



ENVIRONMENTAL IMPACT STATEMENT

Angora Feedlot Expansion

Angora Feedlot Pty Ltd

Date: 28 February 2024



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EIS DECLARATION

Project Details	
Project Name:	Angora Feedlot Expansion
Project Address:	Rannock Burn Road, Somerton, NSW 2346
Lot/DP:	19/DP752169, 1/DP842391, 43/DP752169, 44/DP752169, 141/DP752169, 142/DP752169
Applicant Details	
Name:	Angora Feedlot Pty Ltd
Business Address:	Rannock Burn Road, Somerton, NSW 2346
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Professional Qualifications:	Bachelor of Applied Science
Professional Experience:	Over 10 years' experience in the preparation and regulatory assessment of planning and environmental reports for intensive livestock activities including feedlots, piggeries, and poultry farms.
Declaration	
<p>The undersigned declares that this EIS:</p> <ul style="list-style-type: none"> has been prepared in accordance with the Environmental Planning and Assessment Regulation 2021; contains all available information relevant to the environmental assessment of the development, activity, or infrastructure to which the EIS relates; does not contain information that is false or misleading; addresses the Planning Secretary's environmental assessment requirements (SEARs) for the project; identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments; contains a simple and easy to understand summary of the project as a whole, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development; contains a consolidated description of the project in a single chapter of the EIS; contains an accurate summary of the findings of any community engagement; and contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole. 	
Signature:	
Date:	28 February 2024

1 INTRODUCTION

Angora Feedlot Pty Ltd (Angora) currently operate a 1,000 head feedlot on 'Annabrae', Rannock Burn Road, Rushes Creek. They are proposing to construct an 8,100 head feedlot on a greenfield site and, in addition, increase the capacity of the 1,000 head feedlot to approximately 1,400 head. This will result in a combined feedlot capacity of 9,500 head. Based on the expected cattle type, this equates to a capacity of 7,240 standard cattle units (SCU). The construction of the new feedlot will be staged by row based on market demands and finance availability.

The design and footprint of the existing feedlot will remain unchanged. The existing feedlot is suitably designed for 1,000 SCU which equates to approximately 1,400 head. As such, the expansion of the existing feedlot will be through an increase in stocking density. Existing feedmill infrastructure will be expanded to account for the growth in feedlot capacity with a further feed storage area located closer to the new feedlot complex.

The new feedlot complex will be located within a controlled drainage area (CDA) which will contain runoff from the pens and direct it into a sedimentation basin and effluent holding pond. As construction will be staged, not all infrastructure will be constructed immediately. However, the sedimentation basin and effluent holding pond will be constructed to their full capacity with the completion of the first new row.

Based on current feedlot industry construction costs, the proposed development will equate to \$1,500 per standard cattle unit (SCU). Therefore, the development has an estimated capital investment value of \$10.9 million. This estimate is based on accurate costings of a major feedlot expansion currently under construction adjusted to match the specifications of the proposed infrastructure.

The property is in the RU1 – Primary Production Zone and is permissible with consent from Tamworth Regional Council (TRC). The proposed feedlot is designated, integrated, and advertised development and requires an Environmental Protection Licence (EPL) from the Environment Protection Authority (EPA).

There will be no change to the existing Water Access Licence or associated works approvals. Harvested groundwater is currently stored in tanks, with additional tanks to be installed to meet the demands of the proposed feedlot.

2 STRATEGIC AND STATUTORY CONTEXT

2.1 PROJECT JUSTIFICATION

Australia is well placed to feed the growing domestic and global population with clean, environmentally friendly, and high-quality food. However, land and water supply in Australia are finite. As such, the intensification of food production is necessary to provide for this growing population. If Australian lot feeders were to 'do nothing', the food required for this growing population would need to be sourced from other countries. Many of those countries do not have the same high standards, relating to animal welfare, product integrity and environmental sustainability, as the Australian lot feeding industry.

Angora have heavily invested in their existing feedlot infrastructure. They currently supply a range of markets and, through the growth in demand for Australian beef, are looking to expand their throughput. Due to the size of the property, existing water entitlements, and feedlot experience, the proposed expansion provides the most suitable pathway to expand the economic potential of these assets.

The proposed feedlot represents a capital investment value (CIV) of approximately \$10.9 million and will create approximately 10 direct jobs. These estimations are based on AgDSA's recent experience with feedlot expansions and tenders which have identified a per SCU construction cost of approximately \$1,500 when an upgrade to the feedmill is required.

Based on results from a 2018 Meat and Livestock Australia (MLA) report (Deloitte Access Economics, 2018), the proposed feedlot will have an estimated total (direct and indirect) contribution of \$6.2 million in the local economy (within 75 km) and \$10.6 million contribution in the regional economy (within 150 km).

2.1.1 OBJECTIVES

1. Meet the growing demand for Australian beef

According to the 2023 MLA State of the Industry Report (Meat & Livestock Australia, 2023), global meat consumption has been steadily increasing over the past 20 years, with a 1.2 % increase in beef consumption across 2022. Grain fed beef provides stability to the broader Australian beef industry through times of drought where pasture is inadequate to feed the Australian cattle herd. The existing Angora feedlot is a key part of the local supply chain, and the growth of the feedlot sector will ensure that beef supply can remain reliable and sustainable in the face of growing climatic pressures.

2. Ensure the long-term sustainability of the Angora Feedlot family business

Angora Feedlot, and the broader farming operations, are a family-owned business built around the existing land, water, farming, and feedlot assets on 'Annabrae'. With the changing climate and expectation that drought events will become more frequent, the expansion of the feedlot provides a greater opportunity to secure the long-term future of the business for generations to come.

3. Realise the potential of the existing water asset

The property has a 480 share unit (ML/year) groundwater allocation which is currently supplying the existing feedlot. However, the existing feedlot usage is estimated at 20 ML/year. As such, the potential for agricultural production from that allocation is substantially greater than current production. Due to the size of the property and soil types, the opportunity for irrigated cropping is also limited to small areas. As such, the use of the water for a larger feedlot presents the best opportunity given the constraints of the land. The production of organic fertiliser (manure) from a larger feedlot adds further value to the on-site soils and farming operations.

2.1.2 ASSESSMENT OF ALTERNATIVES

As the subject site has the 480 ML water allocation attached and existing feedlot infrastructure, the assessment of alternatives is limited.

1. Sorento & Stockton properties

The applicants own two other properties approximately 4 km north of the subject site along Rushes Creek Road, Rushes Creek. The two adjacent properties, 'Sorento' and 'Stockton', have some of the physical attributes for a suitable feedlot site, such as slope and soils. However, there are several receptors closer to any potential feedlot site and these would limit the capacity. Further, the properties do not include a legal water allocation for use within a feedlot as all bores are for stock and domestic purposes. In addition to the large water allocation, the existing site has seen significant investment in the existing feedlot and feeding infrastructure.

As such, these properties were less suitable than the subject site at 'Annabrae'.

2. Alternate locations on the subject site

Other locations on the property have been investigated for the feedlot expansion. This includes a preferred location slightly west of the proposed feedlot. However, this would result in the feedlot complex being located across a Crown road reserve. It was unlikely that consent from Crown lands would have been issued for this location. A location to the south-west of the existing feedlot was considered but, due to undulating terrain, the design and requirements for drainage would have been difficult. This site was also immediately adjacent to the on-site dwelling.

The existing feedlot site is heavily constrained by vegetation to the west, a drainage line to the east, and the flood impact area to the south. No further expansion at the existing feedlot site is possible.

Although not currently proposed, and contingent on the ability to acquire the Crown lands, the proposed site may also provide for future expansion opportunities to the west. No other site would allow for the proposed development to proceed in the short-term and allow for future expansion.

3. Do nothing

Into the future, Australian agriculture must produce more, for less. Less land, fewer people, and less water. The intensification of beef production provides a clear path forward in feeding a growing population. Doing nothing would not allow the project to achieve any of the objectives.

2.1.3 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The four principles of ecological development include:

- The precautionary principle;

The feedlot industry is a long-established industry in Australia. Environmental design and a consolidated group management principles for feedlots were originally developed in the 1990s and have continued to evolve into state and national guidance material. This guidance material has underpinned the design and proposed management of the Angora feedlot. The proposed environmental design and management will ensure that serious or irreversible environmental damage will not occur.

- Inter-generational equity;

The feedlot has a relatively small footprint and has been located on existing farming land. It forms a key part of current and future farming operations as part of a larger supply chain. It provides a value-adding opportunity for the surrounding agricultural land and activities and ensures a strong rural economy for the region. The proposed development has been sited, designed, and will be managed to ensure any potential impacts to the environment are minimised and long-term impacts are prevented. The feedlot industry is also investigating the use of feed additives to minimise the production of enteric methane from cattle with MLA committed to being carbon neutral by 2030 (CN30).

- Conservation of biological diversity and ecological integrity; and

The feedlot site has been located, with consideration of all constraints, to minimise the clearing of native vegetation. It has been located on existing farming land, which contains isolated paddock trees. The required widening of Rannock Burn Road will require the clearing of some native trees within 3 m of the existing road. Buffers will also be maintained between native vegetation and land subject to effluent and manure applications.

- Improved valuation, pricing, and incentive mechanisms.

Design and management principles will minimise the potential for pollution with most of the waste generated by the feedlot (e.g. manure) being organic in nature and suitable for use as a fertiliser. The feedlot industry was one of the earliest adopters of a circular economy as agriculture is constantly required to do more with less. As mentioned above, MLA is exploring feed additives to achieve CN30. This will enable the industry to remain globally competitive into the future.

2.2 PLANNING APPROVAL PATHWAY

As the development capital investment value (CIV) is less than \$30 million, the proposed development is deemed to be local development. As such, the development application will be lodged to TRC via the NSW Planning Portal.

Under the *Protection of the Environment Operations Act 1997* (POEO Act), the development will also require an Environment Protection Licence (EPL) from the Environment Protection Authority (EPA). As such, the proposed development is also an integrated and designated development requiring the preparation of an Environmental Impact Statement (EIS) and general terms of approval from the EPA. Nominated integrated development, such as the proposed feedlot, is also considered advertised development requiring public notification for a period of 28 days.

The feedlot utilises water under an existing entitlement. Under the *Water Management Act 2000*, tanks associated with the storage or conveyance of water do not require works approvals. As such, no further approvals are required.

2.3 STATUTORY REQUIREMENTS

The relevant statutory requirements for the feedlot have been identified in Table 1 with the associated section of the EIS identified for quick reference. Relevant sections addressing key issues from the Planning Secretary's Environmental Assessment Requirements (SEARs) (Appendix A) have been identified in Table 2.

Table 1 – Statutory Requirements

Relevant Legislation	Specific Assessment	EIS Section
Waste and Sustainable Materials Strategy 2041	N/A	Section 3.11
State Environmental Planning Policy (Transport and Infrastructure) 2021	Schedule 3	Section 6.1.1
State Environmental Planning Policy (Biodiversity and Conservation) 2021	Chapters 3 & 4 – Koala Habitat	Section 6.1.2
State Environmental Planning Policy (Primary Production) 2021	Schedule 4, Part 3 – Intensive livestock agriculture	Section 6.1.3
State Environmental Planning Policy (Resilience and Hazards) 2021	Chapter 3 – Hazardous and offensive development	Section 6.1.4
New England North West Regional Plan 2014 (Regional Plan)	<ul style="list-style-type: none"> • Consistency with the 2041 vision • Objective 1 • Objective 2 • Objective 10 • Objective 11 • Objective 12 	Section 6.2
Tamworth Regional Local Environmental Plan 2010 (LEP)	<ul style="list-style-type: none"> • LEP Aims • Section 5.10 – Heritage Conservation • Section 5.18 – Intensive Livestock Agriculture • Section 5.21 – Flood planning • Section 7.1 – Earthworks 	Section 6.3.1

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Relevant Legislation	Specific Assessment	EIS Section
Tamworth Regional Development Control Plan 2010 (DCP)	<ul style="list-style-type: none"> General Development Specifications 	Section 6.3.2
Relevant Guidelines	<ul style="list-style-type: none"> National Guidelines for Beef Cattle Feedlots in Australia 3rd Edition (2012) (National Guidelines) National Beef Cattle Feedlot Environmental Code of Practice 2nd Edition (2012) (Code of Practice) Beef Cattle Feedlots: Design and Construction (2016) (Feedlot Design Manual) Beef Cattle Feedlots: Waste Management and Utilisation (2016) (Feedlot Waste Manual) Technical Notes: Assessment and management of odour from stationary sources in NSW (2006) (NSW S-Factor Guidelines) Planning Guidelines – Intensive Livestock Agriculture Development (2019) (Intensive Livestock Planning Guidelines) Environmental Guidelines – Use of Effluent by Irrigation (2003) (NSW Effluent Guidelines) 	

Table 2 – Summary of Key Issues from the SEARs

Secretary's Environmental Assessment Requirements – Key Issues		
Strategic and Statutory Context	<ul style="list-style-type: none"> Project justification 	Section 2.1
	<ul style="list-style-type: none"> Site Suitability 	Section 5
	<ul style="list-style-type: none"> Land Use Conflict Risk Assessment 	Section 5.1.3
	<ul style="list-style-type: none"> Planning Framework 	Section 6
	<ul style="list-style-type: none"> Relevant Approvals 	Section 2.2
Waste Management	<ul style="list-style-type: none"> Waste Handling Manure and Mortality Management Consistency with the NSW Waste Strategy 	Section 3.11
Air Quality and Odour	<ul style="list-style-type: none"> S-Factor Assessment 	Section 5.1
	<ul style="list-style-type: none"> Odour Management 	Section 3.13.1 & Appendix H
Soil and Water	<ul style="list-style-type: none"> Description of Soils 	Section 5.2 & Appendix K
	<ul style="list-style-type: none"> Water Supply 	Section 3.7
	<ul style="list-style-type: none"> Effluent Water Balance 	Section 3.10.5 &
	<ul style="list-style-type: none"> Assessment of impacts to surface water and groundwater 	Sections 5.4 & 5.5
	<ul style="list-style-type: none"> Environmental Management Plan 	Section 3.12 & Appendix H
Hazards and Risk	<ul style="list-style-type: none"> Preliminary risk screening 	Section 6.1.4
Noise and Vibration	<ul style="list-style-type: none"> Noise and Vibration Impact Assessment 	Section 5.1.2.2 & Appendix J
Traffic and Transport	<ul style="list-style-type: none"> Traffic Generation 	Section 3.9.1
	<ul style="list-style-type: none"> Traffic Impact Assessment 	Appendix F
Biodiversity	<ul style="list-style-type: none"> Biodiversity Development Assessment Report 	Section 5.3 & Appendix L
Visual	<ul style="list-style-type: none"> Visibility and potential impact 	Section 5.1.2.4
Heritage	<ul style="list-style-type: none"> Aboriginal Cultural Heritage Assessment Report 	Section 5.6 & Appendix N

3 PROJECT DESCRIPTION

3.1 OVERVIEW

Angora currently operates a 1,000 head feedlot on 'Annabrae', Rannock Burn Road, Rushes Creek. They are proposing to construct an 8,100 head feedlot on a greenfield site and, additionally, increase the capacity of the existing 1,000 head feedlot to approximately 1,400 head. This will result in a combined feedlot capacity of 9,500 head. Based on the expected cattle type, this equates to a capacity of 7,240 standard cattle units (SCU). The expansion may be staged with each row being constructed as finances and market demands allow. However, multiple rows may be constructed at once or the full capacity constructed at once if suitable cattle supply is secured. Refer to Appendix B for design plans.

The existing drought pens will be decommissioned, and on-site backgrounding operations will be managed to ensure ground cover can be maintained across most of the paddocks during normal weather conditions (i.e. outside of drought periods).

The proposed feedlot has been designed in accordance with the *National Guidelines for Beef Cattle Feedlots in Australia* (National Guidelines) and the *National Beef Cattle Feedlot Environmental Code of Practice* (Code of Practice). There will be no change to the existing feedlot infrastructure and the increase in capacity will be achieved by adjusting stocking density. Shade is provided in the existing feedlot and will be constructed in the new feedlot.

Table 3 – Project Summary

Project Element	Summary of the Project
Property size	525 ha
Site address	Rannock Burn Road, Somerton, NSW
Feedlot capacity	9,500 head (7,240 standard cattle units)
Cattle type and days on feed	70-day short-fed domestic cattle and 100-day short-fed cattle
Feedlot throughput	39,655 head/year
Feedlot footprint	22 ha
Feedlot infrastructure	<ul style="list-style-type: none"> Feedlot pens – fences, compacted clay base, water troughs and feed bunks, concrete aprons around feed bunks and troughs. Cattle handling facility (as required) – loading ramp, cattle crush, sorting facility, temporary holding pens, laneways connecting to feedlot pens. Earthen drainage and effluent controls – controlled drainage area, sloped pens, sloped open drains, sedimentation pond, effluent holding pond, pumps, and irrigators. Manure and composting pad – gently sloped earthen pad where manure and mortalities are stored and composted.
Water supply and storage	480 ML/year - groundwater allocation (WAL21120). Water stored in tanks.
Workforce	12
Vehicle generation	8 trucks & 6 light vehicles per day
Hours of operation	<ul style="list-style-type: none"> Cattle occupancy – 24 hours a day, 7 days a week Staff operations – 6am-6pm, 7 days a week Truck movements – 6am-6pm, 7 days a week
Capital investment	\$9.36 million (\$1,500 per SCU)

3.2 SUBJECT SITE

The subject site, 'Annabrae' is located on Rannock Burn Road, Rushes Creek approximately 27 km east, north-east of Gunnedah and 39 km north-west of Tamworth. The property includes seven land parcels with a total area of 525 ha (Table 4 and Property Plan, Appendix B). The property is bounded by Rannock Burn Road on the northern side and the Peel River on the southern side. There are several Crown or 'paper' roads across the property which have been considered in the design of the feedlot. While the property is in the TRC local government area (LGA), The Gunnedah Shire Council LGA commences approximately 2 km south-west of the property.

The existing property includes the 1,000 head feedlot, with the remainder of the property used for dryland cropping and grazing.

Table 4 – Property Description

Land Parcel (Lot/Plan)	Area (ha)
19/DP752169	176.9
1/DP842391	259.7
43/DP752169	21.8
44/DP752169	21.9
141/DP752169	22.4
142/DP752169	22.0
Total	524.7

3.3 FEEDLOT DESIGN

The proposed feedlot will have a stocking density of 15 m²/SCU across 39 pens with dimensions of 48 m (width) by 50 m (depth) resulting in an individual pen area of 2,400 m². Each pen will have a maximum capacity of 160 SCU with pens constructed in a back-to-back configuration with two rows sharing each feed road and some rows sharing a cattle lane and drain. The pens will have a uniform downslope of approximately 3 % which facilitates pen drainage and minimises pen-to-pen drainage. Each pen may have a slightly different slope based on earthworks optimisation. Each drain will have a slope of approximately 0.5 % which will minimise sediment deposition in the drains. As with the pen slope, final drain slope may vary to provide flexibility for earthworks optimisation.

The proposed feedlot will be located in a controlled drainage area (CDA) which will ensure all clean, upslope water is diverted around the feedlot and all contaminated runoff from the feedlot controlled and contained in a 2.5 ML sedimentation basin and a 22 ML effluent holding pond.

The pen width will result in a feed bunk allowance of 313 mm/SCU which is within the range identified in *Beef Cattle Feedlots: Design and Construction* (Feedlot Design Manual). The feed bunks will be made of heavy-duty conveyor belt or concrete with a concrete apron extending 2-3 m into the pen. Water troughs will be constructed along the fence lines towards the bottom of the pens. Each pen will be serviced by two water troughs, each with a concrete apron extending 2-3 m into the pens.

A manure pad will be located on the eastern side of the feedlot which will be used for composting mortalities and temporarily stockpiling manure prior to spreading. The manure pad will be located within the CDA and drain into the sedimentation basin.

Initially, the existing cattle handling facility will continue to be used with a lane extending from the yards to the new feedlot. However, a location for a future cattle handling facility has been identified which will improve operational efficiencies as the feedlot expands. The existing feedmill will be upgraded to accommodate the expansion. Additional feed storage has been identified between the existing and proposed feedlot. This is to allow for future changes which could increase operational efficiency. There will be no change to the infrastructure within the existing feedlot. However, its capacity will be increased from 1,000 head to approximately 1,400 head (1,000 SCU) with a stocking density of 12.85 m²/SCU.

3.4 OPERATIONAL DETAILS

3.4.1 LIFE OF OPERATION

The feedlot has been designed for long-term sustainability and has an indefinite lifetime. There is adequate agricultural land to ensure effluent irrigation and manure spreading can occur sustainably.

Should the feedlot be decommissioned, infrastructure not required for the ongoing operation of the property will be removed and all effluent evaporated or applied to paddocks and manure applied to paddocks or removed from the site. The sedimentation and effluent holding ponds will be filled in and the site returned to pasture.

3.4.2 EMPLOYMENT

The existing feedlot operations form part of the family business and majority of operations are undertaken by family members. Two employees assist with both general farming operations and the feedlot. The proposed feedlot is likely to require a total of 12 employees including family members.

3.4.3 HOURS OF OPERATION

As the feedlot houses cattle for long periods of time, it is 'operational', i.e. it contains cattle, 24 hours a day, seven days a week. For security and animal welfare reasons, staff will be on the property 24 hours a day, seven days a week. However, general operations, such as heavy vehicle movements, plant and machinery use, feed preparation and cattle feeding, will generally occur between the hours of 6 am and 6 pm. Vehicle movements on weekends will be substantially lower than weekdays.

As a result of infrequent animal welfare requirements (e.g. heat loading) or unexpected logistical interruptions, some heavy vehicle movements may occur outside of these hours but no earlier than 4 am and no later than 8 pm.

3.5 LIVESTOCK THROUGHPUT

Livestock throughput is dependent on the target markets for the feedlot which can vary significantly across the lifetime of the feedlot. The proposed feedlot will be, generally, stocked with approximately 70 % 70-day short-fed cattle and 30 % 100-day short-fed cattle. The existing feedlot is accredited under the National Feedlot Accreditation Scheme (NFAS). Following approval and construction, the new feedlot pens will become part of the NFAS accreditation.

Based on the assumed cattle types, cattle weight upon entry to the feedlot will vary from 320 kg to 420 kg with a variable exit weight of 450 kg to 600 kg. This results in an average daily gain of 1.5 kg to 1.9 kg. Generally, 100-day cattle are fed for approximately 120 days to achieve the required specifications. Some cattle are backgrounded in the feedlot prior to being sent to other feedlots as part of a long-fed program. The average occupancy of the feedlot is assumed to be 90 % which is based on an occupancy rate slightly higher than the industry average of 80 %. However, there may be fluctuations in this occupancy depending on market conditions.

A feedlot of this size generally has a mortality rate of approximately 0.8 % which, with an annual throughput of 39,655 head results in approximately 317 mortalities per year. As such, the outgoing cattle have been estimated at 39,338 head/year. Livestock throughput has been calculated in Appendix C.

3.6 FEED REQUIREMENTS AND STORAGE

An as-fed intake of 12 kg/day has been assumed with the ration consisting of grain, roughage, and supplements. This results in an annual as-fed feed requirement of approximately 37,500 tonnes.

The existing feedmill will be upgraded based on the design used for a similar sized facility. A concept layout of the proposed feedmill is provided in Appendix B. Grain will be hammer- or roller-milled which is common for medium sized feedlots. This makes the grain more digestible and increases feed efficiency thereby reducing manure output. Other commodities may also require minor processing (e.g. hull removal).

Commodities and supplements will then be combined into a ration formulated by a nutritionist or veterinarian based on cattle requirements and the availability or cost of commodities. The commodities are then mixed in the feed trucks prior to delivery to the feed bunk. Feed will be delivered to each pen twice a day. This minimises wastage which may otherwise occur due to weather conditions, bird activity or overfeeding.

Grain will be stored in silos and other commodities will be stored in the commodity bays located within the existing sheds. As the feedlot expands, additional storage may be required between the existing and proposed feedlot areas. This is likely to consist of additional silos and a commodity shed. As this will only be required in the long-term, building plans will be prepared for submission as part of subsequent building approvals.

3.7 WATER SUPPLY

According to the National Guidelines, approximately 24 ML/year of water is required per 1,000 head. However, a study by (Davis, Wiedemann and Watts, 2008) identified that, based on data from operating feedlots, the water use for feedlots is closer to 17 ML/1,000 head.

The water supply for the proposed feedlot is already used in the existing feedlot. A sample of the water used in the feedlot was obtained by JG Environmental (Appendix D). Regular contact with a consulting veterinarian or nutritionist will ensure that water quality is balanced with appropriate diet formulation.

The proposed feedlot will require approximately 161.5 ML/year of water for the full capacity. The property is serviced by a groundwater allocation with 480 ML/year (share units/year). Refer to Appendix E for the relevant Water Access Licence (WAL). Water will be stored in tanks adjacent to an existing tank near the on-site dwelling. As water will be stored in tanks, no changes to the water licence or works approval are anticipated. Groundwater may also be used to shandy effluent for optimal plant growth in the new irrigation areas.

3.8 POWER SUPPLY

The existing feedmill and ancillary rural buildings have access to three-phase power. The feedmill will require the most electricity and the new feedlot pens will have minimal power requirements. As required, power will be extended to necessary locations with necessary approvals obtained from Essential Energy.

3.9 TRAFFIC

3.9.1 TRAFFIC GENERATION

The feedlot is accessed from Rushes Creek Road via Rannock Burn Road which only provides access to one other property. It is anticipated that the largest cattle trucks accessing the feedlot will be B-doubles with some semi-trailers utilised. Heavy vehicle movements have been estimated in Appendix C and summarised in Table 5. The traffic generation in Appendix C assumes a 52-week year and a 7-day week. The data summarised in Table 5 assumes a 50-week year and 6-day week, which is more accurate to the proposed operations. A Traffic Impact Assessment has been prepared by Premise Australia (Appendix F).

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Table 5 – Traffic

		Proposed Feedlot
Incoming Cattle		
Cattle (head/year)		39,655
Typical Truck Type		B-double
Capacity (head/truck)		Various
Trucks (vehicles/year)		426
Outgoing Cattle		
Cattle (head/year)		39,338
Typical Truck Type		B Double
Truck Capacity (head)		Various
Trucks (vehicles/year)		531
Feedstuffs		
Feed imported (tonnes/year)		37,467
Typical Truck Type		B Double
Truck Capacity (tonnes)		Various
Trucks (vehicles/year)		1,088
Outgoing Manure		
Manure exported (tonnes)		3,651
Typical Truck Type		Semi-trailer
Capacity (tonnes)		24
Trucks (vehicles/year)		152
Total Trucks	Yearly	2,197
	Weekly	44
	Daily	8

3.9.2 PARKING

A large hardstand pad is provided to allow cattle trucks to unload and load cattle adjacent to the existing or new cattle handling facility. This area also provides parking for any light vehicles accessing the feedlot. Hardstand areas adjacent to the feedmill provide adequate space for commodity deliveries. If the queuing of heavy vehicles is required, the long internal driveway provides adequate space for vehicles to queue without impacting on public roads.

3.9.3 INTERNAL ROAD DESIGN

The existing internal roads have been constructed with gravel/crushed rock and will be, as required, upgraded, and/or maintained, to ensure all-weather access. Any new internal roads will be constructed to a similar standard.

3.9.4 PUBLIC ROADS

As per the recommendations of the traffic impact assessment (TIA) (Appendix F), Rannock Burn Road will be upgraded to accommodate the proposed development. The following upgrades are proposed to be constructed in accordance with TRC standards and specifications:

- Widen the gravel roadway from the intersection of Rushes Creek Road and the property access to 6 m to allow for two-way movement;

- Construct a 1 m table drain either side of the road;
- Maintain the crossing of the unnamed creek to the existing width and install a give way sign;
- Resurfacing of the existing road surface during the widening; and
- Flaring of the intersection of Rushes Creek Road and Rannock Burn Road, including bitumen sealing the first 50 m of Rannock Burn Road. The flaring will be constructed to allow for the swept path of a B-double. The TIA only identifies the swept path for semi-trailers, but B-doubles will also be utilised.

3.10 CONTROLLED DRAINAGE AREA & STORMWATER MANAGEMENT

3.10.1 STORMWATER MANAGEMENT

As the development is rural in nature, industry-specific stormwater controls, identified in the National Guidelines, have been incorporated into the design. This includes the construction of a controlled drainage area (CDA) to exclude clean upslope runoff and to contain and control stormwater contaminated by the feedlot. As much as reasonably possible, the soft catchment areas within the CDA have been reduced to minimise incidental take of clean overland flow which would otherwise enter the natural drainage network and supply downstream stock and domestic dams.

Generally, feedlot effluent generation is rainfall dependent. Large, regular volumes of effluent are not generated each day. Small volumes may be generated regularly from the cleaning of water troughs. This means the biological treatment of feedlot effluent, using a wastewater treatment plant, is generally not effective as a constant feed supply is not available. Industry-specific effluent controls, including a sedimentation basin, effluent holding pond, and sustainable irrigation of effluent, will be implemented.

Refer to Table 6 and Appendix B for a summary of the feedlot catchment areas, maximum drain length, sedimentation basin areas and volumes, and the area and volume of the effluent holding pond. A spreadsheet-based feedlot effluent model has been used to size the sedimentation and effluent holding ponds to ensure they meet the requirements of the NSW Effluent Guidelines and the National Guidelines (Appendix G).

Table 6 – Controlled Drainage Area

Parameter		Proposed Catchment	Unit
Pen Area		9.36	ha
Hard Catchment Area		6.77	ha
Soft Catchment Area		1.93	ha
Manure Pad		1.31	ha
Drain Length		610	m
Sedimentation Pond	Area	0.27	ha
	Volume	2.5	ML
Effluent Holding Pond	Area	1.56	ha
	Volume	22.0	ML

3.10.2 SURFACE PREPARATION

Any surfaces in the CDA that effluent or manure is either deposited on, transferred across, or stored in, must be constructed to ensure an adequately low permeability finish. These areas include pens, drains, sedimentation ponds and effluent holding ponds. The National Guidelines require these surfaces and finishes to have a maximum permeability of 1×10^{-9} m/s. This low permeability is usually achieved by the construction of a clay liner. The in-situ soils will be utilised for the pen surface and construction of the new ponds. Geotechnical testing will be completed on the in-situ material to determine their suitability. Should the in-situ materials be identified as unsuitable, borrow clay material will be sourced from other on-site locations.

3.10.3 DRAINS

Catch drains will be constructed below each row of pens to control runoff and direct it into the sedimentation ponds. As the feedlot has been designed with back-to-back rows, the central drain will service two rows and the outer drains will service a single row. Catch drains will converge prior to the sedimentation basin. The proposed drainage system has been designed in accordance with the National Guidelines.

3.10.4 SEDIMENTATION BASIN

Runoff, generated from the pens and manure pad, can contain a high level of solids (manure) which can be readily removed by a simple sedimentation basin with a spaced drop-board weir. Drop-board weirs are preferred as the boards can be removed to facilitate cleaning of the weir. The sedimentation basin will be shallow (depth of less than 1 m) with a slight (0.1 %) slope towards the weir. This slows effluent and facilitates the settling of solids. It also allows for the solids to be quickly dried prior to removal. The sedimentation weir will include 400 mm freeboard to the top of the concrete block wall and a further 500 mm freeboard to the embankment crest.

In accordance with the National Guidelines, the proposed sedimentation basin has been designed to, as a minimum, cater for the peak flow of a design storm having an ARI of 20 years. The proposed sedimentation basin will have a volume of 2.5 ML. (Appendix B) This assumes a runoff co-efficient of 0.8 for any hardstand areas including pens, drains and the manure pad, and 0.4 for any grassed soft catchment areas (Table 6).

Table 7 – Sedimentation Pond Design

Parameter	Catchment 1	Unit
System Type	Basin	-
Length to Width Ratio	2.0	-
Scaling Factor	2.5	-
Max Design Flow Velocity	0.005	m/s
Time of concentration	24.57	min
Rainfall Intensity (ARI ₂₀)	79.1	mm/hr
Required Volume	1.9	ML
Proposed Volume	2.5	ML
Proposed Buffer	32	%

3.10.5 EFFLUENT HOLDING POND

The sedimentation ponds remove most of the solids from the effluent stream. However, the remaining effluent still contains a high level of soluble contaminants, mainly nutrients and salt. As such, this effluent needs to be contained to prevent it entering the natural drainage system. The industry approved methodology for effluent management is with containment, and reuse through sustainable land application. The effluent holding pond has been designed in accordance with the NSW Effluent Guidelines and the National Guidelines. A water balance model, designed to comply with the requirements of the NSW Effluent Guidelines, has been prepared for the proposed feedlot (Appendix G). The effluent holding pond has been conservatively sized to contain runoff from the CDA up to a 94th percentile wet-year. This exceeds the 90th percentile wet-year required by the NSW Effluent Guidelines.

3.11 WASTE MANAGEMENT

The NSW Waste and Sustainable Materials Strategy 2041 promotes the growth of the circular economy across NSW and the feedlot industry has been promoting the circular economy since its inception. Organic wastes (e.g. manures) are utilised to reduce the reliance on manufactured fertilisers. The use of manure also increases soil carbon.

3.11.1 EFFLUENT IRRIGATION

As per the National Guidelines and industry best practice, runoff contained in the effluent holding pond will be sustainably irrigated to surrounding agricultural land. The design of the CDA has maximised the prevention of effluent creation by minimising the catchment area as much as reasonably possible. The application of effluent to agricultural land is the most suitable option for release, as sewerage infrastructure is not available at the site. A total of 45 ha of effluent utilisation area (EUA) has been identified (Property Plan, Appendix B).

A nutrient mass balance has been undertaken which identified that the available area exceeds the minimum area required for the long-term management of soil Phosphorous and Nitrogen, with Potassium levels to be managed through crop selection (Appendix G). Additional fertiliser is likely to be required for optimum plant growth. The nutrient balance assumed a lucerne crop will be utilised. However, various crops will be used in the EUA across the lifetime of the feedlot. Crops could include grain crops, silage (e.g. corn), pastures cut for hay, etc. The crops selected each season will be based on the previous annual environmental monitoring report and agronomic advice.

Two centre pivots have been identified and have been setback at least 50 m from the nearest drainage line. As such, terminal ponds are not proposed. The clearing of isolated trees will be required for the installation of the centre pivots.

3.11.2 MANURE MANAGEMENT

A manure handling area is proposed on the eastern side of the proposed feedlot. IN accordance with the National Guidelines, manure will be cleaned from the pens, at least every 13 weeks, and temporarily stockpiled on the manure pad prior to spreading on-site or removal off-site to nearby properties. Manure will also be utilised for the composting of mortalities (Section 3.11.3).

A total of 155 ha of manure utilisation area (MUA) is available on the property (Property Plan, Appendix B). Application rates will be determined each year based on soil sampling and agronomic advice. Clearing of vegetation will not occur in the MUA and trees will be avoided during spreading. Should excess manure be accumulated on the manure pad, either due to seasonal, soil nutrient, or cropping variations, it will be exported to other property owned by the applicant or sold to other users.

3.11.3 MORTALITY MANAGEMENT

Mortalities will be composted in manure or an alternate co-composting material (e.g. sawdust) on the manure composting pad. The mortality composting area will be located at the southern end of the manure pad with raw manure stockpiles separated to prevent cross-contamination. This will allow for manure to be exported off-site under the current manure resource recovery exemption. Composted mortality and manure material will be screened prior to spreading, with any large bones placed alongside mortalities for further composting.

Adequate on-site manure spreading area has been identified for the purpose of spreading manure used for composting mortalities. Annual soil sampling and agronomic advice will determine spreading rates.

Should a mass death event occur, a burial pit will be excavated in areas where suitably deep soils have been identified. The location will not be subject to inundation during a flood event or within 50 m of a drainage line. Should sub soils not contain adequate clay, excavated clay will be replaced to form a compacted clay liner. The pit will be excavated to a minimum depth that ensures at least 1 m of soil coverage.

Should the in-situ material have inadequate clay to form an impermeable layer, an alternate location will be selected, or clay material imported to form a clay liner.

3.11.4 GENERAL WASTE

Minimal general waste will be generated by the feedlot with most of this waste associated with the feedmill and ancillary buildings. Generally, commodities are delivered in bulk and not packaged. A very small volume of general waste is produced within the feedmill, which may be sent to landfill. This waste will be stored in a commercial bin and collected by a contractor on an as-required basis.

3.12 EROSION AND SEDIMENT CONTROL

Due to the large property and rural nature of the development, simple erosion and sediment controls have been identified for construction. This includes the placement of sediment fences along the eastern edge of the construction and stockpiling areas. If required, sediment control devices will be placed in downslope contours or drainage lines to further prevent the movement of sediment from the property.

The effluent pond and eastern drain will be constructed first, which will allow the effluent pond to become a sediment control dam for construction. Once the effluent holding pond has been constructed, topsoil will be replaced on the outer banks and adjacent disturbed areas. If natural

vegetation regrowth is inadequate to revegetate these areas, grass seed will be spread and watered until it is established.

A more detailed Erosion and Sediment Control Plan will be developed with the detailed design and submitted for construction approvals.

3.13 ENVIRONMENTAL DESIGN AND MANAGEMENT

An Environmental Management Plan (EMP) (Appendix H) has been prepared to guide the ongoing management of the feedlot to ensure it meets the requirements of the development consent and EPL. The EMP provided in this EIS is expected to require amendments based on the conditions of the development consent and EPL. As this document is expected to be continually amended into the future, it should not be attached to the consent or EPL as an approved document.

Key environmental design and management principles are described below.

3.13.1 ODOUR

The following is a summary of environmental design and management practices for the mitigation of odour impacts:

- The feedlot has been adequately separated from the nearest sensitive receptors (Section 5.1.2.1);
- The pen surface has been designed to ensure a uniform, free-draining pad;
- Pens will be cleaned, and manure removed, at least every 13 weeks;
- Following cleaning, any pen surface maintenance will be undertaken to ensure a uniform, free-draining surface;
- Sediment will be removed from the sedimentation basin to maintain settling capacity;
- Effluent irrigation and manure spreading will occur with consideration of weather conditions (e.g. wind speed and direction); and
- Mortalities will be covered with at least 600 mm of dried manure and composted.

3.13.2 DUST

The following is a summary of environmental design and management practices for the mitigation of dust impacts:

- The proposed stocking density will ensure that the pen surface remains moist, and manure compacted to minimise loose material;
- On-site speed limits of 40 km/hr will be signed and enforced through training and communication;
- Road maintenance will occur to ensure loose surface material is minimised;
- During extended dry periods, roads will be watered; and
- Where possible, general agricultural activities (e.g. cultivation) will be undertaken with consideration of weather conditions.

3.13.3 NOISE

The following is a summary of environmental design and management practices for the mitigation of noise impacts:

- A Noise and Vibration Assessment has been completed for the development (Section 5.1.2.2);
- Operating hours will be limited to between 6 am and 6 pm; and
- Calm stock handling techniques will be implemented during the movement and loading/unloading of stock.

3.13.4 SURFACE WATER

The following is a summary of environmental design and management practices for the mitigation of impacts to surface water:

- The feedlot has been designed, in accordance with the NSW Effluent Guidelines and National Guidelines, to be contained within a CDA. This ensures runoff from the pens and manure pad is directed into a sedimentation and effluent holding system;
- Buffers and setbacks have been provided between nearby drainage paths and the feedlot, MUA, and EUA;
- Sustainable effluent irrigation will occur to maintain available capacity in the effluent holding ponds;
- Irrigation will only occur when soil moisture levels allow for the infiltration of effluent to prevent surface pooling and runoff;
- Existing contour banks will be maintained to conserve topsoil;
- A surface water monitoring program is proposed for spill events; and
- A Pollution Incident Response Plan (PIRMP) will be developed in accordance with the anticipated conditions of the EPL.

3.13.5 GROUNDWATER

The following is a summary of environmental design and management practices for the mitigation of impacts to groundwater:

- The feedlot CDA will be constructed with a compacted clay base to ensure any surface, on which manure or effluent is stored or conveyed, meets the permeability specifications of the National Guidelines;
- Irrigation rates and soil nutrient concentrations will be managed to prevent any leaching of contaminants into groundwater;
- The integrity of pen, sedimentation basin, and effluent holding pond surfaces will be inspected during cleaning events;
- The irrigation of effluent or spreading of manure on alluvial landscapes will be avoided during wet years when alluvial groundwater may be shallow; and
- A groundwater monitoring network is proposed for the property.

3.13.6 SOIL

The following is a summary of environmental design and management practices for the mitigation of impacts to soil:

- The feedlot CDA will be compacted and formed to minimise the potential for erosion;
- Any disturbed soft catchment areas will be revegetated following construction;
- A soil investigation has confirmed that soils in the proposed EUA and MUA are suitable;
- Effluent irrigation and manure spreading rates will be managed to prevent the long-term accumulation of soil nutrients;
- Perennial pasture will be implemented on low-quality soils;
- Contour banks will be maintained to minimise property-wide erosion;
- A soil monitoring program will be implemented across the EUA and MUA.

3.13.7 FLORA AND FAUNA

The following is a summary of environmental design and management practices for the mitigation of impacts to flora and fauna:

- Minimal clearing is required for the proposed development;
- A 20 m buffer will be maintained between native trees and the EUA and MUA;
- Avoid construction and clearing during the breeding season of threatened and resident species;
- A licensed wildlife handler will complete pre-clearing surveys and be present during clearing to inspect all felled trees;
- Retained trees will be clearly marked to avoid accidental clearing of unrelated trees; and
- Implement best-practice erosion and sediment control to minimise indirect impacts on retained trees.

3.14 BIOSECURITY

In conjunction with the Australian Lot Feeders Association (ALFA), Animal Health Australia has developed the National Biosecurity Manual for Beef Cattle Feedlots which is incorporated into the existing NFAS Quality Assurance (QA) manual for the Angora feedlot. The existing NFAS QA manual will be updated to include the proposed feedlot.

3.15 ANIMAL WELFARE

The existing feedlot is NFAS accredited and this will be amended to include the proposed feedlot. An NFAS QA manual, compliant with current rules and standards, is in place for the existing feedlot. The standards include a module on livestock management which addresses industry best-practice standards for animal welfare. The design of the proposed feedlot is such that it facilitates compliance with these standards.

The NFAS standards incorporate the requirements under the *Australian Animal Welfare Standard and Guidelines for Cattle 2016* (animal welfare code). NFAS accreditation for the proposed feedlot is adequate to address the animal welfare requirements stated in the Primary Production State Environmental Planning Policy (Section 6.1.3).

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Shade will be provided across all feedlot pens. The feedlot has been designed with a north/south alignment to facilitate efficient shade design which allows the movement of the sun to move the shade across each pen. A heat load assessment has been completed for the feedlot (Appendix I).

4 ENGAGEMENT

4.1 TAMWORTH REGIONAL COUNCIL

The applicant and AgDSA met with planning officers from TRC on 4 March 2022 to discuss the proposed feedlot. Draft plans of the proposed feedlot were provided during this meeting but have been modified since, with the feedlot capacity and footprint having been reduced. The applicants have been informally engaging with TRC officers since that meeting.

4.2 ENVIRONMENT PROTECTION AUTHORITY

An initial pre-lodgement meeting was completed via videoconference on 6 June 2022. The key outcome of this meeting was that the cumulative impacts of the nearby poultry farms should be considered in the S Factor odour assessment. The Environment Protection Authority have provided detailed advice as part of the SEARs.

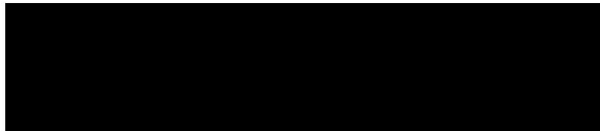
4.3 TAMWORTH LOCAL ABORIGINAL LAND COUNCIL

The Tamworth Local Aboriginal Land Council (LALC) have been consulted as part of the Aboriginal cultural heritage due diligence assessment (Section 5.6.1). The outcomes of this consultation have been incorporated into that report.

4.4 COMMUNITY

The applicants have had several discussions with their nearest neighbours about the proposed feedlot. These discussions have been general in nature, with no specific feedback given or concerns raised by neighbours. The following direct neighbours have been engaged:

-
-
-



5 SITE SUITABILITY

5.1 COMMUNITY AMENITY

5.1.1 RECEPTORS AND LOCALITY

The nearest sensitive receptors surrounding the property have been identified (Table 8, Sensitive Receptor Plan, Appendix B). The nearest sensitive receptor (R4, Lot 2/DP705509) is approximately 1,663 m south of the existing feedlot. Generally, the region is dominated by cropping and grazing uses with a poultry farm located to the south of the feedlot. There are numerous small to medium feedlots in the region and several small to large poultry farms. The potential for cumulative impacts from the nearby poultry farm and proposed feedlot has been considered in the odour impact assessment.

Table 8 – Sensitive Receptors

Receptor	Lot/Plan	Direction	Distance (m)
R1	3/DP755331	E	1,969
R2	27/DP755331	SE	2,005
R3	38/DP755331	SE	2,397
R4	2/DP705509	SSE	1,663
R5	16/DP752189	SW	1,886
R6	47/DP755331	SW	3,065
R7	3/DP834485	W	3,893
R8	228/DP752189	W	5,411
R9	1/DP834485	W	4,528
R10	5/DP179323	NW	4,105
R11	1/DP1180266	NNE	5,834
R12	80/DP752169	NE	4,300
Carroll	701/DP93882	WSW	11,450

5.1.2 POTENTIAL IMPACTS

5.1.2.1 Odour

The Level 1 feedlot odour impact assessment methodology is detailed in the *Technical Notes: Assessment and management of odour from stationary sources in NSW* (NSW S-Factor Guidelines). This methodology is the most suitable for a feedlot odour impact assessment and is utilised by both the EPA and DPI. Figure 1 to Figure 6 are screenshots of the relevant section of the NSW S-Factor Guidelines. Refer to the NSW S-Factor Guidelines for further detail on the methodology and description of each S-factor value.

The Level 1 odour impact assessment considers the following to determine the required separation distances:

- Feedlot class – a combination of feedlot design and management specifications;
- Stocking density;
- Rainfall – greater or less than 750 mm/year;
- Receptor type – various types from a low-use public area to a large town;

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- Terrain between the feedlot and the receptor;
- Vegetation between the feedlot and receptor; and
- Frequency of wind towards or away from the receptor.

A value is applied to each of these considerations, which are multiplied together to form the 'site factor' (S):

- S1 – a combination of feedlot class, rainfall, and stocking density (Figure 1);
- S2 – receptor type (Figure 2);
- S3 – terrain (Figure 3);
- S4 – vegetation (Figure 4); and
- S5 – wind frequency (Figure 5).

Table 7.2a Stocking density factor, S1, average annual rainfall *less* than 750 mm

Feedlot class	Stocking density (m ² /beast)		
	10	15	20
1	65	52	40
2	95	78	58
3	128	103	78
4	158	127	96

Table 7.2b Stocking factor, S1, average annual rainfall *greater* than 750 mm

Feedlot class	Stocking density (m ² /beast)		
	15	20	25
1	65	52	40
2	95	78	58
3	128	103	78
4	158	127	96

Figure 1 – S1 factor values

Table 7.3 Receptor factor, S2

Receptor type	Value
Large towns, greater than 2000 persons	1.6
Medium towns, 500–2000 persons	1.2
Medium towns, 125–500 persons	1.1
Small towns, 30–125 persons	1.0
Small towns, 10–30 persons	0.6
Single rural residence	0.3
Public area (occasional use)	0.05*

* The value for a public area would apply to areas subject to occasional use. Higher values may be appropriate for public areas used frequently or sensitive in nature, such as frequently used halls and recreation areas. These should be assessed individually.

Figure 2 – S2 factor values

Table 7.4 Terrain factor, S3

Terrain	Value
Valley drainage zone	2.0
Low relief	1.2
Flat	1.0
Undulating country between cattle feedlot and receptor	0.9
High relief or significant hills and valleys between cattle feedlot and receptor	0.7

Figure 3 – S3 factor values**Table 7.5 Vegetation factor, S4**

Vegetation	Value
Crops only, no tree cover	1.0
Few trees, long grass	0.9
Wooded country	0.7
Heavy timber	0.6
Heavy forest (both upper and lower storey)	0.5

Figure 4 – S4 factor values**Table 7.6 Wind frequency factor, S5**

Wind frequency	Value
High frequency towards receptor (greater than 60%)	1.5
Normal wind conditions	1.0
Low frequency towards receptor (less than 5%)	0.7

Figure 5 – S5 factor values

Figure 6 is a screenshot of the S-Factor equation, which used to determine the required separation distances between the feedlot and each receptor.

Equation 7.1, Allowable cattle numbers, given the distance

$$N = (D \div S)^2$$

Equation 7.2, Separation distance, given the number of cattle

$$D = \sqrt{N \times S}$$

- N** Number of standard cattle units (SCU). A standard cattle unit is defined as a bovine weighing 600 kilograms live weight at exit from feedlot. See Table 7.1 for converting other types and weights of cattle to SCU
- D** Separation distance in metres from pens and stockpiles
- S** Composite site factor = $S1 \times S2 \times S3 \times S4 \times S5$. Site factors S1, S2, S3, S4 and S5 are determined according to site-specific information relating to stocking density, feedlot class, receptor, terrain, vegetation and wind factor. See Tables 7.1 to 7.6.

Figure 6 – S-Factor equation

A Level 1 odour assessment has been used to determine the required separation distance for the proposed feedlot (Table 9). The feedlot will be operated in accordance with Class 1. However, the feedlot Class system, identified in the NSW S-Factor Guidelines, is based on the classes defined in the Reference Manual for Establishment and Operation of Beef Cattle Feedlots in Queensland. This document is no longer valid in Queensland and has been superseded by the National Guidelines.

Regardless, all receptors comply with the required separation distance. The S1 value has been extrapolated from the guideline values provided in the NSW S-Factor Guidelines. A 20 % buffer has been added on to the required separation to consider the cumulative impacts from the nearby poultry farm. It is understood that there have been no odour complaints made against the existing feedlot.

Table 9 – S-Factor Calculation

Receptor	Direction	S1	S2	S3	S4	S5	Separation Distances		
							Required (m)	Cumulative (120 %)	Available (m)
R1	E	52.8	0.3	1.0	1.0	1.0	1,348	1,618	1,969
R2	SE	52.8	0.3	1.0	1.0	1.0	1,348	1,618	2,005
R3	SE	52.8	0.3	1.0	1.0	1.0	1,348	1,618	2,397
R4	S	52.8	0.3	0.9	1.0	1.0	1,213	1,456	1,663
R5	SW	52.8	0.3	1.0	0.9	1.0	1,213	1,456	1,886
R6-12	Various	52.8	0.3	1.0	1.0	1.0	1,348	1,618	>3,065
Carroll	WSW	52.8	1.1	1.2	0.9	1.0	5,337	6,404	11,450

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S-Factor justification:

- S1 – The proposed Class 1 feedlot will have an average stocking density of 14.7 m²/SCU and average rainfall for the area is less than 750 mm/year.
- S2 – Receptor type
 - 0.3 - Single rural dwellings (including Lake Keepit); and
 - 1.1 – Medium town (125-500 people) with a population of 305 in Carroll (2021 Census).
- S3 – Topography
 - 1.0 – Topography between the feedlot and the receptors is undulating, but the receptors are at a similar height to the feedlot. To ensure a conservative assessment, 'flat' topography has been selected (Figure 7 and Figure 10).
 - 0.9 – Topography between the feedlot and identified receptors is undulating with receptors located upslope from the feedlot (Figure 8 and Figure 9).
 - Whilst there would be katabatic conditions within the banks and floodplain of the Peel River, none of the nearest receptors are located within these low-lying areas.
- S4 – Vegetation
 - 0.9 – A mixture of scattered trees and grazing land (few trees, long grass).
 - 1.0 – Crops only or cropped land with minimal trees.
- S5 –Wind speed and direction plots for Tamworth Airport, sourced from BOM, do not indicate winds with a high frequency, greater than 60 %, towards any sensitive receptor.

