once the study area is fenced and demarcated, at least three Murrawarri decendents clear the site (collect) all artefacts that are in the disturbance footprint.	All known sites and additional artefacts identified during the salvage collection fieldwork will be collected by RAPs and recorded by archaeologists. The number of RAP site officers present on fieldwork will be discussed during the preparation of the AHMP.
All artefacts collected be kept and presented on display in the project site office with an interpretation display board.	As described in section 12.3.5, this recommendation will be followed. However, depending on the number of artefacts collected, a representative sample may be more appropriate for display with the remaining artefacts kept in a secure storage facility.

12.5.5 Irrigation area

Measures to be implemented in the irrigation area in the project site (refer figure 1.2) are listed below.

- Survey of the irrigation area - the 38 ha irrigation area will be surveyed prior to vegetation clearance and ploughing. All stone artefacts will be recorded and collected by a team of RAPs and qualified archaeologists. The collection method will follow that proposed for stone artefacts in the remainder of the study area as outlined in Section 12.5.2.

- Avoidance of Aboriginal sites - if Aboriginal objects other than stone artefacts, or Aboriginal places are identified during in the irrigation area (such as hearths, modified trees and stone arrangements), the following procedure will be undertaken:

  - the site will be left in-situ and will not be collected or moved;

  - the site will be recorded by a qualified archaeologist, including marking their GPS coordinates;

  - once recorded, the boundary of the site will be demarcated using temporary fencing equipment; and

  - these sites will be actively managed through fencing and avoidance and the area within the demarcated boundary and will not be subject to vegetation clearance or ploughing.

- Although avoidance will be the primary management measure, if impacts to certain sites cannot be avoided alternative management measures proportionate to the significance of the site will be developed in consultation with RAPs and will be consistent with the management measures for new sites discovered during salvage.

12.6 Conclusion

The Aboriginal cultural heritage values within the study area were assessed through consultation with Aboriginal groups and field survey.

The field survey identified 25 Aboriginal sites within the study area, comprising stone artefacts across a range of sites of varied size, from 1 m^2 to 6,000 m^2. Subsurface deposits are considered of low potential given the soil conditions in the study area.

A majority of the Aboriginal sites identified were assessed to have low archaeological significance; however four out of 25 were assessed as having moderate significance. No sites were assessed to have high significance.

Eighteen Aboriginal sites will be impacted to some degree by the project. All of the identified artefacts within the disturbance footprint of the project will be salvaged in consultation with the RAPs by surface artefact collection and detailed recording. The remaining seven identified sites will be avoided.

13 Water resources

13.1 Introduction

Potential impacts of the project on surface water and groundwater resources have been assessed, as well as potential impacts in relation to flooding, and measures identified to mitigate and minimise potential impacts if required.

13.2 Existing environment

13.2.1 Surface water

On a regional scale, the project site is located within the catchment of the Darling River, a large tenth order stream which flows from its source in south-eastern Queensland through central western NSW, including the town of Bourke, to its confluence with the Murray River at Wentworth.

At a local level, no wetlands, rivers or streams, either permanent or ephemeral, occur in the project site. The nearest drainage line is the Darling River, flowing in a south-westerly direction to the east of the site; approximately 2.5 km from the project site at its closest point (refer Figure 1.2). Whiskey Creek, a tributary of the Darling River and a first order stream, lies north east of the project site, approximately 4.5 km away at its closest point. The project site lies outside the Darling River floodplain.

Several swamps occur to the north of the project site, the closest of which is 3 km away. Polygonum Swamp and the Big Billabong are on the Darling River, approximately 11 km south of the project site. No waterways are present in the project site that connect to these wetlands.

13.2.2 Groundwater

The project site is within the area covered by the Barwon Darling Unregulated and Alluvial Water Sources Water Sharing Plan 2012.

A search of the Bureau of Meteorology Australian Groundwater Explorer identified one registered groundwater bore (GW096102.1.1) around 1.3 km east of the project site boundary, which was constructed in 2000 for use as a monitoring bore. The bore was drilled to 14.7m. No further information is available. The next nearest bore is located approximately 3 km to the south-west of the project site, and was drilled in 1936 to a depth of 267.9 m as a stock and domestic bore. The status of this bore is unknown.

Subsurface investigations were undertaken as part of the effluent management study (Envirowest 2016, refer Appendix K). Five boreholes were drilled within the project site with a truck mounted auger drill to a depth of 8.8 m or drill refusal due to rock. No free groundwater was encountered. Groundwater is therefore understood to be at greater depths than 8.8 m in the project site.

Groundwater vulnerability in the area is very low due to the absence of shallow aquifers. The site has a low rainfall and deep infiltration does not occur (Envirowest 2016).

13.3 Potential impacts to water resources

Given the absence of surface water drainage lines in and surrounding the project site, no impacts to surface water resources are anticipated.

As described in Chapter 2, irrigation of around 38 ha of land with treated effluent within the project site will occur. An effluent management study has been completed (Envirowest 2016) and recommendations made to ensure irrigation is carried out in a manner to ensure impacts on water resources do not occur. The irrigation method will ensure droplet size is controlled to reduce spray drift and irrigation scheduling will ensure irrigation only occurs when the soil and crop require moisture, minimising the potential for runoff from the area. A 15 m wide vegetative buffer zone consisting of grasses, shrubs and trees will be maintained immediately downslope of the irrigation area to slow down and capture any runoff that occurs from the irrigation area. As such no offsite impacts on water resources as a result of the irrigation area are anticipated. Further information on the outcomes of the effluent irrigation study is provided in Chapter 14.

Drilling conducted on site found no groundwater to 8.8 m. During construction, excavation will be required for construction of the wastewater treatment ponds; however this excavation will not exceed 3 m. No interception of groundwater is anticipated.

Further, all wastewater produced by the abattoir will be contained in the closed wastewater collection system. The wastewater treatment ponds will also be lined with an EPDM synthetic rubber liner as discussed in Section 2.10. No impacts on groundwater are anticipated as a result of the project.

13.4 Flooding

In relation to flooding, the *Bourke Shire Development Control Plan 2012* states the following:

> 3.2. Flooding
>
> 3.2.1. Flood Affected Land
>
> A significant amount of land along the Darling River and its tributaries is floodprone.
>
> The Bourke Shire LEP states that land at or below the flood planning level the flooding provisions of the LEP apply. Council's adopted 1:100 ARI flood is the level of the 1974 flood.
>
> As a general rule, flood affected land within the Shire is that land that is grey soil adjacent to the Darling River and its tributaries. Red soil is generally considered not to be floodprone.
>
> If a development is proposed for land on the grey soil or is, in the opinion of a senior officer of the Council, likely to be flood affected, it is deemed to be flood affected land for the purposes of this DCP.

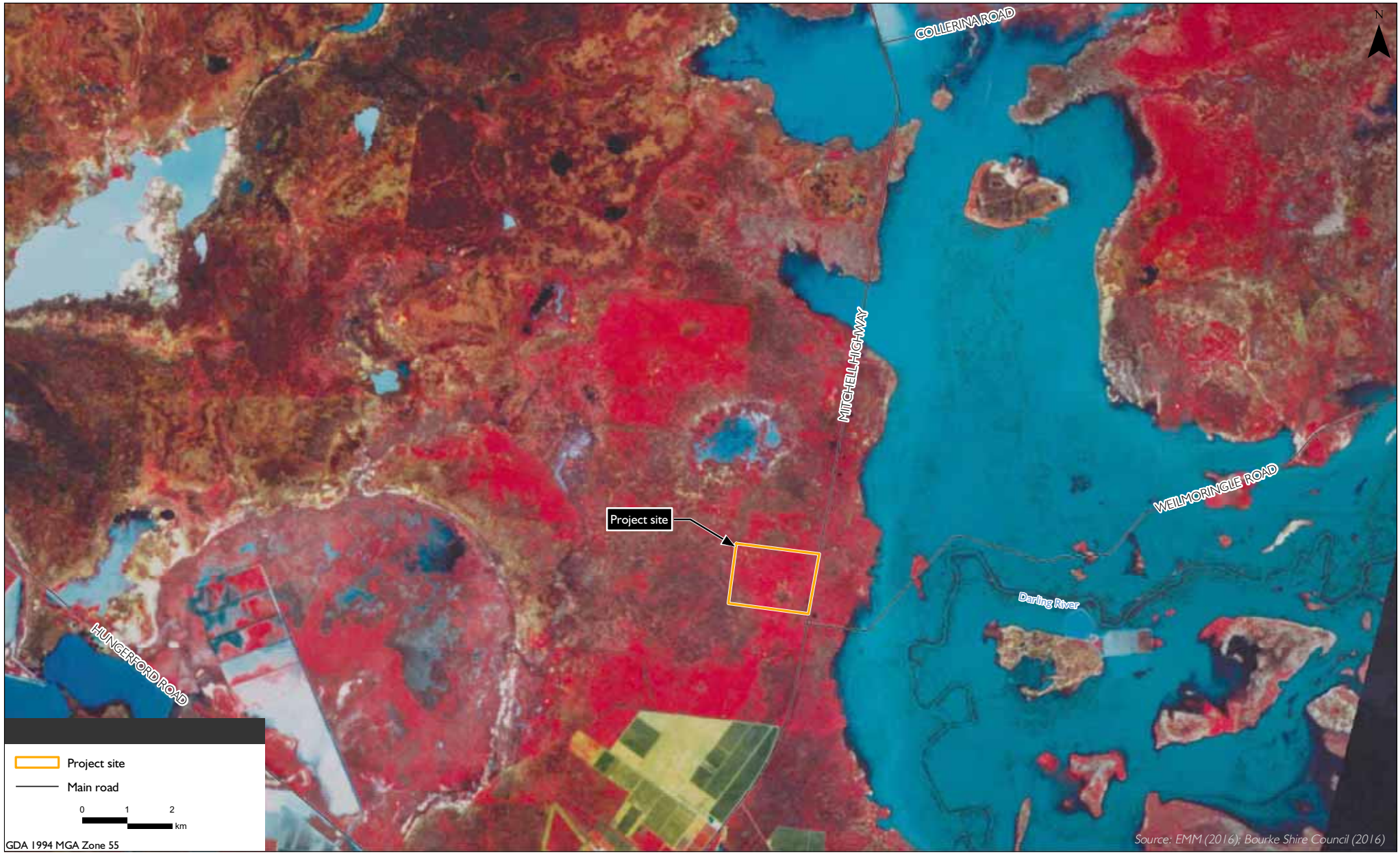
Based on the above, the project site is not on flood prone land for the reasons listed below.

- The 1974 flood, which is Council's adopted 1:100 annual recurrence interval (ARI) flood, reached a gauge height of 14.08 m at Bourke. Whilst flood imagery of the 1974 flood is not available, imagery of the 1998 flood (refer Figure 13.1) which reached a height of 13.79 m at Bourke, shows the flood did not affect the project site.

- The 1974 flood was 0.29 m higher than the 1998 flood. The Mitchell Highway runs north-south between the project site (which is to the west of the Highway) and the Darling River and its associated floodplain (to the east). Detailed survey of the project site showed the highway sits approximately 1 m higher than the surrounding landscape in the vicinity of the project site, this being higher than the additional 0.29 m of the 1974 flood.