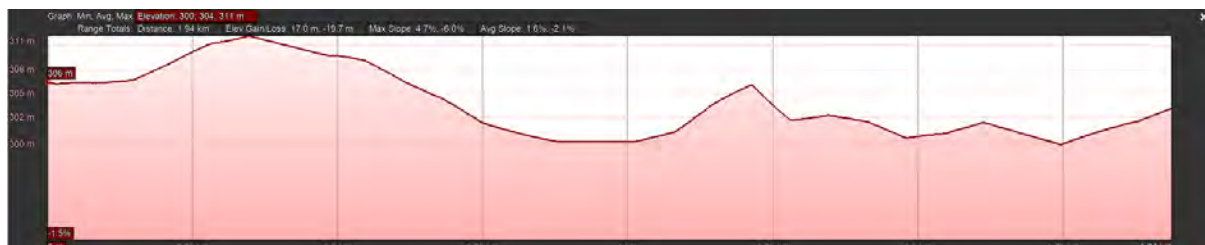


Figure 7 – R1 flat topography

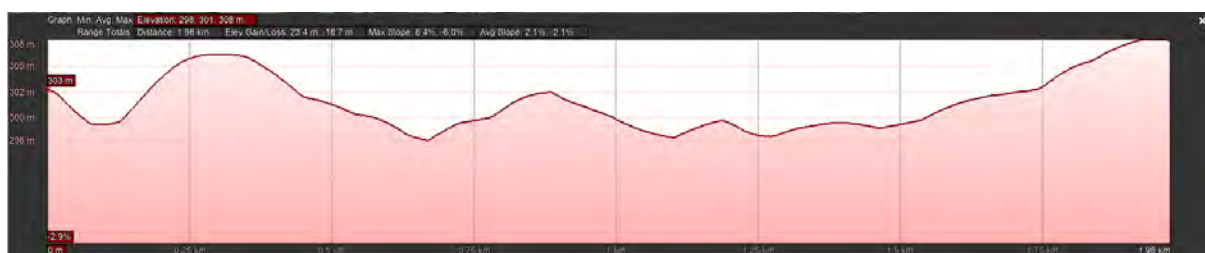


Figure 8 – R2 & R3 undulating topography (receptors upslope)



Figure 9 – R4 undulating topography (receptor upslope)

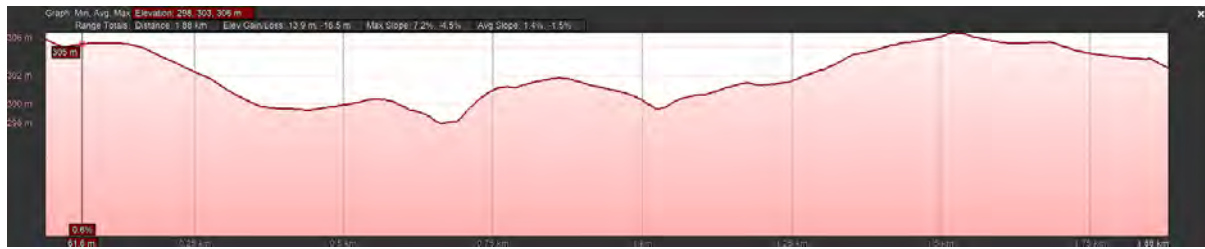


Figure 10 – R5 flat topography

5.1.2.2 Noise and Vibration

The feedlot produces very little noise and vibration with the main sources of noise being internal traffic movements. A detailed Noise and Vibration Impact Assessment has been prepared by Matrix Acoustics (Appendix J). Operating hours and road maintenance are expected to be adequate to mitigate any potential noise impacts.

5.1.2.3 Dust

Key sources of dust from the feedlot are vehicle movements on unsealed roads and dust from the pen surface. As dust particles are larger than odour particles, they tend to settle much closer to the feedlot. The continuous deposition of urine and wet manure from cattle will ensure that dust emissions from the pen floor will be minimised. There are no dwellings adjacent to unsealed internal and public roads.

5.1.2.4 Visual

Although at a distance, the feedlot may be visible from the Oxley Highway. Topography, as well as existing and proposed vegetation screens, will limit impacts on visual amenity along the highway.

Further, the feedlot is a rural activity in a rural area and, beyond fences, feeding and watering infrastructure, does not include a substantial level of built infrastructure that may conflict with the rural locality. There are numerous feedlots and poultry farms in the region, which are highly visible from the Oxley Highway. The feedlot footprint, being constructed with earthen materials, is like the visual impacts of a fallow paddock, only restricted to a defined area. Further, the existing feedlot has been operating for several years and there have been no reports of complaints about visual amenity.

5.1.3 LAND USE CONFLICT RISK ASSESSMENT

A Land use Conflict Risk Assessment (LUCRA) has been incorporated into the EMP (Appendix H). Details of the site suitability and potential impacts are also addressed as part of this EIS. The LUCRA has not been prepared as a separate report as this would result in the unnecessary duplication of information already contained within the EIS and EMP.

5.2 SOIL

A soil investigation has been completed for the site by JG Environmental (Appendix K) which informed the most suitable location for the EUA and MUA. Sampling results were also incorporated into the water and effluent model (Appendix G). Soils in the EUA have a deeper profile and are suitable for cultivation and spray irrigation. Shallower soils have been identified as MUA with limited or no cultivation. Limited manure utilisation will occur on alluvial soils and will be based on agronomic advice and weather conditions. The spreading of composted mortalities will be prioritised for on-site locations, with the remaining manure exported to other properties.

Further information on the management of soils, effluent irrigation, and manure spreading is provided in the EMP (

Appendix H).

5.3 BIODIVERSITY

A Biodiversity Development Assessment Report (BDAR) has been prepared by Premise Australia Pty Ltd (Premise) (Appendix L). The BDAR identified that the proposed development will not have a significant impact on Matters of National Environmental Significance (MNES) and a referral to the Commonwealth is not required.

There is a potential for indirect impacts on native vegetation from manure spreading. However, buffers to individual trees will be maintained. These buffers have not been identified on the mapped MUA and EUA but will be incorporated into normal management practices (Appendix H).

5.4 SURFACE WATER

As there are several drainage lines adjacent to the feedlot and EUA, as well as the location of the Oxley River, there is a potential for impacts to surface waters. The feedlot has been located to maintain a 40 m setback from the adjacent drainage line. The two pivots, which form the EUA, have been located to ensure a setback of 50 m from the adjacent drainage line. As such, terminal ponds are not proposed.

Additionally, the new effluent pond has been conservatively sized to the 94th percentile and exceeds the minimum 90th percentile requirement. This provides additional contingency storage volume for extended wet-weather, during which irrigation may not be possible. A Pollution Incident Response Management Plan (PIRMP) will be developed and submitted to the EPA as part of the subsequent EPL application.

5.5 GROUNDWATER

There are various groundwater bores which have been mapped on the property and adjacent properties (Groundwater Plan, Appendix B). The accuracy of this mapping is limited, particularly for older bores. This is particularly relevant for the bore mapped as being located on the proposed feedlot site which was drilled in 1963. The works summary for the on-site water supply bore was obtained from the Water NSW real time data platform (Appendix M).

As this bore is located on the alluvial landscape, groundwater in this location will be seasonal and could be shallow. As such, this area has not been identified as part of the MUA or EUA.

The nearest bore, located on a similar landscape to the feedlot, with a detailed groundwater works summary is approximately 2 km west, south-west of the feedlot on Lot 17 DP752189. The groundwater works summary for this bore (GW011144, Appendix M), suggests that the surface is underlain by layers of gravel, clay, and shale and that the shallowest water bearing zone is over 11 m below ground level.

The proposed feedlot will be constructed with suitable materials to minimise the potential for the leaching of nutrient into groundwater (Section 3.10.2). If the in-situ material is inadequate, suitable material will be sourced from other parts of the property. The management of effluent irrigation and manure spreading is discussed in the EMP (Appendix H).

5.6 CULTURAL HERITAGE

5.6.1 ABORIGINAL CULTURAL HERITAGE

An Aboriginal Due Diligence Assessment (ADDA) (Appendix N) has been prepared for the project by Premise. The ADDA was prepared in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW 2010), complying with the SEARS requirements issued for the project. The ADDA included a desktop analysis and site survey.

A search of the Aboriginal Heritage Information Management System (AHIMS) database indicates no previously recorded Aboriginal sites, objects or places are located within the project area. One previously recorded site has been, approximately 100 m from the project area within a crown road reserve. This site would not be impacted on by the proposed development.

At the time this report was prepared, one active Native Title claim has been identified across the project area. It has been assessed that this claim will have no implications on the proposed development.

A site survey was conducted over three days and undertaken by the Premise archaeologist and a site officer from Tamworth Local Aboriginal Land Council. Although the project area is located within 200 m of the Peel River, no newly recorded sites were identified during the site survey. No additional areas of archaeological sensitivity were identified during the survey.

Based on the findings of the desktop assessment and site survey, the assessment confirms that there is no evidence of Aboriginal objects located across the project area. The landscape has been subject to extensive ground disturbance and alteration in association with historical grazing and agricultural use for the extant Angora Feedlot. Tamworth LALC have reviewed the ADDA and have no objections.

There will be no direct harm to objects or sites of Aboriginal heritage and works can proceed.

5.6.2 STATE HERITAGE

A historic heritage desktop assessment and site inspection was undertaken by Premise to investigate the presence of archaeological features, focusing on built heritage items of heritage significance related to European settlement of the area.

The heritage assessment aimed to investigate whether historical heritage items or areas are likely to be present in the project area, the significance of these items and the potential impacts that may occur to these items because of the proposed development. This section of the EIS provides a summary of the findings from this assessment.

5.6.2.1 Legislative Requirements

The following assumptions and exclusions apply to the proposed works:

In NSW heritage is managed under a three-tiered system: National, State and Local heritage in accordance with the *Heritage Act 1977*. Certain sites and items may require management under all three levels or a combination of state and local or local only. The assessment area falls under the State and Local Heritage tier. The planning instrument relevant to this project is the LEP.

A search of the following relevant state and federal statutory and non-statutory heritage registers was undertaken on 1 August 2023:

- World, Commonwealth and National Heritage Lists.
- State Heritage Inventory (SHI) database (State Heritage Register (SHR)).
- Protected Matters Search Tool (PMST).
- Register of the National Estate.
- National Trust.
- Tamworth LEP 2010 (Schedule 5).

There are no historic heritage items listed under the World, National or Commonwealth heritage lists within or near the project area. There are no heritage items listed on the State Heritage Inventory (formerly SHR) database relevant to the project area.

A search of the Commonwealth Protected Matters Search Tool indicates that there are no World Heritage Properties, National Heritage Places, or wetlands of international importance within the vicinity of the project area.

There are no heritage items listed under the National Trust or Register for the National Estate (RNE) heritage databases.

No items listed on the Tamworth LEP are located within the project area. The closest LEP listing is located at a distance of 22 km from the project area identified as the residence "Mayvale" I228.

No historic sites or areas of significance were observed during the site inspection.

5.6.2.2 Existing Environment

A desktop investigation and site inspection undertaken by the Premise archaeologist, indicates that there are no historic items identified within or near the project area. The project area is characterised by an existing cattle feedlot with typical rural structures and agricultural infrastructure dating from the late twentieth to early twenty first century.

The structures on site do not contain significant heritage fabric or show distinguishing historical features. The area has been historically used for agricultural purposes including cropping and grazing, predominantly used as an existing cattle feedlot. This type of land use would not accumulate or reveal deposition of historically significant materials. The remainder of the project area has been utilised for agricultural purposes, which has been subject to environmental modifications including vegetation clearing, construction of access roads and establishment of farming infrastructure which does not reveal historical built fabric or artefactual material.

5.6.2.3 Potential impacts

No historic sites or areas of archaeological significance were observed or recorded during the site inspection. Therefore, the project will not impact on any historic heritage sites or known archaeological deposits and no further investigations are required.

6 STATUTORY COMPLIANCE

6.1 STATE ENVIRONMENTAL PLANNING POLICIES

6.1.1 TRANSPORT AND INFRASTRUCTURE

The feedlot is defined as intensive livestock agriculture which is not listed in Schedule 3 of the Transport and Infrastructure SEPP. Additionally, it will not generate more than 200 motor vehicles per hour. The property is accessed via a local road and is not adjacent to a classified road. The feedlot is not sensitive to noise, or vehicle emissions from the classified road.

Traffic generation and impacts are addressed in Section 3.9 and a Traffic Impact Assessment has been prepared by Premise Australia (Appendix F)

6.1.2 BIODIVERSITY AND CONSERVATION

Chapter 3 (Koala Habitat Protection 2020) of the Biodiversity and Conservation SEPP is relevant to the proposed development as it is in the RU1 zone. The BDAR (Appendix L) did not identify suitable habitat for Koalas on the property.

6.1.3 PRIMARY PRODUCTION

Schedule 4, Part 3, Clause 4 of the Primary Production State Environmental Planning Policy (SEPP) identifies the aspects of a proposed development the consent authority must consider. This EIS addresses the following considerations under the Primary Production SEPP:

- (a) the adequacy of the information provided in the statement of environmental effects or (if the development is designated development) the environmental impact statement accompanying the development application,
- (b) the potential for odours to adversely impact on the amenity of residences or other land uses within the vicinity of the site,
- (c) the potential for the pollution of surface water and groundwater,
- (d) the potential for the degradation of soils,
- (e) the measures proposed to mitigate any potential adverse impacts,
- (f) the suitability of the site in the circumstances,
- (g) whether the applicant has indicated an intention to comply with relevant industry codes of practice for the health and welfare of animals.

6.1.4 RESILIENCE AND HAZARDS

The bulk storage of fuel and LPG already occurs on the site and is associated with the feedmill. No additional storage of hazardous materials is required for the proposed feedlot. The proposed use is not defined as an industry use and, according to Section 6.1, Question 6.5 of the *Hazardous and Offensive Development Application Guidelines*, the requirements of the Resilience and Hazards SEPP are unlikely to apply to a cattle feedlot.

The feedlot is considered a potentially offensive industry and this EIS addresses the potential offence caused by the feedlot and design and management practices implemented to reduce that offence.

6.2 NEW ENGLAND NORTH WEST REGIONAL PLAN 2041

The New England North West Regional Plan 2041 (the Regional Plan) vision identifies productive agricultural land and natural environment as a foundation for the region's economy. It also includes the Namoi Regional Jobs Precinct which supports the growth of sustainable intensive agriculture. The subject site is expected to be part of the proposed precinct. The proposed development provides a value adding opportunity to the surrounding agricultural land where cattle and grain are most efficiently combined to drive the economic contribution of agriculture in the local area. Objectives 2, 3, 8, 10, 11, and 12 of the Regional Plan are most relevant to the proposed development and have been addressed below.

6.2.1 OBJECTIVE 2 – PROTECT THE VIABILITY AND INTEGRITY OF RURAL LAND

Cattle are the top agricultural commodity for the region. As agricultural land is a finite resource, the intensification of cattle production is necessary to ensure food security for the domestic and global population. The proposed feedlot will also support the expansion of the on-site farming activities with ancillary irrigation infrastructure proposed which is not currently in place. Manure production will also support improved agricultural practices and offset the need for artificial fertilisers.

These benefits will extend to existing farming operations in the local area as it is anticipated that manure from the feedlot will be utilised on neighbouring properties. The feedlot footprint is also located on marginal soil types where intensive cropping is less suitable. As such, the feedlot is a suitable use for lower quality agricultural land.

6.2.2 OBJECTIVE 3 – EXPAND AGRIBUSINESS AND FOOD PROCESSING SECTORS

The proposed feedlot directly supports this objective as it is the growth of an established, family-owned intensive agriculture business. The surrounding area includes numerous feedlots and poultry farms and is aligned with the Namoi Regional Jobs Precinct. The feedlot will also support existing abattoirs in Tamworth.

6.2.3 OBJECTIVE 8 – ADAPT TO CLIMATE CHANGE AND NATURAL HAZARDS AND INCREASE CLIMATE RESILIENCE

Meat & Livestock Australia (MLA) has an ambitious goal for the industry to be carbon neutral by 2030 and has reduced its greenhouse gas emissions by 65 % since 2005. The feedlot sector plays a key role in achieving this goal as emerging feed additives are showing promising results in the reduction of enteric methane emissions from cattle. The formulation and delivery of a feed ration in a feedlot means such additives can be efficiently delivered to more cattle. Further, the efficiencies gained through the feeding of a high energy diet means cattle can reach market specifications in a shorter time, reducing their lifetime methane emissions.

The feedlot site has been selected to ensure it is not located in an area prone to flooding and the property is low risk for bushfires.

6.2.4 OBJECTIVE 10 – SUPPORT A CIRCULAR ECONOMY

Feedlots, in their nature, are part of a well-established circular economy. Organic wastes (e.g. manures), which form the vast majority of waste products from a feedlot, are utilised both on-site and by other surrounding properties to produce food for people and for the feedlot ration. This both increases soil carbon and reduces the reliance on manufactured fertilisers. Waste products from other industries, such as cottonseed, are commonly fed to cattle as part of a ration. An increase in organic fertiliser supply from intensive livestock in the region will boost soil health and reduce the ever-increasing costs of food production.

6.2.5 OBJECTIVE 11 – SUSTAINABLY MANAGE AND CONSERVE WATER RESOURCES

The property has an existing WAL for 480 ML/year. Due to the size of the property and soil types, the existing feedlot is the only current high-value use for this water. The proposed feedlot expansion, combined with the establishment of irrigation infrastructure, will allow the full potential of this water allocation to be realised. As this allocation is substantially greater than the requirements for the proposed feedlot, climatic variations are unlikely to impact future water supply.

6.2.6 OBJECTIVE 12 – PROTECT REGIONAL BIODIVERSITY AND AREAS OF HIGH ENVIRONMENTAL VALUE

The feedlot has been located to minimise the impacts on on-site biodiversity. Where possible, clearing of established trees has been limited to isolated trees within existing farmland. The drought and backgrounding paddocks within the vegetation adjacent to the cattle yards will be decommissioned or have stocking densities reduced to minimise the long-term impacts on native trees in this location.

6.3 TAMWORTH REGIONAL COUNCIL

6.3.1 TAMWORTH REGIONAL LOCAL ENVIRONMENTAL PLAN 2010

Under the *Tamworth Regional Local Environmental Plan 2010* (LEP), the property is in the RU1 – Primary Production Zone. Intensive livestock agriculture, such as the proposed development, is permitted with consent in the RU1 zone. The alignment of the proposed development with the aims of the LEP is addressed in Section 6.3.1.1. Specific clauses within the LEP are addressed in Sections 6.3.1.2 to 6.3.1.5.

6.3.1.1 LEP Aims

The proposed feedlot aligns with most of the strategic priorities for rural areas in the region and is the expansion of an existing lawful use. It has been sited and designed to minimise the potential impacts on the environment, both built and natural. It is directly aligned with the LEP aims relating to the promotion of ecologically sustainable rural development, the control of flood liable land, and assists in securing a future for agriculture in the region.

6.3.1.2 Section 5.10 – Heritage Conservation

The potential for Aboriginal and state cultural heritage has been identified and there is a low risk of cultural heritage sites being located on the property (Section 5.6). The proposed development will not impact the nearby State heritage site.

6.3.1.3 Section 5.18 – Intensive Livestock Agriculture

Clause 5.18 of the LEP incorporates the requirements of Part 3 of the Primary Production SEPP (Section 6.1.3). The objectives of this clause are:

- a) to ensure appropriate environmental assessment of development for the purpose of intensive livestock agriculture that is permitted with consent under this Plan, and*
- b) to provide for certain capacity thresholds below which development consent is not required for that development subject to certain restrictions as to location.*

Under this clause, in determining whether or not to grant consent for the proposed development, TRC must take the following into consideration:

- (h) the adequacy of the information provided in the statement of environmental effects or (if the development is designated development) the environmental impact statement accompanying the development application,*

This EIS has been prepared by a suitably qualified person with extensive experience in the design, planning, and environmental assessment of feedlots. This report addresses all relevant aspects of the feedlot to ensure it has been designed, and will be managed, in accordance with industry standards.

- (i) the potential for odours to adversely impact on the amenity of residences or other land uses within the vicinity of the site,*

Nearby sensitive receptors and surrounding land use has been identified in Section 5.1.1. The feedlot has been adequately separated from all nearby sensitive receptors (Section 5.1.2.1).

- (j) the potential for the pollution of surface water and groundwater,*

The potential impacts to surface water and groundwater are identified in Sections 5.4 and 5.5, respectively. The feedlot will be located in a CDA which has been designed in accordance with the National Guidelines and NSW Effluent Guidelines (Section 3.10).

- (k) the potential for the degradation of soils,*

The on-site soils and land and soil capability are discussed in Section 3.13.6 and Appendix K. Construction of the feedlot and the long-term utilisation of effluent have the potential to impact soils. Erosion and sediment control during construction is discussed in Appendix H and waste management is discussed in Section 3.11.

- (l) the measures proposed to mitigate any potential adverse impacts,*

The feedlot has been designed and will be managed in accordance with the National Guidelines and Environmental Code of Practice. Section 3 provides information on the design of the proposed feedlot and Appendix H details the proposed management practices. The

design and management of the feedlot will ensure any potential adverse impacts are prevented or minimised as much as reasonably possible.

(m) the suitability of the site in the circumstances,

The feedlot design has been completed with due consideration of the site and any potential limitations. Site suitability is discussed in Section 5.

(n) whether the applicant has indicated an intention to comply with relevant industry codes of practice for the health and welfare of animals.

The existing feedlot is NFAS accredited and the proposed expansion will maintain animal welfare standards in accordance with the *Australian Animal Welfare Standards and Guidelines for Cattle*. Feedlot design has appropriately considered animal welfare.

6.3.1.4 Section 5.21 – Flood Planning

The TRC flood planning overlay has been incorporated into the Property Plan (Appendix B). Flood hazard areas are associated with low areas surrounding the Peel River. Existing feedlot infrastructure is the part of the proposed development closest to the flood hazard area. Due to the siting and design of the proposed feedlot, it is not expected to change flooding characteristics. The proposed EUA is also located outside the flood hazard area. This ensures that irrigation infrastructure will not be damaged or swept away by flood waters.

6.3.1.5 Section 7.1 – Earthworks

Earthworks will be required to construct the new feedlot pens and effluent system. Geotechnical sampling will be completed on the in-situ material to determine its suitability for construction and to meet the requirements of the National Guidelines. Clay content and composition are key parameters and, given the soils and landscapes of the property, are likely to occur on-site. If the in-situ material is not suitable, material will be sought from other parts of the property with more suitable material. Gravel for feedlot and road maintenance is currently sourced from a small on-site gravel pit. This material will be utilised for the expansion.

State-wide LiDAR data has been used to ground-truth the feedlot design to ensure appropriate slopes and batters are possible.

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6.3.2 TAMWORTH REGIONAL DEVELOPMENT CONTROL PLAN 2010

The *Tamworth Regional Development Control Plan 2010* (DCP) identifies various development controls to guide development in the TRC local government area. The following sections of the DCP have been identified as being relevant to the proposed development:

- General Development Specifications – Other Types of Development Controls (Table 10); and
- General Development Specifications – Environmental Controls (Table 11).

The proposed development is not located in a precinct requiring site-specific controls.

Table 10 – TRC Development Control Plan – General Development Controls – Other Types of Development

Development Control	Compliance Assessment
Parking	
Parking must be provided as per the Schedule in Appendix 1.	Feedlots or intensive livestock agriculture are not identified in the Schedule. The development is not open to the public. Due to the rural nature of the development, staff parking is provided by hardstand pads near the feedmill, cattle handling yards, and feedlot infrastructure. Heavy vehicle parking is provided adjacent to where vehicles will be loading and unloading (cattle and commodities). The length of the internal driveway can also be utilised for queuing of heavy vehicles. Heavy vehicles will not queue on Rannock Burn Road. Internal roads have been designed to allow for the largest vehicles to manoeuvre within the property to minimise reversing.
Where calculation of parking spaces required results in a fraction of a space, the total required number of spaces will be the next highest whole number.	
Parking and traffic requirements will be based on consideration of: <ul style="list-style-type: none">• likely peak usage times;• the availability of public transport;• likely demand for off street parking generated by the development;• existing traffic volumes on the surrounding street network; and• efficiency of existing parking provision in the location.	
Comply with AS2890.1 Parking Facilities Off Street Car Parking and AS2890.6 Parking Facilities Off Street Parking for People with a Disability.	
Manoeuvring areas within the development must be designed to accommodate a B99 vehicle under AS2890.1 Parking Facilities Off Street Parking	
Where existing premises are being redeveloped or their use changed, the following method of calculation shall apply: <ul style="list-style-type: none">(a) Determine the parking requirements of the previous or existing premises in accordance with any existing development consent. Otherwise the rate contained in Appendix A should be applied.(b) Determine the parking requirement of the proposed development in accordance with Appendix A;(c) Subtract the number of spaces determined in (a) from the number of spaces calculated in (b);	

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Development Control	Compliance Assessment
(d) The difference calculated in (c) represents the total number of parking spaces to be provided either in addition to the existing on-site carparking or as a cash-in-lieu contribution to Council where applicable.	
Landscaping	
Location and grouping of plant types shall be multi-functional providing privacy, security, shading and recreation functions.	Vegetation screens are being planted along the northern and eastern property boundaries.
Landscaping or shade structures shall be provided in outdoor car parking areas where >10 spaces are required, to provide shading and soften the visual impact of large hard surfaces.	
Landscaping shall comprise low maintenance, drought and frost tolerant species.	
Outdoor Lighting	
All developments shall demonstrate compliance with AS4282 Control of Obtrusive Effects of Outdoor Lighting.	N/A –outdoor lighting is not proposed.
Sweeping lasers or searchlights or similar high intensity light for outdoor advertising or entertainment, when projected above the horizontal is prohibited.	
Illuminated advertising signs should be extinguished outside of operating hours, or 11pm, whichever is earlier.	
Outdoor Advertising/Signage	
Where there is potential for light spill to adjoining properties, all illuminated signage shall be fitted with a timer switch to dim or turn off by 11pm each night.	N/A –outdoor signage is not proposed.
Signage must comply with SEPP 64 – Advertising and Signage Schedule 1 Assessment Criteria.	
“Special promotional advertisements” may be installed in accordance with clause 25 of SEPP 64 – Advertising and Signage provided that the sign does not compromise any Public Art or the integrity of the space in which it is located in the main streets, public parks and gardens and major venues across the region’s city, towns and villages.	
Advertising in rural zones may only: <ul style="list-style-type: none"> • advertise a facility, activity or service located on the land; or • direct travelling public to a tourist facility or building or place of scientific, historical or scenic interest within the area. Cannot include names of proprietary products or services or sponsoring businesses. Each sign must be sited a minimum distance of 1km from each other 	
External illumination to signs must be top mounted and directed downwards.	
The following types of signs are not acceptable:	

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Development Control	Compliance Assessment
<ul style="list-style-type: none">• Portable signs within public footways and road reserves including variable message signs, A Frame and Sandwich Boards;• Outdoor furniture (including chairs, bollards and umbrellas) advertising products such as coffee, alcohol or soft drink;• A roof sign or wall sign projecting above the roof or wall to which it is affixed; o Flashing or intermittently illuminated signs;• Advertisements on parked motor vehicles or trailers (whether or not registered) for which the principal purpose is for advertising;• Signs fixed to trees, lights, telephone or power poles; o Signs which could reduce road safety by adversely interfering with the operation of traffic lights or authorized road signs;• Any sign which would in the opinion of Council, be unsightly, objectionable or injurious to the amenity of the locality, any natural landscape, public reserve or public place;• Numerous small signs and advertisements carrying duplicate information; and• Overhead banners and bunting, except in the form of temporary advertisement.	
Farm Stay Accommodation	
Details of the activities offered should accompany the Development Application which must include some farm related activities.	N/A – farm stay accommodation not proposed.
Guests are restricted a maximum of 14 days per visit.	
Bushfire Prone Land	
The plans prepared to accompany a DA located in a bushfire prone area, being land that is identified on a map certified by the Rural Fire Service, must illustrate the required Asset Protection Zone (APZ).	N/A – the property is not identified as bushfire prone land.
DAs for development located in a bushfire prone area must be accompanied by either a Bushfire Attack Level Self Assessment (BAL) or a Bushfire Planning and Design Report (BPAD).	
Where the DA is accompanied by a BPAD report, Council’s bushfire assessment fee will not be applicable.	

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Table 11 – TRC Development Control Plan – General Development Specifications – Environmental Controls

Development Control		Compliance Assessment	
Environmental Effects			
The application documentation shall identify any potential environmental impacts of the development and demonstrate how they will be mitigated. These impacts may relate to: <ul style="list-style-type: none">TrafficFlood liabilitySlopeConstruction impactsSolid and Liquid WasteAir quality (odour and pollution)Noise emissionsWater qualitySustainability		The contents of this EIS address the environmental effects of the proposed development.	
Soil and Erosion Control			
Runoff shall be managed to prevent any land degradation including offsite sedimentation.		Feedlot industry controls have been incorporated into the design to minimise the impacts of stormwater. A detailed erosion and sediment control plan will be developed with for-construction plans. This will include the construction of the effluent pond system first to capture sediment from the feedlot construction area, sediment fences and bunding along the eastern side of the feedlot development to minimise sediment being transported into the adjacent drainage line, use of stock dams for sediment control, revegetating of soft catchment areas in and adjacent to the feedlot.	
Reference shall be made to the NSW Governments Managing urban stormwater: soils and construction, Volume 1 (available from Landcom), commonly referred to as "The Blue Book".			
Cut and fill will be minimised and the site stabilised during and after construction.			
Arrangements in place to prompt revegetation of earthworks to minimise erosion.			
Vegetation			
Development design shall accommodate the retention of any significant trees and vegetation.		The feedlot has been sited and designed to minimise the clearing of native vegetation. It is located in paddocks that are currently farmed, which only	

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Development Control		Compliance Assessment
		contain scattered paddock trees. A Biodiversity Development Assessment Report has been prepared (Appendix L).
Waste Management		
General waste storage and collection arrangements shall be specified.		Waste management is addressed in Section 3.11 and Appendix H.
Noise		
Where relevant, applications are to contain information about likely noise generation and the method of mitigation.		A noise and vibration assessment has been completed for the proposed development (Appendix J).
Geology		
The design process must give consideration to the potential impact of erosive soils, saline soils, soils of low wet strength, highly reactive soils and steep slopes and document how these constraints are addressed.		A Soil Investigation Study has confirmed that the soils in the proposed EUA and MUA are suitable (Appendix K). Geotechnical testing will be completed in the development of for-construction plans. If the in-situ material is deemed unsuitable, material will be sourced from other parts of the property.
Landscaping Poultry Farms		
A cash bond or bank guarantee to the value of \$1,500 per shed and valid for a period of 5 years, must be submitted to Council prior to issue of a Construction Certificate.		N/A – poultry farm not proposed.

7 CONCLUSION

The proposed development is located and designed in accordance with the National Guidelines, TRC planning documents, and relevant state guidelines. It is a rural development in a rural area and the surrounding environment, both built and natural, will be protected through the design and proposed management. As such, the proposed development should be approved.

8 REFERENCES

Davis, R.J., Wiedemann, S.G. and Watts, P.J. (2008) *Quantifying the water and energy usage of individual activities within Australian feedlots - Part B energy usage at Australian Feedlots*. Sydney, NSW: Meat & Livestock Australia Limited.

APPENDIX A – PLANNING SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

7 July 2022

Mr Matt Norton
Planning and Environmental Compliance
AgDSA
PO Box 292
Toowoomba QLD 4350

EF22/7962
SEAR 1696

Dear Mr Norton,

Feedlot Expansion (cattle)
'Angora' Rannock Burn Road, Rushes Creek (Lot 1 DP 842391 and Lots 19, 43, 44, 141 and 142 DP 752169)
Planning Secretary's Environmental Assessment Requirements (SEAR) 1696

Thank you for your request for the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above development proposal. I have attached a copy of these requirements.

In support of your application, you indicated that your proposal is both designated and integrated development under Part 4 of the *Environmental Planning and Assessment Act 1979* and requires an approval under the *Protection of the Environment Operations Act 1997*. In preparing the SEARs, the Department of Planning and Environment (the Department) has consulted with the Environment Protection Authority. A copy of their requirements is attached.

The Department has also consulted with DPI Agriculture. A copy of their additional requirements for the EIS are attached.

If other integrated approvals are identified before the Development Application (DA) is lodged, you must undertake direct consultation with the relevant agencies, and address their requirements in the EIS.

If your proposal contains any actions that could have a significant impact on matters of National Environmental Significance, then it will require an additional approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to your proposal, you should contact the Commonwealth Department of Agriculture, Water and the Environment on (02) 6274 1111.

Should you have any further enquiries, please contact Joanna Bakopanos, Planning and Assessment, at the Department on (02) 9274 6387 or via joanna.bakopanos@planning.nsw.gov.au.

Yours sincerely



Chris Ritchie
Director
Industry Assessments
as delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*.
Schedule 3 of the *Environmental Planning and Assessment Regulation 2021*.

Designated Development

SEAR Number	1696
Proposal	Increasing feedlot capacity from 1,000 head of cattle to 1,400, as well as constructing a new feedlot with a capacity of 9,900 head of cattle.
Location	'Angora' Rannock Burn Road, Rushes Creek (Lot 1 DP 842391 and Lots 19, 43, 44, 141 and 142 DP 752169)
Applicant	Bottlejac Trading Company
Date of Issue	7 July 2022
General Requirements	The Environmental Impact Statement (EIS) must comply with the assessment requirements and meet the minimum form and content requirements in sections 190 and 192 of the Environmental Planning and Assessment Regulation 2021.
Key Issues	<p>The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed:</p> <ul style="list-style-type: none"> • strategic and statutory context – including: <ul style="list-style-type: none"> – a detailed justification for the proposal and suitability of the site for the development – a demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies – a list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out – a description of how the proposed expansion integrates with existing on-site operations – a description of any amendments to and/ or additional licence(s) or approval(s) required to carry out the proposed development. • suitability of the site – including: <ul style="list-style-type: none"> – a detailed justification that the site can accommodate the proposed capacity, having regard to the scope of the operations and its environmental impacts, including cumulative impacts, and relevant mitigation measures – a Land Use Conflict Risk Assessment in accordance with Department of Primary Industry's Land Use Conflict Risk Assessment Guide. • animal welfare, bio-security and disease management – including: <ul style="list-style-type: none"> – details of how the proposed development would comply with relevant codes of practice and guidelines – a biosecurity risk assessment and response plan

	<ul style="list-style-type: none"> - a heat load assessment in accordance with Department of Primary Industries guidelines - details of all pest, weed and disease control measures - a detailed description of the contingency measures that would be implemented for the mass disposal of livestock in the event of disease outbreak. <ul style="list-style-type: none"> • waste management – including: <ul style="list-style-type: none"> - detail of waste management including manure and disposal of dead cattle under normal operating conditions and in the event of a mass death scenario to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution - consideration of disposal of compost containing mortalities in relation to the resource recovery framework – the current composting order/exemption does not permit the sale of or offsite use of compost containing mortalities - details of waste handling including, transport, identification, receipt, stockpiling and quality control including off-site reuse and disposal - the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the <i>NSW Waste Avoidance and Sustainable Materials Strategy 2041</i>. • air quality and odour – including: <ul style="list-style-type: none"> - a quantitative assessment of the potential air quality, dust and odour impacts of the development, during both construction and operation, in accordance with relevant Environment Protection Authority guidelines. Consideration should be given to cumulative impacts of nearby poultry farms - a description and appraisal of air quality and odour impact mitigation and monitoring measures, in line with International Best Practice. • noise and vibration – including: <ul style="list-style-type: none"> - a description of all potential noise and vibration sources during construction and operation, including road traffic noise - a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines - a description and appraisal of noise and vibration mitigation and monitoring measures. • soil and water – including: <ul style="list-style-type: none"> - a description of local soils, topography, drainage and landscapes - details of water usage for the proposal including existing and proposed water licencing requirements in accordance with the <i>Water Act 1912</i> and/or the <i>Water Management Act 2000</i> - a detailed site water balance - a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo - details of sediment and erosion controls - details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent - an assessment of the potential impacts of the proposal in line with the Natural Resource Access Regulators' <i>Guidelines for controlled activities on waterfront land</i> - an assessment of potential impacts from runoff from feedlot pens, effluent storage, evaporation and terminal ponds and the application of effluent and/or manure on the quality and quantity of surface and
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	<p>groundwater resources</p> <ul style="list-style-type: none"> - details of the proposed stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts - a description and appraisal of impact mitigation and monitoring measures. <ul style="list-style-type: none"> • traffic and transport – including: <ul style="list-style-type: none"> - details of road transport routes and access to the site - road traffic predictions for the development during construction and operation - an assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development. • hazards and risk – including: <ul style="list-style-type: none"> - a preliminary risk screening completed in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 3 and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011) - an assessment of flood risk on the site. The assessment should determine the flood hazard in the area, address the impact of flooding on the proposed development, and the development's impact (including filling) on flood behaviour of the site and adjacent lands, and address adequate egress and safety in a flood event - emergency management procedures for responding to natural hazard threats and mass mortality events. • biodiversity – including: <ul style="list-style-type: none"> - accurate predictions of any vegetation clearing on site or for any road upgrades - a detailed assessment of the potential impacts on any threatened species, populations, endangered ecological communities or their habitats, groundwater dependent ecosystems and any potential for offset requirements in accordance with the current Environment and Heritage Group legislation and guidelines - details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies - a detailed description of the measures to avoid, minimise, mitigate and/or offset biodiversity impacts. • contamination – including: <ul style="list-style-type: none"> - a detailed assessment of the extent and nature of any contamination of the soil, groundwater and marine sediments against the provisions of State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapter 3) - conceptual site model detailing the potential risks to human health and the environmental receptors in the vicinity of the site. • heritage – including an assessment of Aboriginal and non-Aboriginal cultural heritage.
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	<ul style="list-style-type: none"> • infrastructure – including demonstration of an appropriate secure power supply and/or details of any necessary infrastructure to facilitate the development and any contingencies in the event of a power supply failure. • visual – including an impact assessment at private receptors and public vantage points.
Environmental Planning Instruments and other policies	<p>The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to:</p> <ul style="list-style-type: none"> • State Environmental Planning Policy (Primary Production) 2021 (Chapter 2) • State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Chapters 2 and 3) • State Environmental Planning Policy (Transport and infrastructure) 2021 (Chapter 2) • State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapters 3 and 4) • Tamworth Regional Local Environmental Plan 2010 • relevant development control plans and section 7.11 plans.
Guidelines	<p>During the preparation of the EIS you should consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at https://www.planning.nsw.gov.au/Assess-and-Regulate/Development-Assessment/Industries. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development.</p>
Consultation	<p>During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the:</p> <ul style="list-style-type: none"> • Department of Planning and Environment, specifically the: <ul style="list-style-type: none"> ◦ Environment Protection Authority • Department of Regional NSW, specifically: <ul style="list-style-type: none"> ◦ Department of Primary Industries – Agriculture • Tamworth Local Aboriginal Land Council • Tamworth Regional Council • the surrounding landowners and occupiers that are likely to be impacted by the proposal. <p>Details of the consultation carried out and issues raised must be included in the EIS.</p>
Further consultation after 2 years	<p>If you do not lodge an application under Section 4.12(8) of the <i>Environmental Planning and Assessment Act 1979</i> within 2 years of the issue date of these SEARs, you must consult with the Planning Secretary in relation to any further requirements for lodgement.</p>



DOC22/469304

28 June 2022

Dept of Planning and Environment
Industry Assessments
Locked Bag 5022
PARRAMATTA NSW 2150

Attention: Ms Kathryn Moreira

BY EMAIL:



Dear Ms Moreira,

Thankyou for your request, received on 14 June 2022, for the Environment Protection Authority's (EPA) requirements for an Environmental Impact Statement (EIS) for the proposed expansion of an existing feedlot to accommodate 1,400 head of cattle and construction of a new feedlot to accommodate 9,900 head of cattle at 'Angora', Rannock Burn Road, Rushes Creek (Lot 1 DP 842391 and Lots 19, 43, 44, 141 and 142 DP 752169) – your reference being SEAR 1696.

The EPA has considered the details of the proposal as provided by the Department of Planning and Environment and has identified the information it requires to issue its general terms of approval in **Attachment A**.

In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. **Air** - odour and dust generation and management of potential impacts on adjacent residences. Particular attention needs to be provided to odour generation and associated cumulative impact assessment particularly given the existing neighbouring poultry farms in operation and under construction, proximity to recreational areas such as Lake Keepit and potential katabatic drainage conditions and associated with the Peel River valley topography.
2. **Water** - water management systems and the protection of surface and groundwater from runoff from feedlot pens, effluent storage, evaporation and terminal ponds, and the application of effluent and/or manure to soils on the premises.
3. **Sustainable effluent and manure utilisation** - ensure that any proposed application to site soils are sustainable in relation to hydraulic, nutrient and salt loads to prevent land, groundwater or surface water pollution and potential offsite impacts.
4. **Irrigation Method** - provide details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent. This may also effect the size needed for terminal ponds to capture run-off from the irrigation areas after rainfall.
5. **Noise** - proximity to sensitive receptors and the impact of any noise sources associated with the project.

6. Disposal of mortalities - management of mortalities under normal operating conditions and in the event of a mass death scenario, to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution. Consideration should be given to disposal of compost containing mortalities in relation to the resource recovery framework – the current composting order/exemption does not permit the sale of or offsite use of compost containing mortalities.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in **Attachment A** and any relevant industry codes of practice and best practice management guidelines. The application of principles provided in the *National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition*, Meat and Livestock Australia should also be considered by the proponent to assist in mitigating air, odour, water quality and waste (mortalities) impacts associated with the proposal.

Licensing Requirements

Based on the information provided to the EPA, the proponent will require an Environment Protection Licence to construct and operate the proposed feedlots, if approval is granted. The proposal meets the threshold requirements specified in clause 22 – Livestock intensive industries, in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

General information on licence requirements can be obtained from the EPA's Environment Line by calling 131 555 or on the EPA's website at www.epa.nsw.gov.au/licensing/licencePOEO.htm.

To assist the EPA in assessing the proposal we request that the EIS follows the format of the Department of Planning and Environment EIS guidelines and addresses the EPA's specific environmental assessment requirements outlined in the following attachments.

If the necessary information is not adequately provided in the EIS then delays in the development assessment process may occur. The Proponent should be made aware that any commitments made in the EIS may be formalised as approval conditions and may also be placed as formal licence conditions.

The Proponent should be made aware that, consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997* ("the Act") the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an Environment Protection Licence.

In addition, and as a requirement of an Environment Protection Licence if approval is granted, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or plans in accordance with Section 153 of the Act.

If you have any questions or wish to discuss anything further, please contact me on 131 555 or via email to info@epa.nsw.gov.au, marked to my attention.

Yours sincerely



REBECCA SCRIVENER
Head, Regional Operations Unit
Regulatory Operations Regional – West

ATTACHMENT A: Environmental Assessment Requirements – SEARS 1696 – Bottlejac Trading Company– Feedlot Expansion – ‘Angora’, Rannock Burn Road, Rushes Creek

1. Environmental impacts of the project

- 1.1. The Environmental Assessment must address the requirements of Section 45 of the Protection of the Environment Operations Act 1997 (POEO Act) by determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL).
- 1.2. Impacts related to the following environmental issues need to be assessed, quantified and reported on:
 - **Air Issues:** air quality including dust generation and odour from the operation on the surrounding landscape and/or community;
 - **Noise impacts** associated with operational noise particularly machinery and plant movements;
 - **Waste** including general waste and animal mortalities.
 - **Water and Soils** including effluent/manure utilisation options, water quality, catchment description and premise water balance.

The Environmental Assessment (EA) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

2. Licensing requirements

- 2.1. The development is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted.
- 2.2. Should project approval be granted, the proponent will need to make an application to the EPA for its EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the *EPA Guide to Licensing* document (www.epa.nsw.gov.au/licensing/licenceguide.htm).

SPECIFIC ISSUES

3 Air issues

- 3.1. The EA must demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2002)*. Particular consideration should be given to section 129 of the POEO Act concerning control of "offensive odour".
- 3.2. The EA must include an air quality impact assessment (AQIA).
- 3.3. The AQIA must be carried out in accordance with the document, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) <http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf>.
- 3.4. The EA must detail emission control techniques/practices that will be employed at the site and identify how the proposed control techniques/practices will meet the requirements of the POEO Act, *POEO (Clean Air) Regulation* and associated air quality limits or guideline criteria.

- 3.5. Odour emissions must be assessed in accordance with the *Technical Framework - Assessment and Management of Odour from Stationary Sources in NSW* and/or *Technical Notes - Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006).

4. Noise and Vibration

The EA must assess the following noise and vibration aspects of the proposed development

- 4.1. Construction noise associated with the proposed development should be assessed using the *Interim Construction Noise Guideline* (DECC, 2009). These are available at: <https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline>
- 4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). These are available at: <https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration>
- 4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990). These are available at: <https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline>
- 4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Noise Policy for Industry* (EPA, 2017). [https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-\(2017\)](https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017))
- 4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *NSW Road Noise Policy* and associated application notes (EPA, 2011). <https://www.epa.nsw.gov.au/your-environment/noise/transport-noise>

5. Waste, chemicals and hazardous materials and radiation

- 5.1 The EA must assess all aspects of waste generation, management and disposal associated with the proposed development.
- 5.2 The EA must demonstrate compliance with all regulatory requirements outlined in the POEO Act and associated waste regulations, including if applicable, the Resource Recovery Framework.
- 5.3 The EA must identify, characterise and classify the following in accordance with the EPA's *Waste Classification Guidelines (2014)* and associated addendums:
- (i) all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste;
 - (ii) all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.

Note: The EPA's *Waste Classification Guidelines (2014)* and associated addendums are available at: <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste>

- 5.4. The EA must outline contingency plans for any event that may result in environmental harm, such as excessive stockpiling of material, or dirty water volumes exceeding the storage capacity available on-site.
- 5.5. The EA must demonstrate that appropriate spill containment will be provided for storage, filling and loading of all fuels and other chemicals to be used on site, in accordance with the relevant Australian Standard.
- 5.6. Provide details of how waste will be handled and managed onsite, including:
- a) Stockpile location and management
 - Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste).
 - Proposed height limits for all waste to reduce the potential for dust and odour.
 - Procedures for minimising the movement of waste around the site and double handling.
 - Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners and hardstands.
 - b) Mortality disposal arrangements
 - Define disposal methods and locations for normal operations and possible mass death scenarios.
 - Procedures for preventing the spread of pathogens or disease.
 - Measures for protecting surface and/or groundwaters from pollution.
 - Measures to prevent offensive odour generated by mortality disposal.
 - Measures to control or prevent vermin and disease vectors.
- 5.7. The proponent should provide details of:
- how leachate from stockpiled waste material will be kept separate from stormwater runoff;
 - treatment of leachate through a wastewater treatment plant (if applicable); and
 - any proposed transport and disposal of leachate off-site.

6 Water and Soils

- 6.1. The EA must demonstrate how the proposed development will meet the requirements of section 120 of the POEO Act.
- 6.2. The EA must include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.
- 6.3. If the proposed development intends to discharge waters to the environment, the EA must demonstrate how the discharge(s) will be managed in terms of water quantity, quality and frequency of discharge and include an impact assessment of the discharge on the receiving environment. This should include:
- Description of the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.
 - Description of the receiving waters including upstream and downstream water quality as well as any other water users.

- Demonstration that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.
- 6.4. The EA must include an assessment of potential impacts on soil and land resources, being guided by *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000). The nature and extent of any significant impacts should be identified. Mitigation and management options to minimise identified soil and land resource impacts should be described.
 - 6.5. The EA must refer to Water Quality Objectives for the receiving waters and indicators and associated trigger values or criteria for the identified environmental values of the receiving environment. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (<http://www.environment.gov.au/water/policy-programs/nwqms/>).
 - 6.6. The EA must describe how stormwater will be managed in all phases of the project, including details of how stormwater and runoff will be managed to minimise pollution. Information should include measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site. The EA should consider the guidelines *Managing urban stormwater: soils and construction*, vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B. Waste landfills C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC, 2008).
 - 6.7. Erosion, sediment and leachate control measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during construction and operation phases of the project. The EA should show the location of each measure to be implemented. Include such control measures such as:
 - Sediment traps
 - Diversion banks
 - Sediment fences
 - Bunds (earth, hay, mulch)
 - Geofabric liners
 - Other control measures as appropriate.
 - 6.8. Assessment undertaken of the design of terminal pond systems to manage stormwater runoff (and if applicable tailwater) from any proposed effluent utilisation area to minimise water quality impacts on the nearest watercourses.
 - 6.9. Discharges from the site must be characterised with respect to their location, frequency, volume and likely water quality.
 - 6.10. The controlled drainage area including feedlot pens, manure stockpile/composting areas, catch drains, sedimentation and effluent storage/evaporation ponds and terminal pond systems must be protected from inundation during floods with an average recurrence interval of up to 1 in 100 years.
 - 6.11. Feedlot pen surfaces and manure stockpile/composting areas and the walls and bases of any catch drains, sedimentation, effluent holding/evaporation/terminal ponds must incorporate an impermeable liner. Acceptable impermeable liners include:
 - a clay or modified soil liner of at least 900mm of recompacted clay with an in-situ permeability (K) of less than 1×10^{-9} m/s.
 - A natural geological barrier that is established by geotechnical investigations to provide a secure barrier between the groundwater, soil and substrata equivalent to the 900 mm recompacted clay liner above.
 - 6.12. If the proposal incorporates effluent or manure application/utilisation to cropping lands on the premises, an assessment of the sustainability of these utilisation practices must be provided.

The assessment must be undertaken in accordance with the *Environmental Guidelines for the Use of Effluent by Irrigation* (DEC, 2004).

The assessment must identify soil constraints where applicable to the application of manures and/or effluent and include nutrient balance and salt management assessments. Maps of proposed manure and/or effluent application areas must be provided in the EA.

- 6.13. The EA must describe any water quality monitoring programs to be carried out at the project site. Water quality monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutant in NSW* (2004) which is available at:
<http://www.epa.nsw.gov.au/resources/legislation/approvedmethods-water.pdf>.

----END----

Department of Planning and Environment
Industry Assessments

Attention: Ms Kathryn Moreira

Re: Intensive Livestock Agriculture (Beef Feedlot) – request for input into SEARs 1696
'Angora' Rannock Burn Road, Rushes Creek (Lot 1 DP 842391 and Lots 19, 43, 44, 141 and 142
DP 752169), Tamworth Regional Council

Dear Kathryn

Thank you for your correspondence of 16 June 2022 requesting input and comment on the above proposal to inform the preparation of Planning Secretary's Environmental Assessment Requirements (SEARs).

NSW Department of Primary Industries (DPI) Agriculture collaborates with our stakeholders to protect and enhance the productive and sustainable use and resilience of agricultural resources and the environment.

It is important that beef feedlots are designed and operated to meet industry standards and associated codes of practice. NSW DPI Agriculture has reviewed the submitted documentation in relation to the above proposal and recommends the following requirements in addition to standard environmental assessments are addressed in the draft SEARs at Attachment A following.

It is also important that sensitive receptors and the nearby poultry farm respectively are thoroughly assessed for risk of, and contribution to, potential cumulative odour impacts.

Industry guidelines and resource information, listed in Attachment B, should also be provided to the proponent for their consideration when preparing the Environmental Impact Statement.

Should you require clarification on any of the information contained in this response, please do not hesitate to contact me on [REDACTED] or by email at landuse.ag@dpi.nsw.gov.au.

Sincerely



Nita Scott
Agricultural Land Use Planning Officer
Strategic Policy and Initiatives, NSW DPI New England North West Region

Encl: Attachment A: Draft SEARs requirements
Attachment B: Industry guidelines and resource information

Issue	Environmental Assessment Requirements for the EIS
Site Suitability	<ul style="list-style-type: none"> • Demonstrate that the size of the project site is adequate for the yards, sheds and feed silos, any amenity buildings, storage sheds, internal roads, litter composting and stockpile areas, dead animal management and storage areas and mitigation measures for odour, dust and noise impacts and general amenity. Issues such as topography and drainage and the ability of a site to accommodate the project should be considered. • Include a Land Use Conflict Risk Assessment (LUCRA) to identify potential land use conflict, relating to separation distances and management practices to minimise the impact on sensitive receptors, including other agricultural land uses, from odour, dust and noise. Information about groundcover management and vegetative screening should be detailed in relation to the final construction phase and operational provisions to limit dust, noise and other land use conflict issues. A LUCRA is described in the DPI Land Use Conflict Risk Assessment Guide. • Include a map to scale showing the above operational and infrastructure details including separation distances from sensitive receptors and neighbouring agricultural land uses.
Consideration of impacts on agricultural resources and land	<p><u>Characteristics of Agricultural Land</u></p> <ul style="list-style-type: none"> • Describe the soil, slope, land capability, agricultural productivity, land characteristics and the history of agricultural land uses on the proposed development site. • Describe the current and historical agricultural land uses on the surrounding land in the locality including the land capability and agricultural productivity of the surrounding land. • Cumulative odour impacts on adjoining properties need to be assessed in a comprehensive odour modelling report that incorporates and benchmarks existing odour sources. <p><u>Impacts on Agricultural Land, Resources and Land Uses</u></p> <ul style="list-style-type: none"> • Detail the potential impacts on agricultural land and agricultural land uses in the locality. • Consider possible cumulative effects to agricultural enterprises and landholders. • Demonstrate that all significant impacts on current and potential agricultural developments and resources can be reasonably avoided or adequately mitigated.
Appropriate and secure power supply	<ul style="list-style-type: none"> • Demonstrate that a power supply which is reliable, adequate, and sufficient for farm requirements will be available or detail the necessary infrastructure required to achieve this. This includes

	access to 3 phase power, back up arrangements in the event of power failure and sufficient power for potential future farm expansion.
Suitable and secure water supply	<ul style="list-style-type: none"> • Detail the estimated water demand and water availability. Demonstrate that a water supply which is adequate, suitable, and reliable can be provided for drinking, cooling, effluent cleaning, bush fire management and other facilities such as rest rooms, landscaping requirements etc. • Water must meet standards detailed in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) and the National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition. NSW DPI recommends backup of at least 2 days total water requirement in case of breakdown or loss of supply with a stronger preference for seven days' supply. • Detail the proposed source of water and any sanitisation methods required.
Biosecurity	<ul style="list-style-type: none"> • Include a biosecurity (pests, weeds, and disease) risk assessment outlining the likely plant, animal and community risks as per guidelines in Attachment 2. • Detail a biosecurity response plan to deal with identified risks as well as contingency plans for any failures as described in the National Biosecurity Manual for Beef Cattle Feedlots. Including monitoring and mitigation measures in disease (Q Fever), weed and pest management plans. • Details of dead animal management and disposal must be fully detailed. If onsite disposal is proposed the management facility and operations must be fully documented.
Effluent and spent litter disposal	<ul style="list-style-type: none"> • Detail how effluent and solids will be effectively stored, handled, and recycled or disposed of in a lawful manner to protect environmental values and biosecurity. • Provide details of any proposed effluent reuse areas should be appropriately designed based on a nutrient budget that considers proposed annual volumes and nutrient loads, soil types, current soil nutrient levels and pasture use rates via a reuse management plan.
Animal welfare	<ul style="list-style-type: none"> • Demonstrate how the proposed development will: <ul style="list-style-type: none"> ○ comply with the Animal Welfare Standards: Land transport, Cattle and Loading, ○ provide all weather access or provisions on site to provide adequate food for the livestock for the duration of a flood event if applicable, ○ manage sick livestock or disease, and

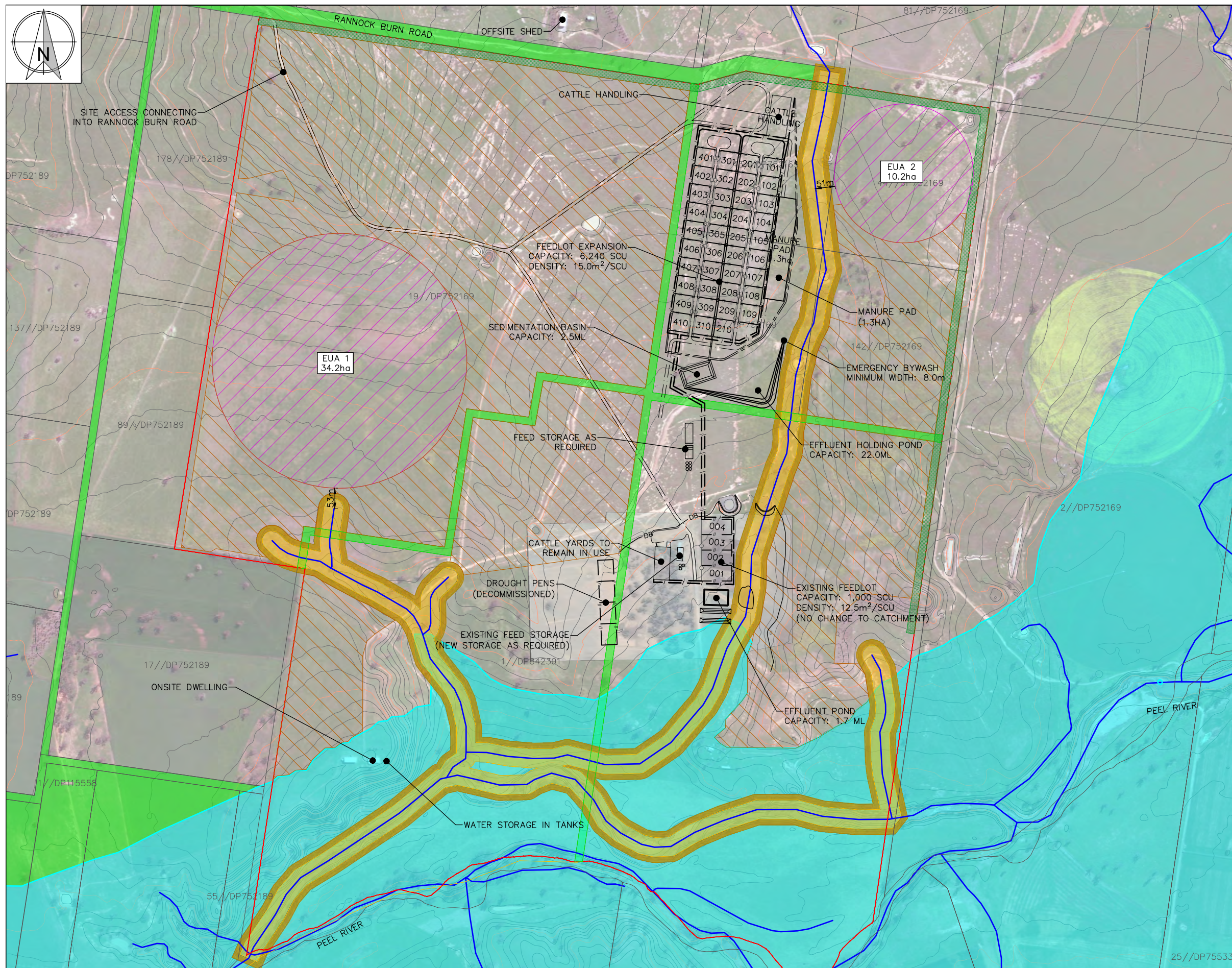
	<ul style="list-style-type: none"> ○ suitably manage and mitigate the heat loading risk after undertaking a heat loading risk assessment using ALFA Risk Assessment Program.
Traffic movements	<ul style="list-style-type: none"> ● Detail the number, timing, and route for traffic movements to the site. This is to take into account potential impacts on sensitive receptors (e.g., noise, dust, volume of traffic) including other agricultural land uses, and how these impacts will be mitigated.
Adequate consultation with community	<ul style="list-style-type: none"> ● Consult with the owners / managers of affected and adjoining neighbours and agricultural operations in a timely and appropriate manner about the proposal, the likely impacts and suitable mitigation measures or compensation.
Contingency and Environmental Management Plan developed	<ul style="list-style-type: none"> ● The proposal is to detail contingency plans to enable the operation to deal with emergency situations. The proposal is to detail Emergency Management procedures and responsibilities for responding to natural hazard threats and possible mass mortality events which might result from extreme climatic conditions, routine, or emergency animal disease outbreaks. ● The proposal is to demonstrate that the emergency management procedures are consistent with the AUSTVETPLAN Manuals and Documents.
Rehabilitation and Decommissioning	<ul style="list-style-type: none"> ● The Rehabilitation and Decommissioning/Closure Management Plan should include, but is not limited to, describing the potential design criteria of the final land use and landform, indicators which may be used to guide the return of the land back to agricultural production, along with the expected timeline for any rehabilitation program.

Attachment B: Industry guidelines and resource information

Beef Feedlots

Title	Website link
Land Use Conflict Risk Assessment Guide	https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment2/lucra
Planning Guidelines, Intensive Livestock Agriculture Development	https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/Policy-and-legislation/Primary-Production/planning-guidelines-intensive-livestock-agricultural-development-2019-02-28.pdf?la=en
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)	https://www.waterquality.gov.au/guidelines/anz-fresh-marine
National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition	https://www.feedlots.com.au/_files/ugd/f25d7a_e63ccd7008c34ccc94e4d278713d5abd.pdf
National Biosecurity Manual for Beef Cattle Feedlots	http://www.farmbiosecurity.com.au/industry/lot-feeding/
ALFA Industry Resources	https://www.feedlots.com.au/resources
Australian Animal Welfare Standards and Guidelines	http://animalwelfarestandards.net.au/
National Beef Cattle Feedlot Environmental Code of Practice	https://www.feedlots.com.au/_files/ugd/f25d7a_9f5490f89b894f4cb3d8fdcadd5f37e4.pdf
AUSVETPLAN	https://animalhealthaustralia.com.au/ausvetplan/

APPENDIX B – FEEDLOT MAPS AND PLANS





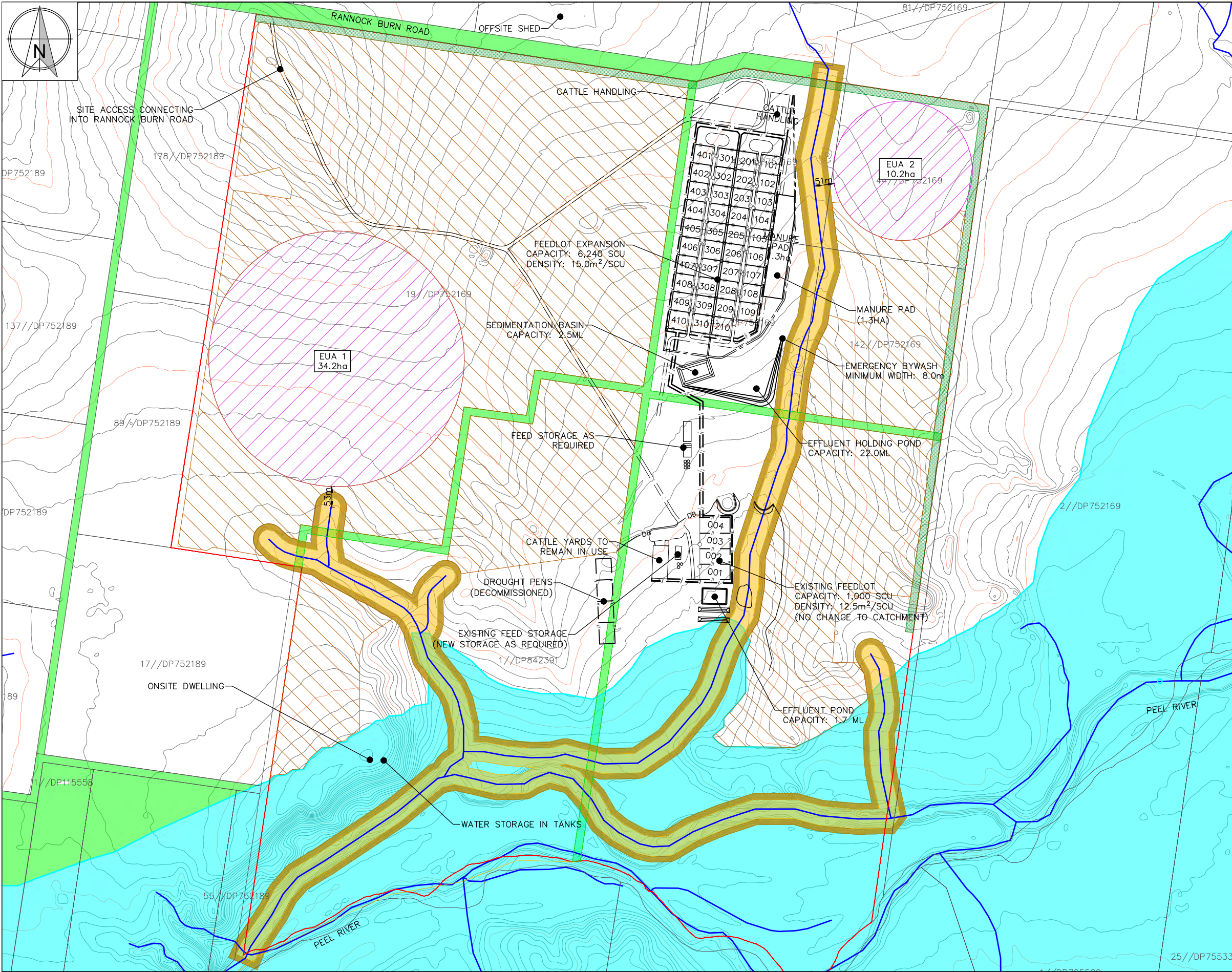
LEGEND

NOTES:

SITE EXPANSION:

DESIGN: PENS

<div>CLIENT</div> <div>ANGORA FEEDLOT PTY LTD</div> <div>PROJECT</div> <div>ANGORA FEEDLOT EXPANSION</div> <div>LOCATION</div> <div>RANNOCK BURN ROAD, RUSHES CREEK NSW 2346</div> <div>SHEET TITLE</div> <div>PROPERTY PLAN – 6240 NORTH (AERIAL IMAGERY)</div>	<div></div> <div>AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA</div> <div>PO BOX 292 TOOWOOMBA QLD 4350 PH: +61 418 446 245 E: contact@gdsa.com.au</div>	<div>SCALE</div> <div></div> <div>SCALE 1:5,000 (A1) 1:10,000 (A3)</div>	<div>ANGORA FEEDLOT PTY LTD</div>	DESIGNED	FOR APPROVAL ONLY					JOB CODE	BTC-001	
				TJS								
				CHECKED							SHEET NUMBER	A401
				MRN								
				PROJECT MANAGER	14/08/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY				MRN	CURRENT REVISION
MRN	DATE	REV	DESCRIPTION				APP	A				



- LEGEND**
- PROPERTY BOUNDARY
 - CADASTRAL BOUNDARY
 - CONTOUR EXISTING (5.0m INTERVAL)
 - CROWN ROAD EASEMENT
 - BUFFER (DRAINAGE LINE – 25m)
 - BUFFER (DRAINAGE LINE – 40m)
 - MAPPED STREAM ORDER
 - EFFLUENT REUSE AREA (44.4 HA)
 - MANURE REUSE AREA (154.4 HA)
 - VEGETATION SCREEN
 - PEN FENCE
 - CATTLE LANE
 - FEED BUNK
 - EFFLUENT DRAIN
 - FEED ROAD
 - COMMODITY ROAD
 - CLEAN WATER DIVERSION BANK
 - TRC FLOOD MODELLING

- NOTES:**
- CADASTRAL BOUNDARIES & WATERCOURSE DATA LAYERS HAVE BEEN SOURCED FROM THE SEED PORTAL. DATA EXTRACTED 28/09/2021.
 - EXISTING CONTOUR DATA OBTAINED FROM THE ELVIS PLATFORM OF PUBLICLY AVAILABLE LIDAR.
 - FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
 - THE EXISTING FEEDLOT HAS A CAPACITY OF 1,000 HEAD AT A STOCKING DENSITY OF 12.85m²/HEAD
 - THERE IS TO BE NO CHANGE TO THE CONTROLLED DRAINAGE AREA (CDA) OF THE EXISTING FACILITY.
 - EFFLUENT MANAGEMENT
 - SEDIMENT BASIN: 2.5ML
 - EFFLUENT POND: 22.0ML
 - FLOOD INUNDATION AREA SOURCED FROM TAMWORTH REGIONAL COUNCIL (TRC) DEVELOPMENT CONTROL PLAN 2010–FLOOD AFFECTED LAND SHEET 6 OF 25.

- SITE EXPANSION:**
- EXISTING FEEDLOT: 1,000 SCU @ 12.85m²/SCU
 - ROW 1: 1,440 SCU @ 15.0m²/SCU
 - ROW 2: 1,600 SCU @ 15.0m²/SCU
 - ROW 3: 1,600 SCU @ 15.0m²/SCU
 - ROW 5: 1,600 SCU @ 15.0m²/SCU
 - COMBINED: 7,240 SCU @ 14.7m²/SCU

- DESIGN: PENS**
- STOCKING DENSITY = 15.0 m²/SCU
 - BUNK SPACE = 313 mm/SCU
 - PENS 48.0 (W) x 50.0m (L) = 2,400 m²/PEN
 - INDIVIDUAL PEN CAPACITY = 160 SCU

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
PROPERTY PLAN – 6240 NORTH

AgDSA
AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

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PH: +61 418 446 245
E: contact@agdsa.com.au

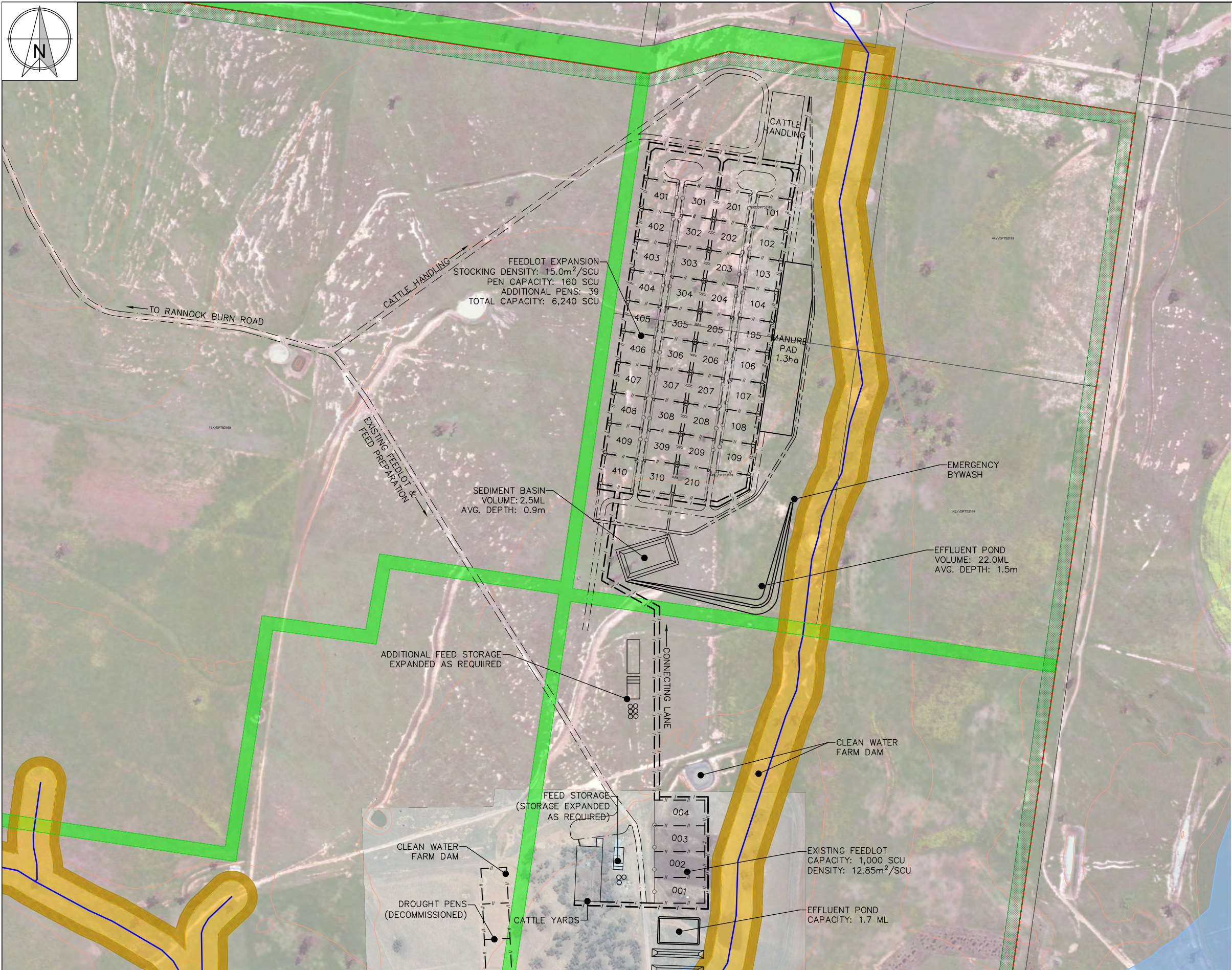
SCALE

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SCALE 1:5,000 (A1) 1:10,000 (A3)

ANGORA FEEDLOT
PTY LTD

DESIGNED TJS	FOR APPROVAL ONLY					JOB CODE BTC-001
CHECKED MRN						SHEET NUMBER A402
PROJECT MANAGER MRN	14/08/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY			CURRENT REVISION A
	DATE	REV	DESCRIPTION			MRN APP
	REVISIONS					



LEGEND

	CADASTRAL BOUNDARY
	CONTOUR EXISTING (5.0m INTERVAL)
	BUFFER (DRAINAGE LINE – 25m)
	BUFFER (DRAINAGE LINE – 40m)
	MAPPED STREAM ORDER
	CROWN ROAD EASEMENT
	VEGETATION SCREEN
	PEN FENCE
	CATTLE LANE
	FEED BUNK
	EFFLUENT DRAIN
	FEED ROAD
	DB
	CLEAN WATER DIVERSION BANK
	TRC FLOOD MODELLING

NOTES:

- AERIAL IMAGE SOURCED THROUGH AUTOCAD MICROSOFT BING MAPPING. IMAGE ACCESS 07/10/2021, IMAGE DATE UNKNOWN.
- CADASTRAL BOUNDARIES & WATERCOURSE DATA LAYERS HAVE BEEN SOURCED FROM THE SEED PORTAL. DATA EXTRACTED 28/09/2021.
- EXISTING CONTOUR DATA OBTAINED FROM THE ELVIS PLATFORM OF PUBLICLY AVAILABLE LIDAR.
- FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
- THE EXISTING FEEDLOT HAS A CAPACITY OF 1,000 HEAD AT A STOCKING DENSITY OF 12.85m²/HEAD
- THERE IS TO BE NO CHANGE TO THE CONTROLLED DRAINAGE AREA (CDA) OF THE EXISTING FACILITY.
- EFFLUENT MANAGEMENT
 - SEDIMENT BASIN: 2.5ML
 - EFFLUENT POND: 22.0ML.
- FLOOD INUNDATION AREA SOURCED FROM TAMWORTH REGIONAL COUNCIL (TRC) DEVELOPMENT CONTROL PLAN 2010–FLOOD AFFECTED LAND SHEET 6 OF 25.

SITE EXPANSION:

- EXISTING FEEDLOT: 1,000 SCU @ 12.85m²/SCU
- ROW 1: 1,440 SCU @ 15.0m²/SCU
- ROW 2: 1,600 SCU @ 15.0m²/SCU
- ROW 3: 1,600 SCU @ 15.0m²/SCU
- ROW 5: 1,600 SCU @ 15.0m²/SCU
- COMBINED 7,240 SCU @ 14.7m²/SCU

DESIGN: PENS

- STOCKING DENSITY = 15.0 m²/SCU
- BUNK SPACE = 313 mm/SCU
- PENS 48.0 (W) x 50.0m (L) = 2,400 m²/PEN
- INDIVIDUAL PEN CAPACITY = 160 SCU

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
CONCEPT PLAN – 6240 NORTH

AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

PO BOX 292
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E: contact@agdsa.com.au

SCALE

0 60 120 180m

SCALE 1:3,000 (A1) 1:6,000 (A3)

ANGORA FEEDLOT
PTY LTD

DESIGNED
TJS

CHECKED
MRN

PROJECT MANAGER
MRN

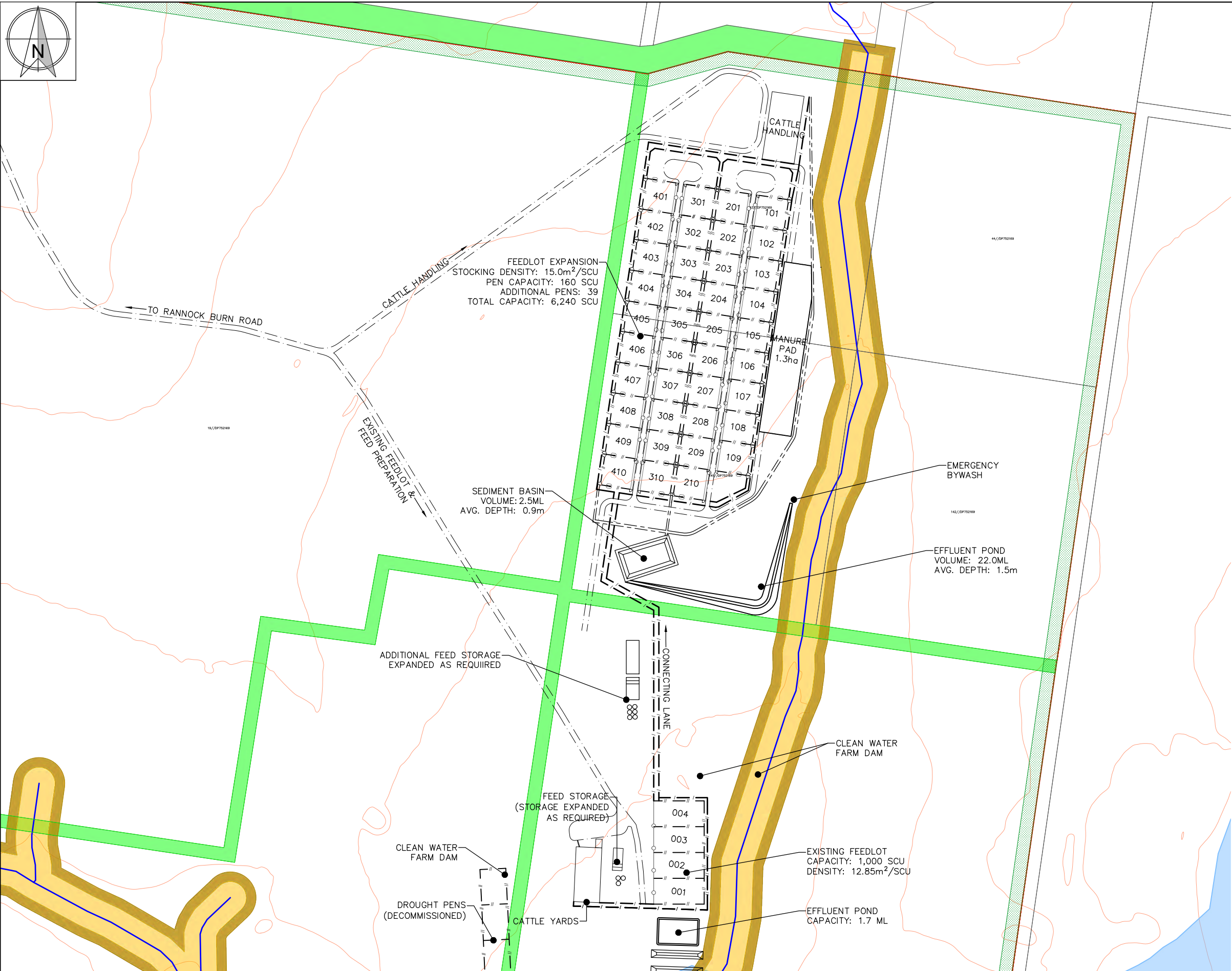
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LEGEND

- | | |
|---|----------------------------------|
|  | CADASTRAL BOUNDARY |
|  | CONTOUR EXISTING (5.0m INTERVAL) |
|  | BUFFER (DRAINAGE LINE - 25m) |
|  | BUFFER (DRAINAGE LINE - 40m) |
|  | MAPPED STREAM ORDER |
|  | CROWN ROAD EASEMENT |
|  | VEGETATION SCREEN |
|  | PEN FENCE |
|  | CATTLE LANE |
|  | FEED BUNK |
|  | EFFLUENT DRAIN |
|  | FEED ROAD |
|  | CLEAN WATER DIVERSION BANK |
|  | TRC FLOOD MODELLING |

NOTES:

1. CADASTRAL BOUNDARIES & WATERCOURSE DATA LAYERS HAVE BEEN SOURCED FROM THE SEED PORTAL. DATA EXTRACTED 28/09/2021.
2. EXISTING CONTOUR DATA OBTAINED FROM THE ELVIS PLATFORM OF PUBLICLY AVAILABLE LIDAR.
3. FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
4. THE EXISTING FEEDLOT HAS A CAPACITY OF 1,000 HEAD AT A STOCKING DENSITY OF 12.85m²/HEAD
5. THERE IS TO BE NO CHANGE TO THE CONTROLLED DRAINAGE AREA (CDA) OF THE EXISTING FACILITY.
6. EFFLUENT MANAGEMENT
 - 6.1. SEDIMENT BASIN: 2.5ML
 - 6.2. EFFLUENT POND: 22.0ML
7. FLOOD INUNDATION AREA SOURCED FROM TAMWORTH REGIONAL COUNCIL (TRC) DEVELOPMENT CONTROL PLAN 2010—FLOOD AFFECTED LAND SHEET 6 OF 25.

SITE EXPANSION:

- | | |
|----------------------|--------------------------------------|
| 1. EXISTING FEEDLOT: | 1,000 SCU @ 12.85m ² /SCU |
| 2. ROW 1: | 1,440 SCU @ 15.0m ² /SCU |
| 3. ROW 2 | 1,600 SCU @ 15.0m ² /SCU |
| 4. ROW 3 | 1,600 SCU @ 15.0m ² /SCU |
| 5. ROW 5: | 1,600 SCU @ 15.0m ² /SCU |
| 6. COMBINED | 7,240 SCU @ 14.7m ² /SCU |

DESIGN: PENS

- | | |
|------------------------------|-----------------------------|
| 1. STOCKING DENSITY | = 15.0 m ² /SCU |
| 2. BUNK SPACE | = 313 mm/SCU |
| 3. PENS 48.0 (W) x 50.0m (L) | = 2,400 m ² /PEN |
| 4. INDIVIDUAL PEN CAPACITY | = 160 SCU |

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

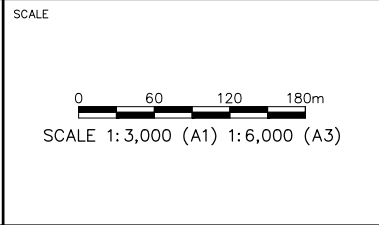
SHEET TITLE
DESIGN PLAN - 6240 NORTH



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AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

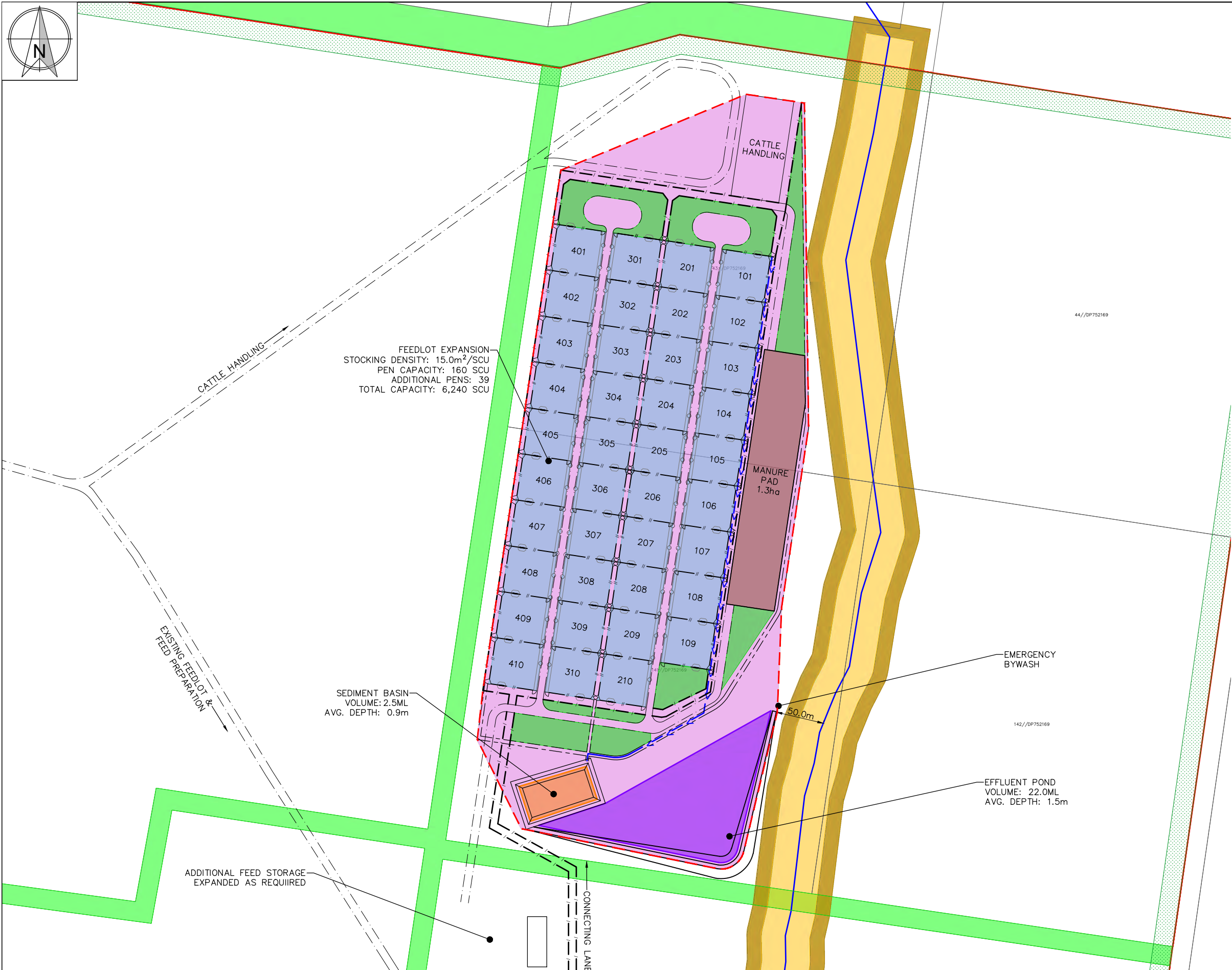
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E: contact@gdsa.com.au



ANGORA FEEDLOT
PTY LTD

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LEGEND	
	CADASTRAL BOUNDARY
	CONTOUR EXISTING (5.0m INTERVAL)
	BUFFER (DRAINAGE LINE - 25m)
	BUFFER (DRAINAGE LINE - 40m)
	MAPPED STREAM ORDER
	CROWN ROAD EASEMENT
	VEGETATION SCREEN
	CATCHMENT BOUNDARY
	MAXIMUM DRAIN LENGTH (610m)
	CLEAN WATER DIVERSION BANK
	BUFFER (DRAINAGE LINE - 25m)
	BUFFER (DRAINAGE LINE - 40m)
	PEN FENCE
	CATTLE LANE
	FEED BUNK
	EFFLUENT DRAIN
	FEED ROAD
	COMMODITY ROAD

- NOTES**
- CATCHMENT BOUNDARIES HAVE BEEN DETERMINED USING THE PUBLICLY AVAILABLE LIDAR THAT COVERS THE SITE DEVELOPMENT.
 - THE CATCHMENT OF THE ORIGINAL FEEDLOT HAS BEEN ECLUDED AS THERE WILL BE NO CHANGE TO THE PREVIOUSLY APPROVED PENS & EFFLUENT HOLDING POND.
 - FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
 - THE REQUIRED SEDIMENTATION BASIN AND EFFLUENT HOLDING POND CAPACITIES HAVE BEEN DETERMINED IN ACCORDANCE WITH THE NSW FEEDLOT GUIDELINES. THE INPUT DATA USED FOR THE SPREADSHEET CALCULATIONS IS CONSISTENT WITH THE CATCHMENT DETAILS PROVIDED IN THIS DRAWING AND THE EFFLUENT REUSE AREAS OUTLINED IN A001.
 - THE COVERED FEEDLOT PENS (SHEDS 1 & 2) ARE TO BE MANAGED TO EXCLUDE RAINFALL AND THEREFORE AVOID EFFLUENT GENERATION. AS SUCH THIS ARE HAS BEEN EXCLUDED FROM THE CONTROLLED DRAINAGE AREA THAT DRAINS INTO THE SEDIMENTATION BASIN AND EFFLUENT HOLDING POND.

CONTROLLED DRAINAGE AREA		
	PEN AREA	= 9.36 ha
	SOFT AREA	= 1.93 ha
	HARD AREA:	= 6.77 ha
	MANURE PAD AREA:	= 1.31 ha
	BASIN AREA	= 0.27 ha
	POND AREA	= 1.56 ha
TOTAL CATCHMENT		= 21.20 ha

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
CONTROLLED DRAINAGE PLAN - 6240 NORTH

AgDSA
AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

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TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE

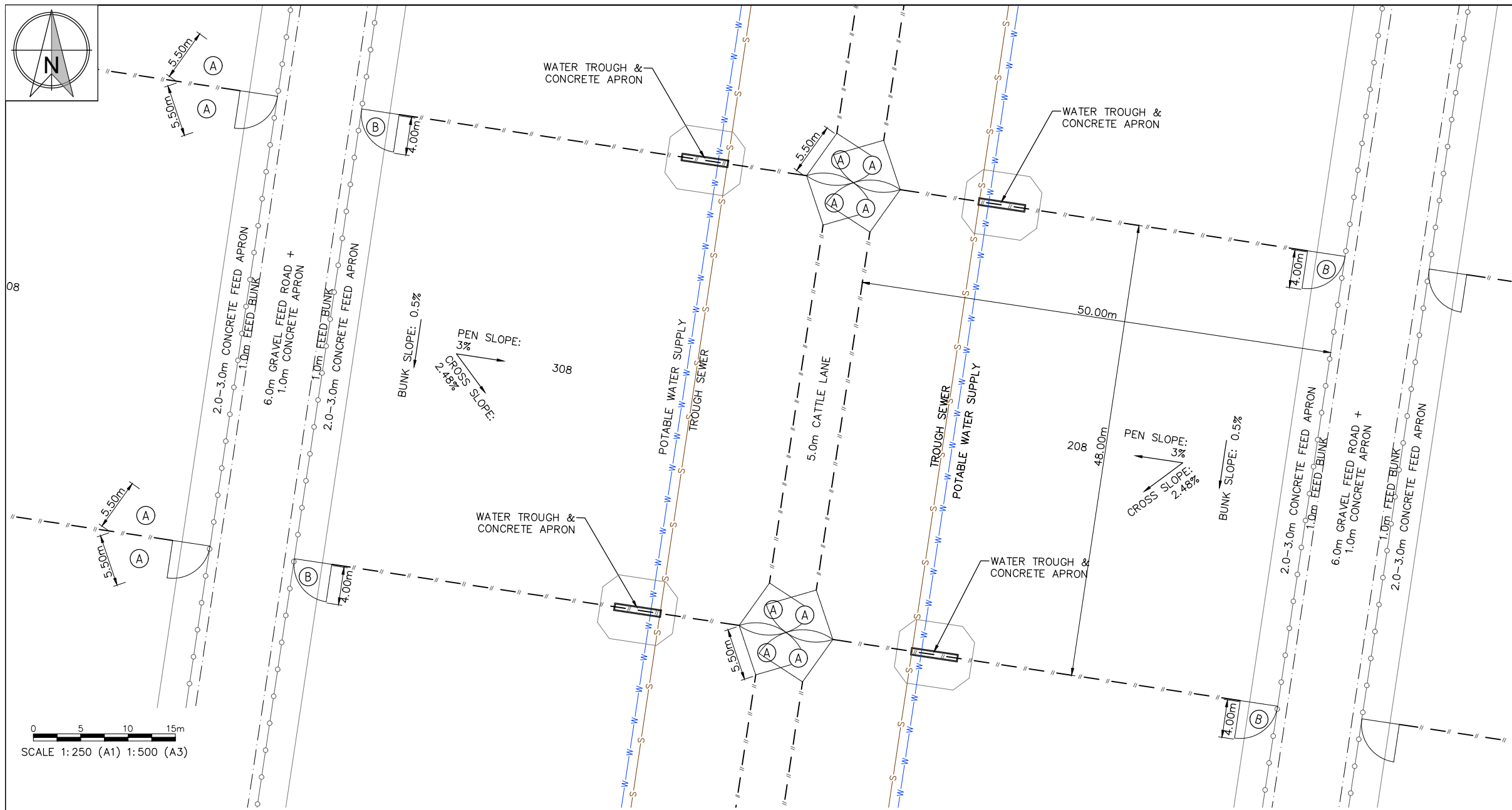
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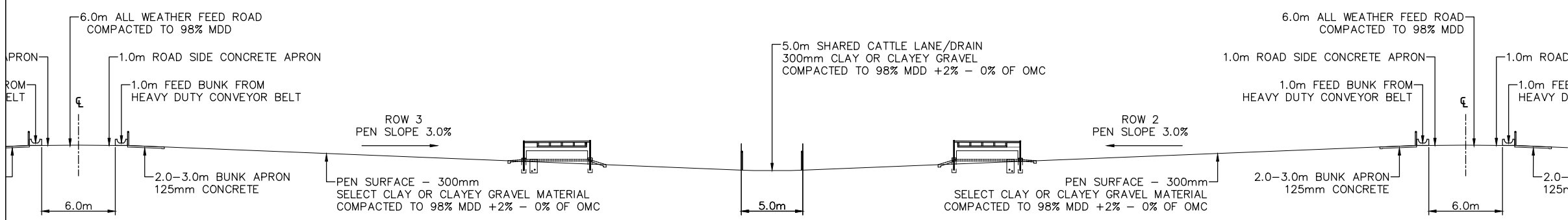
ANGORA FEEDLOT
PTY LTD

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CHECKED MRN				
PROJECT MANAGER MRN	14/08/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY	MRN
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TYPICAL PLAN – PRODUCTION PENS



TYPICAL SECTION – PRODUCTION PENS

LEGEND

- PEN FENCE
- CATTLE LANE
- FEED BUNK
- FEED ROAD
- GATE – 4.0m ACROSS BUNK APRON
- GATE – 5.5m CATTLE ACCESS
- WATER LINE
- TROUGH SEWER LINE

MATERIALS

- THE MATERIALS USED FOR THE CONSTRUCTION OF THE COMPOST PAD SHALL BE CLASSIFIED AS EITHER CL, CI, CH, SC OR GC IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM. IT SHALL COMPLY WITH THE FOLLOWING PARTICLE SIZE & PLASTICITY LIMITS.
- PARTICLE SIZE DISTRIBUTION
 - 37.5 100
 - 19.0 70-700
 - 2.36 40-100
 - 0.075 25-90
- FINES PLASTICITY LIMITS FINES (PASSING 0.425mm)
 - LIQUID LIMIT: 30-60%
 - PLASTICITY INDEX: >10%

CONSTRUCTION REQUIREMENTS

- TOPSOIL STRIPPING SHALL BE UNDERTAKEN TO A SUITABLE DEPTH TO CLEAR THE SITE OF TREES, SCRUB, STUMPS, GRASS & ORGANIC MATTER.
- AFTER TOPSOIL STRIPPING HOLES RESULTING FROM THE STRIPPING SHALL BE FILLED.
- RIPPING TO A DEPTH OF 150mm IS TO BE UNDERTAKEN AND WATER ADDED TO ENSURE MATERIAL IS WITHIN $\pm 2\%$ OF THE OPTIMUM MOISTURE CONTENT (OMC).
- AFTER WATERING COMPACTION IS TO BE UNDERTAKEN TO PRODUCE FIELD DRY DENSITY OF AT LEAST 98% OF THE STANDARD MAXIMUM DRY DENSITY (MDD).
- SUITABLE FILL MATERIAL SHOULD BE PLACED IN LAYERS OF 200mm (PRIOR TO COMPACTION). EACH LAYER SHOULD BE TINED, WETTED TO $\pm 2\%$ OF OPTIMUM MOISTURE CONTENT (AS 1289 5.1.1) AND COMPACTED TO REACH THE REQUIRED COMPACTION RELATIVE TO THE MAXIMUM DRY DENSITY (AS1289 5.4.2).
- THE FINAL SURFACE OF THE PAD MUST HAVE A MINIMUM CBR (CALIFORNIA BEARING RATIO) OF 20, & BE OF SUFFICIENT DEPTH TO ENSURE THE INTEGRITY OF THE STRUCTURE IS MAINTAINED THROUGHOUT THE GENERAL OPERATION OF THE FEEDLOT.
- IRRESPECTIVE OF THE FINISHED PEN SURFACE, THE UNDERLYING SOILS MUST HAVE A MAXIMUM PERMEABILITY OF 1×10^{-9} m/s (0.1mm/day) FOR DISTILLED WATER WITH 1.0m OF PRESSURE HEAD.

DESIGN: PRODUCTION PENS

- STOCKING DENSITY = 15 m²/SCU
- BUNK SPACE = 300 mm/SCU
- PENS 48.0 x 47.0m = 2,400 m²/PEN
- INDIVIDUAL PEN CAPACITY = 160 SCU
- NEW PENS = 39
- CAPACITY = 6,240 SCU

DESIGN: GENERAL FACILITY

- EXPANDED PRODUCTION CAPACITY = 7,240 SCU

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
TYPICAL PEN DESIGN & CROSS SECTION

AgDSA

AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

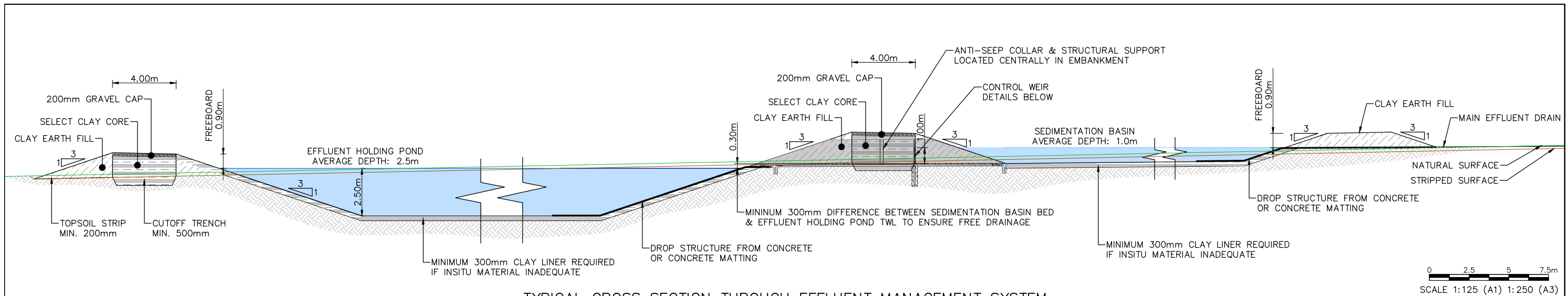
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E: contact@agdsa.com.au

SCALE

AS SHOWN

ANGORA FEEDLOT
PTY LTD

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TYPICAL CROSS SECTION THROUGH EFFLUENT MANAGEMENT SYSTEM

TABLES 1, 2 & 3 DETAIL POTENTIAL FLOW CAPACITIES OF VARIOUS DRAIN CONFIGURATIONS. A MINIMUM DRAIN WIDTH OF 2.5m IS RECOMMENDED TO ALLOW FOR EASE OF MAINTENANCE.

TABLE 1 – 0.50% DRAIN CAPACITY (m ³ /s)							
DEPTH (m)	DRAIN BED WIDTH (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.10	0.130	0.16	0.19	0.22	0.25	0.28	0.31
0.20	0.430	0.53	0.62	0.72	0.81	0.91	1.01
0.30	0.910	1.09	1.27	1.46	1.65	1.83	2.02
0.40	1.560	1.85	2.15	2.44	2.74	3.04	3.35
0.50	2.410	2.83	3.25	3.68	4.11	*4.54	*4.98

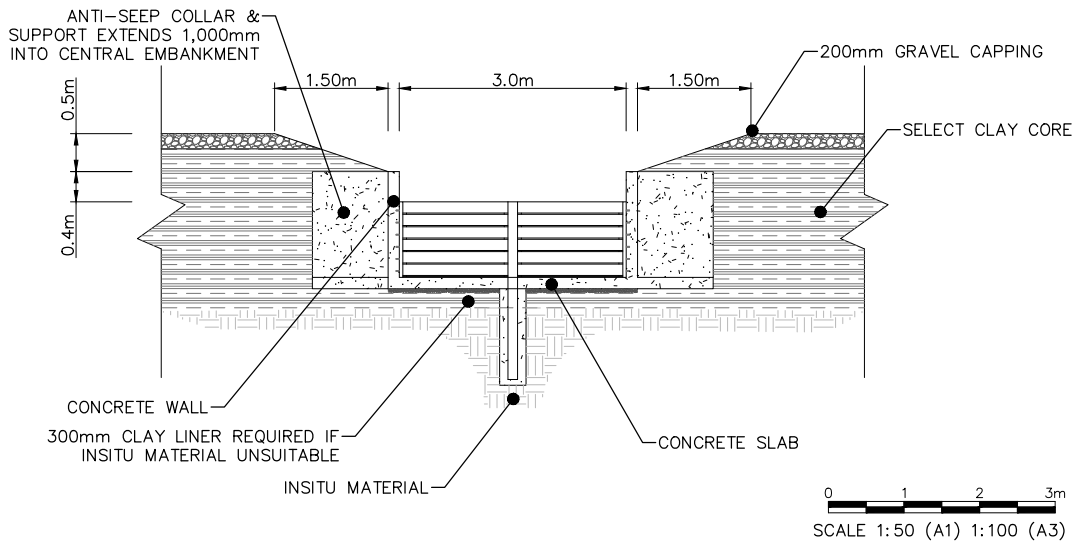
DRAINS ASSUMED TO HAVE COMPACTED GRAVEL BASE & INTERNAL BATTERS OF 1:3.
* IDENTIFIES FLOW VELOCITIES GREATER THAN 1.5 m/s WHICH REQUIRE SPECIFIC DRAIN LINING.

TABLE 2 – 0.75% DRAIN CAPACITY (m ³ /s)							
DEPTH (m)	DRAIN BED WIDTH (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.10	0.160	0.190	0.230	0.270	0.310	0.340	0.380
0.20	0.530	0.650	0.760	0.880	1	1.110	1.230
0.30	1.110	1.330	1.560	1.790	2.020	2.250	2.480
0.40	1.910	*2.27	*2.63	*2.99	*3.36	*3.73	*4.10
0.50	*2.95	*3.46	*3.98	*4.51	*5.03	*5.56	*6.09

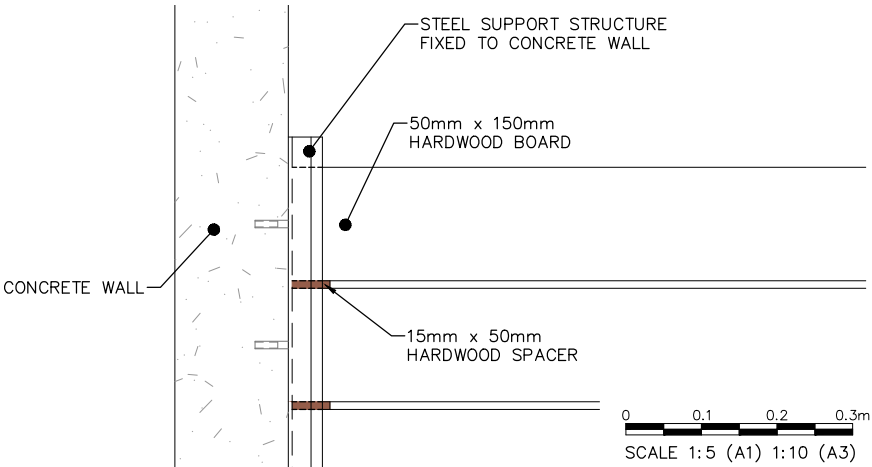
DRAINS ASSUMED TO HAVE COMPACTED GRAVEL BASE & INTERNAL BATTERS OF 1:3.
* IDENTIFIES FLOW VELOCITIES GREATER THAN 1.5 m/s WHICH REQUIRE SPECIFIC DRAIN LINING.