- The project site is not located on the grey soil adjacent to the Darling River, but rather contains the red soils, which as stated in the DCP are not generally flood prone.

- Notwithstanding all of the above, the abattoir buildings will be constructed 1,450 mm above the natural ground surface, providing further protection against the risk of flooding affecting the site.



EMM

Extent of flooding in 1998 flood event

Bourke Small Stock Abattoir

Environmental Impact Statement

Figure 13.1

13.5 Mitigation and management

Whilst impacts to water resources are not anticipated as a result of the project, the following mitigation and management measures will be implemented to ensure the risk of impacts is minimised.

- During the construction phase appropriate erosion and sediment control measures will be put into place as follows:
    - temporary erosion and sediment control structures, such as hay bales and silt fencing, will be used to prevent soil loss and sediment-laden runoff from leaving the project site in accordance with *Managing Urban Stormwater: Soils and Construction, Volume 1* (Landcom 2004) (the Blue Book);
    - all clean surface water from upslope of construction areas will be diverted around areas of disturbance;
    - areas disturbed as part of construction activities that are not part of the final footprint of the project will be promptly revegetated; and
    - a regular maintenance program will be implemented to ensure the continued integrity of the temporary erosion and sediment control structures during construction.
- Irrigation will be undertaken in accordance with the recommendations of the effluent management study (refer Chapter 14 and Appendix K).
- A 15 m wide vegetative buffer zone consisting of grasses, shrubs and trees will be maintained immediately downslope of the irrigation area to slow down and capture any runoff that occurs from the irrigation area.
- The wastewater treatment ponds will be lined with an EPDM synthetic rubber liner so as to prevent any seepage occurring.
- Storage areas for all liquids will be appropriately bunded.
- Spill kits including absorbing materials will be provided nearby handling and storage areas.

In order to minimise the demand on the BSC reticulated water supply and reduce the environmental footprint of the project, the following measures in relation to water use will also be undertaken:

- regular inspections of pipes and connections to ensure there is no leakage occurring;
- use of high impact, low flow nozzles where high pressure is required;
- dry collection of manure;
- dry cleaning of equipment prior to wash down; and
- the order of wash down procedures will be prioritised, eg stands, walls and then the floor;

Monitoring of the treated effluent will also be undertaken to ensure the system is operating properly, as described in Section 14.4.

14 Wastewater

14.1 Introduction

The SEARs require a description of how wastewater produced by the project will be managed. The specific requirements relating to wastewater are as follows:

- a detailed description of wastewater treatment requirements for the development including details of the volume of wastewater generated, treated, reused/recycled, or stored on site;
- details of key pollutant concentrations of the wastewater before and after treatment with reference to relevant water quality guidelines;
- details of the proposed irrigation area, including baseline data on soil characteristics and a technical assessment of the suitability of the soil to sustain on-going wastewater irrigation;
- an Irrigation Management Plan that details proposed irrigation practices and includes a detailed soil nutrient and water balance; and
- a detailed assessment of wastewater management strategies in accordance with relevant guidelines.

An effluent management study was prepared by Envirowest to address the SEARs above. As described in Chapter 2, the project will produce approximately 700 kL of wastewater per day. This wastewater will be treated as per the process described in Chapter 2, and the effluent reused via irrigation of paddocks within the project site. The effluent management study included a site and soil assessment to determine the suitability of the proposed irrigation area for the application of effluent by irrigation in accordance with the *Use of Effluent by Irrigation Environmental Guidelines* (DEC 2004) (herein referred to as the irrigation guidelines).

The full technical report prepared by Envirowest (2016) is attached in Appendix K, and a summary of the key findings and recommendations summarised in the sub-sections below.

14.2 Existing environment

As described in Chapter 3, the climate is typical of a semi-arid environment with an average annual rainfall of 325 mm with monthly rainfall varying between 12 and 41 mm. Temperature varies from mean maximum in January of 36.6°C to a minimum in July of 4.6°C. Monthly evaporation varies between 60 and 300 mm with potential evaporation of over 2,000 mm annually.

The terrain is level to very gently inclined lower-slope with a slope of 1%. The site has a slight southern aspect and a high exposure. The site has low flood potential as it is not situated in the Darling River floodplain. No seasonal or permanent streams are located on the site. Minimal surface run-on and run-off occurs due to the level to very gently inclined topography and sandy clay soil on the site.

14.2.1 Soils

The existing nature of the soils within the project site has been characterised through the collection of soil samples for profile description and determination of characteristics by laboratory analysis. Fourteen boreholes were drilled, and 17 discrete soil samples collected on a systematic pattern from the assessment area on a grid pattern of approximately 200-300m. The sampling density was undertaken in accordance with McKenzie *et.al* 2008. Five boreholes were drilled to depths greater than the required depth of 1.5m to test for shallow groundwater and bedrock.

The results of the soil assessment showed that the site consists of plains with brown cracking and non-cracking clays, and grey cracking clays. Shallow crabhole gilgais were identified. Depth to bedrock was greater than 8.8 m, and no erosion, surface rocks or rock outcrops were found in the proposed irrigation area. Soil pH is neutral to moderately alkaline.

Salt tolerant vegetation was observed in the project site. Topsoils are non-saline to moderately saline while subsoils are moderately saline to extremely saline. The salinity of subsoils is expected to impact salt sensitive plants.

The soil profile is generally strongly structured sandy clay topsoil to a depth of 300 mm over a strongly structured sandy to silty clay subsoil to greater than 8,000 mm. The major irrigation zone is expected to be the upper 300 mm as this is the rooting depth. The permeability of the sandy clay topsoil is estimated to be in the range of 5 mm/hour to 20 mm/hour.

The available water holding capacity of the topsoil is estimated to range between 120 and 220 mm of water per metre of soil. The 0.3 m soil depth has capacity to hold 36 mm of water.

The project site soils also have the following characteristics:

- low calcium and magnesium levels;
- highly sodic;
- slightly to moderately dispersive topsoils;
- slightly dispersive subsoils;
- phosphorus sorption of 4,500 kg/ha;
- strong soil structure; and
- moderate bulk density.

14.2.2 Expected treated effluent quality

Untreated effluent is classified into low, medium and high strengths by the irrigation guidelines (DEC 2004), as reproduced in Table 14.1, with the strength determined by levels of nitrogen, phosphorus, biological oxygen demand (BOD_5), total dissolved solids (TDS) and other potential contaminants. Classification is undertaken according to the limiting constituent, and different strengths have limitations for irrigation.

Table 14.1 Classification of effluent for environmental management (DEC 2004)

Constituent	Strength (average concentration mg/L)		
	Low	Medium	High
Total nitrogen	<50	50-100	>100
Total phosphorus	<10	10-20	>20
BOD_5	<40	40-1,500	>1,500
TDS	<600	600-1,000	>1,000-2,500
Other pollutants	Effluent with more than 5 times the ANZECC and ARMCANZ (2000) long-term water quality trigger values for irrigation waters must be considered strength for the purpose of establishing a strength class for runoff and discharge controls and will require close examination to ensure soil is not contaminated.		
Grease and oil	Effluent with more than 1,500mg/L of grease and oil must be considered high strength and irrigation rates and practices must be managed to ensure soil and vegetation is not damaged.		

The effluent will therefore be classified as low to moderate strength. The quality of the wastewater anticipated to be generated by the abattoir, and subsequently processed through the wastewater treatment plant, is presented in Table 14.2. In addition, the predicted treated effluent quality is also shown, as provided by the wastewater treatment plant manufacturer.

Table 14.2 Anticipated influent and effluent quality

Constituents	Influent (mg/L)	Treated effluent (mg/L)
BOD	2,000	<10
TSS	1,400	<10
TDS	3,500	1200
Fats, oils and greases (FOG)	790-3,350	<2
Total Kjeldahl Nitrogen (TKN)	230-260	45
Ammonia (NH_3)	<5	<5
Total Phosphorus (TP)	30-50	10
pH	6.5-8.0	7-8.0

Levels of synthetic compounds, metals, boron, bicarbonate, alkalinity, chloride, chlorine, potassium, and herbicides in the effluent are expected to be low and suitable for irrigation. In relation to salinity, primary and secondary treatment of the effluent will reduce the amount of TDS in the wastewater to 1,200mg/L, allowing disposal via land irrigation.

14.2.3 Area available for irrigation

Buffer areas are recommended to separate irrigation areas and irrigation infrastructure from neighbours and sensitive environments (DEC 2004). Table 14.3 highlights the recommended buffer distances to neighbours and sensitive environments for low strength effluent.

Table 14.3 Recommended buffer distances to neighbours and sensitive environments

Sensitive area	Buffer distance (m)	Comment
Natural waterbodies	50	
Other water	Site specific	
Domestic wells	Site specific	No groundwater bores are within 1 km of the site
Infrastructure[1]	50	
Other sensitive areas	250	
Property boundary	12	

Note: 1.Houses, roads, pubic open spaces.

After the exclusion of buffer zones and separation distances, approximately 89 ha of the total lot size (246 ha) will be available for irrigation with treated effluent.

14.3 Irrigation assessment

14.3.1 Limitations for irrigation

A summary of the limitations identified on the site to the application of effluent is presented in Table 14.4.

Table 14.4 Site and soil limitations to the application of effluent

Property	Limitation (nil or slight/moderate/severe)
Slope (%)	Nil
Flooding	Nil
Landform	Nil
Surface rock outcrop	Nil
Exchangeable sodium percentage (0-400mm)	Slight to severe
Exchangeable sodium percentage (40-1000mm)	Severe
Electrical conductivity (ECe) (0-700mm)	Slight to moderate
Electrical conductivity (ECe) (700-1000mm)	Severe
Depth to seasonal high water table	Nil
Depth to bedrock or hardpan	Nil
Saturated hydraulic conductivity	Slight
Available waste holding capacity	Nil
Soil pH	Slight to moderate
Effective cation exchange capacity	Nil
Emerson aggregate test	Moderate
Phosphorus sorption	Moderate

14.3.2 Irrigation method and scheduling

Irrigation will be undertaken via spray irrigation. A pivot irrigation system will be utilised with an approximate diameter of 100m. To prevent drift, droplet size will be controlled by preventing excessively high pressure in the system design. Irrigation will be applied when the soil moisture is in deficit and when the crop can utilise the irrigation water, and before the proposed crop becomes stressed. This is expected to be at around 80% of the available water holding capacity of the soil. Soil moisture will be determined prior to irrigation events.

Irrigation will be undertaken year round and based on soil moisture and temperature. Higher irrigation rates are expected in summer and lower rates in winter. Irrigation will be applied at a sustainable rate to prevent accumulation of adverse soil impacts.

Approximately 700 kL of wastewater will be produced daily, equating to around 175 ML of wastewater to be treated and irrigated per year. Effluent will need to be stored over the winter months when less irrigation is required and used during the summer months when irrigation exceeds effluent flow rate. The capacity of the holding dam will need to be sufficient to allow storage for up to 28 days where irrigation will not occur due to high soil moisture.

14.3.3 Hydraulic and nutrient modelling

A hydraulic balance and nutrient balances for BOD, nitrogen, and phosphorus, are presented in Appendix 6, 7, 8 and 9 respectively, with the results discussed below and summarised in Table 14.5.

Nitrogen utilised by summer and winter crops will be 50 mg/L. As noted in Section 14.2.2, the anticipated nitrogen concentration of the effluent is 45 mg/L. The nitrogen balance calculated by Envirowest (2016) determined that nitrogen will be the limiting factor for irrigation, and will require 38 ha of irrigation area for removal.

The nutrient balance conducted for phosphorus also determined that an irrigation area of 38 ha is required to dispose of phosphorus, over a period of 34 years.

Based on a critical loading rate of BOD of 930kg/ha/month, and a BOD concentration of the effluent of 10mg/L, organic matter will require 0.2ha for removal.

Table 14.5 Required irrigation area based on limiting factors in simulation model

Component	Irrigation area (ha)
Hydraulic	13
Organic matter	0.2
Nitrogen	**38**
Phosphorus	38*

*Note: *over 34 years*

14.4 Management and mitigation measures

The risks associated with the irrigation of effluent within project site, and appropriate control measures were identified by Envirowest (2016) and are summarised in Table 14.6.

Table 14.6 Risks and control measures for effluent irrigation

Risk	Control
Human ingestion	Restrict public access
	Signage indicating treated effluent used to irrigate
	Irrigate at night
	Irrigate when low wind
Soil/water pollution	Monitor representative soil for nitrogen, phosphorus, exchangeable sodium percentage, pH, EC, heavy metals and pesticides
	Monitor treated effluent for irrigation volumes, BOD, nitrogen (total), ammonia, oxidised nitrogen, oil and grease, phosphorus (total), phosphate, TSS, TDS and pH
	Monitor soil moisture
	No irrigation during storm events
Off-site movement - spray drift	Buffer zones
	Irrigate when low wind
	Irrigate at night
Water logging	Monitor soil moisture
	Monitor irrigation area
	Application of gypsum and deep ripping
	Maintenance of the vegetation
	Planting of crops with strong rooting systems
Sodicity	Application of gypsum and deep ripping
	Maintenance of vegetation cover
	No till agronomic management
	Selection of crops with vigorous establishment

14.4.1 Monitoring

A rigorous monitoring program will be conducted during the commissioning phase of the irrigation program, as recommended by DEC (2004). Monitoring to be undertaken is presented in Table 14.7.

Table 14.7 Monitoring requirements for low to moderate strength effluent

Analyte	Frequency
Volume irrigated	Daily
BOD	Monthly
Nitrogen (total)	Monthly
Ammonia	Monthly
Oxidised nitrogen	Monthly
Oil and grease	Monthly
Phosphorus (total)	Monthly
Phosphate	Monthly
TSS	Monthly
TDS	Monthly
pH	Monthly

Soil sampling will also be undertaken in accordance with the recommendation in the irrigation guidelines (DEC 2004), as follows:

- surface soil – a composite soil sample of 40 cores per 1-2 ha, taken at a depth of 0-10 cm; and
- soil profile – composite soil samples of five cores at four depth intervals to 1 m, within a 5 m diameter plot. The four depths will fall within 0-20, 20-40, 40-70 and 70-100 cm depth increments.

Evaluation of the trends in the soil properties over time will also be undertaken, as well as inspection of the irrigation area prior each irrigation event. This will allow determination of soil moisture and therefore water requirements of the plants. The frequency of sampling and monitoring for soil is shown in Table 14.8.

Table 14.8 Frequency of soil monitoring and monitoring of irrigation areas

	Frequency of sampling	
Analyte	**Surface soil**	**Soil profile**
pH	Annually	Annually
Electrical conductivity (dS/m)	Annually	Annually
Nitrate – N (mg/kg)	Annually	Annually
Total N (mg/kg)	After 3 years	N/A
Available P (mg/kg)	Annually	N/A
Total P (mg/kg)	After 3 years	Every 3 years
Exchangeable sodium percentage	Annually	Every 3 years
Heavy metals and pesticides (mg/kg)	After 10 years	N/A
P sorption capacity (kg/ha)	3 years	3 years

As noted in Section 13.2.2, groundwater is located at a depth of greater than 8 m and is not expected to be impacted by the project. Notwithstanding, a groundwater monitoring network will be installed to monitor the local groundwater and identify impacts if they were to occur. The groundwater monitoring network will include:

- One monitoring bore located down hydraulic gradient from the wastewater holding ponds.
- One monitoring bore located up hydraulic gradient from the wastewater holding ponds.
- The monitoring bores will be constructed of 50mm casing with a slotted section. Gravel will be placed around the casing with a bentonite seal.

Groundwater will be monitored when water is detected in the monitoring wells.

Trigger levels and corresponding actions have been identified for soil, effluent and groundwater monitoring program, as presented in Table 14.9.

Table 14.9 Monitoring program trigger levels and actions

Parameter	Criteria	Action
Effluent analytes	Greater than 2x design levels	Check treatment process
Soil analytes	Greater than 2x baseline levels	Check irrigation scheduling, application of lime or gypsum
Monitoring wells	Greater than 2x baseline levels	Investigation

Monitoring of surface water downstream of the irrigation areas is not required due to the minimal run-off from the flat topography. However, a 15 m wide vegetative buffer zone consisting of grasses, shrubs and trees will be maintained immediately downslope of the irrigation area to ensure any runoff is slowed down and captured. Stormwater runoff will be directed around the irrigation area by the use of earthen banks.

Monitoring of vegetation will be undertaken on an annual basis. This will involve visual assessments of crop species and bare areas to provide an indication of the presence of soil toxicities and soil degradation.

14.4.2 Management of runoff

No run-off is anticipated from the effluent irrigation area. As noted above the irrigation area will be bunded to prevent both stormwater runoff entering the irrigation area, and irrigated effluent moving away from the irrigation area. A cut off trench will be constructed around the irrigation block. The rate of effluent applied to the irrigation areas will not exceed permeability, which is estimated to be 20mm/hour. The quantity of effluent applied to irrigation areas will not exceed evaporation, and will occur when soil moisture is in deficit which is anticipated to be the case throughout all months of the year.

14.5 Conclusion

The effluent from the abattoir will be treated and classified as low to moderate strength effluent according to the DEC (2004) classification system, and irrigated on crops within the project site. Phosphorus, nitrogen and BOD concentrations have been estimated based on data provided by the wastewater treatment system supplier for the project, identifying nitrogen to be limiting factor for irrigation. The required irrigation area is 38 ha.

The assessed application area is suitable for the reuse of effluent by irrigation. Site limitations will require adoption of mitigation measures such as irrigation scheduling, maintenance of vegetation by crop rotations and regular application of gypsum or lime.

15 Visual amenity

15.1 Introduction

Potential visual amenity impacts of the project have been assessed to determine the likely significance it will have on people living and working in, or travelling through the landscape within and surrounding the project site, and to identify measures to mitigate and minimise potential visual impacts if required.

15.2 Existing environment

The project site is situated within a remote rural area in the Bourke LGA, approximately 14 km north of the town of Bourke.

As evident in Figure 1.2 and Photographs 15.1 and 15.2, the project site and its surrounds have been impacted by historical clearing and agricultural activities, with only sparse trees remaining. However, although remnant trees are sparse and thinly dispersed, they do inhibit views of the project site in several locations. The project site and its surrounds is flat with little to no topographical relief eliminating views of the project site from elevated locations.

The only discernible man-made feature proximate to the project site is the Mitchell Highway (refer to Photograph 15.1). At the project site's eastern boundary, the Mitchell Highway is straight and has a speed limit of 110 km/hr. There are no houses or residences in close proximity to the project site, with the nearest residence located approximately 5.5 km away.

Photograph 15.1 Photograph of the project site

Photograph 15.2 Photograph of the project site

Photograph 15.3 Photograph of the Mitchell Highway corridor

15.3 Methodology

The visual amenity assessment included the following:

- desktop study to asses visual character of the project site and identify view locations within the surrounding area;
- photography of the project site and surrounds; and
- an assessment and determination of visual amenity impacts.

The visual significance of the project on surrounding view locations will result primarily from a combination of the potential visibility of the project infrastructure and the characteristics of the landscape between, and surrounding, any view locations and the project. The potential degree of visibility and resultant visual significance is partly determined by a combination of factors, including:

- the distance between view location and the project site;
- the duration of view from receptor locations toward various constructed elements within the project site;
- the predicted impact of the project site on existing visual amenity;
- the nature of predicted visual impacts; and
- the visual sensitivity of locations from which views towards the project site exist.

15.4 Potential impacts

The potential impact of the project on the visual landscape was assessed and it was determined that the only viewpoint likely to be impacted by the project is the Mitchell Highway. Considering the abattoir will be setback approximately 500 m back from the highway and users are typically travelling at high speeds (110 km/hr) the potential impact on visual amenity from this viewpoint is considered to be negligible.

The nearest residence is approximately 5.5 km from the project site. If unobstructed, this distance represents the limit of eye sight at level ground. With intermediate trees (albeit sparse) obstructing the line of sight, there will be no visual amenity impacts to this residence.

15.5 Mitigation and management

Given that the project will have negligible visual amenity impacts to travellers on the Mitchell Highway, and no impacts to residences, no mitigation measures and management measures are considered necessary. Notwithstanding, landscaping will be undertaken along the access road and around the abattoir buildings.

15.6 Conclusion

The project site is situated within a remote rural area in the Bourke LGA, approximately 5.5 km from the nearest residence. This distance represents the limit of eye sight at ground level when views are unobstructed. Given intermediate trees located between this residence and the project site, no views of the project will be possible.

The only viewpoint that could be impacted by the project is the Mitchell Highway. However, given the abattoir will be setback 500 m from the highway and users are typically travelling at high speeds the potential impact on visual amenity from this viewpoint is considered to be negligible.

16 Greenhouse gas assessment

16.1 Introduction

SLR (2016c) prepared a greenhouse gas assessment (GHG) of the project. A summary of the findings and recommendations is provided below, with the full assessment report attached in Appendix L. The assessment was undertaken in accordance with applicable standards and guidelines, in particular the Australian Government Department of the Environment document, *National Greenhouse Accounts Factors Workbook* (NGA Factors) (DoE, 2015).

16.2 GHG inventories and emission sources

The NGA Factors (DoE, 2015) defines two types of greenhouse gas emissions; direct and indirect. Direct emissions are produced from sources within the boundary of an organisation and as a result of that organisation's activities, such as the consumption of petrol in on-site vehicles. Indirect emissions are generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation (e.g. consumption of purchased electricity) (DoE, 2015). The GHG assessment for the project considers both direct and indirect emissions.

Three 'scopes' of emissions are defined for GHG accounting and reporting purposes, as follows:

- Scope 1: Direct GHG Emissions – are those emissions that occur from sources that are owned or controlled by the applicant, and are principally the result of the generation of electricity, heat or steam, physical or chemical processing, transportation of materials, products, waste and employees, and fugitive emissions.
- Scope 2: Indirect GHG Emissions – are those emissions from the generation of purchased energy products, such as electricity.
- Scope 3: Other Indirect GHG Emissions – are those emissions that are a consequence of the activities of the applicant, but which arise from sources not owned or controlled by them, extraction and production of purchased materials, transportation of purchased fuel and the use of sold products and services.

The scope 1, 2 and 3 emission sources identified for the project are summarised in Table 16.1.