TABLE 3 – 1.0% DRAIN CAPACITY (m ³ /s)							
DEPTH (m)	DRAIN BED WIDTH (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.10	0.180	0.22	0.27	0.31	0.35	0.40	0.44
0.20	0.610	0.75	0.88	1.01	1.15	1.29	1.42
0.30	1.280	*1.54	*1.80	*2.06	*2.33	*2.59	*2.86
0.40	*2.20	*2.62	*3.04	*3.46	*3.88	*4.31	*4.73
0.50	*3.40	*4.00	*4.60	*5.20	*5.81	*6.42	*7.02

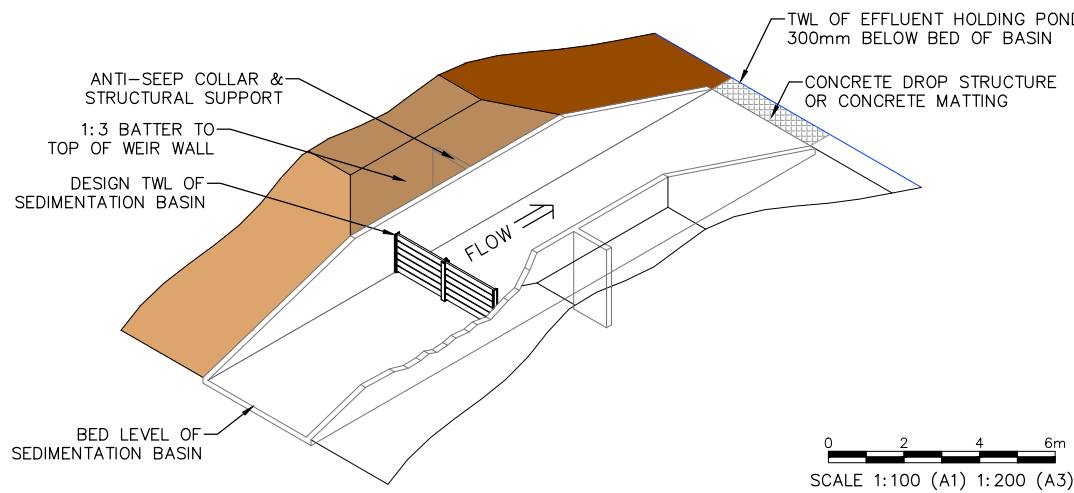
DRAINS ASSUMED TO HAVE COMPACTED GRAVEL BASE & INTERNAL BATTERS OF 1:3.
* IDENTIFIES FLOW VELOCITIES GREATER THAN 1.5 m/s WHICH REQUIRE SPECIFIC DRAIN LINING.



CONTROL WEIR – FRONT ELEVATION



WEIR BOARD INSTALLATION



WEIR INSTALLATION

TABLE 4 DETAILS THE CAPACITY OF VARIOUS RECTANGULAR WEIR CONFIGURATIONS. A MAXIMUM WEIR DEPTH OF 0.5m IS RECOMMENDED. WEIR WIDTH IS DIRECTLY PROPORTIONAL TO FLOW CAPACITY, THEREFORE, THE CAPACITY OF TWO 5.0m WEIR WIDTHS ARE EQUAL TO A SINGLE 10.0m WEIR.

TABLE 4 – WEIR CAPACITY (m ³ /s)							
DEPTH (m)	WEIR WIDTH (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.1	0.11	0.13	0.16	0.19	0.22	0.24	0.27
0.2	0.30	0.38	0.46	0.53	0.61	0.68	0.76
0.3	0.56	0.70	0.84	0.98	1.12	1.26	1.40
0.4	0.86	1.08	1.29	1.51	1.72	1.94	2.15
0.5	1.20	1.50	1.80	2.10	2.40	2.70	3.01
0.6	1.58	1.98	2.37	2.77	3.16	3.56	3.95
0.7	1.99	2.49	2.99	3.48	3.98	4.48	4.98
0.8	2.43	3.04	3.65	4.26	4.87	5.47	6.08

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
TYPICAL EFFLUENT MANAGEMENT SYSTEM DESIGN

AgDSA

AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE

AS SHOWN

ANGORA FEEDLOT
PTY LTD

DESIGNED
TJS

CHECKED
MRN

PROJECT MANAGER
MRN

FOR APPROVAL ONLY

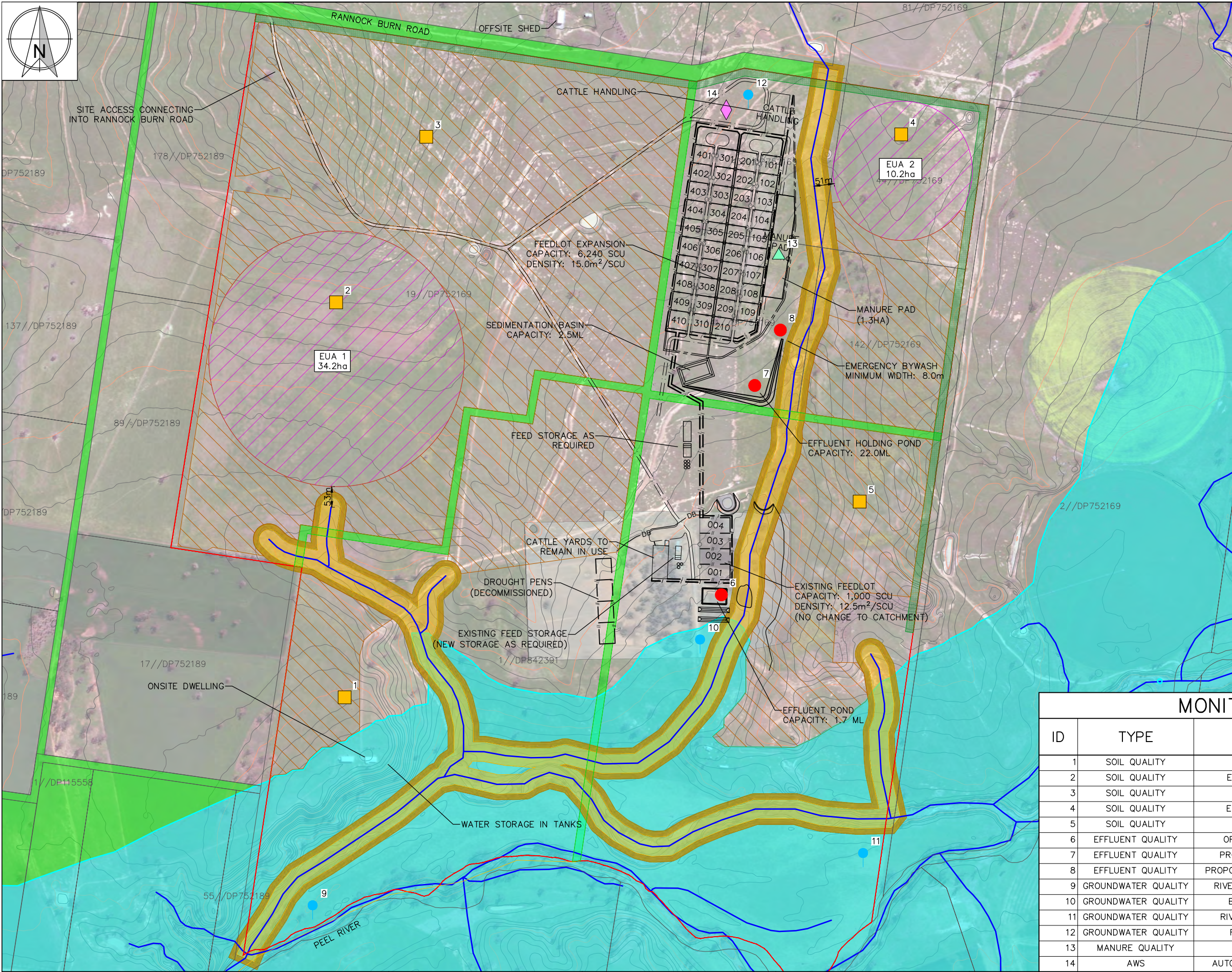
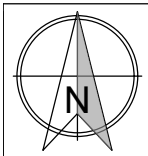
14/08/2023 A ORIGINAL ISSUE FOR APPROVAL ONLY

REVISIONS

JOB CODE
BTC-001

SHEET NUMBER
A407

CURRENT REVISION
A



LEGEND

- PROPERTY BOUNDARY
- CADASTRAL BOUNDARY
- CONTOUR EXISTING (5.0m INTERVAL)
- CROWN ROAD EASEMENT
- BUFFER (DRAINAGE LINE - 25m)
- BUFFER (DRAINAGE LINE - 40m)
- MAPPED STREAM ORDER
- EFFLUENT REUSE AREA (44.4 HA)
- MANURE REUSE AREA (154.4 HA)
- VEGETATION SCREEN
- TRC FLOOD MODELLING
- MANURE QUALITY MASS MONITORING
- SOIL QUALITY MASS MONITORING
- EFFLUENT QUALITY MONITORING
- GROUNDWATER QUALITY MONITORING
- AUTOMATED WEATHER STATION

NOTES:

- AERIAL IMAGE SOURCED THROUGH AUTOCAD MICROSOFT BING MAPPING. IMAGE ACCESS 07/10/2021, IMAGE DATE UNKNOWN.
- CADASTRAL BOUNDARIES & WATERCOURSE DATA LAYERS HAVE BEEN SOURCED FROM THE SEED PORTAL. DATA EXTRACTED 28/09/2021.
- EXISTING CONTOUR DATA OBTAINED FROM THE ELVIS PLATFORM OF PUBLICLY AVAILABLE LIDAR.
- FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
- THE EXISTING FEEDLOT HAS A CAPACITY OF 1,000 HEAD AT A STOCKING DENSITY OF 12.85m²/HEAD
- THERE IS TO BE NO CHANGE TO THE CONTROLLED DRAINAGE AREA (CDA) OF THE EXISTING FACILITY.
- EFFLUENT MANAGEMENT
 - 7.1. SEDIMENT BASIN: 2.5ML
 - 7.2. EFFLUENT POND: 22.0ML.
- FLOOD INUNDATION AREA SOURCED FROM TAMWORTH REGIONAL COUNCIL (TRC) DEVELOPMENT CONTROL PLAN 2010-FLOOD AFFECTED LAND SHEET 6 OF 25.

SITE EXPANSION:

- EXISTING FEEDLOT: 1,000 SCU @ 12.85m²/SCU
- ROW 1: 1,440 SCU @ 15.0m²/SCU
- ROW 2: 1,600 SCU @ 15.0m²/SCU
- ROW 3: 1,600 SCU @ 15.0m²/SCU
- ROW 5: 1,600 SCU @ 15.0m²/SCU
- COMBINED 7,240 SCU @ 14.7m²/SCU

MONITORING POINTS

ID	TYPE	DESCRIPTION	EASTING (mE)	NORTHING (mN)
1	SOIL QUALITY	PASTURE AREA	265694	6575857
2	SOIL QUALITY	EUA 1 IRRIGATION AREA	265672	6576877
3	SOIL QUALITY	PASTURE AREA	265905	6577305
4	SOIL QUALITY	EUA 2 IRRIGATION AREA	267132	6577311
5	SOIL QUALITY	PASTURE AREA	267024	6576363
6	EFFLUENT QUALITY	ORIGINAL EFFLUENT POND	26667	6576122
7	EFFLUENT QUALITY	PROPOSED EFFLUENT POND	266753	6576662
8	EFFLUENT QUALITY	PROPOSED EFFLUENT POND SPILL	266819	6576806
9	GROUNDWATER QUALITY	RIVER FLATS DOWN GRADIENT	265611	6575308
10	GROUNDWATER QUALITY	BELOW EFFLUENT POND	266612	6575994
11	GROUNDWATER QUALITY	RIVER FLATS UP GRADIENT	267033	6575443
12	GROUNDWATER QUALITY	FEEDLOT UP GRADIENT	266736	6577401
13	MANURE QUALITY	MANURE PAD	266815	6576998
14	AWS	AUTOMATED WEATHER STATION	266679	6577374

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
ENVIRONMENTAL MONITORING PLAN - 6240 NORTH

AgDSA
AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE

0 100 200 300m

SCALE 1:5,000 (A1) 1:10,000 (A3)

ANGORA FEEDLOT
PTY LTD

DESIGNED
TJS

CHECKED
MRN

PROJECT MANAGER
MRN

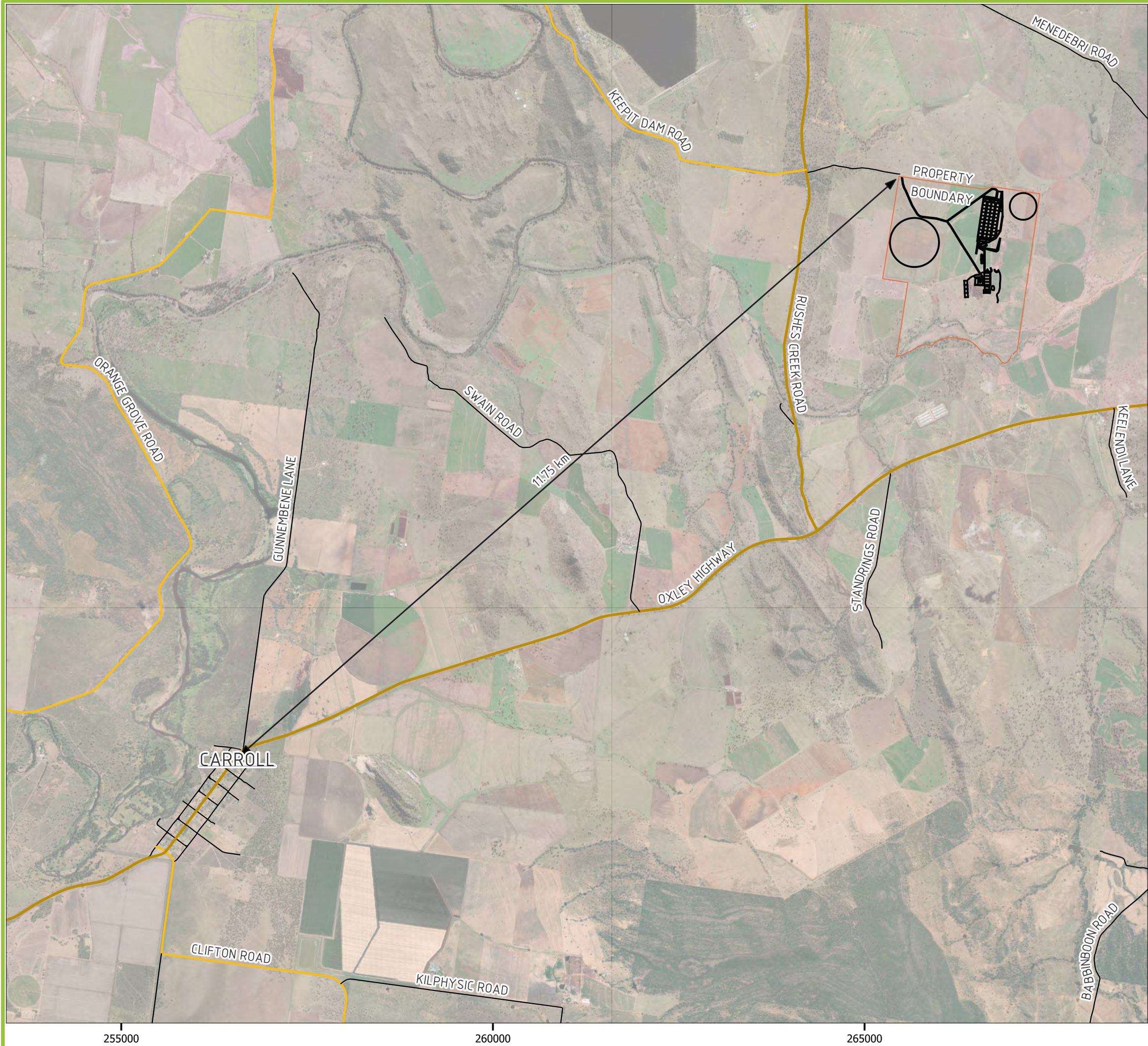
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JOB CODE
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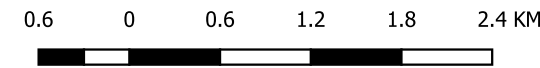
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A408

CURRENT REVISION
A

DATE	REV	DESCRIPTION	MRN	APP
14/08/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY		
REVISIONS				



Agricultural Development Services
Australia Pty Ltd (AgDSA)
ABN: 30 639 923 434



SPATIAL REFERENCE
GDA 2020 MGA ZONE 56
DATUM: GDA 2020
MAP UNITS: METRE

SCALE 1:50,000 AT A3

LEGEND

SITE SPECIFIC

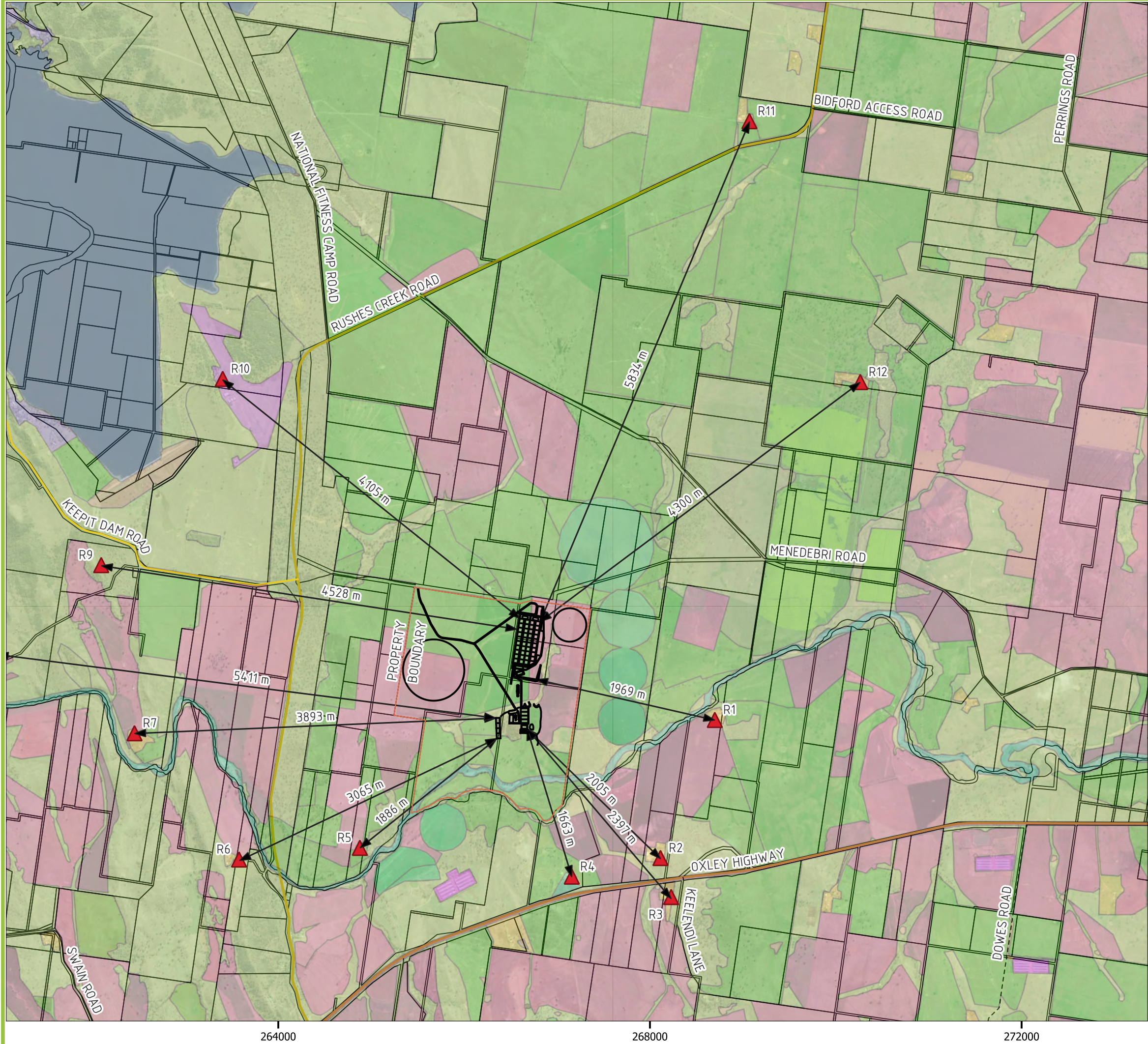
- PROPERTY BOUNDARY
- SITE LAYOUT - PROPOSED
- DISTANCE TO NEAREST TOWN
- NSW ROADS**
- Major Road
- Connector Road
- Secondary (Sub Arterial)
- Local

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ANGORA FEEDLOT PTY LTD

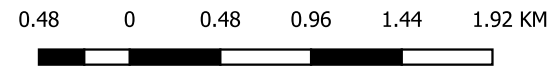
RANNOCK BURN RD,
RUSHES CREEK NSW 2346

LOCALITY PLAN

FIGURE B1



Agricultural Development Services
Australia Pty Ltd (AgDSA)
ABN: 30 639 923 434



SPATIAL REFERENCE
GDA 2020 MGA ZONE 56
DATUM: GDA 2020
MAP UNITS: METRE
SCALE 1:40,000 AT A3

LEGEND

SITE SPECIFIC

SITE LAYOUT - PROPOSED



PROPERTY BOUNDARY



SENSITIVE RECEPTORS

DISTANCE TO RECEPTORS



Sensitive_Receptors



NSW

SOILS

NSW LANDUSE 2017

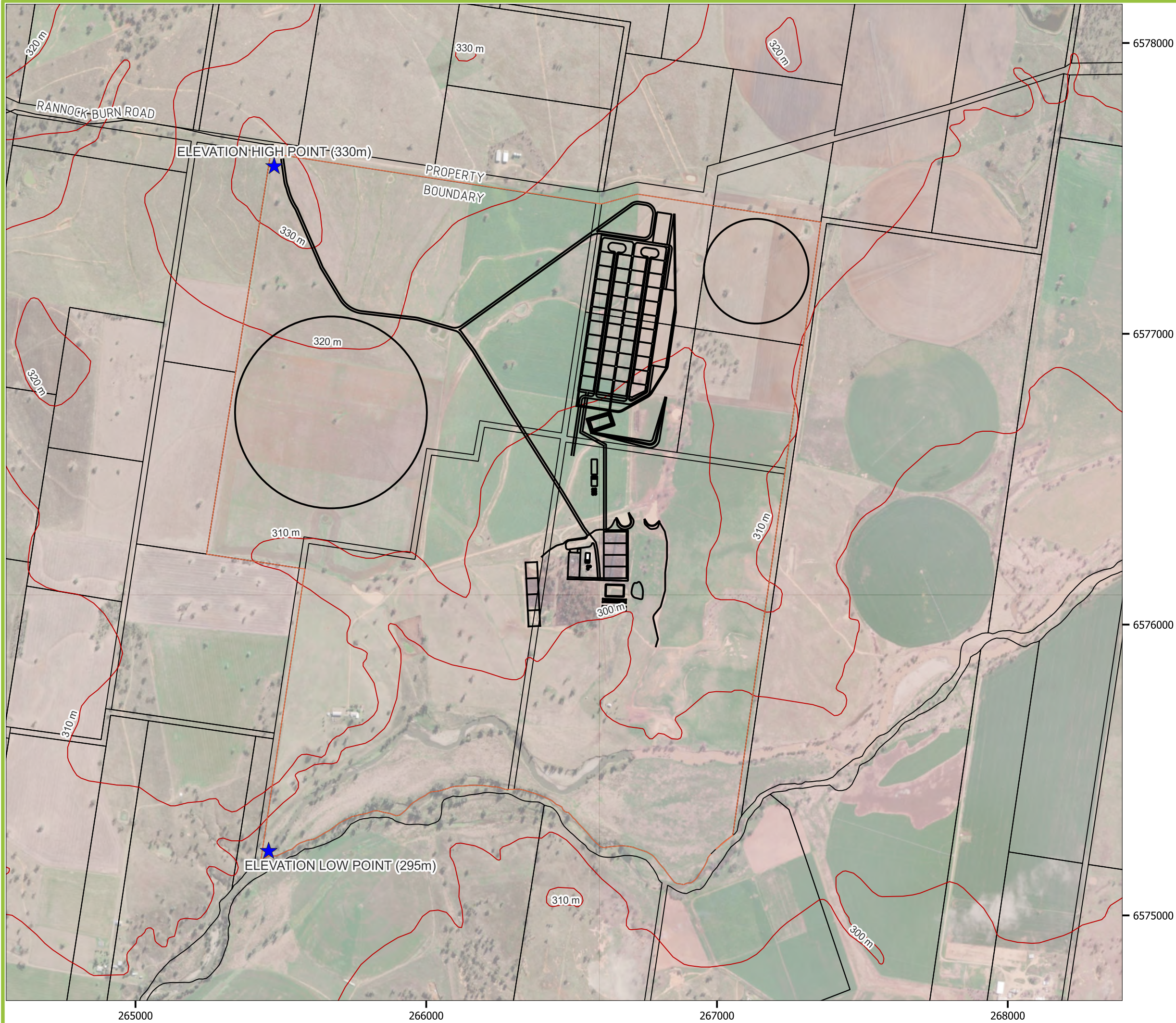
- 1.2.0 Managed resource protection
- 2.1.0 Grazing native vegetation
- 3.2.0 Grazing modified pastures
- 3.3.0 Cropping
- 4.3.0 Irrigated cropping
- 4.4.0 Irrigated perennial horticulture
- 5.2.0 Intensive animal production
- 5.4.0 Residential and farm infrastructure
- 5.5.0 Services
- 5.7.0 Transport and communication
- 6.1.0 Lake
- 6.2.0 Reservoir/dam
- 6.3.0 River

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ANGORA FEEDLOT PTY LTD

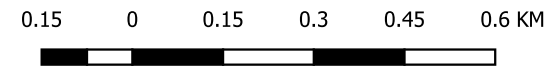
RANNOCK BURN RD,
RUSHES CREEK NSW 2346

SENSITIVE RECEPTORS AND
LANDUSE PLAN

FIGURE B2



Agricultural Development Services
Australia Pty Ltd (AgDSA)
ABN: 30 639 923 434



SPATIAL REFERENCE
GDA 2020 MGA ZONE 56
DATUM: GDA 2020
MAP UNITS: METRE
SCALE 1:12,500 AT A3

LEGEND

SITE SPECIFIC

- Elevation Points of Interest ★
- SITE LAYOUT - PROPOSED —
- PROPERTY BOUNDARY —

NSW

GEOGRAPHY

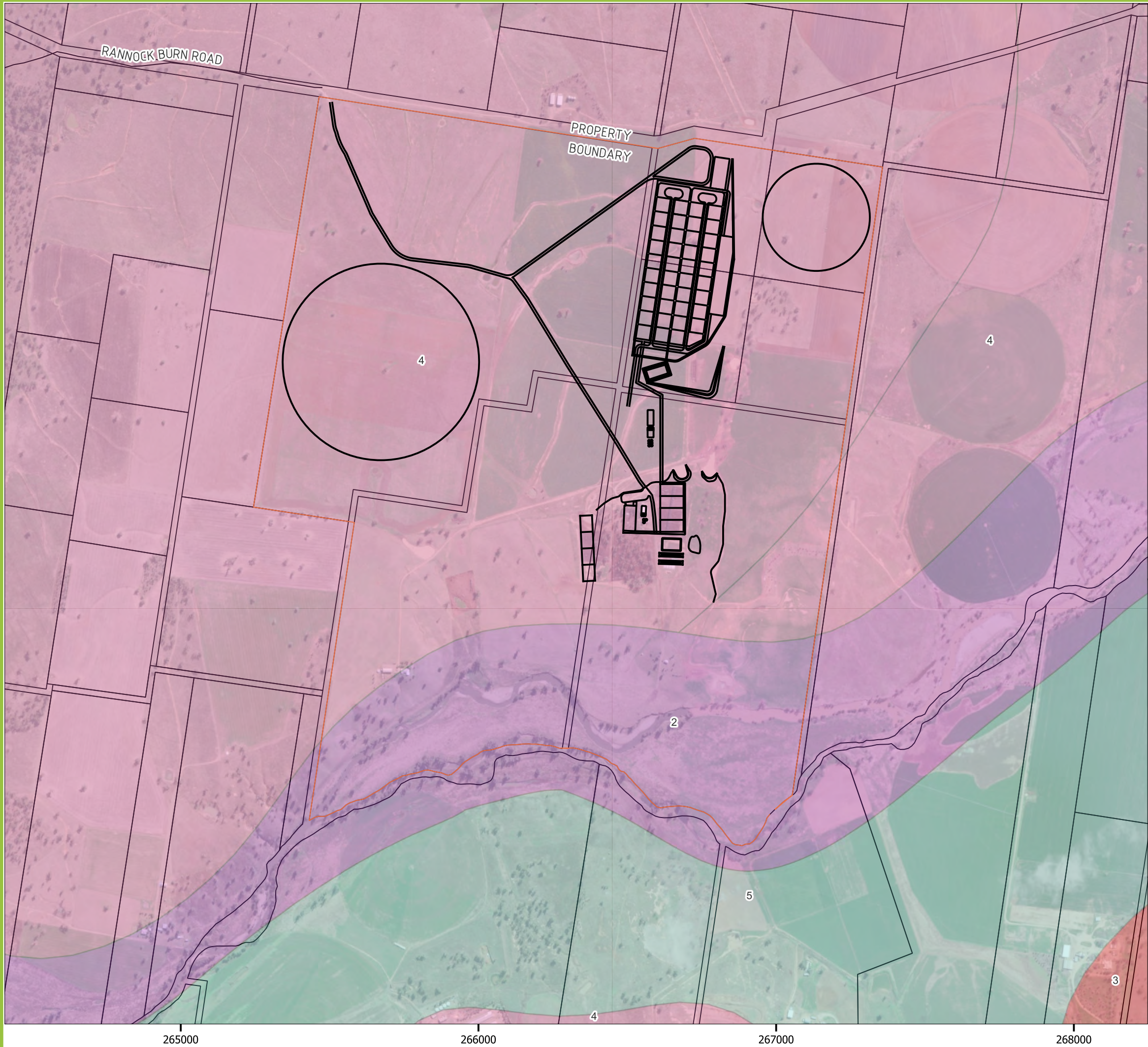
- TOPOGRAPHY —

BTC-001
ANGORA FEEDLOT PTY LTD

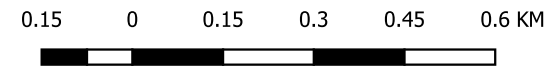
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RUSHES CREEK NSW 2346

TOPOGRAPHY PLAN

FIGURE B3



Agricultural Development Services
Australia Pty Ltd (AgDSA)
ABN: 30 639 923 434



SPATIAL REFERENCE
GDA 2020 MGA ZONE 56
DATUM: GDA 2020
MAP UNITS: METRE
SCALE 1:12,500 AT A3

LEGEND

SITE SPECIFIC

- SITE LAYOUT - PROPOSED —
- PROPERTY BOUNDARY —

NSW

SOILS

LAND SUITABILITY

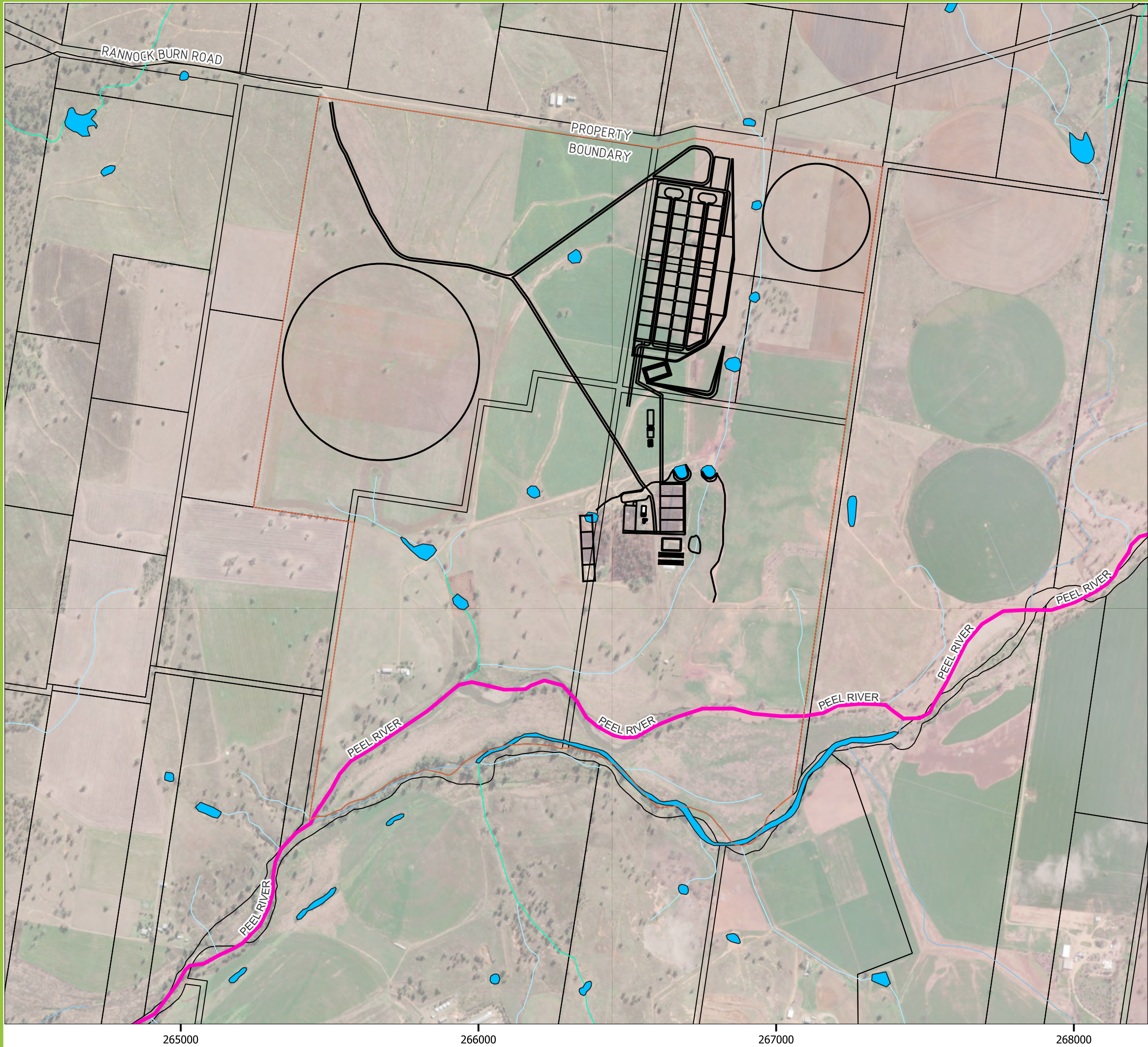
- 2
- 3
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- 5

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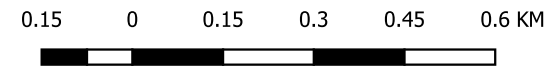
RANNOCK BURN RD,
RUSHES CREEK NSW 2346

SOILS PLAN

FIGURE B4



Agricultural Development Services
Australia Pty Ltd (AgDSA)
ABN: 30 639 923 434



SPATIAL REFERENCE
GDA 2020 MGA ZONE 56
DATUM: GDA 2020
MAP UNITS: METRE
SCALE 1:12,500 AT A3

LEGEND

SITE SPECIFIC

- SITE LAYOUT - PROPOSED —
- PROPERTY BOUNDARY —

NSW

WATER

WATERWAYS AND DRAINAGE

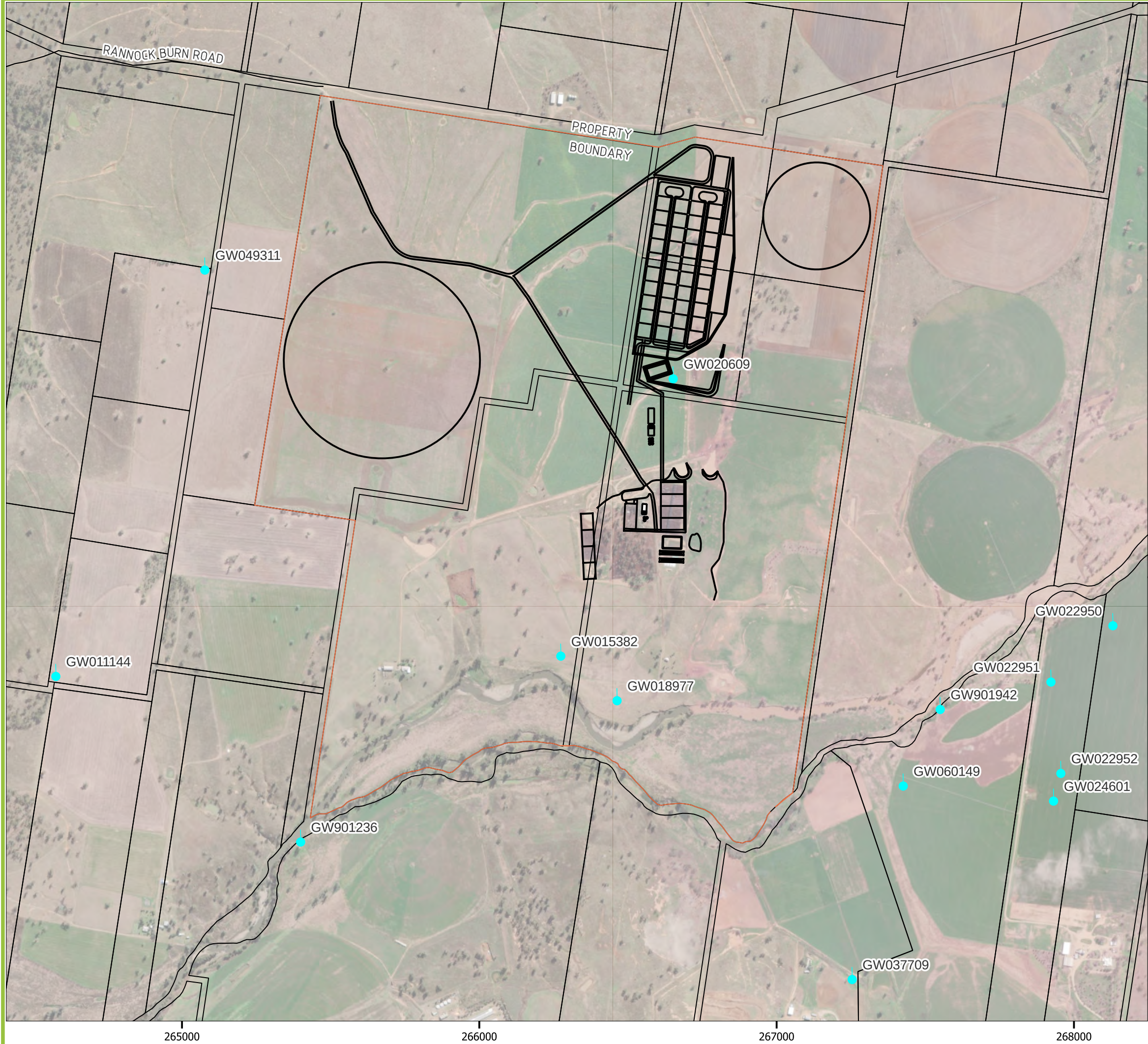
- Hydro Area —
- Hydro Line —
- 1,2,3,4 —
- 7 —
- 8 —
- 9 —

BTC-001
ANGORA FEEDLOT PTY LTD

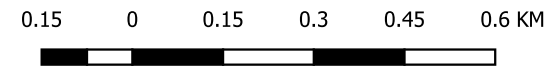
RANNOCK BURN RD,
RUSHES CREEK NSW 2346

SURFACE WATER FEATURES PLAN

FIGURE B5



Agricultural Development Services
Australia Pty Ltd (AgDSA)
ABN: 30 639 923 434



SPATIAL REFERENCE
GDA 2020 MGA ZONE 56
DATUM: GDA 2020
MAP UNITS: METRE
SCALE 1:12,500 AT A3

LEGEND

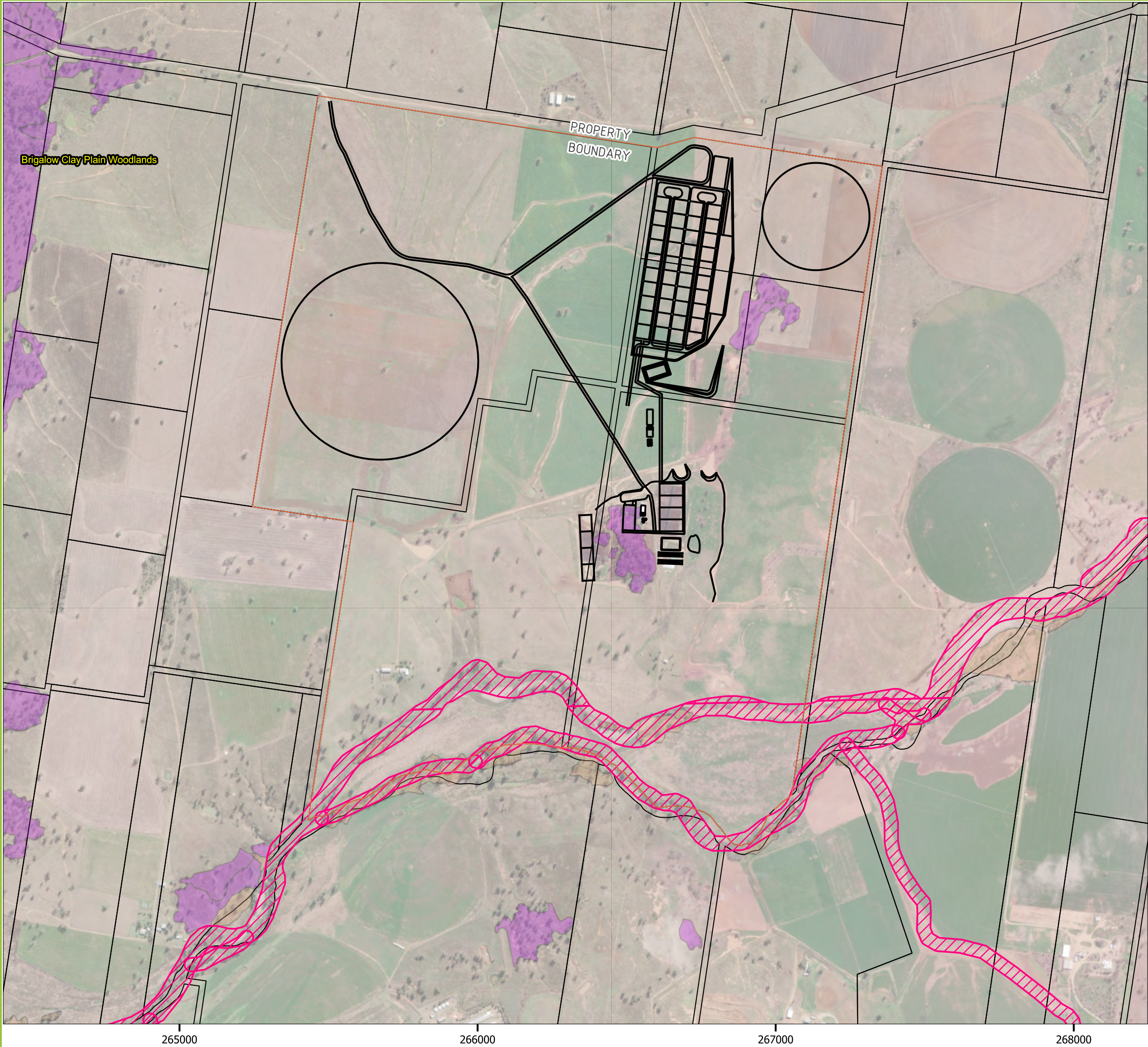
- SITE SPECIFIC**
- SITE LAYOUT - PROPOSED —
 - PROPERTY BOUNDARY —
- NSW WATER**
- GROUNDWATER BORES ●

BTC-001
ANGORA FEEDLOT PTY LTD

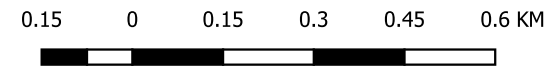
RANNOCK BURN RD,
RUSHES CREEK NSW 2346

GROUNDWATER BORES PLAN

FIGURE B6



Agricultural Development Services
Australia Pty Ltd (AgDSA)
ABN: 30 639 923 434



SPATIAL REFERENCE
GDA 2020 MGA ZONE 56
DATUM: GDA 2020
MAP UNITS: METRE
SCALE 1:12,500 AT A3

LEGEND

SITE SPECIFIC

- SITE LAYOUT - PROPOSED —
- PROPERTY BOUNDARY —

NSW

VEGETATION

- BIODIVERSITY VALUE —
- STATE VEGETATION TYPE MAP
- Brigalow Clay Plain Woodlands - 101 —
- Inland Riverine Forests - 78 —
- Western Slopes Grassy Woodlands - 589 —

CADASTRAL DCDB NSW

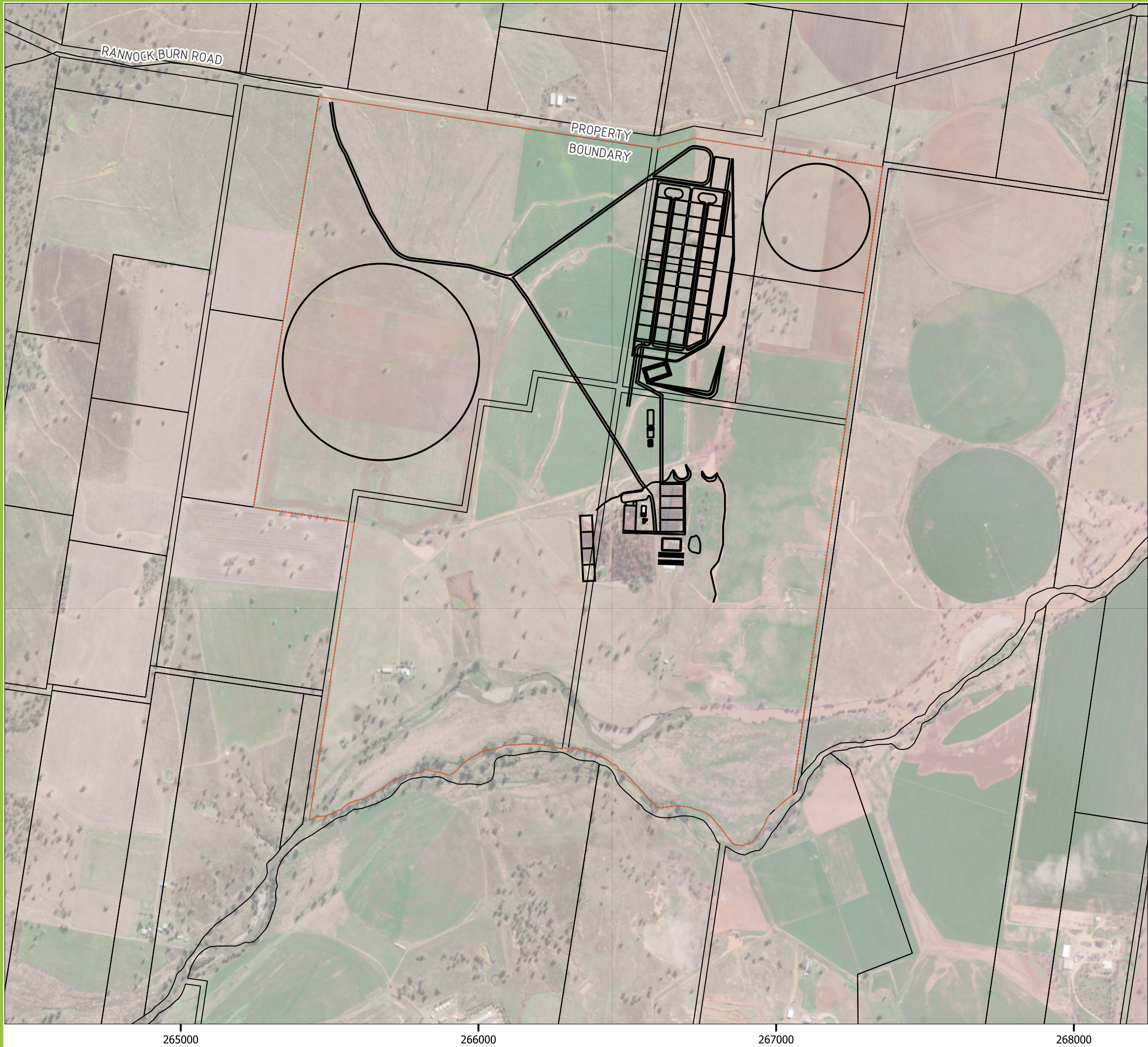
- Lot —

BTC-001
ANGORA FEEDLOT PTY LTD

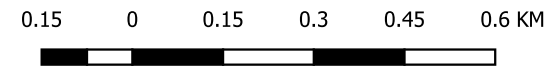
RANNOCK BURN RD,
RUSHES CREEK NSW 2346

REGULATED VEGETATION PLAN

FIGURE B7



Agricultural Development Services
Australia Pty Ltd (AgDSA)
ABN: 30 639 923 434



SPATIAL REFERENCE
GDA 2020 MGA ZONE 56
DATUM: GDA 2020
MAP UNITS: METRE
SCALE 1:12,500 AT A3

LEGEND

SITE SPECIFIC

- SITE LAYOUT - PROPOSED —
- PROPERTY BOUNDARY —

BTC-001
ANGORA FEEDLOT PTY LTD

RANNOCK BURN RD,
RUSHES CREEK NSW 2346

BUSHFIRE PRONE LAND PLAN

FIGURE B8

APPENDIX C – LIVESTOCK THROUGHPUT SPREADSHEET



Beef Feedlot Feed, Manure & Traffic Calculator

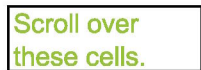
The AgDSA Beef Feedlot Feed, Manure & Traffic Calculator has been developed to assist the preparation of development applications for beef feedlots in Australia.

Cattle stocking rates used to estimate cattle capacities per truck are based on the 2019 Meat & Livestock Australia (MLA) "Fit to Load" manual. Cattle weight above of below those provided in the manual have been interpolated or extrapolated as required.

Legend



Data is to be entered into all of the grey cells, starting with the '1 - General' worksheet and proceeding through the other worksheets from left to right, using the tabs on the bottom of the screen.



For assistance with the selection of appropriate input data, scroll over the cells that have red triangles in the upper right corner to view explanatory comments.