Table 16.1 Project scope 1,2 and 3 emission sources

Scope	Activity	Source
Scope 1	Abattoir operations	Consumption of purchased natural gas
	Wastewater treatment	Wastewater treatment plant
Scope 2	Abattoir operations	Consumption of purchased electricity

Table 16.1 Project scope 1,2 and 3 emission sources

Scope	Activity	Source
Scope 3	Heavy vehicles • Delivery of livestock; • Delivery of consumables; • Removal of meat products from the abattoir; • Removal of meat waste products; • Removal of skins; • Removal of general garbage; and • Maintenance.	Diesel fuel for transport
	Passenger vehicles – employee travel	Unleaded fuel for transport
	Waste • Hair; and • Wastewater solids.	Abattoir wastes

16.3 Potential impacts

The total operational GHG emissions for the project are estimated to be 19,314 t CO_2-e per year. Of this only 5,445 t CO_2-e are direct (Scope 1) emissions, which is associated with the consumption of liquefied natural gas and the production of methane during the wastewater treatment process.

The predicted GHG emissions associated with the project are summarised in 16.2.

Table 16.2 Projected abattoir annual GHG emissions

	Quantity	unit	Emissions (t CO_2-e)
Scope 1			
LNG	41.7	TJ	2,147
Wastewater	175	ML	3,298
Scope 2			
Electricity	4,410,000	kWh	3,704
Scope 3			
Diesel	896	kL	2,438
Gasoline (unleaded fuel)	167	kL	397
Waste	5,637.5	t	7,329
Total			**19,314 t CO_2-e per year**

OEH published the NSW state emissions profile for 2012/2013 as 148.8 million t CO_2-e. Therefore, in the NSW state context the project represents approximately 0.01% of the total state emissions.

16.4 Mitigation measures

GHG mitigation has been considered in the design of the project, particularly in relation to energy efficiency and refrigeration. Refrigerants which do not emit GHG (ammonia and glycol) will be used on site as part of the project.

Additional GHG mitigation measures that may be considered to further reduce GHG emissions are listed below.

- Undertake regular checks of seals on all refrigerated areas.
- A percentage of the total electricity for the site could be offset through purchasing green power from an electricity supplier.
- Sensor lighting could be used in some areas to minimise the number of lights on during all hours of operation.
- Where possible, high efficiency lighting should be used.
- Investigate the option of installing solar panels at the abattoir within three years of commencement of operations.
- All vehicles/plant and machinery should be turned off when not in use and regularly services to ensure efficient operation.
- Truck routes and loading capacity should be designed to reduce the distance and effort required by the vehicles.
- Encourage car-pooling by employees.
- Ensure correct vehicle mass limits not exceeded by use of the heavy vehicle weighbridge.
- Where possible, B5 and E10 fuel should be used in plant and equipment.

16.5 Conclusion

The assessment has determined Scope 1, 2 and key Scope 3 GHG emission estimates for the operation of the project, and found the emissions to be minimal, particularly when compared to the emissions from the state of NSW as a whole. Annual emissions were predicted to be 19,314 t CO2-e from the proposed abattoir. Importantly this represents just 0.01% of the GHG emissions from NSW.

Key elements in the design of the abattoir have ensured that GHG emissions will be minimised where possible, in particular the incorporation of the energy efficient glycol refrigeration system.

17 Hazardous and offensive development

17.1 Introduction

As described in Section 4.2 of this EIS, proposals are required to be considered against SEPP No 33 – Hazardous and Offensive Development to determine if they will be potentially hazardous or offensive development. That is, the development would create an off-site risk or offence to people, property or the environment.

The SEPP requires proponents of such development to prepare a preliminary hazard analysis (PHA) to accompany the development application. The initial step in the process is to screen the development against the dangerous goods criteria in *Applying SEPP 33* (DoP 2011) to determine if the proposal will be hazardous. The purpose of this initial screening is to exclude those developments which do not pose significant risk from more detailed studies.

This initial screening process was conducted for the project, as described in the sub-sections below, finding that the project is not potentially hazardous.

Additionally, the SEPP requires the proponent to consider if a proposal will emit anything potentially offensive, such as significant noise or substances. However, DoP (2011) states that if the EPA considers that licence conditions can be met, the proposal is unlikely to be offensive. Offensive industry is discussed further in the sub-sections below.

This section does not consider hazards to personnel associated with the project, either within the site or outside the site (for example road transport contractors). These factors will be considered under separate work health and safety legislation and regulations, and during detailed design, which will be in accordance with relevant Australian and international standards.

17.2 Potentially hazardous industry

17.2.1 Method

DoP (2011) provides screening threshold quantities for dangerous goods to be stored and used at proposed facilities, using the dangerous goods classifications from the *Australian dangerous goods code* (NTC 2015). Screening quantities and other criteria (such as above ground or underground storage of substances) are provided in Table 3 of DoP (2011) for particular dangerous goods classes.

Figures 5 to 9 in DoP (2011) provide graphs showing the quantity to distance relationship to enable determination of potentially hazardous regions for some flammable or explosive substances. It considers the distance of hazardous good storage/use from publically accessible areas.

Table 3 and Figure 6 were used for this assessment as they provided the appropriate screening thresholds for the hazardous substances proposed to be stored and used at the project site.

DoP (2011) also provides transportation screening thresholds in Table 2 as a proposal may be hazardous if there are large quantities of hazardous substances being regularly transported by truck on public roads.

The hazardous substance quantities and transportation volumes associated with the project are screened below.

17.2.2 Quantity threshold screening

The screening thresholds in Table 17.1 are based on the DoP (2011) quantity thresholds for ammonia and chlorine (Table 5) and quantity versus distance to boundary relationship for class 2.1 pressurised flammable gases (Figure 5).

The project site boundary (Lot 17 in DP 753546) was taken as the distance to publically accessible areas as it will be fenced, which will prevent entry to the project by surrounding land owners and the general public. The access road into the site will be controlled by a boom gate and guard house. The 'other uses' potentially hazardous region in Figure 6 was used as surrounding land uses are agricultural, that is, there are no surrounding sensitive uses such as residential.

Table 17.1 Quantity screening thresholds

Substance	Dangerous good class	Stored quantity	Distance from boundary	Threshold quantity	Threshold distance
Ammonia	2.3	4.5-5 t	>400 m from boundary	5 t[1]	–
Chlorine	2.3	0.92 t	>400 m from boundary	2.5 t[2]	–
Liquefied natural gas (LNG)	2.1	80 kL (equals 40 t at density of 0.5 kg/L)	>400 m from boundary	–	300 m

Notes: 1. From Table 3 in DoP (2011).

2. From Figure 6 in DoP (2011).

As shown in Table 6.1, the quantities of hazardous substances proposed to be stored and used at the project site will be below the threshold quantities in DoP (2011).

17.2.3 Transport threshold screening

The screening thresholds in Table 17.2 are based on the transportation thresholds in Table 2 of DoP (2011). Ammonia is not included in Table 17.2 as the refrigeration system will be charged with ammonia and will, therefore, not be regularly delivered to the project site.

Table 17.2 Transport screening thresholds

Substance	Dangerous good class	Annual truck movements	Quantity per load	SEPP 33 threshold truck movements	SEPP 33 threshold minimum quantity (bulk)
Chlorine	2.3	4	1 t	>100	1 t
LNG	2.1	52	16 t	>500	2 t

As shown in Table 17.2, the proposed annual truck movements and quantities satisfy the DoP (2011) criteria for chlorine.

The annual LNG truck movements will be below the truck movement threshold. However, the quantity per load will be above the minimum bulk quantity threshold. This potential hazard will be reduced by using a specialist gas transport contractor with gas containers, safety and emergency equipment, signage and personal protective equipment provided and maintained in accordance with NTC (2015). Further, there is a low probability of a transport related incident given the comparatively low volume of LNG truck movements.

17.3 Potentially offensive industry

SEPP 33 defines potentially offensive industry as a development which, without the use of management measures, would emit a polluting discharge in a manner which would have a significant adverse impact in the locality or likely future development on other land. DoP (2011) states that if the EPA is satisfied that a proposal can meet the conditions of an EPL, the proposal is not likely to be offensive industry.

As described in Section 4.3.1, the project will require an EPL under the POEO Act, as it will have capacity to slaughter more than 750 t live weight of animals per year with management measures employed to achieve the emissions related conditions in the EPL. Therefore, it is unlikely that the project will qualify as potentially offensive development. Further, as described in Chapter 8, the project will not emit significant noise, with noise levels predicted to be well below the relevant project specific noise criteria at the nearest residence to the project site.

17.4 Conclusion

Comparison of the following to screening thresholds in DoP (2011) demonstrates that the project will not be potentially hazardous development:

- quantities of ammonia and chlorine proposed to be stored and used at the project will satisfy the quantity screening thresholds in Table 3 of DoP (2011);
- quantities of LNG and the distance of LNG storage areas from publicly accessible areas will satisfy the quantity screening thresholds in Table 5 of DoP (2011);
- annual truck movements and quantities per load for the transport of chlorine will satisfy the transport screening thresholds in Table 2 of DoP (2011); and
- annual truck movements for the transport of LNG will be below the movement threshold in Table 2 of DoP (2011). However, the quantity per load will be above the minimum quantity threshold. Potential hazards associated with this will be managed through use of specialist gas transport contractors which comply with NTC (2015).

The project is unlikely to qualify as offensive development as management measures will be implemented to reduce emissions in accordance with the EPL, an application for which will be submitted to the EPA upon receipt of project approval.

A PHA is not required as the project does not satisfy the thresholds to qualify as potentially hazardous or offensive industry.

18 Socio economic considerations

18.1 Introduction

This chapter provides an assessment of the potential socio economic impacts of the project. In terms of economic impacts, it attempts to quantify economic contributions from the project to the local region in terms of both direct and indirect impacts. It also considers likely social impacts to the region based on an analysis of baseline socio economic data and the results of engagement with local community.

18.2 Existing environment

This section provides a broad socio economic profile of both the Bourke LGA and the town of Bourke, which is the largest population centre in the LGA. It is based on data from a range of government sources, including the 2006 Population and Housing Census (the 2006 Census) and 2011 Population and Housing Census (the 2011 Census).

18.2.1 People - demographics and education

In the 2011 Census, there were 2,868 people in the Bourke LGA, and of these 50.8% were male and 49.2% were female. Aboriginal and Torres Strait Islander people made up 30.2% of the population compared 2.5% of the NSW population. In the 2006 Census, there were 3,095 people in the Bourke LGA. As such, there has been a population decline of 227 people (or 7.3%) in the LGA between the two censuses.

Population forecasts undertaken for NSW in 2014 by DP&E predict that the population of the Bourke LGA will continue to decline in the foreseeable future. They predict that the population will decline by 50 people every five years until at least 2031.

In the 2011 Census, there were 2,047 people in the town of Bourke, and of these 48.9% were male and 51.1% were female. Aboriginal and Torres Strait Islander people made up 37.3% of the population. In the 2006 Census, there were 2,145 people in the town of Bourke. As such, there has been a population decline of 98 people (or 4.6%) in the town between the two censuses.

The median age of people in the Bourke LGA was 35 years compared to 38 years in NSW. Children aged 0 - 14 years made up 25.4% of the population and people aged 65 years and over made up 11.8% of the population.

The median age of people in the town of Bourke was 34 years. Children aged 0 - 14 years made up 25.0% of the population and people aged 65 years and over made up 11.1% of the population.

In the Bourke LGA, 35.0% of people were attending an educational institution, compared to 30.9% in NSW. Of these, 25.3% were in primary school, 10.9% in secondary school and 8.7% in a tertiary or technical institution.

In the town of Bourke, 36.1% of people were attending an educational institution. Of these, 23.2% were in primary school, 11.0% in secondary school and 8.5% in a tertiary or technical institution.

18.2.2 People - employment

There were 1,267 people who reported being in the labour force in the week before the 2011 Census night in the Bourke LGA. Of these 67.1% were employed full time, 21.3% were employed part-time and 5.1% were unemployed. This compares to 60.2% employed full time, 28.2% employed part-time and 5.9% unemployed in NSW.

During the week prior to the 2006 Census, 1,428 people reported being in the labour force in the Bourke LGA. Of these 63.9% worked full-time, 20.6% worked part-time, 4.0% were away from work, 3.6% were employed but did not state their hours worked and 7.9% were unemployed. 639 people were not in the labour force.

Employment figures show that while there were less people reported being in the labour force in 2011 compared to 2006 in the Bourke LGA, the unemployment rate dropped from 7.9% to 5.9%.

There were 869 people who reported being in the labour force in the week before the 2011 Census night in the town of Bourke. Of these 64.8% were employed full time, 22.3% were employed part-time and 6.1% were unemployed.

During the week prior to the 2006 Census, 911 people in the town of Bourke reported being in the labour force. Of these 61.0% worked full-time, 20.3% worked part-time, 4.4% were away from work, 4.3% were employed but did not state their hours worked and 10.0% were unemployed. 488 people were not in the labour force.

Similar to the LGA figures, while there were less people reported being in the labour force in 2011 compared to 2006 in the town of Bourke, the unemployment rate dropped from 10% to 6.1%.

Notwithstanding the above, estimates of unemployment provided by the Commonwealth Department of Employment clearly show that the unemployment rate in the Bourke LGA has been increasing. These estimates are provided on a quarterly basis for statistical local areas (SLAs), as well as on a state and metropolitan/non metropolitan basis. The data is disaggregated. SLAs aggregate directly to form the larger spatial units, including LGAs. For Bourke, the Bourke SLA is the same as the Bourke LGA.

The most recently available data is available is for the third quarter of 2015.The data indicates that the unemployment rate in the Bourke LGA was 11.2% in September 2015 compared to 11.9% in September 2014. These quarterly rates were significantly higher than those recorded for NSW, which was 5.7% in September 2014 and 5.9% in September 2015.

The estimates from the Commonwealth Department of Employment indicate a dramatic increase in unemployment in the Bourke LGA between the 2011 Census and 2015.

The most common occupations in the Bourke LGA included managers 21.9%, professionals 17.1%, community and personal service workers 13.7%, clerical and administrative workers 11.2%, and technicians and trades workers 10.3%.

The most common occupations in the town of Bourke included professionals 20.4%, community and personal service workers 17.4%, technicians and trades workers 11.8%, clerical and administrative workers 11.7%, and labourers 11.6%.

Of the employed people in the Bourke LGA, 13.9% worked in sheep, beef cattle and grain farming. other major industries of employment included school education 9.8%, public order and safety services 5.2%, local government administration 5.0% and hospitals 4.6%.

Of the employed people in the town of Bourke, 11.9% worked in school education. Other major industries of employment included public order and safety services 7.6%, local government administration 6.3%, hospitals 5.2% and supermarket and grocery stores 4.9%.

18.2.3 Dwellings

In 2011 in the Bourke LGA, 938 private dwellings (or 80.9%) were occupied and 222 private dwellings (19.1%) were unoccupied. This compares to 90.3% being occupied and 9.7% being unoccupied in NSW. In 2006 in the Bourke LGA, 83.1% of private dwellings were occupied and 16.9% of private dwellings were unoccupied. This indicates a small decrease in occupancy rates between the two census periods.

In 2011 in the town of Bourke, 85.0% of private dwellings were occupied and 15.0% were unoccupied. These rates were the same as the rates recorded in 2006 for the town.

Of occupied private dwellings in the Bourke LGA, 94.9% were separate houses, 0.5% were semi-detached, row or terrace houses, townhouses etc, 2.9% were flats, units or apartments and 1.7% were other dwellings; whilst in the town of Bourke, 94.3% were separate houses, 0.5% were semi-detached, row or terrace houses, townhouses etc, 4.1% were flats, units or apartments and 1.2% were other dwellings.

Of occupied private dwellings in the Bourke LGA, 31.1% were owned outright, 21.8% were owned with a mortgage and 39.6% were rented. In the town of Bourke, 27.0% of occupied private dwellings were owned outright, 22.8% were owned with a mortgage and 42.3% were rented.

18.2.4 Relative advantage

Socio Economic Indexes for Areas (SEIFA) is a suite of four summary measures that were created from2011 Census information. The ABS broadly defines relative socio economic advantage and disadvantage in terms of people's access to material and social resources, and their ability to participate in society. For each measure (or index), every geographic area, including LGAs, in Australia was given a SEIFA score which shows how disadvantaged that area is compared with other areas in Australia. A lower score and ranking indicates a higher degree of disadvantage.

The SEIFA scores (and ranking) for the Bourke LGA were 934 (ranked 153 in Australia and 37 in NSW) for relative socio economic advantage and disadvantage, 933 for relative socio economic disadvantage (ranked 121 in Australia and 32 in NSW), 924 for economic resources (ranked 74 in Australia and 9 in NSW) and 993 for education and occupation (ranked 404 in Australia and 8 in NSW).

For comparison, the SEIFA score for the Ballina LGA, located on the north coast of NSW, were 980 (ranked 343 in Australia and 99 in NSW) for relative socio economic advantage and disadvantage, 989 for relative socio economic disadvantage (ranked 337 in Australia and 101 in NSW), 986 for economic resources (ranked 303 in Australia and 93 in NSW) and 985 for education and occupation (ranked 385 in Australia and 104 in NSW).

The data indicates that the Bourke LGA is considered to be relatively disadvantaged in both national and state terms based on 2011 data, as determined by the four indexes. The only exception would be scores for education and occupation when Bourke is compared to other areas across Australia.

18.2.5 Summary

Based on the 2006 and 2011 Census, unemployment material and SEIFA presented above, the following conclusions can be drawn about Bourke's key socio-economic characteristics:

- the Bourke LGA and town has declining population which is predicted to continue to decline by 50 people every five years for the foreseeable future;
- unemployment rates have significantly increased within the Bourke LGA and these rates are significantly higher than the NSW average;
- the major employment sector in the Bourke LGA is the primary industry sector (principally agriculture) with the workforce characterised by managers (likely to be property managers);
- the major employment sector in the town of Bourke is the services sector, reflecting its role as a service centre for the LGA and broader area; and
- the Bourke LGA exhibited a relative level of socio-economic disadvantage in 2011 compared with both state and national levels. This disadvantage was less pronounced in the education and employment area compared to the national level.

These characteristics are consistent with the results of stakeholder engagement undertaken by CAPRA with residents of Bourke reporting concerns with regard to the population decline and increases in unemployment. This trend is consistent with other relatively isolated rural areas in NSW, where population decline and unemployment increase has been compounded by the Millennium Drought, restructuring of the farming sector, and reductions in employee numbers in the public sector as general population declines.

18.3 Economic impacts

18.3.1 Construction phase

The economic impact generated by investment in capital works (construction of the abattoir)are estimated and summarised in Table 18.1 below. The direct stimulus from the construction works is estimated at $60 million, which will be experienced entirely by the construction industry.

The initial stimulus is also expected to support up to 55 FTE jobs directly. These impacts are likely to only last for the duration of the construction phase.

Economic impacts (or activity) can be described in terms of a number of specific indicators such as regional output, value added and employment. These indicators can be defined as follows:

- regional output, which is the gross value of business turnover (or income) in the LGA and region;
- value added, which is the difference between the gross regional output and the costs of the inputs of raw materials, components and services brought in to produce the regional output; and
- employment, which is the number of people employed either full time or part time and expressed as FTEs.

Table 18.1 Economic impacts of construction on the regional economy

Indicator	Direct impact	Flow on impact	Total impact
Regional output	$59,593,100	$40,710,000	100,710,000
Value added	$12,241,533	$15,300,445	$27,541,978
Employment	55	92	147

In addition, the linkages to construction activity imply flow on effects in other industries, which are shown in the table above. The flow on impact of the investment in construction, the value added and flow on impacts of the value added, and flow on impact of direct employment has been estimated based on an economic assessment of a similar abattoir development at Blayney (SGS, 2014). This includes:

- flow on regional output ratio of $0.68 for every $1.00 of direct investment;
- value added direct impact of 20.4% of the direct investment of $60 million;
- flow on value added ratio of $1.20 for every $1.00 of value added investment; and
- flow on employment ratio of 1.67 jobs for every direct job.

When the flow-on effects in the local region are incorporated, this stimulus translates to a combined (direct and indirect) economic impact of:

- regional output in the order of $100 million;
- value added in the order of $27.5 million; and
- 147FTE jobs.

In addition to the building construction industry, industries such as construction services, real estate services, and professional services are expected to experience increased activity due to flow-on demand generated by the construction of the project.

18.3.2 Operational phase

The economic impact generated by the operational phase of the project are estimated and summarised in Table 18.2 below. These estimates have also been estimated based on a preliminary economic impact analysis by JPA business Pty Ltd (JPAB) in 2016 and an economic analysis of the abattoir conducted by BSC (2015). BSC's economic analysis formed part of a submission for funding under the Commonwealth's National Stronger Regions Fund (NSRF).

JPAB (2016) estimates that the economic stimulus of the first year of production will be about $120 million. The ongoing annual economic stimulus from operational activities increases from $120 million to about $150million in the third year of operations. Based on the flow on ratios for the meat and meat product manufacturing industry, the flow on economic impacts of the project within the local region can be estimated.

The operational phase of the project is estimated to directly employ ~200 FTEs at full production. For the purposes of the assessment it has been assumed that the 175 FTEs will be employed in the first year of operation, 200 FTEs will be employed in the second and third year of operation. Again using flow on ratios, indirect employment within the local region can also be estimated.

Table 18.2 Economic impacts of operations on the regional economy

Indicator	Year 1	Year 2	Year 3	Total (first three years)
Output	$120,729,080	$139,114,256,	$150,550,209	$410,393,545
Value Added Output	$19,599,557	$22,635,819	$40,629,555	$82,864,931
Direct FTEs	175	200	200	NA
Indirect FTEs	250	292	334	NA

Source: JPAB (2016)

By the third year, it is anticipated that the project will be in full operation. Using the estimates for the third year, the ongoing total annual economic contribution to the LGA and local region from operations is estimated as follows:

- regional output in the order of $150 million;
- value added in the order of $40.6 million; and
- 534 FTE jobs.

JPAB results are consistent with the analysis undertaken by BSC. Council's analysis indicated that an abattoir which directly employed 194 FTEs would create 240 indirect FTEs, of which 200 FTE jobs would be employed in the agricultural sector and 40 FTE jobs in other areas of the regional economy. Also, Council's analysis indicates that this direct and indirect employment will increase local wages by more than $21 million annually which are estimated to increase annual household consumption in the Bourke LGA by 25% from $126 million to $159 million.