Developed by: Tim Sullivan

Principal Agricultural Engineer

AgDSA

Email:





General Feedlot Information

Feedlot Details

Feedlot Development

Landholders' name(s):	Angora Feedlot Pty Ltd	Is the feedlot developed in stages	No						
Cattle feedlot name:	Angora								
Feedlot address:		Cattle capacity per market type (SCU)	Market 1	Market 2	Market 3	Market 4	Market 5	Total	
Feedlot locality:		Percentage of full capacity	1,000	4,000	2,240			7,240	
Feedlot State:		Description	14%	55%	31%				
Feedlot Local Government Area:		(i.e Pen Numbers &/or Market Type)							
Spreadsheet user name		Anticipated completion date							
Assessment date									


Expansion Stage	1	2	3	4	5	Total	Units
Maximum SCU Capacity	1,000	4,000	2,240	-	-	7,240	SCU
Maximum SCU Market Split	14%	55%	31%	-	-	100%	%
Animal Performance Data							
Entry Weight	320	320	420				kg
Exit Weight	450	450	600				kg
Average Weight	385	385	510	-	-		kg
SCU Conversion (at average weight)	0.72	0.72	0.89	-	-		
Maximum Head Capacity	1,395	5,579	2,530	-	-	9,504	head
Maximum Head Market Split	15%	59%	27%	-	-	100%	%
Total Days on Feed	70	70	120				Days
Feed cycles per year	5.21	5.21	3.04	-	-		
Average Occupancy Rate	90%					90%	%
Average SCU in Feedlot	900	3,600	2,016	-	-	6,516	SCU
Average Head in Feedlot	1,255	5,021	2,277	-	-	8,554	Head
Maximum Head in Feedlot (100% Occupancy)	1,395	5,579	2,530	-	-	9,504	Head
Total Cattle Entering the Feedlot	6,546	26,183	6,927	-	-	39,655	Head
Average Mortality	0.80%					0.80%	%
Annual Deaths	52	209	55	-	-	317	Head
Outgoing Cattle	6,493	25,973	6,871	-	-	39,338	Head
Cattle Procurement							
Cattle Produced Onsite	0						Head
Cattle Produced Per Stage	0	0	0	0	0	-	Head
Cattle Produced Onsite	0.0%	0.0%	0.0%			0.0%	%
Cattle Transported In	6,546	26,183	6,927	-	-	39,655	Head
Cattle Transported In	100.0%	100.0%	100.0%			100.0%	%
Incoming Cattle Trucks							
Incoming Cattle	6,546	26,183	6,927	-	-		
Incoming Cattle Truck Type	B Double	B Double	B Double				Type
Total Decks / Truck Type	3	3	3	-	-		kg
Incoming Cattle Weight	320	320	420	-	-		kg
Incoming Cattle Floor Area	0.91	0.91	1.08	-	-		m ² /head
Incoming Cattle/Deck	32	32	27	-	-		Head
Incoming Cattle/Truck (Space Limiting)	96	96	81	-	-		Head
Incoming Cattle/Truck	96	96	81				Head
Incoming Cattle Trucks/year	68	273	85.52	-	-	426	Trucks/year
Outgoing Cattle Trucks							
Outgoing Cattle	6,493	25,973	6,871	-	-		
Outgoing Cattle Truck Type	B Double	B Double	B Double				Type
Total Decks / Truck Type	3	3	3	-	-		kg
Outgoing Cattle Weight	450	450	600	-	-		kg
Outgoing Cattle Floor Area	1.13	1.13	1.47	#N/A	#N/A		m ² /head
Outgoing Cattle/Deck	26	26	20	#N/A	#N/A		
Outgoing Cattle/Truck (Space Limiting)	78	78	60	#N/A	#N/A		Head
Outgoing Cattle/Truck	78	78	60				Head
Outgoing Cattle Trucks/Year	83	333	115	-	-	531	Trucks/year

gDSA	Feedstuff Requirements						
Expansion Stage	1	2	3	4	5	Total	Units
Maximum SCU Capacity	1,000	4,000	2,240	-	-	7,240	SCU
Animal Performance Data							
Entry Weight	320	320	420	-	-		kg
Exit Weight	450	450	600	-	-		kg
Average Weight	385	385	510	-	-		kg
SCU Conversion (at average weight)	0.72	0.72	0.89	-	-		
Average Occupancy Rate			90%			90%	%
Average SCU in Feedlot	900	3,600	2,016	-	-	6,516	SCU
Average Head in Feedlot	1,255	5,021	2,277	-	-	8,554	Head
Maximum Head Capacity	1,395	5,579	2,530	-	-	9,504	Head
Animal Feed Intake							
As fed intake	3.1%	3.1%	2.4%	0.0%	0.0%		% Avg. LWT
As fed intake	12.0	12.0	12.0				kg/day
Ration Dry Matter	80%	80%	80%				%
DM feed intake	9.6	9.6	9.6	-	-		kg/day
Days on Feed	70.0	70.0	120.0	-	-		days
Daily Gain	1.9	1.9	1.5	-	-		kg/day
FCR (as fed basis)	6.5	6.5	8.0	-	-		x:1
FCR (DM basis)	5.2	5.2	6.4	#DIV/0!	#DIV/0!		x:1
Feed consumed onsite/day	15.1	60.3	27.3	-	-	102.6	t/day
Feed consumed onsite/week	105.4	421.8	191.3	-	-	718.5	t/week
Feed consumed onsite/year	5,498.4	21,993.5	9,974.7	-	-	37,466.6	t/year
Diet & Ingredient Volumes							
Grain	75.0%	75.0%	75.0%				%
Roughage (Hay/Straw)							%
Roughage (Silage)	16.0%	16.0%	16.0%				%
Liquids + Supplements	9.0%	9.0%	9.0%				%
Total	100.0%	100.0%	100.0%	0.0%	0.0%		%
Annual Feed Requirements							
Grain	4,123.8	16,495.1	7,481.0	-	-	28,099.9	t/year
Roughage (Hay/Straw)	-	-	-	-	-	-	t/year
Roughage (Silage)	879.7	3,519.0	1,596.0	-	-	5,994.7	t/year
Liquids + Supplements	494.9	1,979.4	897.7	-	-	3,372.0	t/year
Total	5,498.4	21,993.5	9,974.7	-	-	37,466.6	t/year
	OK	OK	OK	OK	OK	OK	
Annual Feed Grown Onsite							
Grains produced onsite	0					-	t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Roughage (Hay/Straw) produced onsite	0					-	t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Roughage (Silage) produced onsite	0					-	t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Liquid + Supplements produced onsite	0					-	t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Total feed produced onsite						-	t/year
							% supplied from onsite
Commodity Truck Movements							
Grain - Ex. Farm Grown	4,124	16,495	7,481	-	-	28,100	t/year
Grain Truck Type	B Double	B Double	B Double				Type
Grain Truck Capacity (Suggested)	36	36	36	-	-		t/vehicle
Grain Truck Capacity (Used)	36	36	36				t/vehicle
Grain Truck Loads	115	458	208	-	-	781	Trucks/yr
Roughage (Hay/Straw) - Ex. Farm Grown	-	-	-	-	-	-	t/year
Roughage (Hay/Straw) Truck Type	B Double	B Double	B Double				Type
Roughage (Hay/Straw) Truck Capacity (Suggested)	18	18	18	-	-		t/vehicle
Roughage (Hay/Straw) Truck Capacity (Used)	18	18	18				t/vehicle
Rough (Hay/Straw) Truck Loads	-	-	-	-	-	-	Trucks/yr
Roughage (Silage) - Ex. Farm Grown	880	3,519	1,596	-	-	5,995	t/year
Roughage (Silage) Truck Type	B Double	B Double	B Double				Type
Roughage (Silage) Truck Capacity (Suggested)	36	36	36	-	-		t/vehicle
Roughage (Silage) Truck Capacity (Used)	36	36	36				t/vehicle
Rough (Silage) Truck Loads	24	98	44	-	-	167	Trucks/yr
Liquids + Supplements - Ex. Farm Grown	495	1,979	898	-	-	3,372	t/year
Liquids + Supplements Truck Type	Semi Trailer	Semi Trailer	Semi Trailer				Type
Liquids + Supplements Truck Capacity (Suggested)	24	24	24	-	-		t/vehicle
Liquids + Supplements Truck Capacity (Used)	24	24	24				t/vehicle
Liquids + Supplements Truck Loads	21	82	37	-	-	140	Trucks/yr



Manure Production Details

Expansion Stage	1	2	3	4	5	Total	Units
Maximum SCU Capacity	1,000	4,000	2,240	-	-	7,240	SCU
Occupancy Rate			90%			90%	%
Average SCU in Feedlot	900	3,600	2,016	-	-	6,516	SCU
Manure Production							
Average raw manure harvested per SCU	0.80	0.80	0.80	0.80	0.80	0.80	t/SCU/yr
Average annual raw manure harvested	720	2,880	1,613	-	-	5,213	t/year
Manure processing utilised	Stockpiled	Stockpiled	Stockpiled	Immediate Disposal	Immediate Disposal		
Average raw/processed manure per scu	0.56	0.56	0.56	0.80	0.80		t/SCU/yr
Average annual manure for reuse	504	2,016	1,129	-	-	3,649	
Manure exported off-site annually	505.0	2,016.0	1,130.0			3,651	t/yr
Manure exported off-site annually	100%	100%	100%			100%	%
Manure transport typical truck type	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer		
Tonnes of manure/truckload	24	24	24	-	-		t/vehicle
No. outgoing trucks/year	21.0	84.0	47.1	-	-	152.1	truck/yr

<div>  <div>Traffic Generation - Individual Stages</div> </div>							
Expansion Stage	1	2	3	4	5	Total	Units
Incoming Cattle (Excludes farm grown)							
Average Occupancy	90%	90%	90%	0%	0%	%	
Cattle per year	6,546	26,183	6,927	-	-	39,655	head/year
Typical truck type	B Double	B Double	B Double	-	-		
No. of head/truck	96	96	81	-	-		head/truck
No. of trucks/year	68	273	86	-	-	426	trucks/year
No. of trucks/week	1.3	5.2	1.6	-	-	8.2	trucks/week
No. of trucks/day	0.2	0.7	0.2	-	-	1.2	trucks/day
Outgoing Cattle							
Cattle out per year	6,493	25,973	6,871	-	-	39,338	head/year
Typical truck type	B Double	B Double	B Double	-	-		
No. of Head/truck	78	78	60	-	-		head/truck
No. of trucks/year	83	333	115	-	-	531	trucks/year
No. of trucks/week	1.6	6.4	2.2	-	-	10.2	trucks/week
No. of trucks/day	0.2	0.9	0.3	-	-	1.5	trucks/day
Grain and Feedstuffs							
Total feed Imported <i>Ex. Farm Grown</i>	5,498	21,994	9,975	-	-	37,467	t/year
Typical truck type	B Double	B Double	B Double	-	-		
No. of trucks/year	160	638	290	-	-	1,088	trucks/year
No. of trucks/week	3.1	12.3	5.6	-	-	20.9	trucks/week
No. of trucks/day	0.4	1.7	0.8	-	-	3.0	trucks/day
Outgoing Manure							
Manure transported off-site	505	2,016	1,130	-	-	3,651	t/year
Typical truck type	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer		
No. of trucks/year	21	84	47	-	-	152	trucks/year
No. of trucks/week	0.4	1.6	0.9	-	-	2.9	trucks/week
No. of trucks/day	0.1	0.2	0.1	-	-	0.4	trucks/day
Total - Incoming and Outgoing Trucks							
No. of trucks - Incoming Cattle & Incoming Feed Commodities	228	911	375	-	-	1,514	trucks/year
	4	18	7	-	-	29	trucks/week
	0.6	2.5	1.0	-	-	4.1	trucks/day
Incoming Annual Average Daily Traffic (AADT)	1.2	5.0	2.1	-	-	8.3	trucks/day
No. of trucks - Outgoing Cattle & Manure taken for offsite disposal	104	417	162	-	-	683	trucks/year
	2	8	3	-	-	13	trucks/week
	0.3	1.1	0.4	-	-	1.9	trucks/day
Outgoing Annual Average Daily Traffic (AADT)	0.6	2.3	0.9	-	-	3.7	trucks/day
Total - Incoming & Outgoing Trucks	332	1,328	537	-	-	2,197	trucks/year
	6	26	10	-	-	42	trucks/week
	0.9	3.6	1.5	-	-	6.0	trucks/day
Total Annual Average Daily Traffic (AADT)	1.8	7.3	2.9	-	-	12.0	trucks/day
Total AADT (Rounded to Nearest Complete Trip)	2.0	8.0	4.0	-	-	14.0	trucks/day

<div> <div>Traffic Generation - Cumulative Stages</div> </div>						
Expansion Stage	1	1+2	1+2+3	1+2+3+4	1+2+3+4+5	Units
Incoming Cattle (Excludes farm grown)						
Average Occupancy	90%	90%	90%	0%	0%	%
Cattle per year	6,546	32,728	39,655	-	-	head/year
Typical truck type	B Double	B Double	B Double	-	-	
No. of head/truck	96	96	81	-	-	head/truck
No. of trucks/year	68	341	426	-	-	trucks/year
No. of trucks/week	1.3	6.6	8.2	-	-	trucks/week
No. of trucks/day	0.2	0.9	1.2	-	-	trucks/day
Outgoing Cattle						
Cattle out per year	6,493	32,467	39,338	-	-	head/year
Typical truck type	B Double	B Double	B Double	-	-	
No. of Head/truck	78	78	60	-	-	head/truck
No. of trucks/year	83	416	531	-	-	trucks/year
No. of trucks/week	1.6	8.0	10.2	-	-	trucks/week
No. of trucks/day	0.2	1.1	1.5	-	-	trucks/day
Grain and Feedstuffs						
Total feed Imported <i>Ex. Farm Grown</i>	5,498	27,492	37,467	-	-	t/year
Typical truck type	B Double	B Double	B Double	-	-	
No. of trucks/year	160	798	1,088	-	-	trucks/year
No. of trucks/week	3.1	15.3	20.9	-	-	trucks/week
No. of trucks/day	0.4	2.2	3.0	-	-	trucks/day
Outgoing Manure						
Manure transported off-site	505	2,521	3,651	-	-	t/year
Typical truck type	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer	
No. of trucks/year	21	105	152	-	-	trucks/year
No. of trucks/week	0.4	2.0	2.9	-	-	trucks/week
No. of trucks/day	0.1	0.3	0.4	-	-	trucks/day
Total - Incoming and Outgoing Trucks						
No. of trucks - Incoming Cattle & Incoming Feed Commodities	228	1,139	1,514	-	-	trucks/year
	4	22	29	-	-	trucks/week
	0.6	3.1	4.1	-	-	trucks/day
Incoming Annual Average Daily Traffic (AADT)	1.2	6.2	8.3	-	-	trucks/day
No. of trucks - Outgoing Cattle & Manure taken for offsite disposal	104	521	683	-	-	trucks/year
	2	10	13	-	-	trucks/week
	0.3	1.4	1.9	-	-	trucks/day
Outgoing Annual Average Daily Traffic (AADT)	0.6	2.9	3.7	-	-	trucks/day
Total - Incoming & Outgoing Trucks	332	1,660	2,197	-	-	trucks/year
	6	32	42	-	-	trucks/week
	0.9	4.5	6.0	-	-	trucks/day
Total Annual Average Daily Traffic (AADT)	1.8	9.1	12.0	-	-	trucks/day
Total AADT (Rounded to Nearest Complete Trip)	2.0	10.0	14.0	-	-	trucks/day

Table 1. Incoming cattle truck floor areas

Truck Type	Table Top	Semi Trailer (Single Deck)	Semi Trailer (Double Deck)	B Double	Road Train
Configuration	1 Deck	1 Deck	2 Decks	3 Decks	4 Decks
Total 12.5 x 2.4m decks	0.17	1	2	3	4
Total Floor Area (m ²)	5	29.3	58.5	87.8	117

Table 2. Minimum floor area by animal size

Mean liveweight (kg)	Area required (m ² /head)	Using Regression	% Difference	Head / Standard Deck
100	0.31	0.31	-0.9%	94
150	0.42	0.41	-1.8%	70
200	0.53	0.55	4.6%	55
250	0.77	0.79	2.7%	38
300	0.86	0.86	0.6%	34
350	0.98	0.95	-3.4%	30
400	1.05	1.04	-1.4%	28
450	1.13	1.13	0.3%	26
500	1.23	1.24	0.8%	24
550	1.34	1.36	1.2%	22
600	1.47	1.48	1.0%	20
650	1.63	1.62	-0.4%	18
700	1.78	1.78		16
750	1.94	1.94		15
800	2.13	2.13		13
850	2.33	2.33		12
900	2.55	2.55		11
950	2.79	2.79		10
1000	3.05	3.05		9

Table 3. Incoming Grain truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Grain (tonnes)	12	24	24	36	48

Table 4. Incoming Roughage - Hay/Straw truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Roughage - Hay/Straw (tonnes)	6	12	12	18	24

Table 5. Incoming Roughage - Silage truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Roughage - Silage (tonnes)	12	25	25	36	50

Table 6. Incoming Other - Liquids truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Other - Liquids (tonnes)	12	24	24	36	48

Table 7. Manure quantities depending on manure treatment process

Truck Type	Tonne/SCU
Immediate Disposal	0.8
Stockpiled	0.56
Composted	0.35

Table 8. Outgoing manure truck loading rates

Truck Type	Tonne / truck
Body Truck	12
Truck & Dog	18
Semi Trailer	24
B double	36

APPENDIX D – DRINKING WATER ANALYSIS RESULTS

RESULTS OF WATER ANALYSIS

1 sample supplied by JG Environmental Pty Ltd on 8/02/2023. Lab Job No. N7206.

Samples submitted by Justin Galloway. Your Job: Job Ref: 23702

PO Box 237 NAMBOUR QLD 4560

Parameter	Methods reference	Sample 1 23702 / Water
	Job No.	N7206/1
pH	APHA 4500-H ⁺ -B	7.27
Conductivity (EC) (dS/m)	APHA 2510-B	1.74
Total Dissolved Salts (mg/L)	** Calculation using EC x 680	1,183
Turbidity (NTU)	APHA 2130	0.3
Bicarbonate (Alkalinity) (mg/L CaCO ₃ equivalent)	** Total Alkalinity - APHA 2320	497
Water Hardness (mg/L CaCO ₃ equivalent)	** Using Ca and Mg calculation	711
Phosphate (mg/L P)	APHA 4500 P-G	0.043
Nitrate (mg/L N)	APHA 4500 NO ₃ ⁻ -F	4.76
Ammonia (mg/L N)	APHA 4500 NH ₃ -H	0.041
Sodium (mg/L)	APHA 3125 ICPMS ^{*note 1&2}	165
Potassium (mg/L)	APHA 3125 ICPMS ^{*note 1&2}	1.18
Calcium (mg/L)	APHA 3125 ICPMS ^{*note 1&2}	152
Magnesium (mg/L)	APHA 3125 ICPMS ^{*note 1&2}	80.3
Sodium Absorption Ratio (SAR)	** By calculation	2.7
Chloride (mg/L)	APHA 3125 ICPMS ^{*note 1&2}	192
Sulfate (mg/L SO ₄ ²⁻)	APHA 3125 ICPMS ^{*note 1&2}	199
Chloride/Sulfate Ratio	** Calculation	1.0
Total Coliforms (cfu/100 ml)	** APHA 9222-B	27
E.Coli (cfu/100 ml)	** ColiBlue Membrane Filtration	3
Aluminium (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	0.005
Arsenic (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	<0.001
Cadmium (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	<0.001
Chromium (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	<0.001
Copper (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	<0.001
Iron (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	<0.005
Manganese (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	0.001
Nickel (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	<0.001
Lead (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	<0.001
Zinc (mg/L)	Total Available - APHA 3125 ICPMS ^{*note 1&2}	0.019

Notes:

- Total metals - samples digested with nitric acid; Total available (acid soluble/ extractable) metals - samples acidified with nitric acid to pH <2;
Dissolved metals - samples filtered through 0.45µm cellulose acetate and then acidified with nitric acid prior to analysis
- Metals and salts analysed by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS).
- 1 mg/L (milligram per litre) = 1 ppm (part per million) = 1000 µg/L (micrograms per litre) = 1000 ppb (part per billion).
- For conductivity 1 dS/m = 1 mS/cm = 1000 µS/cm.
- Analysis performed according to APHA (2017) 'Standard Methods for the Examination of Water & Wastewater', 23rd Edition, except where stated otherwise.
- Analysis conducted between sample arrival date and reporting date.
- ** NATA accreditation does not cover the performance of this service.
- ... Denotes not requested.
- This report is not to be reproduced except in full.
- All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal or on request).
- Results relate only to the samples tested.
- This report was issued on 15/02/2023.



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APPENDIX E – WATER LICENCES

Information about a water licence or approval

Use this tool to search for information about water licences and approvals issued under the *Water Act 1912* or *Water Management Act 2000*.

Select the type of licence or approval and enter the licence or approval number:

- **Water access licence (WAL):** a WAL number starts with the letters 'WAL' followed by several numbers; a WAL also has a reference number that starts with a two digit number, followed by 'AL' and then several numbers.
- **1912 water licence:** a water licence number starts with a two digit number, followed by a two letter code and then several numbers. Note: a PT reference number cannot be entered.
- **Approval:** an approval number starts with a two digit number, followed by a two letter code (WA, UA, CA or FW) and then several numbers.

Search for information about either a:

🔍 **Water access licence (WAL) issued under the *Water Management Act 2000***

Water Access Licence (WAL) Number

WAL

21120

A WAL number starts with the letters 'WAL' followed by several numbers

Can't find your WAL number? Do you have a reference number? A reference number starts with a two digit number, followed by 'AL' and then several numbers. Use the following tool to find your WAL by entering your reference number. [Enter the reference number to find the WAL number.](#)

Notes:

The search results will list the conditions imposed on the water access licence. Any approved water supply work/s nominated on the water access licence are identified by the approval number/s for the work/s.

The information about a water access licence provided in the search results is a summary and may not always be up to date. If you require full and up to date details about a particular water access licence (including current holders, share and extraction component details, encumbrances

and notations) you should search the [Water Access Licence Register](#) administered by NSW Land Registry Services.

- ☐ [Water Act 1912 Licences and Authorities](#)
- ☐ [Approval issued under the Water Management Act 2000](#)

Find out if a **Water Act 1912** licence has been converted

- ☐ [Water licence conversion status](#)

[<< Previous](#)
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Search Results

Category [Subcategory]	Status	Water Source	Tenure Type	Management Zone	Share Components (units or ML)	IDEC (Daily flow share)
Aquifer (General Security)	Current	Peel Alluvium Water Source	Continuing	Peel Regulated River Alluvium Management Zone	480.00	N/A

Extraction Times or Rates

Subject to conditions water may be taken at any time or rate

Nominated Work Approval(s)

90CA814886

- Conditions

Plan Conditions

Water sharing **Namoi Alluvial Groundwater Sources 2020**

plan**Take of water**

- MW7024-00001 The maximum water account debit in a water year must not exceed the following:
- A. the sum of water allocations credited to the water allocation account from available water determinations in that water year, plus
 - B. the net amount of water allocations assigned to or from the water allocation account under a water allocation assignment in that water year, plus
 - C. any water allocations re-credited by the Minister to the water allocation account in that water year.
- MW6595-00001 Water allocations remaining in the water allocation account for this access licence must not be carried over from one water year to the next water year.

Monitoring and recording

- MW6977-00002 Until 1 December 2021, the following information must be recorded in the logbook for each period of time that water is taken:
- A. date, volume of water taken, start and end time when water was taken, and
 - B. the access licence number under which the water is taken, and
 - C. the approval number of the water supply work used to take the water, and
 - D. the purposes for which water is taken.
- This requirement does not apply if water is taken through a water supply work that has both an operational:
- E. meter that complies with Australian Standard AS 4747-Meters for non-urban water supply, and
 - F. data logger.
- MW6612-00001 A logbook used to record water take information must be retained for five (5) years from the last date recorded in the logbook.
- MW6979-00002 Until 1 December 2021, the volume of water taken in a water year must be recorded in the logbook at the end of each water year. The maximum volume of water permitted to be taken in that water year must also be recorded in the logbook.
- This requirement does not apply if water is taken through a water supply work that has both an operational:
- A. meter that complies with Australian Standard AS 4747 - Meters for non-urban water supply, and
 - B. data logger.

Reporting

MW6983-00003 A. Once the water access licence holder becomes aware of a breach of any condition on this water access licence, the water access licence holder must notify the Minister as soon as practicable.
B. If the initial notification was not in writing, written notice must be provided within seven days of becoming aware of the breach by emailing:
nrar.enquiries@nrar.nsw.gov.au

Other Conditions

NIL

Disclaimer: WaterNSW is making the information available on the understanding that it does not warrant that the information is suitable for any intended use. In using the information supplied, the user acknowledges that they are responsible for any deductions or conclusions arrived at from interpretation of the data.

Privacy: The information provided is limited to meet the requirements of section 57 of the *Privacy and Personal Information Act 1998*.

Exporting and printing: Search results show a maximum of 50 rows per page. Search results can only be printed page by page.

More information: Should you require further information or technical assistance, please submit your request to water.enquiries@waternsw.com.au or contact 1300 662 077

APPENDIX F – TRAFFIC IMPACT ASSESSMENT



Premise

ANGORA FEEDLOT PTY LTD

**Angora Cattle Feedlot Rannock Burn Road
at Rushes Creek, Tamworth**

TRAFFIC IMPACT ASSESSMENT

Report No: 223029_TIA_001

Rev: B

14 August 2023

TRAFFIC IMPACT ASSESSMENT
9,500 HEAD (7,240 SCU) ANGORA CATTLE
FEEDLOT

ANNABRAE - RANNOCK BURN ROAD, TAMWORTH

PREPARED FOR:
ANGORA FEEDLOT PTY LTD

AUGUST 2023



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Report Title:	<i>Traffic Impact Assessment</i>
Project:	<i>9,500 Head (7,240 SCU) Angora Cattle Feedlot</i>
Client:	<i>Angora Feedlot Pty Ltd</i>
Report Ref.:	<i>223029_TIA_001 Rev B</i>
Status:	<i>Final</i>
Issued:	<i>14 August 2023</i>

Premise Group Pty Ltd and the authors responsible for the preparation and compilation of this report declare that we do not have, nor expect to have a beneficial interest in the study area of this project and will not benefit from any of the recommendations outlined in this report.

The preparation of this report has been in accordance with the project brief provided by the client and has relied upon the information, data and results provided or collected from the sources and under the conditions outlined in the report.

All information contained within this report is prepared for the exclusive use of Angora Feedlot Pty Ltd to accompany this report for the land described herein and is not to be used for any other purpose or by any other person or entity. No reliance should be placed on the information contained in this report for any purposes apart from those stated therein.

Premise Group Pty Ltd accepts no responsibility for any loss, damage suffered or inconveniences arising from, any person or entity using the plans or information in this study for purposes other than those stated above.

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DRAWINGS

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PLATES

APPENDICES

APPENDIX A

SEARs No. 1696

APPENDIX B

Beef Feedlot – Feed, Manure & Traffic Calculator Prepared by AGDSA

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1.0 INTRODUCTION

1.1 BACKGROUND

Angora Feedlot Pty Ltd has operated an existing 1,000 head cattle feedlot on its property Annabrae at Rushes Creek between Gunnedah and Tamworth. The property contains numerous farm dams, internal tracks and roadways and infrastructure associated with the existing feedlot. The feedlot is known as the Angora cattle feedlot.

An application is being prepared to submit to Tamworth Regional Council for the approval for the expansion and operation of a feedlot with 9,500 head (7,240 SCU) capacity.

The expanded Angora cattle feedlot will comprise the following facilities:

- The existing cattle feedlot pens (1,000 SCU) will remain with a stocking density of 12.85m² per SCU.
- Expansion of the cattle feedlot with an additional 39 feedlot pens each with an area of 2,400m² with a stocking density of 15.0m² per SCU providing a total capacity of 6,240 SCU.
- The total capacity of the expanded feedlot lot will be 7,240 SCU.
- Cattle receival/dispatch yards.
- Manure composting and storage pads.
- Sedimentation and effluent holding ponds.
- Effluent reuse areas with terminal effluent ponds.

1.2 SITE LOCATION

The Angora feedlot is accessed from the Oxley Highway via its intersection with Rushes Creek Road and Rannock Burn Road. Rushes Creek Road is located approximately 29km east of Gunnedah and 47km west of Tamworth along the Oxley Highway.

The existing feedlot and its associated facilities are located on Lot 1 in DP842391 and Lots 19, 43, 44, 141 and 142 in DP752169 and comprises an area of approximately 293ha, excluding the area of Crown Roads within the property.

The property is bounded by Rannock Burn Road to the north and east, the Peel River to the south and Rushes Creek Road to the west.

Annabrae has a long history of agricultural production including grazing and cropping.

The locality of the Angora cattle feedlot is indicated on **Drawing TS01** included in the **Drawings** Section of this Report.

The approved plan for the existing 1,000 head Angora cattle feedlot is indicated **Drawing TS02** included in the **Drawings** Section of this Report.

1.3 TRAFFIC IMPACT STATEMENT

Schedule 3 of *State Environmental Planning Policy (Transport and Infrastructure) 2021* classifies developments based upon the potential to generate additional traffic onto the surrounding road network.

Developments listed in Schedule 3 of SEPP (Transport and Infrastructure) require referral to Transport for NSW (TfNSW) by the consent authority. The consent authority is required to take into consideration any submission that TfNSW provides in response to the notice of the development.

In addition, the consent authority must consider, pursuant to Clause 2.121 of SEPP (Transport and Infrastructure), the accessibility of the site and any potential traffic safety, road congestion or parking implications of the proposed development.

Whilst the feedlot is accessed via the Oxley Highway, the proposed expansion of the cattle feedlot is not classified in accordance with the requirements set out in Schedule 3 in SEPP (Transport and Infrastructure) 2021.

However, the Planning Secretary's Environmental Requirements (SEARs) No. 1696 dated 7 July 2022 outlined the requirements for the preparation of a Traffic Impact Assessment for the approval of the feedlot.

SEARs No. 1696 is attached at **Appendix A**.

The SEARs state the following with regards to Traffic and Transport:

- *Details of road transport routes and access to the site.*
- *Road traffic predictions for the development during construction and operation.*
- *An assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development.*

A letter dated 27 June 2022 from the Department of Primary Industries – Agriculture as appended to SEARs No. 1696 also stated the following with regards to Traffic Movements:

- *Detail the number, timing and route for traffic movements to the site. This is to take into account potential impacts on sensitive receptors (e.g., noise, dust, volume of traffic) including other agricultural land uses, and how these impacts will be mitigated.*

A Traffic Impact Assessment will be prepared to assess whether potential impacts may occur to traffic on the Oxley Highway, Rushes Creek Road and Rannock Burn Road due to the operation of the expanded Angora cattle feedlot.

This Traffic Impact Assessment will be prepared in accordance with the provisions in the SEARs to assist in the planning approval process for the development and will address the following issues:

- Existing traffic and roadway conditions including details of the access arrangements to the site.
- Potential impacts of construction activities including transport routes to and from the site.
- Potential impacts of the operation of the feedlot on the operation, safety and amenity of the surrounding road network.
- Mitigation measures to minimise potential impacts of the proposed development.

This Traffic Impact Assessment will be prepared in accordance with the requirements outlined in the SEARs dated 7 July 2022, NSW Roads and Traffic Authority's (RTA) *Guide to Traffic Generating Developments* and AUSTROADS *Guide to Traffic Management Part 12*.

The methodology for the preparation of the Traffic Impact Assessment is outlined in the following Section of the Report.

1.4 TRAFFIC IMPACT ASSESSMENT METHODOLOGY

In carrying out the preparation of this Traffic Impact Assessment for the Angora cattle feedlot, the following three (3) general broad issues are addressed as outlined below:

- (a) Existing Site and Traffic Conditions
 - Development location;
 - Road network surrounding the development site;
 - Existing site access;
 - Existing roadway capacity; and
 - Existing traffic flows
- (b) Proposed Development
 - Vehicular access to and from the site for construction and for the feedlot operation;
 - Connectivity to the surrounding road network.
- (c) Traffic Impact of the Proposed Development
 - Traffic generation from the proposed development;
 - Traffic distribution external to the development and access to and from the main roads servicing the development site;
 - Impact of the traffic generated from the development on existing traffic parameters for the surrounding road network; and
 - Local area traffic management.

The methodology to satisfactorily address all the relevant traffic issues for the proposed feedlot will require the following work tasks to be carried out:

1. Inspect the site and the surrounding road network to prepare a road inventory on the travel routes to and from the feedlot site for transport of cattle and associated feed for the feedlot.
2. Review all available background data, community concerns and traffic history relating to the area around the development site.
3. Determine the traffic generating potential of the operation of the proposed feedlot, calculation of peak hour and daily traffic volumes and the distribution of the generated traffic onto the Oxley Highway to determine post development traffic volumes on the road network.
4. Assessment of the impact of the traffic generated by the development of the proposed cattle feedlot on the surrounding road network. The traffic impact assessment will be carried out in terms of:
 - Road capacity;
 - Road safety;

- Intersection operation; and
- Access requirements.

In summary, this Traffic Impact Assessment will review the existing traffic movements on the road network surrounding the development site, the expected traffic volumes generated by the proposed cattle feedlot, the effect of the generated traffic on the surrounding road network and the determination of a safe and efficient means of providing access to the development to cater for the determined traffic volumes.

2.0 EXISTING TRAFFIC CONDITIONS

2.1 ROAD NETWORK HIERARCHY

The Roads and Traffic Authority (1984) proposes four basic road classes as the basis for the functional hierarchy of a road network.

A functional classification takes into account the relative balance of the traffic mobility function and amenity/access functions of streets and roads and defines the purpose of a road within the context of a road network.

The four road classes are arterial, sub-arterial, collector and local roads and are defined below.

- **Arterial Roads**

Roads whose main function is to carry through traffic from one region to another forming the principal means of communication for major traffic movements.

- **Sub-Arterial Roads**

Those roads which supplement the arterial roads in providing for through traffic movement to an individually determined limit that is sensitive to both roadway characteristics and adjoining land uses.

- **Collector Roads**

Roads that distribute traffic between the arterial roads and the local street system and provide access to adjoining property.

- **Local Roads**

Subdivisional roads whose main traffic function is to provide access to adjoining property.

An assessment of the classification of the roads surrounding and intended to be used by vehicle traffic generated by the cattle feedlot development is indicated in **Table 2.1**.

Table 2.1 Existing Road Classification

Road	Classification
Oxley Highway (B56)	Arterial Road
Rushes Creek Road	Local Road
Rannock Burn Road	Local Road

2.2 EXISTING ROADWAY CONDITIONS

The existing roadway configuration, conditions and intersection facilities on the road network providing access to the Angora cattle feedlot site are outlined in this Section of the Report.

Oxley Highway

The Oxley Highway (Road B56) is a major east west Highway connecting to the Pacific Highway (A1) just outside Port Macquarie in the east and to the Newell Highway (A39) just to the north of Coonabarabran in the west.

The Oxley Highway is a two way two lane roadway and comprises a standard highway configuration with bitumen sealed travel lanes a minimum of 3.5m wide with part bitumen sealed gravel shoulders. The roadway is centreline and edgeline marked and is speed limited at 100km/hr.

Along the section of the Oxley Highway between Gunnedah and Tamworth, a number of intersections with the Highway have turn lanes provided, there are overtaking lanes and off road truck parking areas.

The Oxley Highway is well regulated and provides a high level of service for all types of vehicles using the roadway.

Rushes Creek Road

Rushes Creek Road is a two way two lane roadway and comprises a variable bitumen seal width of 6m to 7m with minimal gravel shoulders. Several sections of the roadway have recently been resealed. The roadway is generally centreline marked with barrier lines as appropriate on horizontal curves and undulating roadway.

Rushes Creek Road crosses the Peel River over a bridge with approximately 600mm high side rails with a width between the rails of approximately 7m.

The road also crosses an unnamed creek with guardrails either side with a width between the rails of approximately 9m.

Rushes Creek Road connects from the Oxley Highway through to the town of Manilla.

Rannock Burn Road

Rannock Burn Road is a gravelled roadway and comprises a width of approximately 4m.

The roadway crosses an unnamed creek with a low level crossing with a pipe culvert beneath.

The roadway incorporates a set of gates (unlocked) with the gravel roadway continuing to (and through) the entry gates / cattle ramp to the Angora feedlot.

There are a number of large trees along the sides of Rannock Burn Way. The closest tree to the roadway is an offset of 3m from the edge of the roadway to the face of tree trunk with a number of other trees with offsets of 4m from the edge of the roadway to the face of the trunk.

Intersection of the Oxley Highway and Rushes Creek Road

The intersection of the Oxley Highway and Rushes Creek Road comprises a major channelised Tee intersection with facilities for left and right turning vehicles from the Oxley Highway into Rushes Creek Road.

For vehicles on the Oxley Highway travelling towards Tamworth, there is an Auxiliary Left Turn Lane (AUL) into Rushes Creek Road with a total length of 235m including a 100m taper.

For vehicles on the Oxley Highway travelling towards Gunnedah, there is a Channelised Right Turn (CHR) Lane into Rushes Creek Road with a total length of 140m including a 50m taper.

The length of the chevron providing the channelised right turn is 125m in length and the chevron past the intersection with Rushes Creek Road is 50m in length.

The Rushes Creek Road leg of the intersection is controlled with Give Way signage.

The entrance to the Moana poultry production farm is located off Rushes Creek Road approximately 120m from the intersection with the Oxley Highway. For the left turn out from the poultry farm, a short left turn lane is provided that merges back with Rushes Creek Road prior to the intersection with the Highway.

In addition, for vehicles travelling towards Gunnedah, just past the extents of the channelised intersection, an overtaking lane is provided.

The intersection of the Oxley Highway and Rushes Creek Road provides significant facilities for the safe operation of the intersection.

Intersection of Rushes Creek Road and Rannock Burn Road

The intersection of Rushes Creek Road and Rannock Burn Road comprises a Tee intersection with some flaring of the Rannock Burn Road leg of the intersection to improve the turnout of vehicles using the roadway.

There is no signage provided on the Rannock Burn Road leg of the intersection and it operates with the standard give way rules at intersections.

The intersection of Rushes Creek Road and Keepit Dam Road is offset to the intersection with Rannock Burn Road by approximately 40m.

Intersection of Rannock Burn Road and the Entry to the Angora Feedlot

The intersection of Rannock Burn Road and the entry to the Angora Feedlot comprises a cattle grid that provides entry to the extension of Rannock Burn Road and the Angora property.

Various photographs of the roads described in this Section are contained in the **Plates** Section of this Report.

2.3 EXISTING ROADWAY CAPACITY

The provision of roads within a road network provides four main functions:

- i) to cater for moving vehicles;
- ii) to cater for parked vehicles;
- iii) to cater for pedestrians and bicycle traffic; and
- iv) to allow for development and to provide access to adjoining property.

In carrying out the above functions, a road must also be capable of handling the traffic demands placed on it. Roads have varying capacities dependent on the function they are performing. The *AUSTROADS Guide to Traffic Management* defines capacity as follows:

“Capacity is the maximum sustainable hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, environmental, traffic and control conditions.”

The physical characteristics of a roadway such as lane width, alignment, frequency of intersections etc make up the prevailing roadway conditions.

Based upon its capacity and a driver’s expectations of the operational characteristics of a traffic stream is a qualitative measure denoted as the level of service of a road.

Level of service definitions combine such factors as speed, travel time, safety, convenience and traffic interruptions and fall into six levels of service categories ranging from A down to F.

The *AUSTROADS Guide to Traffic Management* describes Level of Service A as:

“A condition of a free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high and the general level of comfort and convenience provided is excellent.”

The *AUSTROADS Guide to Traffic Management* describes Level of Service B as:

“A condition of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is a little less than with Level of Service A”

The categories are graduated from Level of Service A down through six levels to Level of Service F that is a zone of forced flow. The amount of traffic approaching the point under consideration exceeds that which can pass it. Flow breakdowns occur and queuing and delays result.

Based on the physical configurations of the surrounding road network, observations of traffic movements and the methodology outlined in Part 3 of *AUSTROADS Guide to Traffic Management*, the capacity and Level of Service of the surrounding roads can be determined as indicated in **Table 2.2**.

Table 2.2 Roadway Capacity and Level of Service

Road	Level of Service	Two Way Hourly Capacity
Oxley Highway (B56)	Level of Service B	1,800 vehicles per hour
Rushes Creek Road	Level of Service B	900 vehicles per hour
Rannock Burn Road	Level of Service B	300 vehicles per hour

2.4 ANNUAL AVERAGE DAILY TRAFFIC

Annual Average Daily Traffic (AADT) is defined as the total volume of traffic passing a roadside observation point over a period of a year divided by the number of days in the year.

The TfNSW Traffic Volume Viewer was referenced to determine available traffic volumes on the Oxley Highway in the vicinity of the access to the Angora cattle feedlot.

The TfNSW recording stations on the Oxley Highway that are applicable to the feedlot site are:

- Recording Station ID 6167 Oxley Highway, 1.45km east of Wilkinson Road, Gunnedah.

- Recording Station ID 92046 Oxley Highway, 1.87km east of Breeza Street, Carroll (note, this station only recorded westbound traffic volumes in 2011).
- Recording Station ID 6194 Oxley Highway, 530m north of Bective Reserve Road.
- Recording Station ID 6168 Oxley Highway, 380m south of Bowlers Lane, Westdale.

With the exception of Recording Station ID 92046, each of the three (3) other Recording Stations have available data back to 2015. Based on a single 2011 recording of westbound traffic only, Recording Station ID 92046 will not be considered further.

The traffic volume data sourced from the TfNSW Traffic Volume Viewer for the years 2020 to 2023 is summarised in **Table 2.3**.

Table 2.3 TfNSW Traffic Volume Viewer Available AADT

Road	Recording Station	Year	AADT	% Heavy Vehicles
Oxley Highway	ID 6167	2020	3,315 veh/day	19%
Oxley Highway	ID 6167	2021	3,536 veh/day	19%
Oxley Highway	ID 6167	2022	3,763 veh/day	20%
Oxley Highway	ID 6167	2023	3,822 veh/day	21%
Oxley Highway	ID 6194	2020	3,105 veh/day	20%
Oxley Highway	ID 6194	2021	3,186 veh/day	22%
Oxley Highway	ID 6194	2022	3,446 veh/day	22%
Oxley Highway	ID 6194	2023	3,565 veh/day	23%
Oxley Highway	ID 6168	2020	3,231 veh/day	22%
Oxley Highway	ID 6168	2021	3,447 veh/day	23%
Oxley Highway	ID 6168	2022	3,449 veh/day	23%
Oxley Highway	ID 6168	2023	3,339 veh/day	23%

Source: TfNSW Traffic Volume Viewer

The available traffic data for the Oxley Highway at Recording Stations ID 6167 and ID 6194 have relevance for the preparation of this Report as it is expected that traffic generated by the expansion of the Angora Feedlot will travel from both east and west of the Oxley Highway intersection with Rushes Creek Road.

Whilst traffic data is available for 2023 at both locations, the traffic data will need to be extrapolated to estimate the 2025 traffic on the Oxley Highway. The year 2025 will be used for comparison purposes as this may be the first full years operation of the cattle feedlot following the approval process and then the construction and stocking and full time operation of the facility.

The available traffic data will be extrapolated to estimate the 2025 traffic data by the application of a growth factor to take into account the natural growth in traffic that occurs over time on roads.

Based on the traffic data, an average natural growth factor of 2% per annum will be assumed to inflate traffic volumes on the Oxley Highway.

The estimated 2025 AADT on the Oxley Highway at the two (2) Recording Stations together with the estimated passenger vehicles and heavy vehicles at each location is indicated in **Table 2.4**. An average allowance of 20% heavy vehicles has also been made.

Table 2.4 Estimated 2025 AADT

Oxley Highway Station ID	Recorded 2023 AADT (Year)	Estimated 2025 AADT
Recording Station ID 6167	3,822 veh/day	3,976 veh/day
80% Passenger Vehicles	3,058 veh/day	3,181 veh/day
20% Heavy Vehicles	764 veh/day	795 veh/day
TOTALS	3,822 veh/day	3,976 veh/day
Recording Station ID 6194	3,565 veh/day	3,709 veh/day
80% Passenger Vehicles	2,852 veh/day	2,967 veh/day
20% Heavy Vehicles	713 veh/day	742 veh/day
TOTALS	3,565 veh/day	3,709 veh/day

2.5 PEAK HOUR TRAFFIC

Peak hour traffic data is not available for the roads surrounding the proposed cattle feedlot site. However, an accepted TfNSW procedure used to estimate peak hour traffic volume on roads from AADT data is to take the peak hour as 15% of AADT data.

On this basis, the 2025 peak hour traffic on the Oxley Highway can be estimated as:

- Oxley Highway, 1.45km east of Wilkinson Road, Gunnedah: 596 veh/hour
- Oxley Highway, 530m north of Bective Reserve Road: 556 veh/hour

2.5.1 Rushes Creek Road

Whilst Rushes Creek Road provides access to Keepit Dam and to the town of Manilla, there is no traffic data available for this road.

It should be noted that Rushes Creek Road is not the direct route to Manilla particularly for traffic in or close to Tamworth as the direct route to and from Tamworth is via the Manilla Road.

The recreational facilities at Keepit Dam would be expected to generate traffic in holiday and seasonal periods, however, it would not be expected that this type of traffic would impact on the potential peak hour traffic generated by the Angora feedlot.

3.0 TRAFFIC IMPACT OF THE PROPOSED CATTLE FEEDLOT

3.1 PROPOSED CATTLE FEEDLOT

Angora Feedlot Pty Ltd has operated an existing 1,000 head cattle feedlot on its property Annabrae at Rushes Creek between Gunnedah and Tamworth. The property contains numerous farm dams, internal tracks and roadways and infrastructure associated with the existing feedlot.

An application is being prepared to submit to Tamworth Regional Council for the approval for the expansion and operation of a feedlot with 9,500 head (7,240 SCU) capacity.

The expanded Angora cattle feedlot will comprise the following facilities:

- The existing cattle feedlot pens (1,000 SCU) will remain with a stocking density of 12.85m² per SCU.
- Expansion of the cattle feedlot with an additional 39 feedlot pens each with an area of 2,400m² with a stocking density of 15.0m² per SCU providing a total capacity of 6,240 SCU.
- The total capacity of the expanded feedlot lot will be 7,240 SCU.
- Cattle receival/dispatch yards.
- Manure composting and storage pads.
- Sedimentation and effluent holding ponds.
- Effluent reuse areas with terminal effluent ponds.

The general layout of the expanded Angora cattle feedlot is indicated on **Drawing TS03** in the **Drawings** Section of this Report.

3.2 TRAFFIC GENERATION FROM THE FEEDLOT

Information provided by the proponent indicates that the yearly truck generation from the various activities carried out at the expanded cattle feedlot are summarised in **Table 3.1**. The data provided by the proponent as prepared by AGDSA is attached in **Appendix B**.

Table 3.1 Cattle Feedlot Truck Generation

Item	Description	Number	Truck Generation
Incoming Cattle	Cattle (head per year)	39,655 head	
	Typical Truck Type	B Doubles	
	Truck Capacity (head per truck)	96 / 81 head	
	Trucks (vehicles per year)	426 trucks	426 trucks
Outgoing Cattle	Cattle (head per year)	39,338 head	
	Typical Truck Type	B Doubles	
	Truck Capacity (head per truck)	78 / 60 head	
	Trucks (vehicles per year)	531 trucks	531 trucks

Table 3.1 Cattle Feedlot Truck Generation

Item	Description	Number	Truck Generation
Feedstuffs	Grain imported from outside sources (tonnes per year)	28,100 tonnes 781 trucks	
	Roughage imported from outside sources (tonnes per year)	5,995 tonnes 167 trucks	
	Liquid + Supplements imported from outside sources (tonnes per year)	3,372 tonnes 140 trucks	
	Typical Truck Type	B Doubles / Semis	
	Trucks (vehicles per year)	948 B Double trucks 140 semi-trailer trucks	1,088 trucks
Outgoing Manure	Manure Exported (tonnes per year)	3,651 tonnes	
	Typical Truck Type	Semi-Trailer Trucks	
	Trucks (vehicles per year)	152 trucks	152 trucks
Total Annual Trucks			2,197 trucks per year
Weekly Trucks (50 weeks)			44 trucks per week
Daily Trucks (6 days)			8 trucks per day

In addition to the trucks generated by the operation of the cattle feedlot, light passenger vehicles will also be generated for minor deliveries or for errands during the day. It is expected that 6 vehicles per day could be generated for these purposes.

The feedlot staff comprise 6 on farm employees and 6 employees from off farm. As a worst case, off farm employees will arrive and depart the feedlot in individual vehicles

The total daily vehicle generation by the proposed cattle feedlot is summarised below:

Daily Trucks	8 Trucks per day
Passenger Vehicles	12 Vehicles per day

The total daily trip generation by the proposed cattle feedlot (vehicle arrives and departs during a day) is summarised below:

Daily Trucks	16 trips per day
Daily Passenger Vehicles	24 trips per day
Total	40 trips per day

Given the relatively low numbers of trucks generated per day by the feedlot, it is not expected that there will be a definable peak hour. However, employees arriving from off farm may constitute a peak hour, therefore, as a worst case scenario, the peak hour traffic generation for the cattle feedlot equating to the arrival and departure of a truck and 6 passenger vehicles can be estimated as set out below:

Peak Hour Trucks	2 trips per hour
Peak Hour Passenger Vehicles	6 trips per hour
Total	8 trips per hour

It should be noted that the existing Angora 1,000 head feed lot currently generates truck and passenger vehicles associated with its current operations. The estimated traffic generation of 40 trips per day and 8 trips per hour will be assessed as for a new feedlot, however, this is a worst case scenario as the existing feed lot operation already generates a proportion of these traffic volumes.

3.3 TRAFFIC DISTRIBUTION

Trucks and passenger vehicles associated with the operation of the expanded Angora feedlot will travel via Rushes Creek Road to and from Manilla and from the Oxley Highway, either to and from Gunnedah or to and from Tamworth.

Information provided by the proponent indicates the following distribution of generated traffic:

Incoming Cattle

- From Manilla: 15.0%
- From Tamworth: 42.5%
- From Gunnedah: 42.5%

Finished Cattle

- To Manilla: 30.0%
- To Tamworth: 10.0%
- To Gunnedah: 60.0%

Feed Supplies

- From Manilla: 5.0%
- From Gunnedah: 95.0%

Employee Passenger Vehicles

- From Manilla: 4 vehicles
- From Tamworth: 1 vehicle
- From Gunnedah: 1 vehicle

Based on the percentages indicated above, the traffic generated by the Angora feedlot is summarised in **Table 3.2**.

Table 3.2 Angora Feedlot Annual Traffic Distribution

Feedlot Component	Annual Vehicles	Percentage Distribution	Manilla	Gunnedah	Tamworth
Incoming Cattle	426 trucks	15 : 42.5 : 42.5	64	181	181
Outgoing Cattle	531 trucks	30 : 60 : 10	159	319	53
Feedstuffs	1,088 trucks	5 : 95 : 0	54	1,034	0
Outgoing Manure	152 trucks	50 : 25 : 25	76	38	38
Passenger Vehicles	3,600 vehicles	68 : 16 : 16	2,448	576	576
TOTALS	5,797 vehicles		2,801 vehicles	2,148 vehicles	848 vehicles

Based on the annual vehicle generation to and from the directions indicated in **Table 3.2**, the daily traffic distribution (50 weeks, 6 days per week) is summarised below:

Daily Distribution:

- To and from Manilla: 9.0 veh/day
- To and from Gunnedah: 7.0 veh/day
- To and from Tamworth: 3.0 veh/day

Each individual truck and passenger vehicle generates 2 trips for its arrival and departure and based on the vehicle numbers above, the trips generated by the feedlot are set out as follows:

Daily Trip Distribution

- To and from Manilla: 18.0 trips/day
- To and from Gunnedah: 14.0 trips/day
- To and from Tamworth: 6.0 trips/day

3.4 IMPACT OF THE GENERATED TRAFFIC FROM THE FEEDLOT

The impact of the traffic generated by the expansion of the Angora cattle feedlot on the surrounding road network will be assessed in terms of:

- i) Traffic Volume;
- ii) Site Access; and
- iii) Road Safety.

3.4.1 Traffic Volumes

The traffic generated by the operation of the expansion of the Angora cattle feedlot will impact on the Oxley Highway and in particular on the Highway to and from Gunnedah and to and from Tamworth.

A comparison of the estimated 2025 traffic volumes at the two (2) recording station locations on the Oxley Highway and following the operation of the feedlot will be assessed for both the daily traffic and peak hour traffic volumes with the heavy vehicle trips and the light passenger trips combined.

An assessment of the feedlot operation traffic volumes is indicated in **Table 3.3**.

Table 3.3 Comparison of the Estimated 2025 and Feedlot Operation Traffic Volumes

Oxley Highway	Estimated 2025 Traffic Volume	Including Feedlot Operation Traffic Volume	Percentage Increase
Station ID 6167 (To and from Gunnedah)			
Daily Traffic Volume	3,976 veh/day	3,990 veh/day	0.4%
Peak Hour Traffic	596 veh/hour	602 veh/hr	1.0%
Station ID 6194 (To and from Tamworth)			
Daily Traffic Volume	3,709 veh/day	3,715 veh/day	0.2%
Peak Hour Traffic	556 veh/hour	558 veh/hr	0.4%

Following the increased operation of the feedlot, the maximum increase in the daily traffic volume on the Oxley Highway is 0.4% (to and from Gunnedah). The increase in the daily traffic volume on the Oxley Highway not significant.

The maximum increase in peak hour traffic is 1.0% (to and from Gunnedah) and again the increase in peak hour traffic volume on the Oxley Highway is not significant.

Based on the roadway capacities determined in **Section 2.3** of this Traffic Impact Statement, a comparison of the post development peak hour traffic volume and the actual roadway capacity can be determined.

The Operational Capacity of a road is the percentage of actual volume capacity that the road is functioning at.

For the Oxley Highway, the roadway capacity at a Level of Service B is 1,800 veh/hour. The maximum post development peak hour volume on the Highway is at Station ID 6167 (to and from Gunnedah) at 602 veh/hour. Therefore, the Operational Capacity of the Oxley Highway can be determined as 33%

The Oxley Highway is operating well below the Operational Capacity of the roadway at a Level of Service B and the impact of the traffic generated by the expanded operation of the Angora feedlot is not significant in terms of the volume of existing and post development peak hour traffic using the Oxley Highway.

Whilst there is no traffic data available for Rushes Creek Road, the peak hour traffic volume on the road could not exceed the traffic recorded at either Station ID 6167 (to and from Gunnedah) or Station ID 6194 (to and from Tamworth) on the Oxley Highway. The roadway capacity of Rushes Creek Road at a Level of Service B is 900 veh/hour. As the Operational Capacity determined for the Oxley Highway is 33%, it is not expected that the Operational Capacity of Rushes Creek Road would exceed that on the Oxley Highway.

3.4.2 Cattle Feedlot Access

The Angora cattle feedlot is accessed from the Oxley Highway and its intersection with Rushes Creek Road and then via Rannock Burn Road.

As outlined in **Section 2.2** of this Report, the intersection of the Oxley Highway and Rushes Creek Road comprises a major channelised Tee intersection with facilities for left and right turning vehicles from the Oxley Highway into Rushes Creek Road.

For vehicles on the Oxley Highway travelling towards Tamworth, there is an Auxiliary Left Turn (AUL) lane into Rushes Creek Road with a total length of 235m including a 100m taper.

For vehicles on the Oxley Highway travelling towards Gunnedah, there is a Channelised Right Turn (CHR) lane into Rushes Creek Road with a total length of 140m including a 50m taper.

The length of the chevron providing the channelised right turn is 125m in length and the chevron past the intersection with Rushes Creek Road is 50m in length.

The Rushes Creek Road leg of the intersection is controlled with Give Way signage.

Rushes Creek Road is a two way two lane roadway and comprises a variable bitumen seal width of 6m to 7m with minimal gravel shoulders. Several sections of the roadway have recently been resealed. The roadway is generally centreline marked with barrier lines as appropriate on horizontal curves and undulating roadway.

The intersection of Rushes Creek Road and Rannock Burn Road comprises a Tee intersection with some flaring of the Rannock Burn Road leg of the intersection to improve the turnout of vehicles using the roadway.

Rannock Burn Road is a gravelled roadway and comprises a width of approximately 4m.

The roadway crosses an unnamed creek with a low level crossing with a pipe culvert beneath.

The Oxley Highway, the intersection of the Oxley Highway and Rushes Creek Road and Rushes Creek Road provide safe and efficient access for vehicles travelling to and from the direction of the Angora feedlot.

However, Rannock Burn Road does not provide for the two way operation of vehicles either accessing the Angora feedlot or other properties accessed along the road. Rannock Burn Road will require upgrading associated with the expansion of the Angora feedlot.

Upgrading requirements for Rannock Burn Road will be outlined in the following Section of this Report.

3.4.3 Road Upgrades and Traffic Management

The Oxley Highway, the intersection of the Oxley Highway and Rushes Creek Road and Rushes Creek Road provide safe and efficient access for vehicles travelling to and from the direction of the Angora feedlot.

However, Rannock Burn Road is a gravelled roadway and comprises a width of approximately 4m. The roadway crosses an unnamed creek with a low level crossing with a pipe culvert beneath.

There are a number of large trees along the sides of Rannock Burn Way. The closest tree to the roadway is an offset of 3m from the edge of the roadway to the face of tree trunk with a number of other trees with offsets of 4m from the edge of the roadway to the face of the trunk.

Rannock Burn Road will require upgrading to cater for the vehicles generated by the development of the cattle feedlot. The recommended upgrades to the roadway include:

- The gravelled roadway will need to be widened to a minimum of 6.0m to allow two way operation for vehicles travelling on the roadway.
- A tabledrain should be included (1m wide) each side of the roadway to improve drainage. The disturbance of vegetation for the construction of the tabledrain should be minimised.
- The widened section of the roadway shall be constructed from the intersection with Rushes Creek Road through to the entry gates / cattle ramp into to the Angora feedlot.
- The low level crossing of the unnamed creek should be maintained as a single lane crossing. A Give Way sign should be installed on one approach to the creek crossing to control the operation of vehicles on the single lane crossing of the creek.
- Where Rannock Burn Road is to be widened, the gravel roadway should be resheeted to improve the shape and strength of the road pavement.
- The flaring of the intersection of Rannock Burn Road onto Rushes Creek Road shall be widened to accommodate the swept paths of semitrailers without vehicles crossing onto the opposite side of Rushes Creek Road.
- The initial 50m of Rannock Burn Road (including the widened flaring onto Rushes Creek Road) should be bitumen sealed to minimise the dust and gravel brought onto Rushes Creek Road.
- All works should be carried out to the approval and appropriate standards of Tamworth Regional Council.

3.4.4 Traffic Impact Summary

The impact of the traffic generated by the expansion of the Angora cattle feedlot on the surrounding road network has been assessed in terms of:

- i) Traffic Volume;
- ii) Site Access; and
- iii) Road Safety.

Following the increased operation of the feedlot, the maximum increase in the daily traffic volume on the Oxley Highway is 0.4% (to and from Gunnedah). The increase in the daily traffic volume on the Oxley Highway not significant.

The maximum increase in peak hour traffic is 1.0% (to and from Gunnedah) and again the increase in peak hour traffic volume on the Oxley Highway is not significant.

The maximum post development peak hour volume on the Highway is at Station ID 6167 (to and from Gunnedah) at 602 veh/hour. Therefore, the Operational Capacity of the Oxley Highway can be determined as 33%

The Oxley Highway is operating well below the Operational Capacity of the roadway at a Level of Service B and the impact of the traffic generated by the expanded operation of the Angora feedlot is not significant in terms of the volume of existing and post development peak hour traffic using the Oxley Highway.

The Oxley Highway, the intersection of the Oxley Highway and Rushes Creek Road and Rushes Creek Road provide safe and efficient access for vehicles travelling to and from the direction of the Angora feedlot.

However, Rannock Burn Road does not provide for the two way operation of vehicles either accessing the Angora feedlot or other properties accessed along the road. Rannock Burn Road will require upgrading associated with the expansion of the Angora feedlot as set out in **Section 3.4.3** of this Report.

4.0 CONCLUSIONS

Angora Feedlot Pty Ltd has operated an existing 1,000 head cattle feedlot on its property Annabrae at Rushes Creek between Gunnedah and Tamworth.

An application is being prepared to submit to Tamworth Regional Council for the approval for the expansion and operation of a feedlot with 9,500 head (7,240 SCU) capacity.

The operation of the expanded feedlot will generate an estimated 40 trips per day and up to 8 trips per hour in an expected peak hour. This is a worst case scenario as the existing 1,000 head feedlot already generates a proportion of these traffic volumes.

The traffic generated by the operation of the feedlot will have minimal impact on Rushes Creek Road and the Oxley Highway and the functional classification of these roads will not change.

Whilst there are recommendations in this Report for the upgrading of Rannock Burn Road, the functional classification of this road will also not change due to the operation of the feedlot.

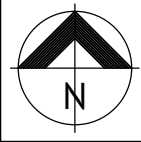
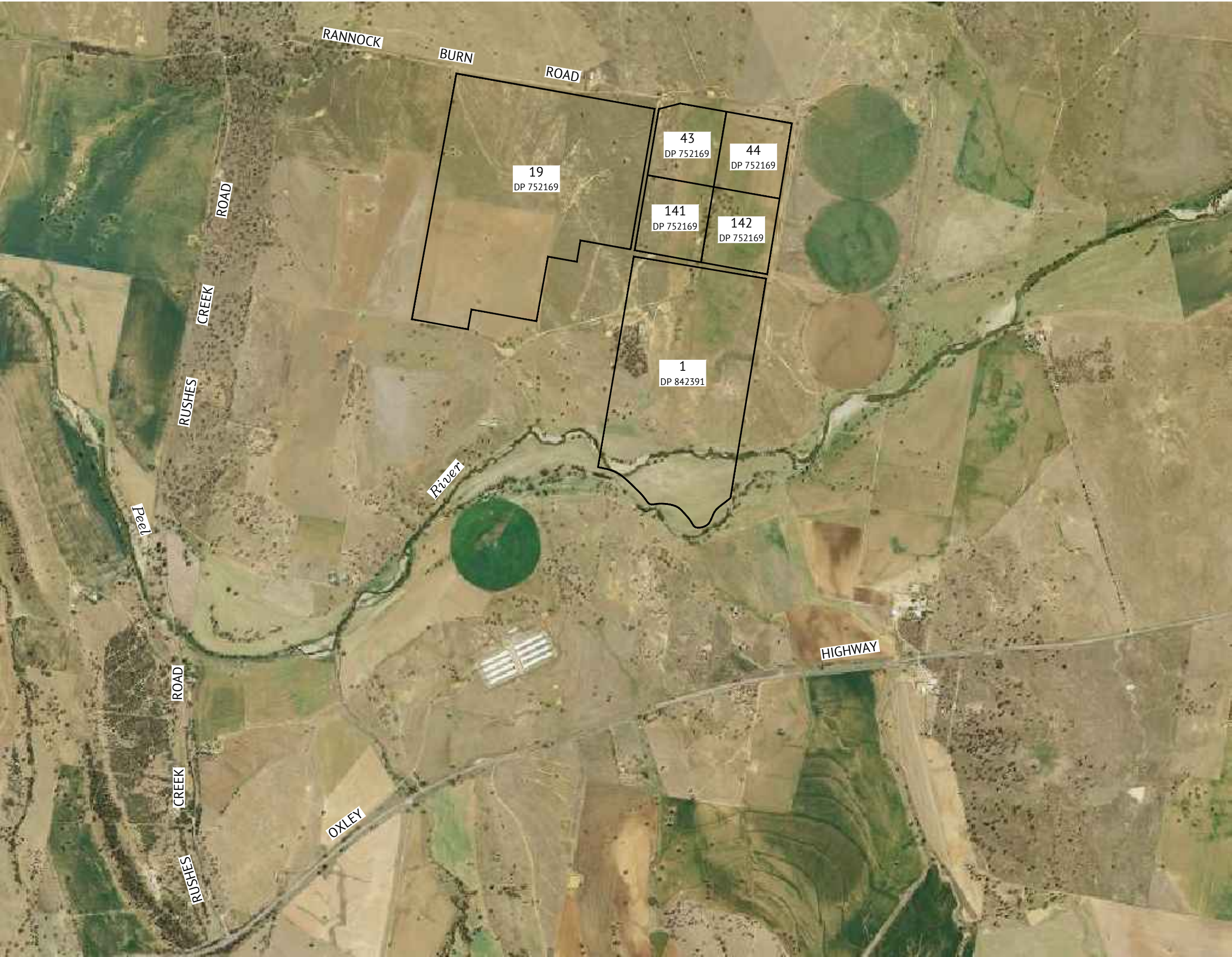
For the vehicles associated with the operation of the expanded Angora feedlot, the existing intersection facilities on the Oxley Highway (AUL and CHR turning lanes) provide safe access for the heavy and passenger vehicles using Rushes Creek Road for access to and from the feedlot.

This Traffic Impact Statement has assessed the existing traffic movements on the Oxley Highway providing access to the cattle feedlot site, the expected traffic volumes generated by the expanded operation of the feedlot, the effect of the generated traffic on the road network and has determined that the existing intersection facilities on the Oxley Highway provide a safe and efficient means of providing access to the feedlot to cater for the operational traffic volumes.

The recommendations for the upgrade of Rannock Burn Road are outlined in **Section 3.4.3** of this Report.

The implementation of the recommendations of this Traffic Impact Statement during the approval and development of the expanded Angora cattle feedlot will see the operation of the facility with minimal impact on the surrounding road network.

Drawings



ISSUED FOR REPORT

11/08/2023	A	ISSUED FOR REPORT	JE	SIH
DATE	REV	DESCRIPTION	REC	APP
REVISIONS				



DUBBO OFFICE
1ST FLOOR
62 WINGWARRA STREET
DUBBO, NSW 2830
PH: (02) 6887 4500
WEB: www.premise.com.au

SURVEYED	11/08/2023
STEPHEN J HOYNES	
CHECKED	
STEPHEN J HOYNES	
PROJECT MANAGER	
STEPHEN J HOYNES	
ENGINEERING CERTIFICATION	
STEPHEN J HOYNES	

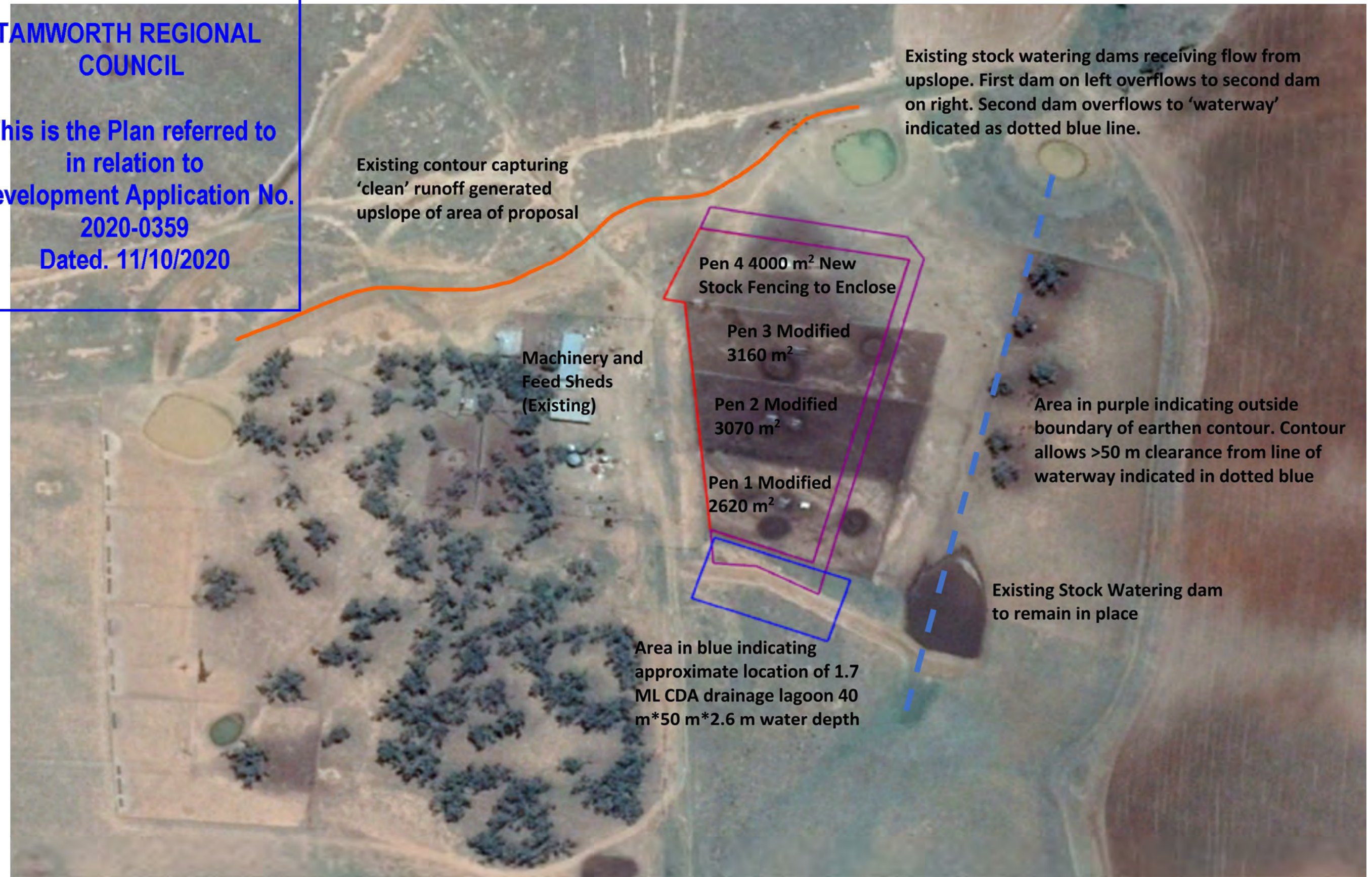
SCALE
NOT TO SCALE
ORIGINAL SHEET SIZE A1

CLIENT	AGDSA
PROJECT	ANGORA FEEDLOT
LOCATION	RANNOCK BURN ROAD, TAMWORTH
SHEET TITLE	SITE LOCALITY

JOB CODE	223029_01
SHEET NUMBER	TS01
REV	A

TAMWORTH REGIONAL
COUNCIL

This is the Plan referred to
in relation to
Development Application No.
2020-0359
Dated. 11/10/2020



DATE: 34/07

SHEET: 1/1

DRAWN: RS

ISSUE: 2

**'ANNABRAE' PROPOSED SMALL
SCALE FEEDLOT**

CONTINUUM ERS

ISSUED FOR REPORT

DATE	REV	DESCRIPTION	REVISIONS
11/08/2023	A	ISSUED FOR REPORT	



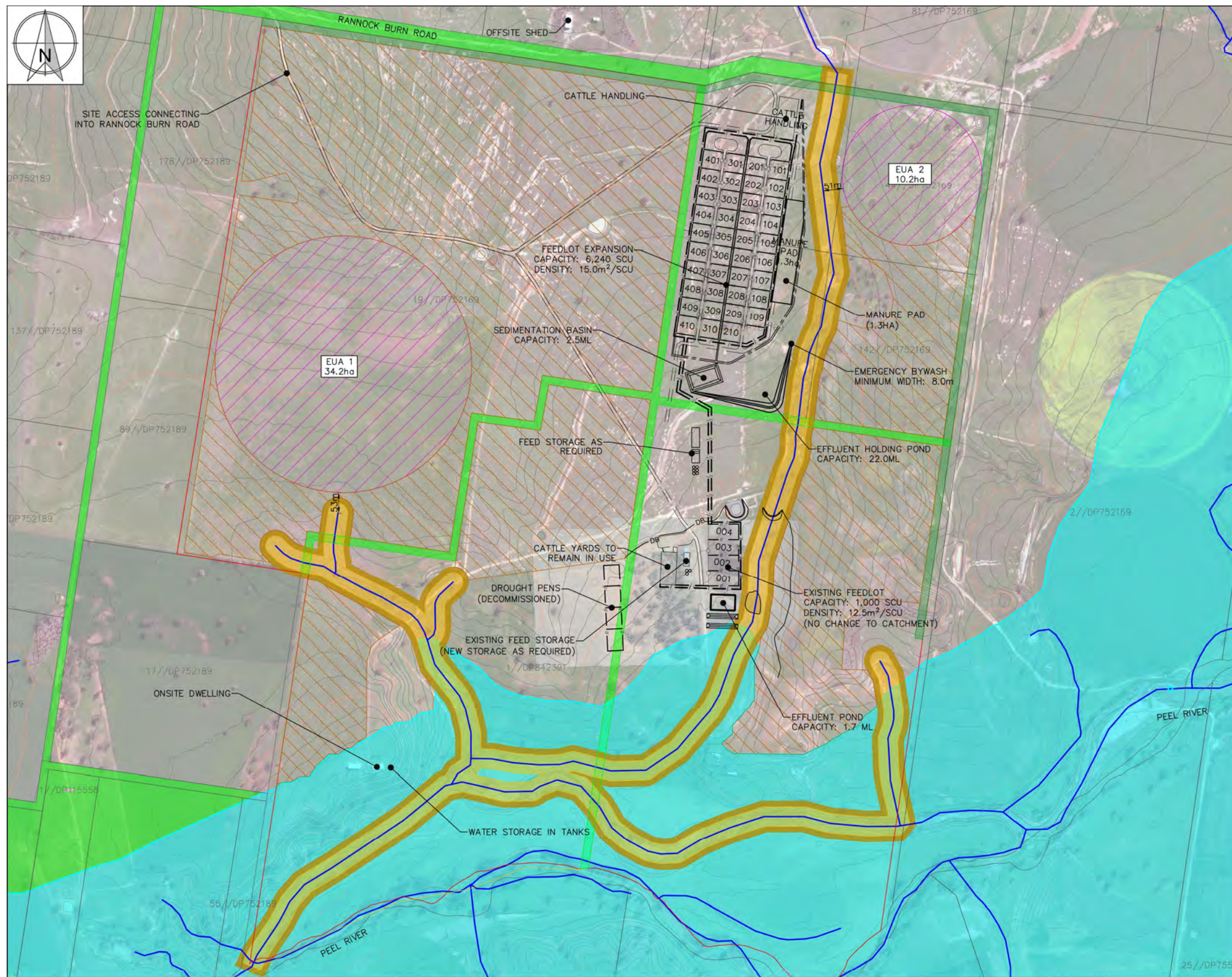
DUBBO OFFICE
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WEB: www.premise.com.au

SURVEYED
STEPHEN J HOYNES
CHECKED
STEPHEN J HOYNES
PROJECT MANAGER
STEPHEN J HOYNES
ENGINEERING CERTIFICATION
11/08/2023
STEPHEN J HOYNES

SCALE
NOT TO SCALE
ORIGINAL SHEET SIZE A1

CLIENT
AGDSA
PROJECT
ANGORA FEEDLOT
LOCATION
RANNOCK BURN ROAD, TAMWORTH
SHEET TITLE
APPROVED 1,000 HEAD ANGORA FEEDLOT

JOB CODE
223029_01
SHEET NUMBER
TS02
REV
A




LEGEND	
	PROPERTY BOUNDARY
	CADASTRAL BOUNDARY
	CONTOUR EXISTING (5.0m INTERVAL)
	CROWN ROAD EASEMENT
	BUFFER (DRAINAGE LINE - 25m)
	BUFFER (DRAINAGE LINE - 40m)
	MAPPED STREAM ORDER
	EFFLUENT REUSE AREA (44.4 HA)
	MANURE REUSE AREA (154.4 HA)
	VEGETATION SCREEN
	PEN FENCE
	CATTLE LANE
	FEED BUNK
	EFFLUENT DRAIN
	FEED ROAD
	COMMODITY ROAD
	CLEAN WATER DIVERSION BANK
	TRC FLOOD MODELLING

- NOTES:**
- AERIAL IMAGE SOURCED THROUGH AUTOCAD MICROSOFT BING MAPPING. IMAGE ACCESS 07/10/2021, IMAGE DATE UNKNOWN.
 - CADASTRAL BOUNDARIES & WATERCOURSE DATA LAYERS HAVE BEEN SOURCED FROM THE SEED PORTAL. DATA EXTRACTED 28/09/2021.
 - EXISTING CONTOUR DATA OBTAINED FROM THE ELVIS PLATFORM OF PUBLICLY AVAILABLE LIDAR.
 - FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
 - THE EXISTING FEEDLOT HAS A CAPACITY OF 1,000 HEAD AT A STOCKING DENSITY OF 12.85m²/HEAD
 - THERE IS TO BE NO CHANGE TO THE CONTROLLED DRAINAGE AREA (CDA) OF THE EXISTING FACILITY.
 - EFFLUENT MANAGEMENT
7.1. SEDIMENT BASIN: 2.5ML
7.2. EFFLUENT POND: 22.0ML
 - FLOOD INUNDATION AREA SOURCED FROM TAMWORTH REGIONAL COUNCIL (TRC) DEVELOPMENT CONTROL PLAN 2010-FLOOD AFFECTED LAND SHEET 6 OF 25.

SITE EXPANSION:	
1. EXISTING FEEDLOT:	1,000 SCU @ 12.85m ² /SCU
2. ROW 1:	1,440 SCU @ 15.0m ² /SCU
3. ROW 2:	1,600 SCU @ 15.0m ² /SCU
4. ROW 3:	1,600 SCU @ 15.0m ² /SCU
5. ROW 5:	1,600 SCU @ 15.0m ² /SCU
6. COMBINED	7,240 SCU @ 14.7m ² /SCU

DESIGN: PENS	
1. STOCKING DENSITY	= 15.0 m ² /SCU
2. BUNK SPACE	= 313 mm/SCU
3. PENS 48.0 (W) x 50.0m (L)	= 2,400 m ² /PEN
4. INDIVIDUAL PEN CAPACITY	= 160 SCU

CLIENT ANGORA FEEDLOT PTY LTD PROJECT ANGORA FEEDLOT EXPANSION LOCATION RANNOCK BURN ROAD, RUSHES CREEK NSW 2346 SHEET TITLE PROPERTY PLAN - 6240 NORTH (AERIAL IMAGERY)	 AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA PO BOX 292 TOOWOOMBA QLD 4350 PH: +61 418 446 245 E: contact@agdsa.com.au	SCALE 0 100 200 300m SCALE 1:5,000 (A1) 1:10,000 (A3)	ANGORA FEEDLOT PTY LTD	DESIGNED TJS	FOR APPROVAL ONLY		JOB CODE BTC-001
				CHECKED MRN			SHEET NUMBER A401
				PROJECT MANAGER MRN	14/08/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY
					DATE	REV	DESCRIPTION

ISSUED FOR REPORT					 DUBBO OFFICE 1ST FLOOR 62 WINGEWARRA STREET DUBBO, NSW 2830 PH: (02) 6887 4500 WEB: www.premise.com.au	<div>SURVEYED STEPHEN J HOYNES</div> <div>CHECKED STEPHEN J HOYNES</div> <div>PROJECT MANAGER STEPHEN J HOYNES</div> <div>ENGINEERING CERTIFICATION</div> <div>11/08/2023</div>	SCALE NOT TO SCALE ORIGINAL SHEET SIZE A1	CLIENT AGDSA		JOB CODE 223029_01	
								PROJECT ANGORA FEEDLOT	LOCATION RANNOCK BURN ROAD, TAMWORTH	SHEET NUMBER TS03	REV A
								SHEET TITLE GENERAL LAYOUT OF THE EXPANDED ANGORA FEEDLOT			
11/08/2023	A	ISSUED FOR REPORT			JE	SIH					
DATE	REV	DESCRIPTION			REC	APP					
REVISIONS											

Plates



Plate 1: Intersection of Rushes Creek Road and Rannock Burn Road.



Plate 2: Rushes Creek Road at the Intersection with Rannock Burn Road.



Plate 3: Signage at the Intersection of Rushes Creek Road and Keepit Dam Road.



Plate 4: Intersection of Rushes Creek Road and Keepit Dam Road.



Plate 5: Rannock Burn Road Viewed Towards the Intersection of Rushes Creek Road.



Plate 6: General Alignment of Rannock Burn Road.



Plate 7: General Alignment of Rannock Burn Road.



Plate 8: General Alignment of Rannock Burn Road.



Plate 9: General Alignment of Rannock Burn Road.



Plate 10: Creek Crossing on Rannock Burn Road.



Plate 11: Opposite view of Creek Crossing on Rannock Burn Road



Plate 12: Pipe Culvert in the Creek Crossing on Rannock Burn Road.



Plate 13: Gates (unlocked Across Rannock Burn Road.



Plate 14: General Alignment of Rannock Burn Road.



Plate 15: Cattle Ramp at Entry to the Angora Feedlot.



Plate 16: Signage at the Entry to the Angora Feeldlot.



Plate 17: General Alignment of Rannock Burn Road.



Plate 18: General Alignment of Rushes Creek Road.



Plate 19: General Alignment of Rushes Creek Road at the Approach to the Unnamed Creek Crossing.



Plate 20: Rashes Creek Road at the Crossing of the Unnamed Creek.



Plate 21: Rushes Creek Road at the Approach to the Peel River Bridge.



Plate 22: Peel River Bridge on Rashes Creek Road.



Plate 23: Peel River Bridge on Rushes Creek Road.



Plate 24: Rushes Creek Road at its Intersection with the Oxley Highway.



Plate 25: Give Way Signage at the Intersection of Rushes Creek Road and the Oxley Highway.



Plate 26: Directional Signage at the Intersection of Rushes Creek Road and the Oxley Highway.



Plate 27: Left Turn Out from Rushes Creek Road onto the Oxley Highway.



Plate 28: Right Turn Lane from the Oxley Highway into Rushes Creek Road.



Plate 29: Directional Signage on the Oxley Highway.



Plate 30: Rushes Creek Road Viewed from it's Intersection with the Oxley Highway.



Plate 31: Left Turn Lane from the Oxley Highway into Rushes Creek Road.



Plate 32: Left Lane Merge on Rushes Creek Road at the Approach to the Oxley Highway.



Plate 33: General Alignment of Rushes Creek Road.



Plate 34: Entrance to the Moana Poultry Production Farm off Rushes Creek Road.

Appendix A

SEARs No. 1696

7 July 2022

Mr Matt Norton
Planning and Environmental Compliance
AgDSA
PO Box 292
Toowoomba QLD 4350

EF22/7962
SEAR 1696

Dear Mr Norton,

Feedlot Expansion (cattle)
'Angora' Rannock Burn Road, Rushes Creek (Lot 1 DP 842391 and Lots 19, 43, 44, 141 and 142 DP 752169)
Planning Secretary's Environmental Assessment Requirements (SEAR) 1696

Thank you for your request for the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the above development proposal. I have attached a copy of these requirements.

In support of your application, you indicated that your proposal is both designated and integrated development under Part 4 of the *Environmental Planning and Assessment Act 1979* and requires an approval under the *Protection of the Environment Operations Act 1997*. In preparing the SEARs, the Department of Planning and Environment (the Department) has consulted with the Environment Protection Authority. A copy of their requirements is attached.

The Department has also consulted with DPI Agriculture. A copy of their additional requirements for the EIS are attached.

If other integrated approvals are identified before the Development Application (DA) is lodged, you must undertake direct consultation with the relevant agencies, and address their requirements in the EIS.

If your proposal contains any actions that could have a significant impact on matters of National Environmental Significance, then it will require an additional approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to your proposal, you should contact the Commonwealth Department of Agriculture, Water and the Environment on (02) 6274 1111.

Should you have any further enquiries, please contact Joanna Bakopanos, Planning and Assessment, at the Department on (02) 9274 6387 or via joanna.bakopanos@planning.nsw.gov.au.

Yours sincerely



Chris Ritchie
Director
Industry Assessments
as delegate of the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*.
Schedule 3 of the *Environmental Planning and Assessment Regulation 2021*.

Designated Development

SEAR Number	1696
Proposal	Increasing feedlot capacity from 1,000 head of cattle to 1,400, as well as constructing a new feedlot with a capacity of 9,900 head of cattle.
Location	'Angora' Rannock Burn Road, Rushes Creek (Lot 1 DP 842391 and Lots 19, 43, 44, 141 and 142 DP 752169)
Applicant	Bottlejac Trading Company
Date of Issue	7 July 2022
General Requirements	The Environmental Impact Statement (EIS) must comply with the assessment requirements and meet the minimum form and content requirements in sections 190 and 192 of the Environmental Planning and Assessment Regulation 2021.
Key Issues	<p>The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed:</p> <ul style="list-style-type: none"> • strategic and statutory context – including: <ul style="list-style-type: none"> – a detailed justification for the proposal and suitability of the site for the development – a demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies – a list of any approvals that must be obtained under any other Act or law before the development may lawfully be carried out – a description of how the proposed expansion integrates with existing on-site operations – a description of any amendments to and/ or additional licence(s) or approval(s) required to carry out the proposed development. • suitability of the site – including: <ul style="list-style-type: none"> – a detailed justification that the site can accommodate the proposed capacity, having regard to the scope of the operations and its environmental impacts, including cumulative impacts, and relevant mitigation measures – a Land Use Conflict Risk Assessment in accordance with Department of Primary Industry's Land Use Conflict Risk Assessment Guide. • animal welfare, bio-security and disease management – including: <ul style="list-style-type: none"> – details of how the proposed development would comply with relevant codes of practice and guidelines – a biosecurity risk assessment and response plan

	<ul style="list-style-type: none"> - a heat load assessment in accordance with Department of Primary Industries guidelines - details of all pest, weed and disease control measures - a detailed description of the contingency measures that would be implemented for the mass disposal of livestock in the event of disease outbreak. <ul style="list-style-type: none"> • waste management – including: <ul style="list-style-type: none"> - detail of waste management including manure and disposal of dead cattle under normal operating conditions and in the event of a mass death scenario to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution - consideration of disposal of compost containing mortalities in relation to the resource recovery framework – the current composting order/exemption does not permit the sale of or offsite use of compost containing mortalities - details of waste handling including, transport, identification, receipt, stockpiling and quality control including off-site reuse and disposal - the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the <i>NSW Waste Avoidance and Sustainable Materials Strategy 2041</i>. • air quality and odour – including: <ul style="list-style-type: none"> - a quantitative assessment of the potential air quality, dust and odour impacts of the development, during both construction and operation, in accordance with relevant Environment Protection Authority guidelines. Consideration should be given to cumulative impacts of nearby poultry farms - a description and appraisal of air quality and odour impact mitigation and monitoring measures, in line with International Best Practice. • noise and vibration – including: <ul style="list-style-type: none"> - a description of all potential noise and vibration sources during construction and operation, including road traffic noise - a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines - a description and appraisal of noise and vibration mitigation and monitoring measures. • soil and water – including: <ul style="list-style-type: none"> - a description of local soils, topography, drainage and landscapes - details of water usage for the proposal including existing and proposed water licencing requirements in accordance with the <i>Water Act 1912</i> and/or the <i>Water Management Act 2000</i> - a detailed site water balance - a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water source embargo - details of sediment and erosion controls - details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent - an assessment of the potential impacts of the proposal in line with the <i>Natural Resource Access Regulators' Guidelines for controlled activities on waterfront land</i> - an assessment of potential impacts from runoff from feedlot pens, effluent storage, evaporation and terminal ponds and the application of effluent and/or manure on the quality and quantity of surface and
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	<p>groundwater resources</p> <ul style="list-style-type: none"> - details of the proposed stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts - a description and appraisal of impact mitigation and monitoring measures. <ul style="list-style-type: none"> • traffic and transport – including: <ul style="list-style-type: none"> - details of road transport routes and access to the site - road traffic predictions for the development during construction and operation - an assessment of impacts to the safety and function of the road network and the details of any road upgrades required for the development. • hazards and risk – including: <ul style="list-style-type: none"> - a preliminary risk screening completed in accordance with State Environmental Planning Policy (Resilience and Hazards) 2021, Chapter 3 and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is "potentially hazardous" a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011) - an assessment of flood risk on the site. The assessment should determine the flood hazard in the area, address the impact of flooding on the proposed development, and the development's impact (including filling) on flood behaviour of the site and adjacent lands, and address adequate egress and safety in a flood event - emergency management procedures for responding to natural hazard threats and mass mortality events. • biodiversity – including: <ul style="list-style-type: none"> - accurate predictions of any vegetation clearing on site or for any road upgrades - a detailed assessment of the potential impacts on any threatened species, populations, endangered ecological communities or their habitats, groundwater dependent ecosystems and any potential for offset requirements in accordance with the current Environment and Heritage Group legislation and guidelines - details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies - a detailed description of the measures to avoid, minimise, mitigate and/or offset biodiversity impacts. • contamination – including: <ul style="list-style-type: none"> - a detailed assessment of the extent and nature of any contamination of the soil, groundwater and marine sediments against the provisions of State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapter 3) - conceptual site model detailing the potential risks to human health and the environmental receptors in the vicinity of the site. • heritage – including an assessment of Aboriginal and non-Aboriginal cultural heritage.
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	<ul style="list-style-type: none"> • infrastructure – including demonstration of an appropriate secure power supply and/or details of any necessary infrastructure to facilitate the development and any contingencies in the event of a power supply failure. • visual – including an impact assessment at private receptors and public vantage points.
Environmental Planning Instruments and other policies	<p>The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to:</p> <ul style="list-style-type: none"> • State Environmental Planning Policy (Primary Production) 2021 (Chapter 2) • State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Chapters 2 and 3) • State Environmental Planning Policy (Transport and infrastructure) 2021 (Chapter 2) • State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapters 3 and 4) • Tamworth Regional Local Environmental Plan 2010 • relevant development control plans and section 7.11 plans.
Guidelines	<p>During the preparation of the EIS you should consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at https://www.planning.nsw.gov.au/Assess-and-Regulate/Development-Assessment/Industries. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development.</p>
Consultation	<p>During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the:</p> <ul style="list-style-type: none"> • Department of Planning and Environment, specifically the: <ul style="list-style-type: none"> ◦ Environment Protection Authority • Department of Regional NSW, specifically: <ul style="list-style-type: none"> ◦ Department of Primary Industries – Agriculture • Tamworth Local Aboriginal Land Council • Tamworth Regional Council • the surrounding landowners and occupiers that are likely to be impacted by the proposal. <p>Details of the consultation carried out and issues raised must be included in the EIS.</p>
Further consultation after 2 years	<p>If you do not lodge an application under Section 4.12(8) of the <i>Environmental Planning and Assessment Act 1979</i> within 2 years of the issue date of these SEARs, you must consult with the Planning Secretary in relation to any further requirements for lodgement.</p>



DOC22/469304

28 June 2022

Dept of Planning and Environment
Industry Assessments
Locked Bag 5022
PARRAMATTA NSW 2150

Attention: Ms Kathryn Moreira

BY EMAIL:

Dear Ms Moreira,

Thankyou for your request, received on 14 June 2022, for the Environment Protection Authority's (EPA) requirements for an Environmental Impact Statement (EIS) for the proposed expansion of an existing feedlot to accommodate 1,400 head of cattle and construction of a new feedlot to accommodate 9,900 head of cattle at 'Angora', Rannock Burn Road, Rushes Creek (Lot 1 DP 842391 and Lots 19, 43, 44, 141 and 142 DP 752169) – your reference being SEAR 1696.

The EPA has considered the details of the proposal as provided by the Department of Planning and Environment and has identified the information it requires to issue its general terms of approval in **Attachment A**.

In summary, the EPA's key information requirements for the proposal include an adequate assessment of:

1. **Air** - odour and dust generation and management of potential impacts on adjacent residences. Particular attention needs to be provided to odour generation and associated cumulative impact assessment particularly given the existing neighbouring poultry farms in operation and under construction, proximity to recreational areas such as Lake Keepit and potential katabatic drainage conditions and associated with the Peel River valley topography.
2. **Water** - water management systems and the protection of surface and groundwater from runoff from feedlot pens, effluent storage, evaporation and terminal ponds, and the application of effluent and/or manure to soils on the premises.
3. **Sustainable effluent and manure utilisation** - ensure that any proposed application to site soils are sustainable in relation to hydraulic, nutrient and salt loads to prevent land, groundwater or surface water pollution and potential offsite impacts.
4. **Irrigation Method** - provide details of irrigation methods for effluent including consideration of pivot spray irrigation system to allow better control of irrigated effluent. This may also effect the size needed for terminal ponds to capture run-off from the irrigation areas after rainfall.
5. **Noise** - proximity to sensitive receptors and the impact of any noise sources associated with the project.

6. Disposal of mortalities - management of mortalities under normal operating conditions and in the event of a mass death scenario, to prevent odour emissions, contain pathogens, control vermin and disease vectors, and protect surface water and groundwater from pollution. Consideration should be given to disposal of compost containing mortalities in relation to the resource recovery framework – the current composting order/exemption does not permit the sale of or offsite use of compost containing mortalities.

In carrying out the assessment, the proponent should refer to the relevant guidelines as listed in **Attachment A** and any relevant industry codes of practice and best practice management guidelines. The application of principles provided in the *National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition*, Meat and Livestock Australia should also be considered by the proponent to assist in mitigating air, odour, water quality and waste (mortalities) impacts associated with the proposal.

Licensing Requirements

Based on the information provided to the EPA, the proponent will require an Environment Protection Licence to construct and operate the proposed feedlots, if approval is granted. The proposal meets the threshold requirements specified in clause 22 – Livestock intensive industries, in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

General information on licence requirements can be obtained from the EPA's Environment Line by calling 131 555 or on the EPA's website at www.epa.nsw.gov.au/licensing/licencePOEO.htm.

To assist the EPA in assessing the proposal we request that the EIS follows the format of the Department of Planning and Environment EIS guidelines and addresses the EPA's specific environmental assessment requirements outlined in the following attachments.

If the necessary information is not adequately provided in the EIS then delays in the development assessment process may occur. The Proponent should be made aware that any commitments made in the EIS may be formalised as approval conditions and may also be placed as formal licence conditions.

The Proponent should be made aware that, consistent with provisions under Part 9.4 of the *Protection of the Environment Operations Act 1997* ("the Act") the EPA may require the provision of a financial assurance and/or assurances. The amount and form of the assurance(s) would be determined by the EPA and required as a condition of an Environment Protection Licence.

In addition, and as a requirement of an Environment Protection Licence if approval is granted, the EPA will require the Proponent to prepare, test and implement a Pollution Incident Response Management Plan and/or plans in accordance with Section 153 of the Act.

If you have any questions or wish to discuss anything further, please contact me on 131 555 or via email to info@epa.nsw.gov.au, marked to my attention.

Yours sincerely



REBECCA SCRIVENER
Head, Regional Operations Unit
Regulatory Operations Regional – West

ATTACHMENT A: Environmental Assessment Requirements – SEARS 1696 – Bottlejac Trading Company– Feedlot Expansion – ‘Angora’, Rannock Burn Road, Rushes Creek

1. Environmental impacts of the project

- 1.1. The Environmental Assessment must address the requirements of Section 45 of the Protection of the Environment Operations Act 1997 (POEO Act) by determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL).
- 1.2. Impacts related to the following environmental issues need to be assessed, quantified and reported on:
 - **Air Issues:** air quality including dust generation and odour from the operation on the surrounding landscape and/or community;
 - **Noise impacts** associated with operational noise particularly machinery and plant movements;
 - **Waste** including general waste and animal mortalities.
 - **Water and Soils** including effluent/manure utilisation options, water quality, catchment description and premise water balance.

The Environmental Assessment (EA) should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned.

2. Licensing requirements

- 2.1. The development is a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and will therefore require an Environment Protection Licence (EPL) if approval is granted.
- 2.2. Should project approval be granted, the proponent will need to make an application to the EPA for its EPL for the proposed facility prior to undertaking any on site works. Additional information is available through the *EPA Guide to Licensing* document (www.epa.nsw.gov.au/licensing/licenceguide.htm).

SPECIFIC ISSUES

3 Air issues

- 3.1. The EA must demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the *Protection of the Environment Operations (POEO) Act (1997)* and the *POEO (Clean Air) Regulation (2002)*. Particular consideration should be given to section 129 of the POEO Act concerning control of "offensive odour".
- 3.2. The EA must include an air quality impact assessment (AQIA).
- 3.3. The AQIA must be carried out in accordance with the document, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2005) <http://www.epa.nsw.gov.au/resources/air/ammodelling05361.pdf>.
- 3.4. The EA must detail emission control techniques/practices that will be employed at the site and identify how the proposed control techniques/practices will meet the requirements of the POEO Act, *POEO (Clean Air) Regulation* and associated air quality limits or guideline criteria.

- 3.5. Odour emissions must be assessed in accordance with the *Technical Framework - Assessment and Management of Odour from Stationary Sources in NSW* and/or *Technical Notes - Assessment and Management of Odour from Stationary Sources in NSW* (DEC, 2006).

4. Noise and Vibration

The EA must assess the following noise and vibration aspects of the proposed development

- 4.1. Construction noise associated with the proposed development should be assessed using the *Interim Construction Noise Guideline* (DECC, 2009). These are available at: <https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline>
- 4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the *Assessing Vibration: a technical guideline* (DEC, 2006). These are available at: <https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration>
- 4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in *Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990). These are available at: <https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline>
- 4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the *NSW Noise Policy for Industry* (EPA, 2017). [https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-\(2017\)](https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017))
- 4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the *NSW Road Noise Policy* and associated application notes (EPA, 2011). <https://www.epa.nsw.gov.au/your-environment/noise/transport-noise>

5. Waste, chemicals and hazardous materials and radiation

- 5.1 The EA must assess all aspects of waste generation, management and disposal associated with the proposed development.
- 5.2 The EA must demonstrate compliance with all regulatory requirements outlined in the POEO Act and associated waste regulations, including if applicable, the Resource Recovery Framework.
- 5.3 The EA must identify, characterise and classify the following in accordance with the EPA's *Waste Classification Guidelines (2014)* and associated addendums:
- (i) all waste that will be generated onsite through excavation, demolition or construction activities, including proposed quantities of the waste;
 - (ii) all waste that is proposed to be disposed of to an offsite location, including proposed quantities of the waste and the disposal locations for the waste. This includes waste that is intended for re-use or recycling.

Note: The EPA's *Waste Classification Guidelines (2014)* and associated addendums are available at: <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste>

- 5.4. The EA must outline contingency plans for any event that may result in environmental harm, such as excessive stockpiling of material, or dirty water volumes exceeding the storage capacity available on-site.
- 5.5. The EA must demonstrate that appropriate spill containment will be provided for storage, filling and loading of all fuels and other chemicals to be used on site, in accordance with the relevant Australian Standard.
- 5.6. Provide details of how waste will be handled and managed onsite, including:
- a) Stockpile location and management
 - Labelling of stockpiles for identification, ensuring that all waste is clearly identified and stockpiled separately from other types of material (especially the separation of any contaminated and non-contaminated waste).
 - Proposed height limits for all waste to reduce the potential for dust and odour.
 - Procedures for minimising the movement of waste around the site and double handling.
 - Measures to minimise leaching from stockpiles into the surrounding environment, such as sediment fencing, geofabric liners and hardstands.
 - b) Mortality disposal arrangements
 - Define disposal methods and locations for normal operations and possible mass death scenarios.
 - Procedures for preventing the spread of pathogens or disease.
 - Measures for protecting surface and/or groundwaters from pollution.
 - Measures to prevent offensive odour generated by mortality disposal.
 - Measures to control or prevent vermin and disease vectors.
- 5.7. The proponent should provide details of:
- how leachate from stockpiled waste material will be kept separate from stormwater runoff;
 - treatment of leachate through a wastewater treatment plant (if applicable); and
 - any proposed transport and disposal of leachate off-site.

6 Water and Soils

- 6.1. The EA must demonstrate how the proposed development will meet the requirements of section 120 of the POEO Act.
- 6.2. The EA must include a water balance for the development including water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.
- 6.3. If the proposed development intends to discharge waters to the environment, the EA must demonstrate how the discharge(s) will be managed in terms of water quantity, quality and frequency of discharge and include an impact assessment of the discharge on the receiving environment. This should include:
- Description of the proposal including position of any intakes and discharges, volumes, water quality and frequency of all water discharges.
 - Description of the receiving waters including upstream and downstream water quality as well as any other water users.

- Demonstration that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary.
- 6.4. The EA must include an assessment of potential impacts on soil and land resources, being guided by *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000). The nature and extent of any significant impacts should be identified. Mitigation and management options to minimise identified soil and land resource impacts should be described.
 - 6.5. The EA must refer to Water Quality Objectives for the receiving waters and indicators and associated trigger values or criteria for the identified environmental values of the receiving environment. This information should be sourced from the ANZECC (2000) Guidelines for Fresh and Marine Water Quality (<http://www.environment.gov.au/water/policy-programs/nwqms/>).
 - 6.6. The EA must describe how stormwater will be managed in all phases of the project, including details of how stormwater and runoff will be managed to minimise pollution. Information should include measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site. The EA should consider the guidelines *Managing urban stormwater: soils and construction*, vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; B. Waste landfills C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC, 2008).
 - 6.7. Erosion, sediment and leachate control measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site during construction and operation phases of the project. The EA should show the location of each measure to be implemented. Include such control measures such as:
 - Sediment traps
 - Diversion banks
 - Sediment fences
 - Bunds (earth, hay, mulch)
 - Geofabric liners
 - Other control measures as appropriate.
 - 6.8. Assessment undertaken of the design of terminal pond systems to manage stormwater runoff (and if applicable tailwater) from any proposed effluent utilisation area to minimise water quality impacts on the nearest watercourses.
 - 6.9. Discharges from the site must be characterised with respect to their location, frequency, volume and likely water quality.
 - 6.10. The controlled drainage area including feedlot pens, manure stockpile/composting areas, catch drains, sedimentation and effluent storage/evaporation ponds and terminal pond systems must be protected from inundation during floods with an average recurrence interval of up to 1 in 100 years.
 - 6.11. Feedlot pen surfaces and manure stockpile/composting areas and the walls and bases of any catch drains, sedimentation, effluent holding/evaporation/terminal ponds must incorporate an impermeable liner. Acceptable impermeable liners include:
 - a clay or modified soil liner of at least 900mm of recompacted clay with an in-situ permeability (K) of less than 1×10^{-9} m/s.
 - A natural geological barrier that is established by geotechnical investigations to provide a secure barrier between the groundwater, soil and substrata equivalent to the 900 mm recompacted clay liner above.
 - 6.12. If the proposal incorporates effluent or manure application/utilisation to cropping lands on the premises, an assessment of the sustainability of these utilisation practices must be provided.

The assessment must be undertaken in accordance with the *Environmental Guidelines for the Use of Effluent by Irrigation* (DEC, 2004).

The assessment must identify soil constraints where applicable to the application of manures and/or effluent and include nutrient balance and salt management assessments. Maps of proposed manure and/or effluent application areas must be provided in the EA.

- 6.13. The EA must describe any water quality monitoring programs to be carried out at the project site. Water quality monitoring should be undertaken in accordance with the *Approved Methods for the Sampling and Analysis of Water Pollutant in NSW* (2004) which is available at:
<http://www.epa.nsw.gov.au/resources/legislation/approvedmethods-water.pdf>.

----END----

Department of Planning and Environment
Industry Assessments

Attention: Ms Kathryn Moreira

Re: Intensive Livestock Agriculture (Beef Feedlot) – request for input into SEARs 1696
'Angora' Rannock Burn Road, Rushes Creek (Lot 1 DP 842391 and Lots 19, 43, 44, 141 and 142
DP 752169), Tamworth Regional Council

Dear Kathryn

Thank you for your correspondence of 16 June 2022 requesting input and comment on the above proposal to inform the preparation of Planning Secretary's Environmental Assessment Requirements (SEARs).

NSW Department of Primary Industries (DPI) Agriculture collaborates with our stakeholders to protect and enhance the productive and sustainable use and resilience of agricultural resources and the environment.

It is important that beef feedlots are designed and operated to meet industry standards and associated codes of practice. NSW DPI Agriculture has reviewed the submitted documentation in relation to the above proposal and recommends the following requirements in addition to standard environmental assessments are addressed in the draft SEARs at Attachment A following.

It is also important that sensitive receptors and the nearby poultry farm respectively are thoroughly assessed for risk of, and contribution to, potential cumulative odour impacts.