These impacts are significant for the local regional and will have significant positive benefits for both the Bourke LGA and town.

18.4 Social impacts

18.4.1 Stakeholder engagement

Community consultation is an important part of the development of a project as it allows stakeholder values, issues, impacts and opportunities to be identified and addressed during project implementation. A second important function is to properly inform interested parties about the project, its potential impacts, and how they would be managed and mitigated.

Details on stakeholder engagement undertaken for the project are provided in Chapter 5.

18.4.2 Method

Potential social impacts of the project have been considered in terms of the following aspects:

- duration – related generally to the length of, for example, the construction and operations phases;
- significance – whether the impact is considered to be of 'high', 'medium' or low' significance; and
- extent – the area, people, facilities and/or services potentially affected.

18.4.3 Workforce

Workforce details indicate that:

- the project would directly employ a peak construction and operational workforce of 55 and 200FTE workers, respectively;
- the project would indirectly generate an additional 92and 334FTE workers during the construction and operational phases, respectively; and
- the total workforce generated by the project (direct and indirect) would be 147 and 534 FTE workers during the construction and operational phases, respectively.

It is likely that, given the availability, size and skill set, the majority of both the construction and operational workforces would be sourced from the local region with a proportion drawn from further away. For the purposes of this assessment, it has been estimated that:

- 20% of the total construction workforce (direct and indirect) would be sourced from outside of the local region; and
- 10% of the total operational workforce (direct and indirect) would be sourced from outside of the local region and would relocate, with their families, to the town of Bourke.

Therefore, based on a total construction workforce of 147 FTEs, it has been assumed that 30 construction workers would be sourced from outside the region. And based on a total operational workforce of 534 FTEs, it has been assumed that 54 workers would be sourced from outside the region and relocate with their families to the town of Bourke. Based on the NSW average household size of 2.6 persons (from the 2011 Census), this would lead to a population increase of 140 people within the town of Bourke.

Given the Bourke LGA and the town of Bourke is experiencing population decline which is anticipated to continue to at least 2031, any population increase associated with the project would help offset past and forecast population decline.

Employment generated by the project may put pressure on the available labour pool for existing employers within the town. In addition, the prospect of enhanced employment availability may also attract people from elsewhere to come to the town of Bourke on the prospect of gaining employment. However, based on the rate of unemployment within the Bourke LGA and the town of Bourke, it is anticipated that there will be a large enough labour pool available to be taken up by the project without placing undue pressure of labour for existing employers.

The impact of employment generated by the project is considered to be of 'high' positive significance because of the extent of work opportunities generated, particularly for the unemployed in the Bourke LGA and town, and the potential for offsetting of population decline.

18.4.4 Increased demand for accommodation

During the construction and operational phases of the project, there will be an increased demand for accommodation. During the construction phase, this demand will likely be for short term accommodation (ie hotels and motels). During the operational phase, this demand will likely be for long term accommodation (ie houses), particularly for those workers (direct and indirect) relocating to the town of Bourke.

Surveys indicates that there is capacity in the short term accommodation sector in the town of Bourke, and enough to accommodate 30 construction workers that have been estimated to be sourced from outside the region. Notwithstanding this, given the small supply of short term accommodation, it is possible this may fill up from time to time when there are regional tourism events.

It is estimated that the population increase generated by the project would generate demand for about 54dwellings in the town of Bourke. The results of the 2011 Census indicates that there are 222 unoccupied private dwellings in the Bourke LGA. While the condition of these dwellings is unknown, the results indicate that there would be more than enough housing stock within Bourke to meet any demand for housing.

The impact of demand for accommodation during the construction and operational phases of the project is considered to be of 'low' significance.

18.4.5 Demands on community services

There are unlikely to be any substantive demands during either the construction or operational phase on existing community services and facilities because it is anticipated that there would only be a relatively small in-migration of new families to Bourke directly as a result of the project. As stated above, it is anticipated that 54 workers would relocate during the operational phase which would lead to a population increase of 140 people within the town of Bourke.

Generally, any increased demands on or use of community services and facilities in Bourke as a result of the project would only partly reduce the likelihood of further reductions in these services given the projected population decline for Bourke.

Generally the significance of additional demands on community and retail services are considered to be 'low' because of the existing capacity in most community services sectors in Bourke.

18.4.6 Impacts on social amenity

During both the construction and operational phases of the project, there would be the presence of more people and traffic movements in and around the town centre and the Mitchell Highway to the project site. However, the increased level of activity around town that would be generated by the project workforce is considered to be positive because of the likely economic benefits that would be experienced in the town.

In addition, the presence of more people in town during the construction and operational phases, particularly as a result of the anticipated permanent relocation of some workers and their families during the operational phase, will likely improve the social fabric of the town. It will provide more opportunities for participation is civic, social and sporting events.

The significance of impacts on the social amenity of Bourke is considered to be of 'medium' positive.

18.4.7 Results

The results of the social assessment of the project are provided in Table 18.3.

Table 18.3 Summary of potential social impacts

Potential social impacts	Duration	Significance	Extent
Increased workforce	Construction and operational phases (about 10 years)	High (positive)	Bourke LGA and regional area within 200 km
Increased demand for accommodation and housing	As above	Low	Town of Bourke
Increased demand for community facilities or services	As above	Low	Town of Bourke
Changes in social amenity	As above	Medium (positive)	Town of Bourke

Overall, the results indicate that the social impacts of the project are likely to be positive.

18.5 Management and mitigation measures

A key matter to be addressed in relation to the project's workforce is to ensure opportunities are created for local residents to gain employment. As such, CAPRA's approach to employment will adopt the following principles:

- a preference for local employment wherever possible; and
- encourage local contractors to tender for work, both during the construction and operations phases.

Due to the relatively small volume of potential new residents to Bourke as a result of the project and the availability of vacant housing stock, it is not anticipated that this would impact the availability of accommodation for existing or other new residents.

In terms of short-term accommodation demand (ie hotels and motels during construction works), the project may restrict availability of supply to other users during peak demand periods. CAPRA will work with local short-term accommodation providers and BSC to identify such periods and determine what, if any, modifications can be made to scheduling and accommodation demand.

While no impacts are predicted on community services and facilities, CAPRA proposes to have discussions with health and emergency services (ambulance, fire and rescue services) prior to commencement of construction, to ensure that there would be appropriate interface arrangements for operational matters.

18.6 Conclusion

Based on the results of the socio economic assessment, the net community benefit of the project for the Bourke community is considered to be positive. This assessment is based on the test of whether a proposal is likely to have, in planning terms, 'acceptable' or 'reasonably acceptable' outcomes.

The economic impacts of the project on the Bourke LGA and local region are anticipated to be significant. During the construction phase of the project, 55 FTE jobs will directly be created, with a further 92 FTE jobs though flow on effects. In total, the combined (direct and indirect) economic impact generated during the construction phase is $100.7 million in output or an additional $27.6 million in value added output.

Between the first and third year of operational activities, the total economic impact increases as production and jobs increase, with output from the project growing from $120 million to $150 million and value add to the economy from $19.6 million to $40.6 million. Based on an analysis of the creation of 194 FTE jobs and 240 indirect FTE jobs (which will occur between Years 2 and 3 of operations), employment during the operational phase will increase local wages by more than $21 million annually which are estimated to increase annual household consumption in the Bourke LGA by 25% from $126 million to $159 million.

The key socio economic benefits of the project as a result of employment and expenditure are considered to be:

- enhancement of the local and regional economies; and
- assisting to arrest predicted local and regional population decline, diminishing availability of services and facilities in the region and declining community sustainability.

The project has the potential to help strengthen the local region's economic base. Businesses in the region would likely benefit through direct expenditure and the extra money injected into the area through employment and services catering to the project.

These factors mean the economy of the local region could be more resilient in the short and longer term. During construction and operations there would be greater economic activity and employment opportunities than currently exist. The social benefits of stronger local and regional economies would include more diverse employment opportunities for local residents and the availability of enhanced community and business services.

19 Summary of management and mitigation measures

A summary of the management and mitigation measures for the project are summarised in Table 19.1. In addition to the measures in Table 19.1, a site-specific operational EMP will be developed for approval by the DP&E, and implemented to ensure that the commitments made within the EIS, along with the conditions imposed by the development consent and EPL, are fully implemented and complied with.

Table 19.1 Summary of management and mitigation measures

Commitment	EIS section
Air Quality and Odour	
Construction	
Construction activities will be managed so that the works are conducted in a manner that minimises the generation of air emissions. Construction contractors will undertake regular environmental inspections of their works and worksite which will include; • visual inspection of dust generation; • inspection of the erosion and sediment controls; • ensuring vehicles entering/exit the site are covered to prevent escape of materials during transport; and • ensure the Mitchell Highway in the vicinity of the site is kept free of soil, and soil tracking onto the road network is prevented.	7.5.1
Operation	
• Stock holding yards will be regularly cleaned. • Potential odour-generating material will be removed from site in accordance with operational procedures. • Waste will be transported off site in enclosed systems. • Wastewater treatment system will be maintained to avoid odour generation in accordance with operational procedures, including crust formation on the anaerobic ponds; • Controlling of the irrigation droplet size by preventing excessively high pressure in the system design, so as to minimise spray drift. • Spill management will include immediate clean-up of any spill/leakage in accordance with operational procedures. • Boilers will be installed and operated in accordance with manufacturer's instructions, including regular maintenance and tuning to minimise pollutant emissions and to optimise the fuel efficiency. • Unsealed access roads will be constructed and maintained so as to minimise wheel generated dust. • An odour complaint logbook will be maintained on site. In the event of a complaint, an investigation of any unusual odour sources within the site boundary will occur and appropriate action taken to mitigate these sources.	7.5.2
Traffic	
Construction	
• A construction traffic management plan will be prepared and implemented prior to the commencement of construction activities.	9.4

Table 19.1 Summary of management and mitigation measures

Commitment	EIS section
Operation	
• Approximately 150 car parks will be provided on site. Car parking areas will have appropriate dimensions to accommodate the required number and size of the vehicles using the car park. • The site access intersection with the Mitchell Highway will be designed to comply with the relevant Austroads intersection traffic capacity and safety design standards. • Internal pedestrian linkages will be included in the design of the on-site car park to direct employees to the staff entrances to the abattoir.	9.4
Health	
• Livestock will be sourced from depots where standard operating procedures include that prior to transport, animals are rested to "empty out" to reduce urination and defecation during transport, and where screening of heavily pregnant does from transport occurs. • All waste to be removed from site will be transported off site in enclosed containers and disposed of at an appropriately licensed facility. • The abattoir will be fenced (1.8m high man proof fencing) as shown in the detailed site plans in Appendix B, and access to the site will be controlled by a security gatehouse and boom gate. • Onsite procedures will be implemented in accordance with industry standards in relation to provision of appropriate PPE and good hygiene practice. • A Q fever vaccination program will be implemented to ensure all employees are vaccinated appropriately. • Contract truck drivers will be encouraged to come directly to the site when carrying loaded trucks of livestock to avoid stopping in Bourke or North Bourke.	10.4 and 10.5
Biodiversity	
• Felling of hollow-bearing trees in the disturbance footprint will follow a two-stage clearing protocol, where surrounding non-hollow vegetation is cleared 24 hours prior to the hollow trees to allow fauna time to move. • A biodiversity offset strategy will be prepared in consultation with OEH, DP&E and DPI-Lands within 12 months of project approval, and will involve: - Identifying if suitable credits are available on the market to meet offset requirements. - Finding potential offset sites with the biodiversity values required to compensate for the project's impacts, including possibly within the project site and CAPRA landholdings. - In the absence of suitable offset credits or properties, applying the variation criteria rules of the FBA and finding suitable offsets to meet the requirements. • Weeds will be managed within the project site in accordance with relevant DPI – Lands best practice guidelines. • The PVP which applies to the broader property of 'Artesia' (of which the project site forms a small part) will be amended to exclude the project site.	11.4.2 Section 4.3.5
Heritage	
• An Aboriginal Heritage Management Plan will be prepared in consultation with OEH and the RAPs prior to construction commencing. • Surface collection of known Aboriginal objects within the disturbance footprint of the project will be undertaken prior to construction works commencing. Survey of the irrigation area, and surface collection of any artefacts found, will be undertaken prior to the commencement of construction activities, in conjunction with the surface collection program for the site disturbance footprint.	12.5