Industry guidelines and resource information, listed in Attachment B, should also be provided to the proponent for their consideration when preparing the Environmental Impact Statement.

Should you require clarification on any of the information contained in this response, please do not hesitate to contact me on [REDACTED] or by email at landuse.ag@dpi.nsw.gov.au.

Sincerely

Nita Scott
Agricultural Land Use Planning Officer
Strategic Policy and Initiatives, NSW DPI New England North West Region

Encl: Attachment A: Draft SEARs requirements
Attachment B: Industry guidelines and resource information

Issue	Environmental Assessment Requirements for the EIS
Site Suitability	<ul style="list-style-type: none"> • Demonstrate that the size of the project site is adequate for the yards, sheds and feed silos, any amenity buildings, storage sheds, internal roads, litter composting and stockpile areas, dead animal management and storage areas and mitigation measures for odour, dust and noise impacts and general amenity. Issues such as topography and drainage and the ability of a site to accommodate the project should be considered. • Include a Land Use Conflict Risk Assessment (LUCRA) to identify potential land use conflict, relating to separation distances and management practices to minimise the impact on sensitive receptors, including other agricultural land uses, from odour, dust and noise. Information about groundcover management and vegetative screening should be detailed in relation to the final construction phase and operational provisions to limit dust, noise and other land use conflict issues. A LUCRA is described in the DPI Land Use Conflict Risk Assessment Guide. • Include a map to scale showing the above operational and infrastructure details including separation distances from sensitive receptors and neighbouring agricultural land uses.
Consideration of impacts on agricultural resources and land	<p><u>Characteristics of Agricultural Land</u></p> <ul style="list-style-type: none"> • Describe the soil, slope, land capability, agricultural productivity, land characteristics and the history of agricultural land uses on the proposed development site. • Describe the current and historical agricultural land uses on the surrounding land in the locality including the land capability and agricultural productivity of the surrounding land. • Cumulative odour impacts on adjoining properties need to be assessed in a comprehensive odour modelling report that incorporates and benchmarks existing odour sources. <p><u>Impacts on Agricultural Land, Resources and Land Uses</u></p> <ul style="list-style-type: none"> • Detail the potential impacts on agricultural land and agricultural land uses in the locality. • Consider possible cumulative effects to agricultural enterprises and landholders. • Demonstrate that all significant impacts on current and potential agricultural developments and resources can be reasonably avoided or adequately mitigated.
Appropriate and secure power supply	<ul style="list-style-type: none"> • Demonstrate that a power supply which is reliable, adequate, and sufficient for farm requirements will be available or detail the necessary infrastructure required to achieve this. This includes

	access to 3 phase power, back up arrangements in the event of power failure and sufficient power for potential future farm expansion.
Suitable and secure water supply	<ul style="list-style-type: none"> • Detail the estimated water demand and water availability. Demonstrate that a water supply which is adequate, suitable, and reliable can be provided for drinking, cooling, effluent cleaning, bush fire management and other facilities such as rest rooms, landscaping requirements etc. • Water must meet standards detailed in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) and the National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition. NSW DPI recommends backup of at least 2 days total water requirement in case of breakdown or loss of supply with a stronger preference for seven days' supply. • Detail the proposed source of water and any sanitisation methods required.
Biosecurity	<ul style="list-style-type: none"> • Include a biosecurity (pests, weeds, and disease) risk assessment outlining the likely plant, animal and community risks as per guidelines in Attachment 2. • Detail a biosecurity response plan to deal with identified risks as well as contingency plans for any failures as described in the National Biosecurity Manual for Beef Cattle Feedlots. Including monitoring and mitigation measures in disease (Q Fever), weed and pest management plans. • Details of dead animal management and disposal must be fully detailed. If onsite disposal is proposed the management facility and operations must be fully documented.
Effluent and spent litter disposal	<ul style="list-style-type: none"> • Detail how effluent and solids will be effectively stored, handled, and recycled or disposed of in a lawful manner to protect environmental values and biosecurity. • Provide details of any proposed effluent reuse areas should be appropriately designed based on a nutrient budget that considers proposed annual volumes and nutrient loads, soil types, current soil nutrient levels and pasture use rates via a reuse management plan.
Animal welfare	<ul style="list-style-type: none"> • Demonstrate how the proposed development will: <ul style="list-style-type: none"> ○ comply with the Animal Welfare Standards: Land transport, Cattle and Loading, ○ provide all weather access or provisions on site to provide adequate food for the livestock for the duration of a flood event if applicable, ○ manage sick livestock or disease, and

	<ul style="list-style-type: none"> ○ suitably manage and mitigate the heat loading risk after undertaking a heat loading risk assessment using ALFA Risk Assessment Program.
Traffic movements	<ul style="list-style-type: none"> ● Detail the number, timing, and route for traffic movements to the site. This is to take into account potential impacts on sensitive receptors (e.g., noise, dust, volume of traffic) including other agricultural land uses, and how these impacts will be mitigated.
Adequate consultation with community	<ul style="list-style-type: none"> ● Consult with the owners / managers of affected and adjoining neighbours and agricultural operations in a timely and appropriate manner about the proposal, the likely impacts and suitable mitigation measures or compensation.
Contingency and Environmental Management Plan developed	<ul style="list-style-type: none"> ● The proposal is to detail contingency plans to enable the operation to deal with emergency situations. The proposal is to detail Emergency Management procedures and responsibilities for responding to natural hazard threats and possible mass mortality events which might result from extreme climatic conditions, routine, or emergency animal disease outbreaks. ● The proposal is to demonstrate that the emergency management procedures are consistent with the AUSTVETPLAN Manuals and Documents.
Rehabilitation and Decommissioning	<ul style="list-style-type: none"> ● The Rehabilitation and Decommissioning/Closure Management Plan should include, but is not limited to, describing the potential design criteria of the final land use and landform, indicators which may be used to guide the return of the land back to agricultural production, along with the expected timeline for any rehabilitation program.

Attachment B: Industry guidelines and resource information

Beef Feedlots

Title	Website link
Land Use Conflict Risk Assessment Guide	https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment2/lucra
Planning Guidelines, Intensive Livestock Agriculture Development	https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/Policy-and-legislation/Primary-Production/planning-guidelines-intensive-livestock-agricultural-development-2019-02-28.pdf?la=en
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)	https://www.waterquality.gov.au/guidelines/anz-fresh-marine
National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition	https://www.feedlots.com.au/_files/ugd/f25d7a_e63ccd7008c34ccc94e4d278713d5abd.pdf
National Biosecurity Manual for Beef Cattle Feedlots	http://www.farmbiosecurity.com.au/industry/lot-feeding/
ALFA Industry Resources	https://www.feedlots.com.au/resources
Australian Animal Welfare Standards and Guidelines	http://animalwelfarestandards.net.au/
National Beef Cattle Feedlot Environmental Code of Practice	https://www.feedlots.com.au/_files/ugd/f25d7a_9f5490f89b894f4cb3d8fdcadd5f37e4.pdf
AUSVETPLAN	https://animalhealthaustralia.com.au/ausvetplan/

Appendix B

**BEEF FEEDLOT – FEED, MANURE &
TRAFFIC CALCULATOR PREPARED BY
AGDSA**



Beef Feedlot Feed, Manure & Traffic Calculator

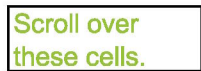
The AgDSA Beef Feedlot Feed, Manure & Traffic Calculator has been developed to assist the preparation of development applications for beef feedlots in Australia.

Cattle stocking rates used to estimate cattle capacities per truck are based on the 2019 Meat & Livestock Australia (MLA) "Fit to Load" manual. Cattle weight above of below those provided in the manual have been interpolated or extrapolated as required.

Legend



Data is to be entered into all of the grey cells, starting with the '1 - General' worksheet and proceeding through the other worksheets from left to right, using the tabs on the bottom of the screen.



For assistance with the selection of appropriate input data, scroll over the cells that have red triangles in the upper right corner to view explanatory comments.

Developed by: Tim Sullivan

Principal Agricultural Engineer

AgDSA

Email:



General Feedlot Information

Feedlot Details


Feedlot Development

Landholders' name(s):	Angora Feedlot Pty Ltd	Is the feedlot developed in stages	No					
Cattle feedlot name:	Angora							
Feedlot address:		Cattle capacity per market type (SCU)	Market 1	Market 2	Market 3	Market 4	Market 5	Total
Feedlot locality:		Percentage of full capacity	1,000	4,000	2,240			7,240
Feedlot State:		Description	14%	55%	31%			
Feedlot Local Government Area:		(i.e Pen Numbers &/or Market Type)						
Spreadsheet user name		Anticipated completion date						
Assessment date								




Cattle Movements

Expansion Stage	1	2	3	4	5	Total	Units
Maximum SCU Capacity	1,000	4,000	2,240	-	-	7,240	SCU
Maximum SCU Market Split	14%	55%	31%	-	-	100%	%
Animal Performance Data							
Entry Weight	320	320	420				kg
Exit Weight	450	450	600				kg
Average Weight	385	385	510	-	-		kg
SCU Conversion (at average weight)	0.72	0.72	0.89	-	-		
Maximum Head Capacity	1,395	5,579	2,530	-	-	9,504	head
Maximum Head Market Split	15%	59%	27%	-	-	100%	%
Total Days on Feed	70	70	120				Days
Feed cycles per year	5.21	5.21	3.04	-	-		
Average Occupancy Rate	90%					90%	%
Average SCU in Feedlot	900	3,600	2,016	-	-	6,516	SCU
Average Head in Feedlot	1,255	5,021	2,277	-	-	8,554	Head
Maximum Head in Feedlot (100% Occupancy)	1,395	5,579	2,530	-	-	9,504	Head
Total Cattle Entering the Feedlot	6,546	26,183	6,927	-	-	39,655	Head
Average Mortality	0.80%					0.80%	%
Annual Deaths	52	209	55	-	-	317	Head
Outgoing Cattle	6,493	25,973	6,871	-	-	39,338	Head
Cattle Procurement							
Cattle Produced Onsite	0						Head
Cattle Produced Per Stage	0	0	0	0	0	-	Head
Cattle Produced Onsite	0.0%	0.0%	0.0%			0.0%	%
Cattle Transported In	6,546	26,183	6,927	-	-	39,655	Head
Cattle Transported In	100.0%	100.0%	100.0%			100.0%	%
Incoming Cattle Trucks							
Incoming Cattle	6,546	26,183	6,927	-	-		
Incoming Cattle Truck Type	B Double	B Double	B Double				Type
Total Decks / Truck Type	3	3	3	-	-		kg
Incoming Cattle Weight	320	320	420	-	-		kg
Incoming Cattle Floor Area	0.91	0.91	1.08	-	-		m ² /head
Incoming Cattle/Deck	32	32	27	-	-		Head
Incoming Cattle/Truck (Space Limiting)	96	96	81	-	-		Head
Incoming Cattle/Truck	96	96	81				Head
Incoming Cattle Trucks/year	68	273	85.52	-	-	426	Trucks/year
Outgoing Cattle Trucks							
Outgoing Cattle	6,493	25,973	6,871	-	-		
Outgoing Cattle Truck Type	B Double	B Double	B Double				Type
Total Decks / Truck Type	3	3	3	-	-		kg
Outgoing Cattle Weight	450	450	600	-	-		kg
Outgoing Cattle Floor Area	1.13	1.13	1.47	#N/A	#N/A		m ² /head
Outgoing Cattle/Deck	26	26	20	#N/A	#N/A		Head
Outgoing Cattle/Truck (Space Limiting)	78	78	60	#N/A	#N/A		Head
Outgoing Cattle/Truck	78	78	60				Head
Outgoing Cattle Trucks/Year	83	333	115	-	-	531	Trucks/year

<div>  <div>Feedstuff Requirements</div> </div>							
Expansion Stage	1	2	3	4	5	Total	Units
Maximum SCU Capacity	1,000	4,000	2,240	-	-	7,240	SCU
Animal Performance Data							
Entry Weight	320	320	420	-	-		kg
Exit Weight	450	450	600	-	-		kg
Average Weight	385	385	510	-	-		kg
SCU Conversion (at average weight)	0.72	0.72	0.89	-	-		
Average Occupancy Rate			90%			90%	%
Average SCU in Feedlot	900	3,600	2,016	-	-	6,516	SCU
Average Head in Feedlot	1,255	5,021	2,277	-	-	8,554	Head
Maximum Head Capacity	1,395	5,579	2,530	-	-	9,504	Head
Animal Feed Intake							
As fed intake	3.1%	3.1%	2.4%	0.0%	0.0%		% Avg. LWT
As fed intake	12.0	12.0	12.0				kg/day
Ration Dry Matter	80%	80%	80%				%
DM feed intake	9.6	9.6	9.6	-	-		kg/day
Days on Feed	70.0	70.0	120.0	-	-		days
Daily Gain	1.9	1.9	1.5	-	-		kg/day
FCR (as fed basis)	6.5	6.5	8.0	-	-		x:1
FCR (DM basis)	5.2	5.2	6.4	#DIV/0!	#DIV/0!		x:1
Feed consumed onsite/day	15.1	60.3	27.3	-	-	102.6	t/day
Feed consumed onsite/week	105.4	421.8	191.3	-	-	718.5	t/week
Feed consumed onsite/year	5,498.4	21,993.5	9,974.7	-	-	37,466.6	t/year
Diet & Ingredient Volumes							
Grain	75.0%	75.0%	75.0%				%
Roughage (Hay/Straw)							%
Roughage (Silage)	16.0%	16.0%	16.0%				%
Liquids + Supplements	9.0%	9.0%	9.0%				%
Total	100.0%	100.0%	100.0%	0.0%	0.0%		%
Annual Feed Requirements							
Grain	4,123.8	16,495.1	7,481.0	-	-	28,099.9	t/year
Roughage (Hay/Straw)	-	-	-	-	-	-	t/year
Roughage (Silage)	879.7	3,519.0	1,596.0	-	-	5,994.7	t/year
Liquids + Supplements	494.9	1,979.4	897.7	-	-	3,372.0	t/year
Total	5,498.4	21,993.5	9,974.7	-	-	37,466.6	t/year
	OK	OK	OK	OK	OK	OK	
Annual Feed Grown Onsite							
Grains produced onsite			0				- t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Roughage (Hay/Straw) produced onsite			0				- t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Roughage (Silage) produced onsite			0				- t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Liquid + Supplements produced onsite			0				- t/year
	-	-	-	-	-		t/stage/year
							% supplied from onsite
Total feed produced onsite							- t/year
							% supplied from onsite
Commodity Truck Movements							
Grain - Ex. Farm Grown	4,124	16,495	7,481	-	-	28,100	t/year
Grain Truck Type	B Double	B Double	B Double				Type
Grain Truck Capacity (Suggested)	36	36	36	-	-		t/vehicle
Grain Truck Capacity (Used)	36	36	36				t/vehicle
Grain Truck Loads	115	458	208	-	-	781	Trucks/yr
Roughage (Hay/Straw) - Ex. Farm Grown	-	-	-	-	-	-	t/year
Roughage (Hay/Straw) Truck Type	B Double	B Double	B Double				Type
Roughage (Hay/Straw) Truck Capacity (Suggested)	18	18	18	-	-		t/vehicle
Roughage (Hay/Straw) Truck Capacity (Used)	18	18	18				t/vehicle
Rough (Hay/Straw) Truck Loads	-	-	-	-	-	-	Trucks/yr
Roughage (Silage) - Ex. Farm Grown	880	3,519	1,596	-	-	5,995	t/year
Roughage (Silage) Truck Type	B Double	B Double	B Double				Type
Roughage (Silage) Truck Capacity (Suggested)	36	36	36	-	-		t/vehicle
Roughage (Silage) Truck Capacity (Used)	36	36	36				t/vehicle
Rough (Silage) Truck Loads	24	98	44	-	-	167	Trucks/yr
Liquids + Supplements - Ex. Farm Grown	495	1,979	898	-	-	3,372	t/year
Liquids + Supplements Truck Type	Semi Trailer	Semi Trailer	Semi Trailer				Type
Liquids + Supplements Truck Capacity (Suggested)	24	24	24	-	-		t/vehicle
Liquids + Supplements Truck Capacity (Used)	24	24	24				t/vehicle
Liquids + Supplements Truck Loads	21	82	37	-	-	140	Trucks/yr

Manure Production Details

Expansion Stage	1	2	3	4	5	Total	Units
Maximum SCU Capacity	1,000	4,000	2,240	-	-	7,240	SCU
Occupancy Rate			90%			90%	%
Average SCU in Feedlot	900	3,600	2,016	-	-	6,516	SCU
Manure Production							
Average raw manure harvested per SCU	0.80	0.80	0.80	0.80	0.80	0.80	t/SCU/yr
Average annual raw manure harvested	720	2,880	1,613	-	-	5,213	t/year
Manure processing utilised	Stockpiled	Stockpiled	Stockpiled	Immediate Disposal	Immediate Disposal		
Average raw/processed manure per scu	0.56	0.56	0.56	0.80	0.80		t/SCU/yr
Average annual manure for reuse	504	2,016	1,129	-	-	3,649	
Manure exported off-site annually	505.0	2,016.0	1,130.0			3,651	t/yr
Manure exported off-site annually	100%	100%	100%			100%	%
Manure transport typical truck type	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer		
Tonnes of manure/truckload	24	24	24	-	-		t/vehicle
No. outgoing trucks/year	21.0	84.0	47.1	-	-	152.1	truck/yr

<div>  <div>Traffic Generation - Individual Stages</div> </div>							
Expansion Stage	1	2	3	4	5	Total	Units
Incoming Cattle (Excludes farm grown)							
Average Occupancy	90%	90%	90%	0%	0%	%	
Cattle per year	6,546	26,183	6,927	-	-	39,655	head/year
Typical truck type	B Double	B Double	B Double	-	-		
No. of head/truck	96	96	81	-	-		head/truck
No. of trucks/year	68	273	86	-	-	426	trucks/year
No. of trucks/week	1.3	5.2	1.6	-	-	8.2	trucks/week
No. of trucks/day	0.2	0.7	0.2	-	-	1.2	trucks/day
Outgoing Cattle							
Cattle out per year	6,493	25,973	6,871	-	-	39,338	head/year
Typical truck type	B Double	B Double	B Double	-	-		
No. of Head/truck	78	78	60	-	-		head/truck
No. of trucks/year	83	333	115	-	-	531	trucks/year
No. of trucks/week	1.6	6.4	2.2	-	-	10.2	trucks/week
No. of trucks/day	0.2	0.9	0.3	-	-	1.5	trucks/day
Grain and Feedstuffs							
Total feed Imported <i>Ex. Farm Grown</i>	5,498	21,994	9,975	-	-	37,467	t/year
Typical truck type	B Double	B Double	B Double	-	-		
No. of trucks/year	160	638	290	-	-	1,088	trucks/year
No. of trucks/week	3.1	12.3	5.6	-	-	20.9	trucks/week
No. of trucks/day	0.4	1.7	0.8	-	-	3.0	trucks/day
Outgoing Manure							
Manure transported off-site	505	2,016	1,130	-	-	3,651	t/year
Typical truck type	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer		
No. of trucks/year	21	84	47	-	-	152	trucks/year
No. of trucks/week	0.4	1.6	0.9	-	-	2.9	trucks/week
No. of trucks/day	0.1	0.2	0.1	-	-	0.4	trucks/day
Total - Incoming and Outgoing Trucks							
No. of trucks - Incoming Cattle & Incoming Feed Commodities	228	911	375	-	-	1,514	trucks/year
	4	18	7	-	-	29	trucks/week
	0.6	2.5	1.0	-	-	4.1	trucks/day
Incoming Annual Average Daily Traffic (AADT)	1.2	5.0	2.1	-	-	8.3	trucks/day
No. of trucks - Outgoing Cattle & Manure taken for offsite disposal	104	417	162	-	-	683	trucks/year
	2	8	3	-	-	13	trucks/week
	0.3	1.1	0.4	-	-	1.9	trucks/day
Outgoing Annual Average Daily Traffic (AADT)	0.6	2.3	0.9	-	-	3.7	trucks/day
Total - Incoming & Outgoing Trucks	332	1,328	537	-	-	2,197	trucks/year
	6	26	10	-	-	42	trucks/week
	0.9	3.6	1.5	-	-	6.0	trucks/day
Total Annual Average Daily Traffic (AADT)	1.8	7.3	2.9	-	-	12.0	trucks/day
Total AADT (Rounded to Nearest Complete Trip)	2.0	8.0	4.0	-	-	14.0	trucks/day

<div> <div>Traffic Generation - Cumulative Stages</div> </div>						
Expansion Stage	1	1+2	1+2+3	1+2+3+4	1+2+3+4+5	Units
Incoming Cattle (Excludes farm grown)						
Average Occupancy	90%	90%	90%	0%	0%	%
Cattle per year	6,546	32,728	39,655	-	-	head/year
Typical truck type	B Double	B Double	B Double	-	-	
No. of head/truck	96	96	81	-	-	head/truck
No. of trucks/year	68	341	426	-	-	trucks/year
No. of trucks/week	1.3	6.6	8.2	-	-	trucks/week
No. of trucks/day	0.2	0.9	1.2	-	-	trucks/day
Outgoing Cattle						
Cattle out per year	6,493	32,467	39,338	-	-	head/year
Typical truck type	B Double	B Double	B Double	-	-	
No. of Head/truck	78	78	60	-	-	head/truck
No. of trucks/year	83	416	531	-	-	trucks/year
No. of trucks/week	1.6	8.0	10.2	-	-	trucks/week
No. of trucks/day	0.2	1.1	1.5	-	-	trucks/day
Grain and Feedstuffs						
Total feed Imported <i>Ex. Farm Grown</i>	5,498	27,492	37,467	-	-	t/year
Typical truck type	B Double	B Double	B Double	-	-	
No. of trucks/year	160	798	1,088	-	-	trucks/year
No. of trucks/week	3.1	15.3	20.9	-	-	trucks/week
No. of trucks/day	0.4	2.2	3.0	-	-	trucks/day
Outgoing Manure						
Manure transported off-site	505	2,521	3,651	-	-	t/year
Typical truck type	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer	Semi Trailer	
No. of trucks/year	21	105	152	-	-	trucks/year
No. of trucks/week	0.4	2.0	2.9	-	-	trucks/week
No. of trucks/day	0.1	0.3	0.4	-	-	trucks/day
Total - Incoming and Outgoing Trucks						
No. of trucks - Incoming Cattle & Incoming Feed Commodities	228	1,139	1,514	-	-	trucks/year
	4	22	29	-	-	trucks/week
	0.6	3.1	4.1	-	-	trucks/day
Incoming Annual Average Daily Traffic (AADT)	1.2	6.2	8.3	-	-	trucks/day
No. of trucks - Outgoing Cattle & Manure taken for offsite disposal	104	521	683	-	-	trucks/year
	2	10	13	-	-	trucks/week
	0.3	1.4	1.9	-	-	trucks/day
Outgoing Annual Average Daily Traffic (AADT)	0.6	2.9	3.7	-	-	trucks/day
Total - Incoming & Outgoing Trucks	332	1,660	2,197	-	-	trucks/year
	6	32	42	-	-	trucks/week
	0.9	4.5	6.0	-	-	trucks/day
Total Annual Average Daily Traffic (AADT)	1.8	9.1	12.0	-	-	trucks/day
Total AADT (Rounded to Nearest Complete Trip)	2.0	10.0	14.0	-	-	trucks/day

Table 1. Incoming cattle truck floor areas

Truck Type	Table Top	Semi Trailer (Single Deck)	Semi Trailer (Double Deck)	B Double	Road Train
Configuration	1 Deck	1 Deck	2 Decks	3 Decks	4 Decks
Total 12.5 x 2.4m decks	0.17	1	2	3	4
Total Floor Area (m ²)	5	29.3	58.5	87.8	117

Table 2. Minimum floor area by animal size

Mean liveweight (kg)	Area required (m ² /head)	Using Regression	% Difference	Head / Standard Deck
100	0.31	0.31	-0.9%	94
150	0.42	0.41	-1.8%	70
200	0.53	0.55	4.6%	55
250	0.77	0.79	2.7%	38
300	0.86	0.86	0.6%	34
350	0.98	0.95	-3.4%	30
400	1.05	1.04	-1.4%	28
450	1.13	1.13	0.3%	26
500	1.23	1.24	0.8%	24
550	1.34	1.36	1.2%	22
600	1.47	1.48	1.0%	20
650	1.63	1.62	-0.4%	18
700	1.78	1.78		16
750	1.94	1.94		15
800	2.13	2.13		13
850	2.33	2.33		12
900	2.55	2.55		11
950	2.79	2.79		10
1000	3.05	3.05		9

Table 3. Incoming Grain truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Grain (tonnes)	12	24	24	36	48

Table 4. Incoming Roughage - Hay/Straw truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Roughage - Hay/Straw (tonnes)	6	12	12	18	24

Table 5. Incoming Roughage - Silage truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Roughage - Silage (tonnes)	12	25	25	36	50

Table 6. Incoming Other - Liquids truck loading rates

Commodity	Body Truck	Truck & Dog	Semi Trailer	B Double	Road Train
Other - Liquids (tonnes)	12	24	24	36	48

Table 7. Manure quantities depending on manure treatment process

Truck Type	Tonne/SCU
Immediate Disposal	0.8
Stockpiled	0.56
Composted	0.35

Table 8. Outgoing manure truck loading rates

Truck Type	Tonne / truck
Body Truck	12
Truck & Dog	18
Semi Trailer	24
B double	36

APPENDIX G – EFFLUENT MODEL

Feedlot Catchment Parameters

Parameters	Value	Unit
Feedlot Capacity	6,240	SCU
Stocking Density	15.0	m2/SCU
Pen Area	9.36	ha
Soft Area	1.93	ha
Hard Area	6.77	ha
Manure Area	1.31	ha
Basin Area	0.27	ha
Pond Area	1.56	ha
Total Area	21.20	ha
Total Area (Excluding) Pond	19.64	ha

Effluent Pond Parameters

Parameters	Value	Unit
Years Modelled In Water Balance	50	years
Initial Pond Volume	3.7	ML
Maximum Pond Volume	22.0	ML
Maximum Pond Depth	1.5	m
Residual Pond Water Depth	0.3	m
Pond Evaporation Volume Limit	0.1	m3
Class A to Open body water conversion	0.7	
Pond Residual Volume	3,667	m3
Pond Residual - Fraction of Maximum Volume	17%	
Minimum Pond Volume for Minimum Irrigation	216	m3
Minimum Pond Volume for Maximum Irrigation	2,592	m3
Overtopping Incidents	3	No.
Overtopping Frequency - 1 in	16.67	years
Overtopping Percentile	94%	%

Effluent Irrigation Area Parameters

Parameters	Value	Unit
Total Property Irrigation Area	45.0	ha
Irrigation area partitioned to this catchment	45	ha
Maximum daily site effluent pump volume	2.6	ML/day
Pumping volume partitioned to this catchment	2.60	ML/day
USDA SCS Runoff Model K1	45	
USDA SCS Runoff Model K2	65	
USDA SCS Runoff Model K3	82	

Soil Parameters

Parameters	Value	Unit
Soil Textural Description	Sandy Clay Loam	
Soil Field Capacity (FC)	184	mm/m
Soil Plant Available Water (PAW)	110	mm/m
Wilting Point (WP)	74	mm/m
Crop / Pasture Species (Summer)	ial temperate mixtures (November - April)	
Crop / Pasture Species (Winter)	ial temperate mixtures (May - October)	
Normal Deficit Fraction (NDF)	0.50	
Normal Deficit Trigger (soil moisture deficit below FC)	55	mm
Irrigation Trigger (soil moisture deficit below FC)	30	mm
Irrigation Deficit Fraction	0.27	
Crop Root Depth	1.00	m

Irrigation Application Parameters

Parameters	Value	Unit
Irrigation withhold due to Rain	20	mm
Irrigation Method	Low Press Travelling	
Percolation Loss Factor, f2	1.0	
Evaporation Loss Factor, f3	1.1	
Pump flowrate	60	L/s
Minimum application duration	1	hr/day
Maximum application duration	12	hr/day
Minimum Daily Irrigation Volume	0.22	ML/day
Minimum Daily Irrigation Depth (over entire area)	0.5	mm
Maximum Daily Irrigation Volume	2.59	ML/day
Maximum Daily Irrigation Depth (over entire area)	5.8	mm

General Crop Parameters (from Water-Bal)

Crop	Crop co-efficient values (Kc)													Reference	Root depth (m)	Depletion fraction, p
	January	February	March	April	May	June	July	August	September	October	November	December				
Barley						0.3	1	1.15	1				3.45	ICalc (Qld)	1.20	0.55
Brassica		0.5	0.6	1	1	1							4.10	ICalc (Qld)	0.75	0.50
Kikuyu	0.9	0.9	0.9	0.9						0.9	0.9	0.9	6.30	ICalc (Qld)	1.00	0.50
Lucerne	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	10.80	ICalc (Qld)	1.50	0.55
Maize (early)									0.5	1.2	1.2	0.8	3.70	ICalc (Qld)	1.30	0.60
Maize (late)	1.2	1.2	0.8									0.5	3.70	ICalc (Qld)	1.30	0.60
Oats					0.3	0.9	0.9	0.9	0.9				3.90	ICalc (Qld)	1.20	0.55
Perennial temperate mix	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	10.80	ICalc (Qld)	1.00	0.50
Prairie grass	0.9	0.9		0.5	0.9	1	1	1	1	1	1	1	10.20	ICalc (Qld)	1.00	0.50
Ryegrass - annual				0.5	0.9	1	1	1	1	1	1		7.40	ICalc (Qld)	0.70	0.40
Ryegrass - perennial	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	10.80	ICalc (Qld)	1.00	0.50
Sorghum - grain	0.9	0.6											2.00	ICalc (Qld)	1.20	0.55
Sorghum - forage	0.9	0.9	0.9										3.20	ICalc (Qld)	1.44	0.55
Triticale						0.3	0.9	1	0.9				3.10	ICalc (Qld)	1.00	0.50

Crop Parameters for Scenario

Month	Summer (Nov - Apr)			Winter (May - Oct)			Combined		
	Crop co-efficient, Kc	p ¹	Zr (m)	Crop co-efficient, Kc	p ¹	Zr (m)	Crop co-efficient ¹ , Kc	p ¹	Zr (m)
	1	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	2	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	3	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	4	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	5	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	6	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	7	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	8	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	9	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	10	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	11	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50
	12	0.90	1.00	0.50	0.90	1.00	0.90	1.00	0.50

¹ Crop coefficient, Kc, set to 0.35 in months when there are no crops/pastures

² Root depth, Zr, set to 0.3 m in months when there are no crops/pastures

³ Depletion factor set to 0.5 in months when there are no crops/pastures

Soil Texture Parameters (from Water-Bal)

Soil Texture	FC (m ³ / m ³)	WP (m ³ / m ³)	TAW (m ³ / m ³)
Sand	0.080	0.020	0.060
Loamy Sand	0.140	0.040	0.100
Sandy Clay Loam	0.184	0.074	0.110
Silty Clay Loam	0.200	0.080	0.120
Sand Loam	0.230	0.090	0.140
Medium Clay	0.380	0.240	0.140
Well Structured Clay	0.500	0.300	0.200
Loam	0.340	0.120	0.220
Self Mulching Clay	0.485	0.265	0.220

Irrigation Losses (from Water-Bal)

Irrigation Method	Evap loss factor, f ₃	Percolation loss factor, f ₂			
		Coarse Sands	Fine Sands & Sandy Loams	Loams	Clay Loams and Clays
Surface	1.05	Permeable	Permeable	1.20	1.10
High Press Travelling	1.15	1.15	1.1	1.05	1.00
Low Press Travelling	1.10	1.15	1.1	1.05	1.00
Other Spray	1.10	1.15	1.1	1.05	1.00
Micro (mini sprinkler)	1.05	1.12	1.07	1.02	1.00
Micro (drip)	1.00	1.10	1.05	1.00	1.00

Catchment Data

Catchment Type	Area (m ²)	Runoff Coefficient
Pen Area	93,600	0.8
Soft Area	19,316	0.4
Hard Area	67,743	0.8
Manure Pad	13,100	0.8
Basin Area	2,687	0.8
Pond Area	15,554	1
Total Catchment (Excluding Pond)	196,446	0.76
Total Catchment	212,000	0.78

Sedimentation Basin Design

Parameter	Value	Units
Type	Basin	
Surface Area at TWL	0.27	ha
Water Depth	0.93	m
Capacity	2,500	m3
Weir Type	Horizontal Slat	
Cleaning Frequency	As Required	

Parameter	Value	Units
Time of concentration	t _c = 0.76A0.38	
Time of concentration	0.41	hours
Time of concentration	24.57	min
Rainfall Intensity for ARI ₂₀	79.1	mm/hr
Peak flow rate -	Qp = (CiA)/3600	
Qp: Pen Area	0.51	m ³ /s
Qp: Hard Area	1.19	m ³ /s
Qp: Soft Area	0.17	m ³ /s
Qp: Total	1.87	m ³ /s
Sedimentation Basin Volume	V _p =Q _p x L/W x λ/v	
Lambda:	2.50	(λ)
Length: Breadth Ratio at TWL	2.00	L/w
Design Flow Velocity	0.005	m/s
Required Sedimentation Basin Volume	1,873	m ³
Proposed Sedimentation Basin Volume	2,500	m ³
Compliance	Acceptable	

IFD Table - Rainfall intensity (mm/hour)

Location: Angora Feedlot: -30.90 & 150.55

DURATION	Storm AEP 63.2%	Storm AEP 50%	Storm AEP 20%	Storm AEP 10%	Storm AEP 5%	Storm AEP 2%	Storm AEP 1%
1 min	108	122	167	199	230	274	308
2 min	91.2	102	139	167	194	229	257
3 min	84.5	95	129	154	179	212	238
4 min	79.4	89.4	122	145	169	199	224
5 min	74.9	84.6	116	138	159	189	212
10 min	58.8	66.6	91.5	109	126	150	169
15 min	48.7	55.2	75.9	90.4	105	125	141
20 min	41.8	47.3	65.1	77.5	90.1	107	121
25 min	36.7	41.6	57.1	68.1	79.1	94.3	106
30 min	32.9	37.2	51.1	60.9	70.8	84.3	95.1
45 min	25.4	28.6	39.1	46.6	54.2	64.5	72.7
1 hour	20.9	23.5	32	38.1	44.3	52.6	59.3
1.5 hour	15.8	17.7	24	28.4	33	39.1	44
2 hour	12.9	14.4	19.5	23	26.6	31.5	35.4
3 hour	9.7	10.8	14.5	17.1	19.7	23.2	26
4.5 hour	7.3	8.14	10.8	12.7	14.6	17.2	19.3
6 hour	5.97	6.65	8.83	10.4	11.9	14	15.6
9 hour	4.49	5.01	6.65	7.79	8.94	10.5	11.8
12 hour	3.67	4.09	5.45	6.4	7.35	8.69	9.74
18 hour	2.75	3.07	4.11	4.86	5.61	6.67	7.51
24 hour	2.23	2.49	3.36	3.99	4.65	5.55	6.27
30 hour	1.89	2.11	2.87	3.43	4.01	4.82	5.47
36 hour	1.64	1.84	2.51	3.02	3.56	4.29	4.88
48 hour	1.32	1.47	2.03	2.46	2.92	3.55	4.07
72 hour	0.95	1.07	1.48	1.82	2.18	2.67	3.09
96 hour	0.75	0.842	1.18	1.44	1.74	2.14	2.49
120 hour	0.623	0.701	0.976	1.19	1.43	1.78	2.06
144 hour	0.536	0.603	0.836	1.01	1.21	1.5	1.75
168 hour	0.472	0.532	0.732	0.879	1.04	1.29	1.5

Pond Parameters

Parameter	Value	Unit
Volume at Outlet	22.00	ML
Depth at Outlet	1.50	m
Internal Batter (Length)	3.0	h : 1v
Internal Batter (Width)	3.0	h : 1v
Length: Breadth Ratio at TWL	1.00	
Freeboard Depth	0.9	m
Maximum sludge percentage	10%	
Maximum sludge volume	2.20	
Depth at maximum sludge	0.17	
Crest Width		m
External Batter		h : 1v
External Bank Height		m
Internal Cut	2.40	m
Depth (Crest to Base)	2.40	m
Face Distance	7.6	m

94%

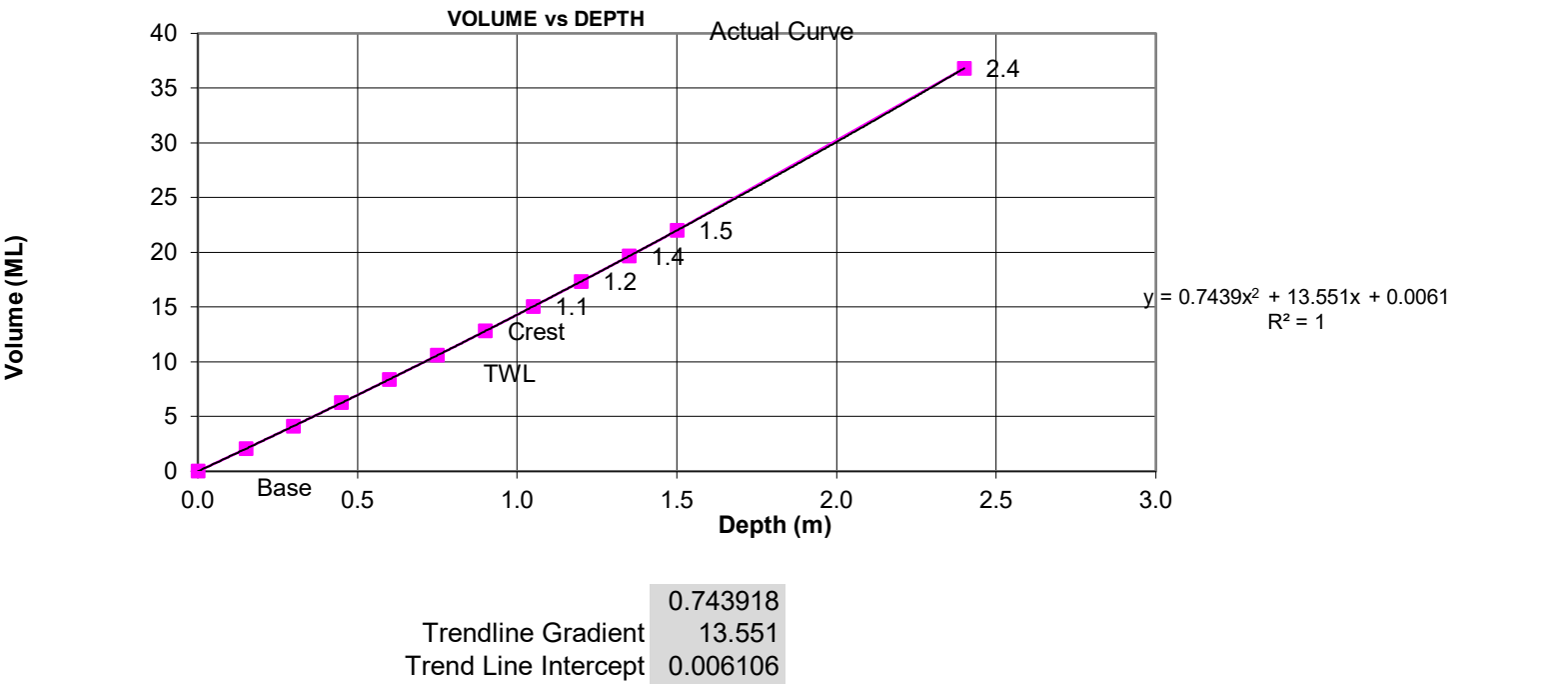
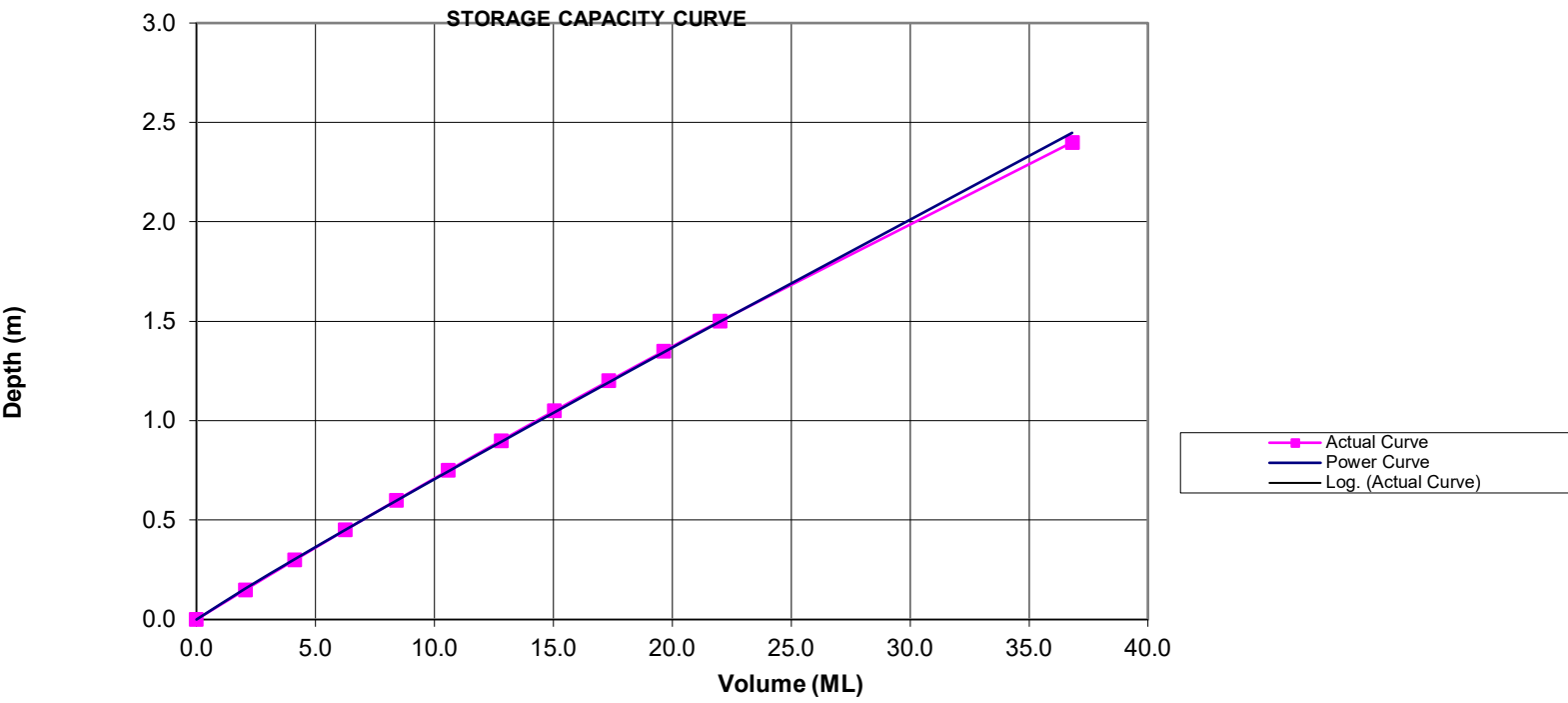
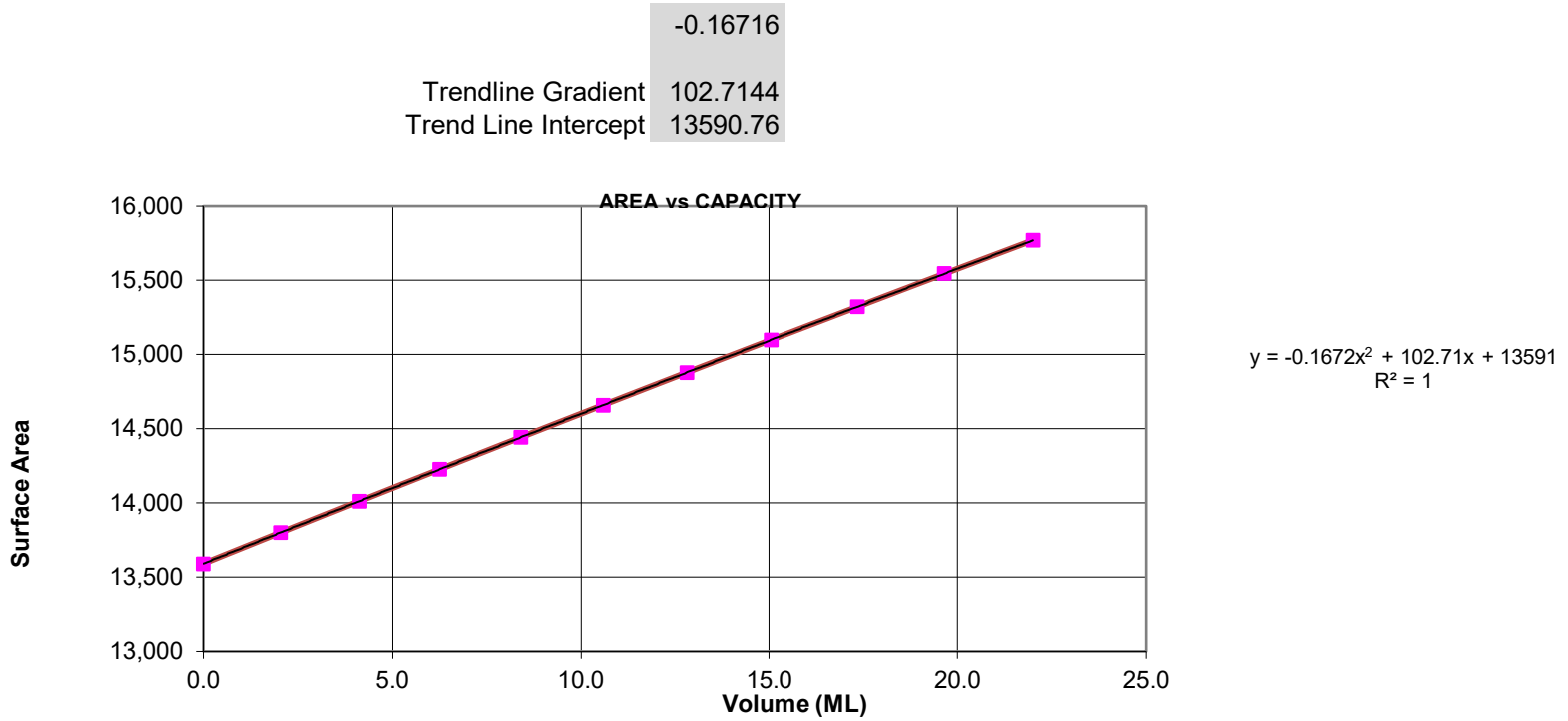
Finished Pond Dimensions

Description	Length (m)	Width (m)	Surface Area (m ²)	(ha)
Base (Inside Bed)	116.6	116.6	13,590	1.36
Inside at Natural Surface	131.0	131.0	17,155	1.72
Top Water Level	125.6	125.6	15,770	1.58
Internal Liner			17,348	1.73
Inside Crest	131.0	131.0	17,155	1.72
Outside Crest	131.0	131.0	17,155	1.72
Outside Toe	131.0	131.0	17,155	1.72

Storage Capacity Curve

Description	Depth (m)	Length (m)	Width (m)	Surface Area (m ²)	(ha)	Volume (ML)	Power Curve		Depth (m)
Base (Inside Bed)	0.0	116.6	116.6	13,590	1.4	0	0	0	0.0
1/10 TWL	0.2	117.5	117.5	13,801	1.4	2.05	-1.90	0.72	0.2
2/10 TWL	0.3	118.4	118.4	14,013	1.4	4.14	-1.20	1.42	0.3
3/10 TWL	0.5	119.3	119.3	14,227	1.4	6.26	-0.80	1.83	0.5
4/10 TWL	0.6	120.2	120.2	14,443	1.4	8.41	-0.51	2.13	0.6
5/10 TWL	0.8	121.1	121.1	14,660	1.5	10.59	-0.29	2.36	0.7
6/10 TWL	0.9	122.0	122.0	14,879	1.5	12.81	-0.11	2.55	0.9
7/10 TWL	1.1	122.9	122.9	15,099	1.5	15.06	0.05	2.71	1.0
8/10 TWL	1.2	123.8	123.8	15,321	1.5	17.34	0.18	2.85	1.2
9/10 TWL	1.4	124.7	124.7	15,545	1.6	19.65	0.30	2.98	1.3
Top Water Level	1.5	125.6	125.6	15,770	1.6	22.00	0.41	3.09	1.5
Inside Crest	2.4	131.0	131.0	17,155	1.7	36.82	0.88	3.61	2.4

Power Curve



Climate Data

Month	Average Evaporation (mm) ¹	Average Rainfall (mm) ¹	90 th Percentile Rainfall (mm) ²	10 th Percentile Evaporation (mm) ²
January	166.2	80.4	118.0	219.8
February	140.1	60.1	86.7	172.0
March	138.8	43.4	67.3	168.0
April	93	34.3	63.8	112.6
May	43.9	39.1	46.7	76.0
June	19.2	38.5	50.5	55.4
July	22.9	40.9	50.2	59.3
August	59.1	32.8	41.4	82.3
September	92.2	37.8	50.0	118.0
October	132.6	46.4	52.7	156.9
November	145.8	65.6	67.0	190.2
December	175	72.9	78.0	225.6
Annual Total	1228.8	592.2	772.3	1636.1

¹Data sourced from Silo Data Drill & processed in MEDLI. Data period 1971-2020

²90th Percentile adjusted rainfall & 10th Percentile adjusted evaporation using historical silo data

Catchment Data

Catchment Type	Area (m ²)	Runoff Coefficient
Pen Area	93,600	0.8
Soft Area	19,316	0.4
Hard Area	67,743	0.8
Manure Pad	13,100	0.8
Basin Area	2,687	0.8
Pond Area	15,554	1.00
Total Catchment (Excluding Pond)	196,446	0.76
Total Catchment	212,000	0.78

Disposal Data

Parameter	Value	Unit
Sedimentation Structure	Basin	n/a
Effluent Disposal Method	Evaporation & Irrigation	n/a
Irrigation Area Available	45.0	ha

Holding Pond - Design Method 1: Major Storm Event - Pond to retain 1 in 20 yr, 24 hour storm event

	Pens	Soft Balance	Hard	Manure Pad	Basin	Pond	Total	Units
Area	93,600	19,316	67,743	13,100	2,687	15,554	212,000	m ²
Rainfall event	95.8	95.8	95.8	95.8	95.8	95.8		mm
Runoff co-efficient A	0.8	0.4	0.8	0.8	0.8	1.0		n/a
Runoff depth	76.6	38.3	76.6	76.6	76.6	95.8		mm
Sludge Accumulation Factor, Fs	1.25	1.25	1.25	1.25	1.25	1.00		n/a
Runoff Volume	8,963	925	6,487	1,254	257	1,489	19,376	m ³

IFD Table - Rainfall intensity (mm/hour)