Table 19.1 Summary of management and mitigation measures

Commitment	EIS section
• A keeping place (designated secure area) will be established within the offices on site to store all Aboriginal stone artefacts collected from the project site. A selection of these artefacts will be put on display. All associated reports and records will be stored in close proximity to the artefacts in a bound hard copy and digital form. All materials will be held in a locked cabinet (both those objects on display and those in storage). • The identified Gurri tree (wild orange tree – *Capparis mitchellii*) will be avoided during construction of the site access road.	
Water resources	
Construction	
• Effective temporary erosion and sediment control structures, such as hay bales and silt fencing, will be used to prevent soil loss and sediment-laden runoff from leaving the project site. • All clean surface water from upslope of construction areas will be diverted around areas of disturbance where required. • Areas disturbed as part of construction activities that are not part of the final footprint of the project will be promptly revegetated. • Temporary erosion and sediment control structures used during construction will be regularly inspected and maintained.	13.5
Operation	
• A 15 m wide vegetative buffer zone consisting of grasses, shrubs and trees will be maintained immediately downslope of the irrigation area to slow down and capture any runoff that occurs from the irrigation area. • The wastewater treatment ponds will be lined so as to prevent any seepage occurring. • Storage areas for all liquids will be appropriately bunded. • Spill kits including absorbing materials will be provided nearby handling and storage areas. • Water use will be minimised through regular inspections of pipes and connections to ensure there is minimal leakage occurring, use of high impact, low flow nozzles where high pressure is required, dry collection of manure, dry cleaning of equipment prior to wash down; and prioritising the order of washdown procedures eg stands, walls and then the floor.	13.5
Wastewater and irrigation	
• Treated effluent will be irrigated over 38 ha as per the findings of the on-site irrigation study (Envirowest 2016). • Regular sampling of soil, treated effluent and groundwater will be undertaken in accordance with the program detailed in Section 14.4 of this EIS. • Monitoring of vegetation will be undertaken on an annual basis and will involve visual assessments of crop species and bare areas to provide an indication of the presence of soil toxicities and soil degradation.	14.4
Greenhouse gas	
• Regular checks of seals on all refrigerated areas will be undertaken as part of routine site maintenance. • Where possible, high efficiency lighting will be used. • The option of installing solar panels at the abattoir will be assessed and determined within three years of commencement of operations. • As part of operational procedures, the correct vehicle mass limits will be determined (and not exceeded) by use of the heavy vehicle weighbridge.	16.4

Table 19.1 Summary of management and mitigation measures

Commitment	EIS section
Socio-economic	
CAPRA's approach to employment will adopt the following principles: • a preference for local employment wherever possible; and • encourage local contractors to tender for work, both during the construction and operations phases. Selection of suppliers will be based on merit, assessed capability and competitive dynamics.	18.5

20 Project justification and conclusion

20.1 Introduction

The project requires justification on economic, social and environmental grounds, taking into consideration whether it is consistent with the objects of the EP&A Act. Each aspect is dealt with below.

20.2 Need for the project

The project has been designed to realise a number of opportunities with respect to both the goat and sheep markets, whilst providing benefits to Bourke and the farming community. In particular, there is a significant supply of rangeland goats in NSW, predominantly in the north-western region of the state, and a current deficit in processing capacity with respect to both the supply of goats and the international demand for goat meat. With only one dedicated goat abattoir currently operating in Australia, the construction of another facility with the ability to process goats will assist in addressing this deficit, whilst providing a boost to the emerging goat meat industry and its associated contribution to the NSW economy.

The agricultural grazing sector has invested heavily in broadening and diversifying the sheep base to include goat farming over recent years, providing vital income in times of difficult climatic conditions such as drought. The project will add a significant participant in the goat meat processing market to stimulate a more sustainable market for their production.

Unmanaged goats are listed as a “threatening process” under the Commonwealth Government’s EPBC Act, and as “pests’ by some State animal control legislations. The environmental impacts of rangeland goat populations include competition for food with native fauna, destruction of habitat caused by aggressive feeding upon native flora and compaction of soils. Impacts are also largely associated with agricultural production where rangeland goats compete with other small livestock for feed and cause destruction to agricultural infrastructure such as fencing. A threat abatement plan (TAP) for competition and land degradation by unmanaged goats was released in 2008 by the Commonwealth Department of the Environment Water Heritage and the Arts (DEWHA (now DoE)). This TAP established a national framework to guide and coordinate Australia's response to the impacts of unmanaged goats on biodiversity.

A review of the TAP for unmanaged goats was released in 2014 by DoE, and acknowledged that the threat of unmanaged goats continues to grow. Managed goats are however emerging as a foundation enterprise in many rangeland areas. They are helping producers to diversify and withstand drought (Ferguson 2011), sometimes with evident benefits to rangeland condition.

Goat meat production from rangeland enterprises comprises about 95% of total production and goat meat or live export of goats is worth about $125 million in 2010-11 (Meat and Livestock Australia 2011). These figures on the goat livestock and meat industries illustrate that goats are important to primary production in the rangelands of Australia even though they are significantly smaller than sheep or beef production.

The project will also process sheep and lambs, supporting producers in NSW by providing an additional processing facility and access to a global market place.

20.3 Economic justification

The economic impacts of the project are detailed in the socio economic assessment contained in Chapter 18. The project is justified economically due to the net economic benefits and the economic stimulus it would provide to the local region and the town of Bourke.

The capital investment and operational expenditure required for the project will stimulate the regional and NSW economies. The stimulus to the regional economy is normally measured by its effects on the size of the economy, value adding by local production or provision of services, and changes in employment.

Different levels of stimulus will occur during construction and operations.

Construction of the project will require a workforce of 55 people, requiring an expenditure of approximately $60 million. The stimulus effects of this expenditure and employment on the region are in the order of:

- $100 million in direct and indirect regional output or business turnover;
- $27.5 million in annual direct and indirect regional value added; and
- 147 direct and indirect jobs.

Stimulus effects will be much greater during the operational phase when the expenditure and employment created will be more substantial. The representative increased annual stimulus provided to the region when the project is operating at full production is estimated to be in the order of:

- regional output in the order of $150 million;
- value added in the order of $40.6 million; and
- 534 FTE jobs.

The project is justified economically. It will provide substantial economic stimulus to the local the region where there are limited other alternative economic opportunities of this scale.

20.4 Social justification

The social impacts of the project within the town of Bourke and the wider region are detailed in the socio economic assessment which is summarised in Chapter 18.

The project is justified on social grounds for three principal reasons; it is broadly supported by the local and regional community, it will enhance the capacity of the local and regional economies, and help to arrest population decline and diminishing availability of services and facilities locally and regionally.

20.4.1 Community support

Based on the results of stakeholder engagement, there is a positive attitude and broad community support for the project. Results indicate that the community believes that the project will enhance the capacity of the local and regional economies and help to arrest population decline and diminishing availability of services and facilities locally and regionally.

20.4.2 Stronger regional economy

The project will strengthen the region's economic base. It will increase the size of a number of industry sectors, particularly the building construction industry, and industries such as construction services, real estate services, and professional services.

Businesses in the region will benefit through direct expenditure and the extra money injected into the area through employment, employee expenditure locally and services catering to the project.

These factors will result in an economy that will be more resilient in the short and medium term. During construction and operations there will be greater economic activity and employment opportunities than currently exist.

20.4.3 Arresting population decline

Populations in regional and rural areas in Australia are declining because of a range of factors, including amalgamation of farms, greater mechanisation, declining competitiveness of smaller rural properties, and improved transport infrastructure, which is encouraging activity to concentrate in regional centres. Regionally, the Bourke LGA and the town of Bourke has been impacted by recent drought and restructuring of the agricultural sector. As rural populations decline, local retail, community services and employment opportunities are reduced. This combination has a compounding effect resulting in an overall loss of productive capacity, especially youth and working age people, and declining asset values, such as those of private residences.

Much of the project's host region is at risk of these adverse social impacts. Bourke LGA and town has experienced population decline for some years and this decline is predicted to continue. According to population forecasts by DP&E (2014), the Bourke LGA is anticipated to experience a continued decline in both its population growth rate and its total population through to 2031. The predicted decline is 50 people every five years. Direct and indirect jobs created by the project will provide the opportunity for people to remain in the region and help arrest the predicted decline.

Overall, the project will reduce the likelihood of decline by providing economic stimulus and jobs. In particular, the socio economic assessment identified that due to population decline there is spare capacity within existing community infrastructure and services. Some of the workforce associated with the project that will relocate to Bourke with their families is likely to take up some of this spare capacity.

20.5 Biophysical justification

20.5.1 Loss of agricultural land

Agricultural land within the project site will be removed from production during the life of the project. However the area of land removed is small, at just 17.3 ha, when considering the amount of land available in the region for agriculture. Importantly, 38 ha will be set aside for cropping and irrigated with effluent from the abattoir. In addition, the use of the project site as an abattoir will assist in strengthening the agricultural sector within the local region.

20.5.2 Enhanced biodiversity conservation

The project has been designed to avoid and minimise impacts to biodiversity where practicable. To compensate for unavoidable disturbance of native vegetation, biodiversity offsets are proposed. Through the provision of these offsets, biodiversity values in the local area will be maintained or improved over the medium to long term.

20.6 Objects of the EP&A Act

Section 5 of the EP&A Act sets out its objects. It states:

> The objects of this Act are:
>
> (a) to encourage:
>
> (i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,
>
> (ii) the promotion and co-ordination of the orderly and economic use and development of land,
>
> (iii) the protection, provision and co-ordination of communication and utility services,
>
> (iv) the provision of land for public purposes,
>
> (v) the provision and co-ordination of community services and facilities, and
>
> (vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and
>
> (vii) ecologically sustainable development, and
>
> (viii) the provision and maintenance of affordable housing, and
>
> (b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and
>
> (c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

The project's consistency with the objects of the EP&A Act is considered below. However, the overall conclusion is that the project is consistent with the objects of the EP&A Act either wholly or in the majority.

20.6.1 Proper management, development and conservation of resources

The object is to encourage 'the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment'.

Resources within the project site include land that is suitable for agricultural production (predominantly grazing), and land which has biodiversity and cultural heritage values. This constitutes the 'natural resources', which must be properly managed, developed or conserved.

Through the project, CAPRA will develop and operate a valuable resource to the local agricultural sector (ie local abattoir) by providing the necessary investment capital and operational skills.

As stated previously, agricultural land within the project site will be removed from production during the life of the project. However the area of land removed is small, and development of the project will assist in strengthening the agricultural sector.

The biodiversity values and cultural resources in the project site will be mitigated or offset. There will be a net biodiversity gain over the project's life due to the biodiversity offsets proposed.

For the reasons given above the project will improve 'social and economic welfare' and achieve 'a better environment'.

20.6.2 Orderly development

The object is to encourage 'the promotion and co-ordination of the orderly and economic use and development of land'.

The project provides an opportunity for orderly and economic use land with considerable net benefits to the local region. The project's planning and design has taken into account all potential impacts and incorporates measures to avoid, minimise or compensate for these impacts. Thus, it will be an orderly development.

At full production, the project will generate in the order of $150 million in annual direct output and in the order of $40.6 million in extra value added regionally; compared with continuing existing uses. It will, therefore, be 'economic use and development of land'.

20.6.3 Communication and utility services

The object is to encourage 'the protection, provision and co-ordination of communication and utility services'.

The project will utilise and draw from existing power and water services. Measures to maintain the capacity of these services will be incorporated into its design, meaning all communication and utility services will be protected.

20.6.4 Land for public purposes

The object is to encourage 'the provision of land for public purposes'.

The project will be developed on land that is under a WLL, and therefore is not available for public purposes. No land that is currently available for public purposes will be impacted by the project.

20.6.5 Community services and facilities

The object is to encourage 'the provision and co-ordination of community services and facilities'.

During operations, the project is likely to place some additional demand on existing community services and facilities arising from the migration of a small proportion of the operational workforce to Bourke. However, the socio economic assessment indicates that there is current capacity for this demand. It may also help support services and facilities affected with recent population decline.

There will also be payments to the NSW and Commonwealth governments, and BSC, in taxes and land rates. A proportion of these funds will be available to provide or finance the provision of community services and facilities more broadly with the Bourke LGA and town of Bourke.

20.6.6 Protection of the environment

The object is to encourage 'the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats'.

The project has sought to minimise impacts on native vegetation within the project site, as far as practicable, while establishing offsets would enhance biodiversity values in the medium to short term.

20.6.7 Ecologically sustainable development

The object is to encourage 'ecologically sustainable development' (ESD). The principles of ESD, for the purposes of the EP&A Act, are provided in clause 7(4) of Schedule 2 of the EP&A Regulation. It states:

> The principles of ecologically sustainable development are as follows:
>
> (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. In the application of the precautionary principle, public and private decisions should be guided by:
>
> (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
>
> (ii) an assessment of the risk-weighted consequences of various options,
>
> (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, such as:
>
> (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The four principles of ESD and the project's compatibility with each is considered below.

In addition, the Commonwealth's *National Strategy for Ecologically Sustainable Development* defines ESD as 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.

Conservation of ecological resources will be achieved through avoiding valuable areas (as far as practicable), while progressive rehabilitation and establishing offsets would enhance biodiversity.

i Precautionary principle

This means that if there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. This EIS, prepared by experts in their respective fields, has identified and assessed the potential environmental impacts, and appropriate mitigation and management measures have been developed in response. Taking these measures into account, it is considered that there will be no threat of serious or irreversible damage to the environment as a result of the project.

ii Inter-generational equity

Inter-generational equity is a part of social equity, as is intra-generational equity.

Inter-generational equity is the concept that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations, while intra-generational equity is applied within the same generation.

Much of the region suffers from limited opportunities because of a narrow economic base which is contracting. The project will contribute to social equity by providing additional employment opportunities both directly and indirectly. It will facilitate the cost effective and efficient use of agricultural land to produce an agricultural product, thus developing physical and human capital through investment in infrastructure and workforce training. This transformation from natural to human capital will contribute to both inter-generational and intra-generational equity.

The project incorporates a range of operational controls and environmental management and mitigation measures to minimise potential impacts on the environment, and the costs of these measures will be met by CAPRA.

iii Conservation of biological diversity and maintenance of ecological integrity

The project will increase the area of land conserved for biodiversity protection (through the provision of biodiversity offsets). Therefore, the project will conserve biological diversity and maintain ecological integrity.

iv Improved valuation and pricing of environmental resources

One of the common broad underlying goals or concepts of ESD is economic efficiency, including improved valuation and pricing of environmental resources.

In the past, it was assumed that some environmental resources were free or underpriced, leading to their wasteful use and consequent degradation. Consideration of economic efficiency, with improved valuation of environmental resources, aims to overcome the underpricing of natural resources and has the effect of integrating economic and environment considerations in decision making, as required by ESD.

As previously stated, the project incorporates a range of operational controls and environmental management and mitigation measures to minimise potential impacts on the environment, and the costs of these measures will be met by CAPRA. These costs have been incorporated into the operating costs of the project which were considered in the socio economic assessment. While the socio economic assessment does not include prices for all environmental resources, reasonable judgments about their monetary value are still possible. For the project's costs to exceed its benefits, the costs would need to be greater than the stimulus the project provides the local region during both the construction and operational phases.

Having considered all aspects of ESD, the conclusion is that the project is consistent with the object and with its specific components.

20.6.8 Affordable housing

The object is to encourage 'the provision and maintenance of affordable housing'.

It is expected that the majority of the workforce required during the construction and operation of the project will be sourced from the local region. However, it has been conservatively assumed in the socio economic assessment that during the operational phase, some workers will relocate themselves and their families to Bourke. In addition, the project will generate indirect or flow-on jobs within the region during the operational phase. The population increase generated by the project (directly and indirectly) could generate demand for about 48 dwellings.

The results of the 2011 Census indicates that there are 222 unoccupied private dwellings in the Bourke LGA. While the condition of these dwellings is unknown, the results indicate that there will be more than enough housing stock within Bourke to meet any demand for housing.

20.6.9 Sharing of responsibility

The object is 'to promote the sharing of the responsibility for environmental planning between the different levels of government in the State'.

All State and local government agencies that have an interest in the project have been engaged prior to, and during the preparation of this EIS. Further engagement will occur during preparation of the RTS document following exhibition and pre-determination phases. Thus all levels of government have been involved to date and this would continue through to determination of the project.

20.6.10 Increased public involvement

The object is 'to provide increased opportunity for public involvement and participation in environmental planning and assessment'.

The EIS for the project has been undertaken in conjunction with a stakeholder engagement program, which included engaging with the local and regional community. The engagement activities undertaken included formal and informal stakeholder engagement forums, such as phone calls, meetings and briefing sessions. Thus there has been sufficient 'opportunity for public involvement and participation in environmental planning and assessment'.

20.7 Conclusions

There is a sound and broadly based justification for the project. It will realise a number of opportunities with respect to both the goat and sheep markets, thus providing a social and economic benefit to the region. It will provide substantial stimulus to a region in need and with few equivalent economic opportunities.

A range of commitments are proposed in this EIS to minimise and address impacts of the project. Through the commitments made in this EIS and operational practices, the project will enable the orderly and logical use of natural, physical and human resources existing in the area and region. Enhanced outcomes will result from greater investment and employment, while minimising potential environmental and social impacts.

The project's construction will require a workforce of 55 people, requiring direct expenditure of $60 million in the heavy and civil engineering construction and construction services sectors. The stimulus effects of this expenditure and employment on the region are in the order of:

- $100 million in direct and indirect regional output or business turnover;
- $27.5 million in direct and indirect regional value added; and
- 147 direct and indirect jobs.

Stimulus effects will be much greater during the operational phase when the expenditure and employment created would be more substantial. The representative increased annual stimulus provided to the region when the project is at full production is estimated as follows:

- regional output in the order of $150 million;
- value added in the order of $40.6 million; and
- 534 FTE jobs.

The benefits of the project are significant and it is considered to be in the public interest for it to be positively determined.

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Abbreviations

Abbreviation	Meaning
ACHA	Aboriginal cultural heritage assessment
ABS	Australian Bureau of Statistics
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AHMP	Aboriginal Heritage Management Plan
Approved Methods	*Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales*
AQIA	Air Quality Impact Assessment
AQMS	air quality monitoring station
AWS	Automatic Weather Station
BACWP	Bourke Aboriginal Community Working Party
BAR	Biodiversity Assessment Report
BoM	Bureau of Meteorology
BSC	Bourke Shire Council
BVT	BioMetric Vegetation Type
CAPRA	CAPRA Developments Pty Ltd
CEMP	Construction Environmental Management Plan
CIV	capital investment value
CL Act	*Crown Land Act 1989*
^{o}C	degrees Celsius
dB	decibel
DCP	development control plan
DoA	Department of Agriculture
DoP	Department of Planning
DP	Deposited Plan
DPI	Department of Primary Industries
DS ACT	*Dams Safety Act 1978*
EC	*Export Control Act 1982*
EEC	endangered ecological community
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EnHealth	Environmental Health Standing Committee
Envirowest	Envirowest Consulting Pty Ltd
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPI	environmental planning instruments
EPL	Environmental Protection License
EMM	EMM Consulting Pty Limited
ESD	ecologically sustainable development
FBA	Framework for Biodiversity Assessment

Abbreviation	Meaning
Food Act	*Food Act 2003*
Food Regulation	*Food Regulation 2015*
FTE	full time equivalent
FSP	Food Safety Program
GHG	greenhouse gas
ha	hectares
Heritage Act	*Heritage Act 1977*
HRA	Health Risk Assessment
IAQM	Institute of Air Quality Management
ICNG	*Interim Construction Noise Guideline*
ICOMOS	International Council on Monuments and Sites
INP	Industrial Noise Policy
kL	kilolitres
km	kilometres
LGA	local government area
LNG	Liquefied natural gas
MNES	matters of national environmental significance
NGA Factors	*National Greenhouse Accounts Factors Workbook*
NO_2	Nitrogen dioxide
NPI	National Pollutant Inventory
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
NV Act	*Native Vegetation Act 2003*
OEH	Office of Environment and Heritage
OU	odour unit
PAC	Planning Assessment Commission
PBFP guidelines	*Planning for Bush Fire Protection 2006*
PCT	Plant Community Type
PHA	preliminary hazard analysis
PM	Particulate Matter
POEO Act	*Protection of the Environment Operations 1997*
PVP	property vegetation plan
RAP	registered Aboriginal party
RBL	Rating Background Level
RD&E	Research, Development and Extension strategy
REP	regional environmental plan
RF ACT	*Rural Fires Act 1997*
RL	reduced level
RMS	Roads and Maritime Services
RNP	Road Noise Policy
Roads Act	*Roads Act 1993*
RTS	response to submissions
SEARs	Secretary's environmental assessment requirements
SEIFA	Socio Economic Indexes for Areas
SEPP	state environmental planning policy
SLA	statistical local area

Abbreviation	Meaning
State and Regional Development SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
SSD	State Significant Development
swt	shipping weight
TAMP	The Air Pollution Model
TEC	Threatened ecological community
TSC Act	*Threatened Species Conservation Act 1995*
USDA	United States Department of Agriculture
VPA	voluntary planning agreement
Water Act	*Water Act 1912*
WL Act	*Western Lands Act 1901*
WLL	Western Lands Lease
WM Act	*Water Management Act 2000*
WSP	water sharing plan

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