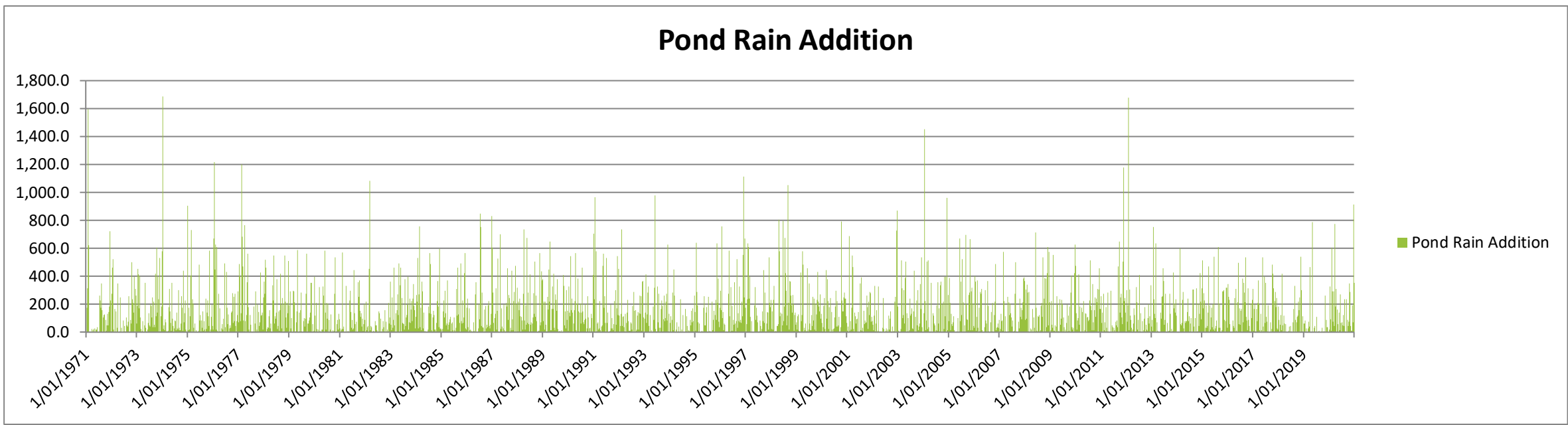
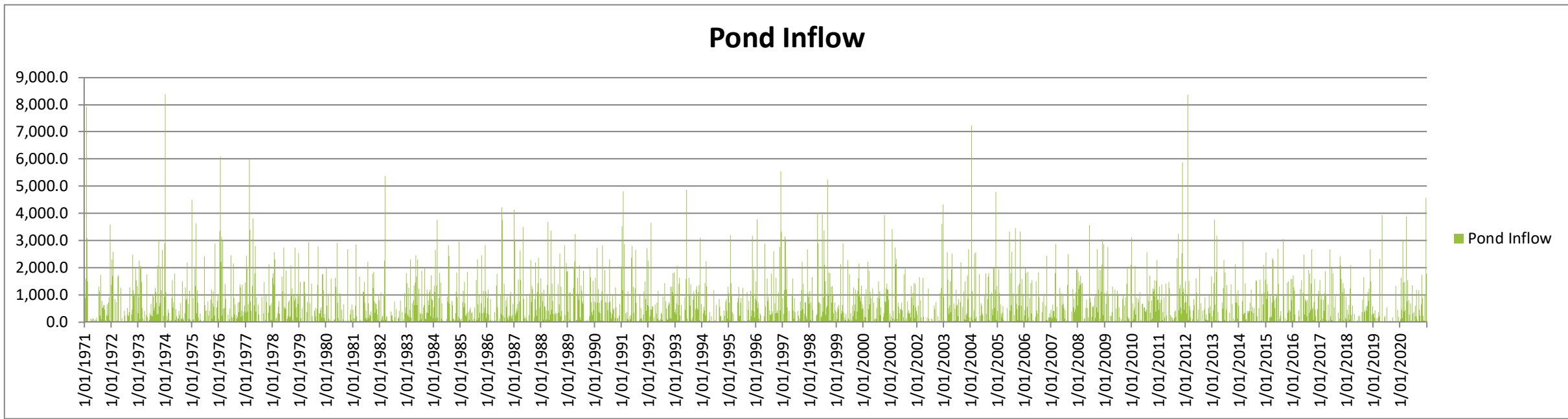
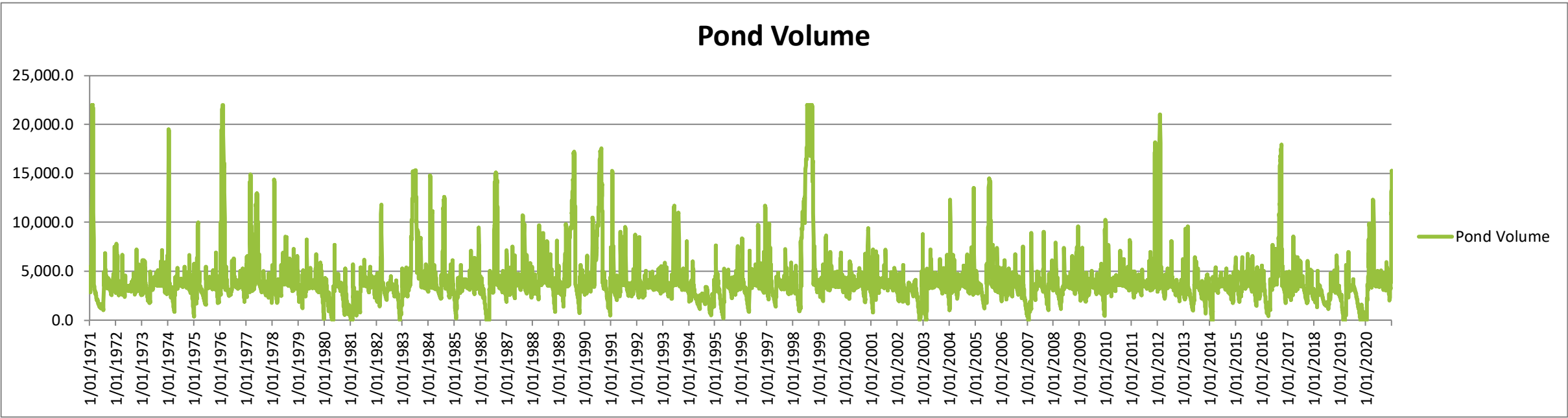
Location: Angoda Feedlot: -30.90 & 150.55

DURATION	Storm ARI 1 Year	Storm ARI 2 years	Storm ARI 5 years	Storm ARI 20 years	Storm ARI 50 years	Storm ARI 100 years
1 min	108	122	167	199	230	274
2 min	91.2	102	139	167	194	229
3 min	84.5	95	129	154	179	212
4 min	79.4	89.4	122	145	169	199
5 min	74.9	84.6	116	138	159	189
10 min	58.8	66.6	91.5	109	126	150
15 min	48.7	55.2	75.9	90.4	105	125
20 min	41.8	47.3	65.1	77.5	90.1	107
25 min	36.7	41.6	57.1	68.1	79.1	94.3
30 min	32.9	37.2	51.1	60.9	70.8	84.3
45 min	25.4	28.6	39.1	46.6	54.2	64.5
1 hour	20.9	23.5	32	38.1	44.3	52.6
1.5 hour	15.8	17.7	24	28.4	33	39.1
2 hour	12.9	14.4	19.5	23	26.6	31.5
3 hour	9.7	10.8	14.5	17.1	19.7	23.2
4.5 hour	7.3	8.14	10.8	12.7	14.6	17.2
6 hour	5.97	6.65	8.83	10.4	11.9	14
9 hour	4.49	5.01	6.65	7.79	8.94	10.5
12 hour	3.67	4.09	5.45	6.4	7.35	8.69
18 hour	2.75	3.07	4.11	4.86	5.61	6.67
24 hour	2.23	2.49	3.36	3.99	4.65	5.55
30 hour	1.89	2.11	2.87	3.43	4.01	4.82
36 hour	1.64	1.84	2.51	3.02	3.56	4.29
48 hour	1.32	1.47	2.03	2.46	2.92	3.55
72 hour	0.95	1.07	1.48	1.82	2.18	2.67

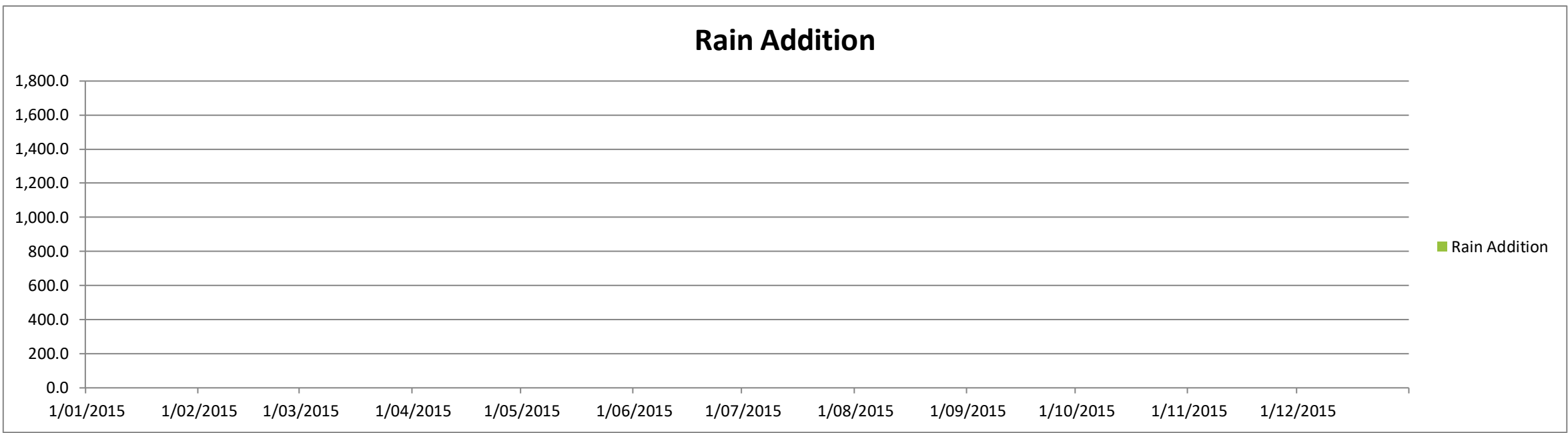
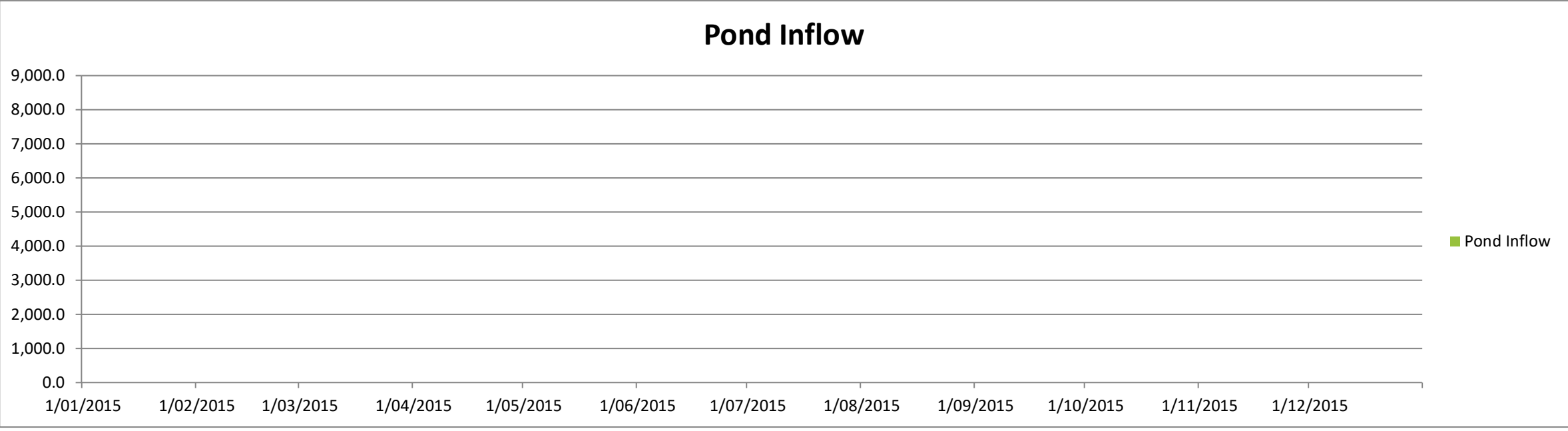
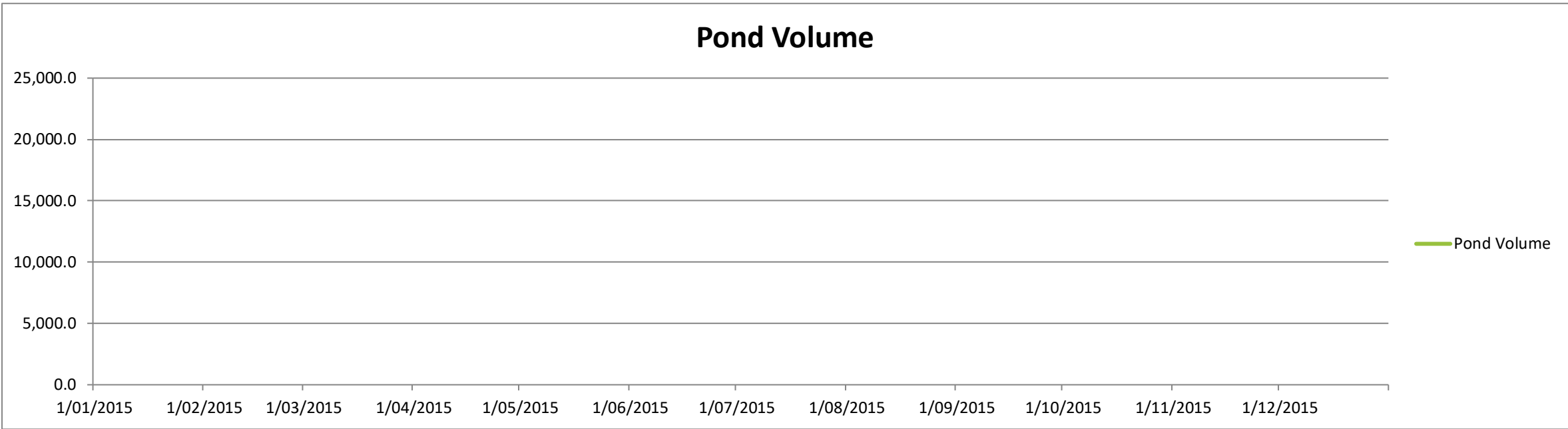
Annual Pond Balance

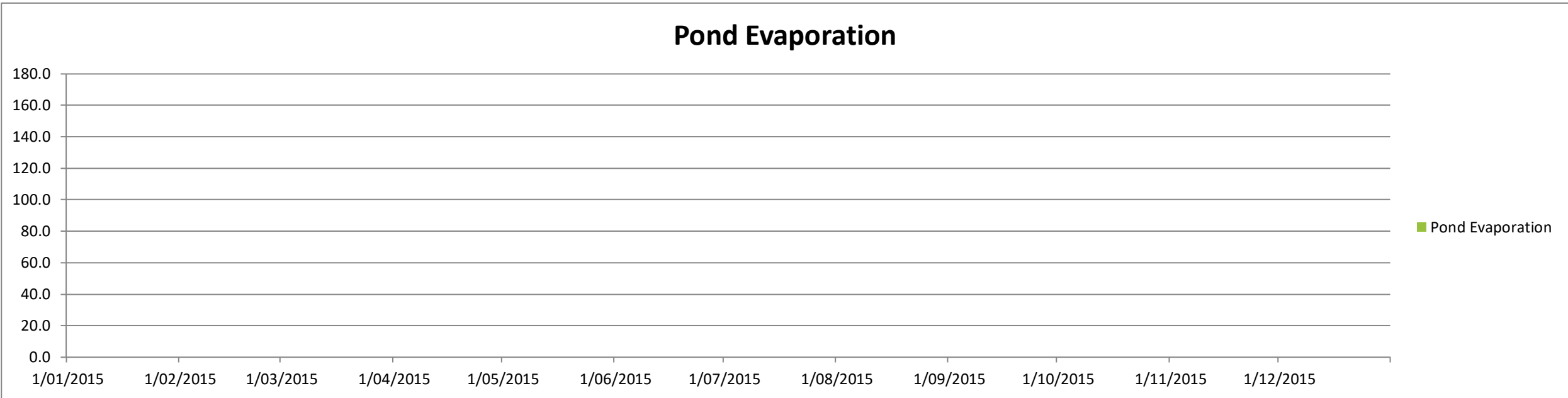
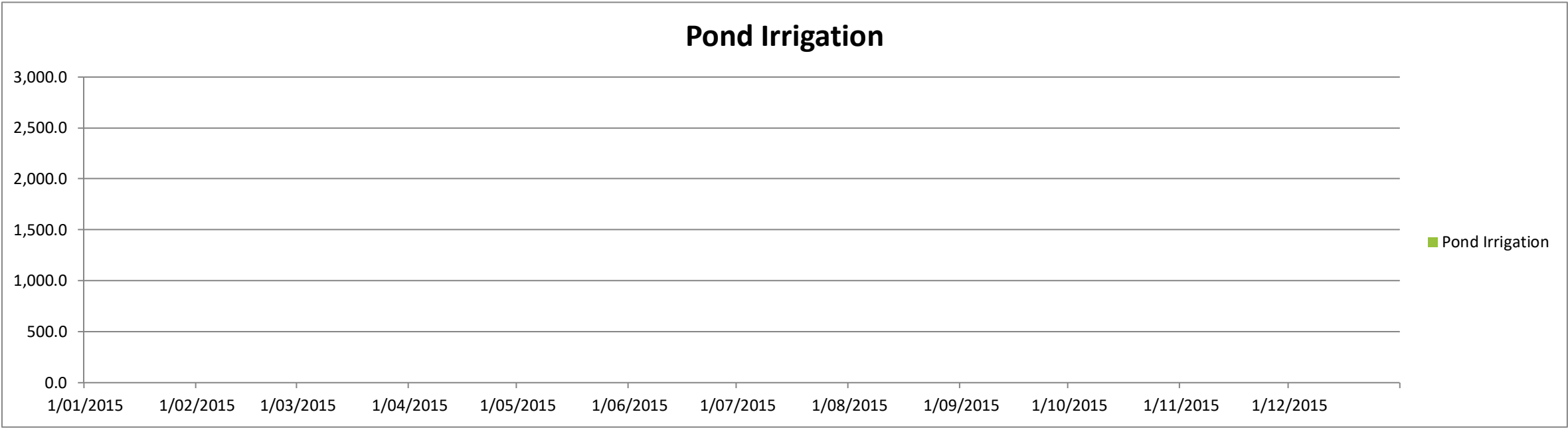
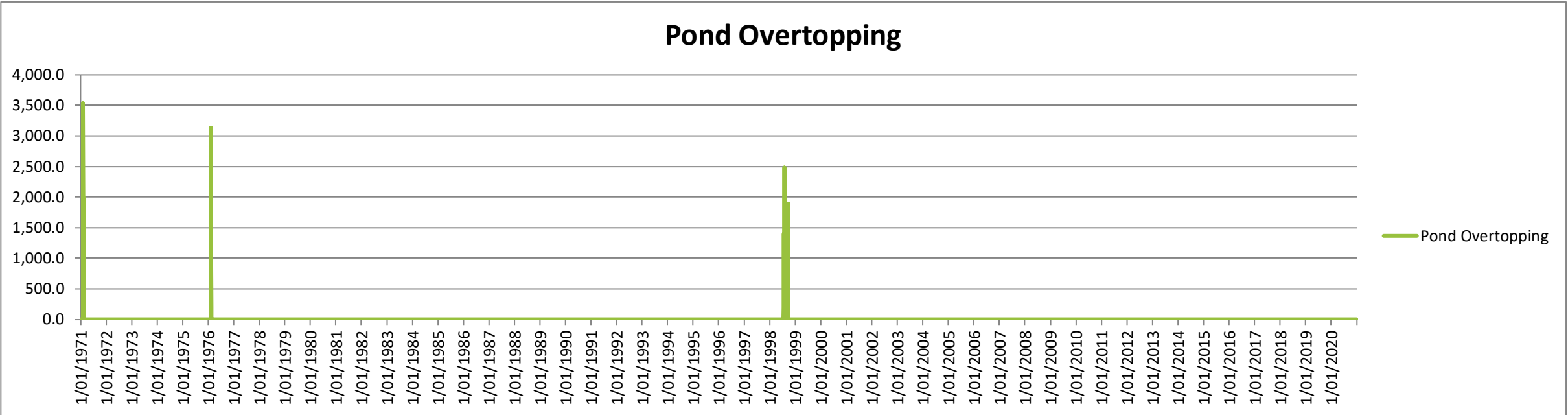
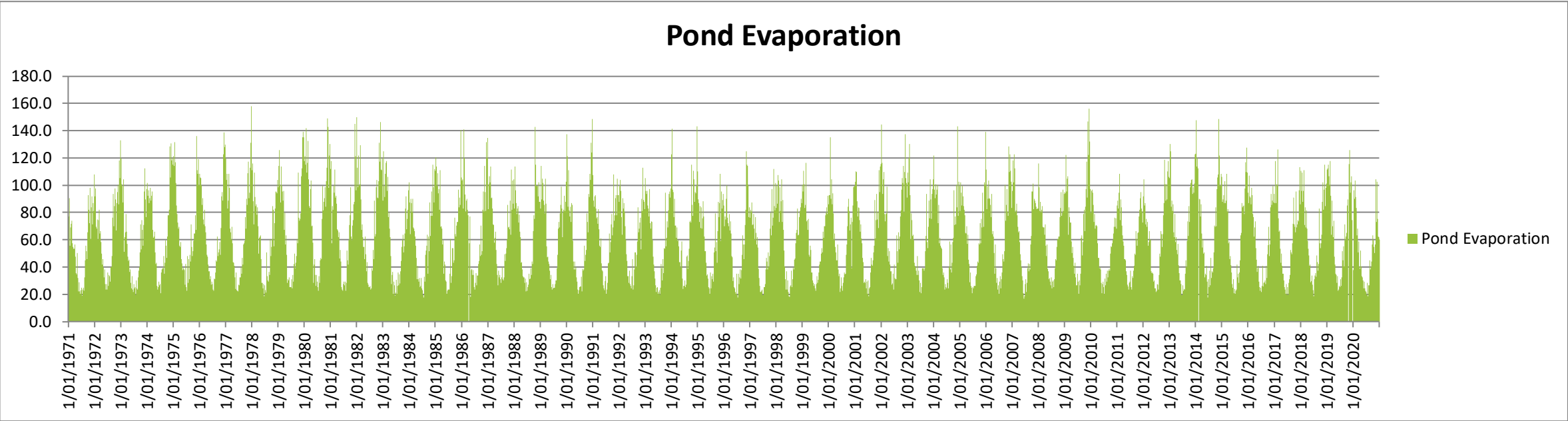
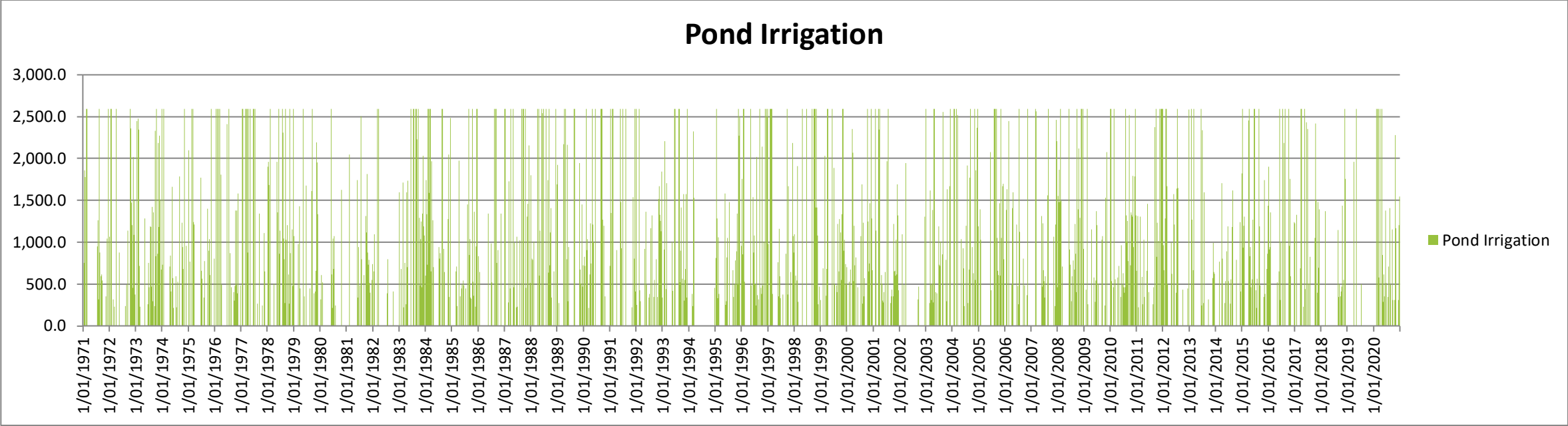
Year	Inflow (ML)	Rain Addition (ML)	Evaporation (ML)	Irrigation (ML)	Overtopping (ML)
1971	58.6	11.8	15.2	45.8	10.1
1972	44.6	8.9	17.7	35.6	
1973	53.0	10.6	15.9	45.6	
1974	40.1	8.1	18.0	35.1	
1975	45.8	9.2	17.8	34.2	
1976	60.0	12.0	17.7	49.8	5.0
1977	60.6	12.2	18.7	55.2	
1978	65.3	13.1	16.8	59.9	
1979	37.2	7.5	20.0	27.9	
1980	28.9	5.8	21.6	12.3	
1981	38.2	7.7	17.3	26.3	
1982	31.3	6.3	20.4	15.1	
1983	57.4	11.5	17.0	54.3	
1984	62.8	12.6	16.1	59.6	
1985	42.3	8.5	18.0	32.7	
1986	34.6	6.9	18.4	24.0	
1987	58.6	11.8	17.9	50.8	
1988	56.8	11.4	17.8	50.7	
1989	50.0	10.0	17.5	42.6	
1990	51.6	10.4	17.5	43.4	
1991	54.9	11.0	18.0	47.7	
1992	41.7	8.4	17.3	34.2	
1993	50.1	10.1	16.5	43.7	
1994	20.3	4.1	18.8	5.5	
1995	42.8	8.6	16.7	33.2	
1996	57.0	11.4	15.8	52.6	17.7
1997	46.2	9.3	16.1	39.8	
1998	70.5	14.2	16.6	51.4	
1999	51.0	10.2	16.3	44.1	
2000	46.0	9.2	17.4	38.6	
2001	44.2	8.9	17.5	35.2	
2002	26.1	5.2	20.2	11.1	
2003	42.1	8.5	17.7	34.4	
2004	61.7	12.4	17.8	54.7	
2005	51.0	10.2	18.0	44.1	
2006	31.6	6.3	19.4	20.8	
2007	44.7	9.0	17.9	32.8	
2008	57.1	11.5	16.7	51.7	
2009	37.0	7.4	19.6	23.7	
2010	56.2	11.3	15.0	53.8	
2011	51.3	10.3	16.2	45.5	
2012	49.7	10.0	17.4	41.9	
2013	38.2	7.7	19.5	26.8	
2014	36.3	7.3	18.3	25.0	
2015	46.7	9.4	18.0	38.1	
2016	48.5	9.7	16.6	41.9	
2017	41.3	8.3	17.0	32.5	
2018	26.9	5.4	18.7	14.2	
2019	16.0	3.2	16.1	5.7	
2020	51.6	11.6	12.9	45.5	
50 year Avg.	47.5	9.5	17.8	38.6	3.0

Model	Inflow (m3)	Rainfall on Pond (m3)	Evaporation (m3)	Effluent Applied (m3)	Cumulative Storage Volume (m3)	Overflow (m3)
0.4 Universal Runoff - Total	2,326,699	466,944	877,904	1,871,156	70,603,084	32,839
0.4 Universal Runoff - Avg.	46,534	9,339	17,558	37,423	1,412,062	657



Model	Inflow (m3)	Rainfall on Pond (m3)	Evaporation (m3)	Effluent Applied (m3)	Cumulative Storage Volume (m3)	Overflow (m3)
0.4 Universal Runoff - Year	46,707	9,374	17,988	38,101	1,253,453	0
2015						





Effluent Reuse Area - Cropping Information

Parameter	Liquid effluent irrigation area	
Crop Period	Summer	Winter
Crop or fodder produced	Lucerne	Lucerne
Normal average yield	20	20
Anticipated DM yield (t/ha/yr)	15	15
Dry Matter Nitrogen content	3.50%	3.50%
Dry Matter Phosphorous content	0.40%	0.40%
Dry Matter Potassium content	2.50%	2.50%
Crop Nitrogen removal	525	525
Crop Phosphorous removal	60	60
Crop Potassium removal	375	375

Effluent Reuse Area - Soil Type & Phosphorous Buffering Capacity

Parameter	Effluent Utilisation Area	
Soil type	Brown dermosol	
Soil depth to the base of the root zone	1.0	m
Bulk density of the soil	1,200	kg/m ³
Measured P sorption capacity of the soil		mg P/kg soil
P sorption capacity of the soil	102	mg P/kg soil
Safe P storage capacity of soil	1,224	kg/ha

Effluent Reuse Area - Nutrient Uptake

Parameter	Nitrogen	Phosphorous	Potassium	Units
Estimated average annual effluent irrigation volume		37		ML/yr
Proposed effluent irrigation method		Spray		
Proposed irrigator type / system		Pivot		
Average pond effluent nutrient composition	220	71	1092	mg/L
N losses during effluent irrigation	15%			
N losses from soil surface following effluent irrigation	10%			
Irrigated effluent available for plant uptake	6,298	2,657	40,866	kg/yr
Total crop nutrient removal	1050	120	750	kg/ha/yr

Effluent Reuse Area - Minimum effluent irrigation areas

Parameter	Nitrogen	Phosphorous	Potassium	Units
Minimum area based on: Total nutrient uptake	6.0	22.1	54.5	ha
Minimum area based on: Soil P Storage (50 year life)		18.4		ha (50 year life)
Minimum required effluent irrigation area			18.4	ha
Maximum effluent application rate			203.49	mm/yr
Proposed effluent irrigation area			45	ha
Proposed effluent irrigation application rate			83.2	mm/yr

Effluent Reuse Area - Nutrient balance

Parameter	Nitrogen	Phosphorous	Potassium	Units
Nutrients added (after losses)	6,298	2,657	40,866	kg/yr
Nutrients added (after losses) per ha	140	59	908	kg/ha/yr
Nutrients removed by crop	47,250	5,400	33,750	kg/yr
Nutrients removed by crop per ha	1,050	120	750	kg/ha/yr
Nutrient excess per ha	0	0	158	kg/ha/yr
Nutrient deficiency per ha	910	61	0	kg/ha/yr

Crop type, average yield & nutrient uptake

Crop	Average Yield (t/ha/yr)	Nitrogen	Phosphorous	Potassium
No Crop	0	0.0%	0.0%	0.0%
Grain barley	3.5	1.8%	0.4%	0.7%
Grain sorghum	3.5	2.1%	0.3%	0.3%
Grain maize	7	1.6%	0.3%	0.5%
Grain oats	4	1.7%	0.4%	0.4%
Grain wheat	4	1.9%	0.4%	0.6%
Forage sorghum	15	1.8%	0.3%	1.9%
Maize silage	25	1.1%	0.2%	1.0%
Winter cereals	5	1.5%	0.3%	1.4%
Wheat straw	5	0.5%	0.1%	1.3%
Lucerne	20	3.5%	0.4%	2.5%
Misc.				
Misc.				

Data from Table 4.2 of the NSW effluent reuse manual (Select crops only)

Soil type & phosphorous storage capability

Soil classification	Great soil group	Soil bulk density (kg/m ³)	P sorption capacity (mg P/kg soil)
Brown sodosol	Soloths	1,300	50
Stratic rudosol	Podzol	1,500	45
Grey vertosol	Grey clay	1,200	73
Black vertosol	Black earth	1,300	73
Brown dermosol	Prairie soil	1,200	102
Brown kandosol	Yellow earth	1,300	142
Brown chromosol	Yellow podzolic	1,200	194
Red ferrosol	Krasnozem	1,300	280
Red chromosol	Red podzolic	1,200	304
Misc.			
Misc.			
Misc.			
Misc.			

Data from soil type sheet of QLD DAF spreadsheet

APPENDIX H – ENVIRONMENTAL MANAGEMENT PLAN



ENVIRONMENTAL MANAGEMENT PLAN

Angora Feedlot

Angora Feedlot Pty Ltd

Date: 13 December 2023



Prepared by:

Matt Norton (B. App. Sc.)
Director

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ENVIRONMENTAL MANAGEMENT PLAN

Angora Feedlot

Angora Feedlot Pty Ltd



Document Control						
Revision	Description	Date Issued	Prepared by	Signed	Reviewed by	Signed
Rev 0	Draft	13/12/2023	MRN		TCG	
Rev A	Final					

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APPENDICES

Appendix A – Environment Protection Licence
Appendix B – Feedlot Plans

1 INTRODUCTION

Angora Feedlot Pty Ltd (Angora) currently operate a 1,000 head feedlot on 'Annabrae', Rannock Burn Road, Rushes Creek. They are proposing to construct an 8,100 head feedlot on a greenfield site and additionally increase the capacity of the 1,000 head feedlot to approximately 1,400 head. This will result in a combined feedlot capacity of 9,500 head. Based on the expected cattle type, this equates to a capacity of 7,240 standard cattle units (SCU). The construction of the new feedlot will be staged by row based on market demands and finance availability.

This Environmental Management Plan (EMP) has been prepared to support a development application for the feedlot and to guide future management. Where relevant, parts of it have been written as though the expanded feedlot has obtained town planning consent and an Environmental Protection Licence (EPL). However, an update is likely to be required following the development approval and prior to the submission of the EPL application. Subsequent amendments to this EMP may be required to ensure ongoing compliance with conditions of the town planning consent or EPL.

This document is to be read in conjunction with the information provided in the Environmental Impact Statement (EIS) submitted with the development application. If there is a contradiction between this EMP and the conditions of the Tamworth Regional Council (TRC) consent or the EPL, the EMP should be updated to reflect the conditions. If required, a modification to the consent or variation to the EPL can be completed to ensure consistency.

A copy of this EMP should be retained at the site office where it is readily accessible to all staff.

Refer to Appendix A for the EPL.

2 SITE AND LOCALITY

2.1 SUBJECT SITE

The subject site, 'Annabrae' is located on Rannock Burn Road, Rushes Creek approximately 27 km east, north-east of Gunnedah and 39 km north-west of Tamworth. The property includes seven land parcels with a total area of 525 ha (Table 1). The property is bounded by Rannock Burn Road on the northern side and the Peel River on the southern side. There are several Crown or 'paper' roads across the property which have been considered in the design of the feedlot. While the property is in the TRC local government area (LGA), The Gunnedah Shire Council LGA commences approximately 2 km south-west of the property.

The existing property includes the 1,000 head feedlot, with the remainder of the property used for dryland cropping and grazing. Effluent from the existing feedlot is irrigated on adjacent land via a travelling irrigator. Upon approval, the property will also include the new feedlot complex and two centre pivots for effluent irrigation.

Table 1 – Property Description

Land Parcel (Lot/Plan)	Area (ha)
19/DP752169	176.9
1/DP842391	259.7
43/DP752169	21.8
44/DP752169	21.9
141/DP752169	22.4
142/DP752169	22.0
Total	524.7

2.2 CLIMATE

Climate for the region is warm temperate with mean monthly rainfall slightly higher in summer but more evenly distributed throughout the year than a sub-tropical climate (Figure 1). Long-term rainfall statistics show a mean annual rainfall of 628 mm with a January average maximum temperature of 32.2 °C and a July average minimum temperature of 4.8 °C. Climate data, sourced from the Bureau of Meteorology, is presented for Gunnedah.

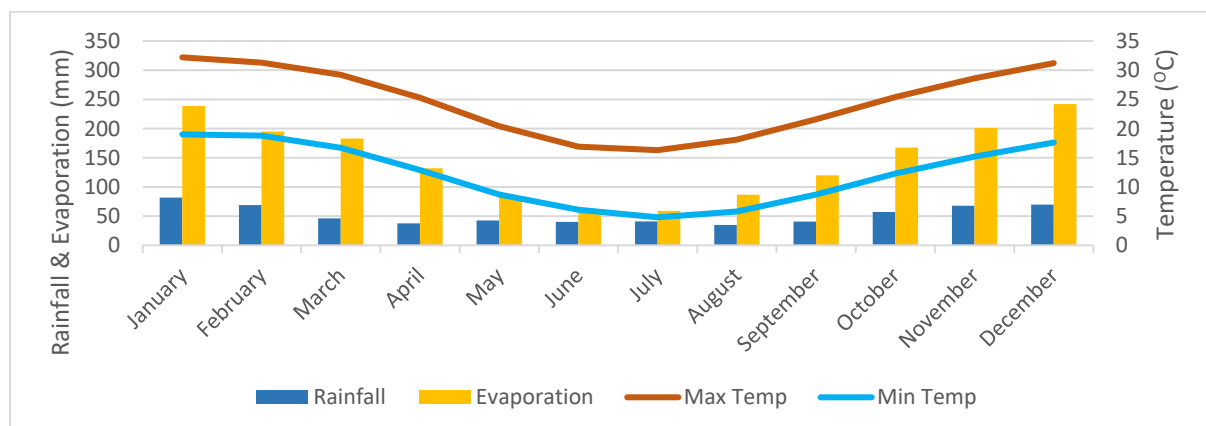


Figure 1 –Climate Data

2.3 RECEPTORS AND SURROUNDING LAND USE

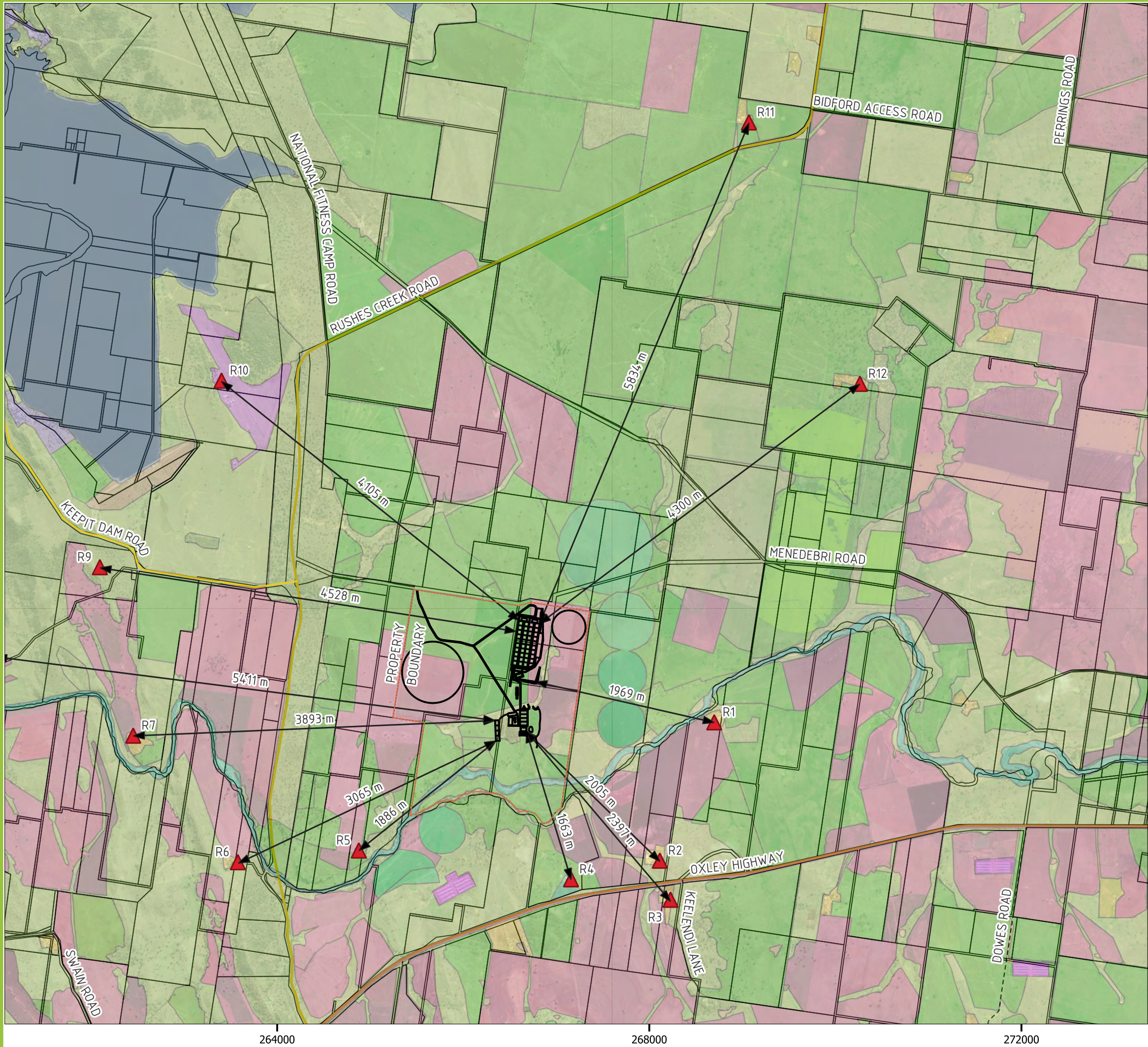
The nearest sensitive receptors surrounding the property have been identified (Table 2, Figure 2). The nearest sensitive receptor (R4, Lot 2/DP705509) is approximately 1,663 m south of the existing feedlot. Generally, the region is dominated by cropping and grazing uses with a poultry farm located to the south of the feedlot. There are numerous small to medium feedlots in the region and several small to large poultry farms. The potential for cumulative impacts from the nearby poultry farm and proposed feedlot has been considered in the odour impact assessment.

Table 2 – Sensitive Receptors

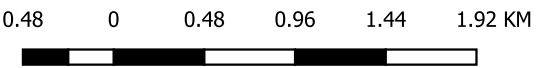
Receptor	Lot/Plan	Direction	Distance (m)
R1	3/DP755331	E	1,969
R2	27/DP755331	SE	2,005
R3	38/DP755331	SE	2,397
R4	2/DP705509	SSE	1,663
R5	16/DP752189	SW	1,886
R6	47/DP755331	SW	3,065
R7	3/DP834485	W	3,893
R8	228/DP752189	W	5,411
R9	1/DP834485	W	4,528
R10	5/DP179323	NW	4,105
R11	1/DP1180266	NNE	5,834
R12	80/DP752169	NE	4,300
Carroll	701/DP93882	WSW	11,450

2.4 TOPOGRAPHY

On-site topography varies from sloping areas to flat alluvial landscapes. The highest point of the property, in the north-west corner near the property access, has an elevation of 330 m and the lowest point of the property, along the Peel River in the south-west corner, has an elevation of 295 m. Steeper areas are to the west of the feedlot site and not subject to development. The gradient of the property site is typically 1-2 % with some steeper areas on the edge of the Peel River.



Agricultural Development Services
Australia Pty Ltd (AgDSA)
ABN: 30 639 923 434



SPATIAL REFERENCE
GDA 2020 MGA ZONE 56
DATUM: GDA 2020
MAP UNITS: METRE
SCALE 1:40,000 AT A3

LEGEND

SITE SPECIFIC

SITE LAYOUT - PROPOSED

PROPERTY BOUNDARY

SENSITIVE RECEPTORS

DISTANCE TO RECEPTORS

Sensitive_Receptors

NSW

SOILS

NSW LANDUSE 2017

- 1.2.0 Managed resource protection
- 2.1.0 Grazing native vegetation
- 3.2.0 Grazing modified pastures
- 3.3.0 Cropping
- 4.3.0 Irrigated cropping
- 4.4.0 Irrigated perennial horticulture
- 5.2.0 Intensive animal production
- 5.4.0 Residential and farm infrastructure
- 5.5.0 Services
- 5.7.0 Transport and communication
- 6.1.0 Lake
- 6.2.0 Reservoir/dam
- 6.3.0 River

BTC-001
ANGORA FEEDLOT PTY LTD

RANNOCK BURN RD,
RUSHES CREEK NSW 2346

SENSITIVE RECEPTORS AND
LANDUSE PLAN

FIGURE B2

3 FEEDLOT OPERATIONS

3.1 OVERVIEW

Angora currently operates a 1,000 head feedlot on 'Annabrae', Rannock Burn Road, Rushes Creek. They are proposing to construct an 8,100 head feedlot on a greenfield site and increase the capacity of the 1,000 head feedlot to approximately 1,400 head. This will result in a combined feedlot capacity of 9,500 head. Based on the expected cattle type, this equates to a capacity of 7,240 standard cattle units (SCU).

The existing drought pens will be decommissioned, and on-site backgrounding operations will be managed to ensure ground cover can be maintained across most of the paddocks during normal weather conditions (i.e. outside of drought periods).

The proposed feedlot will have a stocking density of 15 m²/SCU across 39 pens with dimensions of 48 m (width) by 50 m (depth) resulting in an individual pen area of 2,400 m². Each pen will have a maximum capacity of 160 SCU with pens constructed in a back-to-back configuration with two rows sharing each feed road and some rows sharing a cattle lane and drain. The pens will have a uniform downslope of approximately 3 % which facilitates pen drainage and minimises pen-to-pen drainage. Each pen may have a slightly different slope based on earthworks optimisation. Each drain will have a slope of approximately 0.5 % which will minimise sediment deposition in the drains. As with the pen slope, final drain slope may vary to provide flexibility for earthworks optimisation.

The proposed feedlot will be located in a controlled drainage area (CDA) which will ensure all clean, upslope water is diverted around the feedlot and all contaminated runoff from the feedlot controlled and contained in a 2.5 ML sedimentation basin and a 22 ML effluent holding pond.

Generally, the feedlot has been constructed in accordance with the *National Guidelines for Beef Cattle Feedlots in Australia* (National Guidelines) and the *National Beef Cattle Feedlot Environmental Code of Practice* (Code of Practice).

The feedlot has been designed and will be managed for long-term sustainability and has an indefinite lifetime. Should the feedlot be decommissioned, infrastructure not required for the ongoing operation of the property will be removed and all effluent and manure applied to paddocks. The sedimentation and effluent holding ponds will be filled in and the site returned to pasture.

Due to welfare requirements, staff and general operations can be required 24 hours a day, seven days a week. However, where possible, operations, work and heavy vehicle movements are restricted to daylight hours between 6 am and 6 pm. Occasionally, heavy vehicle movements are required outside of these hours.

3.2 WASTE MANAGEMENT

3.2.1 EFFLUENT IRRIGATION

As per the National Guidelines and industry best practice, runoff contained in the effluent holding pond is either reused for dust suppression on internal roadways or sustainably irrigated to surrounding agricultural land. A total of 45 ha of effluent utilisation area (EUA), across two centre pivots, is available for irrigation.

Due to the size of the groundwater allocation, there is additional fresh water available for irrigation to optimise plant growth, maximise yields and maximise nutrient removal rates. Crop selection will change each year but will usually include a high-biomass silage crop during summer and cereal crops during winter. Pasture may also be utilised, which would be cut for hay. Opportunistic grazing may occur in the EUA, but this will not be relied upon for nutrient removal.

3.2.2 MANURE MANAGEMENT

A new manure handling area is proposed on the eastern side of the new feedlot. Once manure is removed from the pens, it will be stockpiled and/or composted on the manure pad prior to utilisation on-site or transport to off-site properties for use. To ensure compliance with the relevant resource recovery order and exemption (manure or compost), manure-only stockpiles will be managed separately to manure used for composting of mortalities.

A total of 155 ha of manure utilisation area (MUA) is available on the property. Application rates will be determined each year based on soil sampling and agronomic advice. This area will be prioritised for the application of manure and composted mortalities. Should excess manure be accumulated on the manure pad, either due to seasonal, soil nutrient or cropping variations, it will be exported to other properties owned by the applicant.

3.2.3 MORTALITY MANAGEMENT

The mortality composting area will be located at the southern end of the manure pad with raw manure stockpiles separated to prevent cross-contamination. This will allow for manure to be exported off-site under the current manure resource recovery exemption. Except for a mass death event, mortalities will not be buried.

Should a mass death event occur, a burial pit will be excavated in the paddock containing the EUA 1 centre pivot, but to the south-east or south-west of the pivot. The pit will be excavated to a minimum depth that ensures at least 1 m of soil coverage can be placed above the carcasses. The base of the pit will be rolled and compacted to minimise permeability. Should the in-situ material have inadequate clay to form an impermeable layer, an alternate location will be selected, or clay material imported to form a clay liner. The selection of an alternate site will be undertaken following consultation with TRC and the EPA. However, the process of preparation and burial will remain the same. Any location should be free from inundation during a flood event and ensure that the shallowest depth to groundwater exceeds 2 m below the base of the pit. This needs to consider seasonal changes in groundwater conditions.

3.2.4 GENERAL WASTE

Any general waste generated will be placed in commercial bins near the feedmill or house and removed by the property owner or a commercial contractor. General waste will not be buried on the property.

4 ENVIRONMENTAL MANAGEMENT

The environmental design and management of the feedlot aims to ensure compliance with the requirements of the planning consent, EPL, and environmental standards of the National Feedlot Accreditation Scheme (NFAS). As Angora is a family run business, the directors of the business are responsible for compliance with the EPL.

4.1 DATA COLLECTION AND MONITORING

Identified management actions will be recorded as they are completed. An electronic database, or spreadsheet, will be utilised to record each date on which the action is completed, and any corrective action required. Regular training and internal communication will ensure all employees, new and existing, are aware of their environmental obligations.

An Annual Environmental Monitoring Report (AEMR) will be prepared each year to accompany the annual return. Preliminary monitoring locations and requirements have been identified but will require confirmation following the issuing of the EPL. A Monitoring Plan (Appendix B) will be prepared once the requirements are finalised. All laboratory analyses will be completed at a NATA accredited laboratory.

Data on the following will need to be collected and recorded:

- Climate data (automated weather station);
- Cattle entering and exiting the feedlot and average monthly head on feed;
- Daily mortalities and mass mortality events;
- Vehicle movements outside of normal operating hours (6am – 6pm);
- Pen cleaning events (recorded per pen);
- Mature manure quality (1-2 sampling events per year);
- Manure quantity exported from the property;
- Effluent quality from both ponds (1-2 sampling events per year);
- Effluent irrigation volumes – daily records preferred but adequate recording to determine average application rates;
- Effluent pond volume observations following heavy rainfall;
- Effluent spill events including an effluent quality sample;
- Sediment and effluent pond cleaning;
- Soil monitoring (MUA and EUA)– number of sites to be confirmed, 1-2 sampling events per year;
- Groundwater monitoring – number of sites to be confirmed but must include an upgradient and downgradient location, 1-2 sampling events per year;
- Complaints received; and
- Maintenance inspections (embankments, drains, roads, pens, ponds, etc) and corrective actions.

4.2 POLLUTION INCIDENT RESPONSE MANAGEMENT PLAN

A Pollution Incident Response Management Plan (PIRMP) will be developed and submitted as part of the subsequent application for an EPL. The PIRMP will include notification and response procedures in the event of an effluent spill.

4.3 ENVIRONMENTAL AND LAND USE CONFLICT RISK ASSESSMENT

An environmental and land use conflict risk assessment allows for the risks presented by the proposed development to be identified and minimised as much as reasonably possible. Environmental risk is determined by the potential consequences of the activity and the likelihood of those consequences occurring (Table 3). Appropriate management strategies can then be identified based on the risk (Table 4). This risk assessment has been completed in accordance with the Land Use Conflict Risk Assessment Guide.

For the purposes of this environmental risk assessment, consequence is described as:

- Negligible – environmental harm/nuisance is not detectable;
- Minor – environmental harm/nuisance is detected but is short term or easily remedied;
- Moderate – environmental harm/nuisance is ongoing and difficult to remedy but unlikely to result in prosecution;
- Significant – environmental harm/nuisance is long-term and difficult to remedy; or
- Severe – environmental harm is permanent, irreversible, and likely to result in prosecution.

Likelihood is described as:

- Rare – practically impossible;
- Unlikely – could occur in some circumstances, but not likely to occur;
- Possible – could occur, or 'I've heard of it happening';
- Likely – known to occur, or 'it has happened'; or
- Almost certain – common or repeating occurrence.

Table 3 – Environmental Risk Assessment Matrix

Likelihood	Consequence				
	Negligible	Minor	Moderate	Major	Severe
Almost Certain	Medium (15)	Med-High (19)	Med-High (22)	High (24)	High (25)
Likely	Low Med (10)	Medium (14)	Med-High (18)	Med-High (21)	High (23)
Possible	Low Med (6)	Low Med (9)	Medium (13)	Med-High (17)	Med-High (20)
Unlikely	Low (3)	Low Med (5)	Low Med (8)	Medium (12)	Med-High (16)
Rare	Low (1)	Low (2)	Low Med (4)	Low Med (7)	Medium (11)

ENVIRONMENTAL MANAGEMENT PLAN

Angora Feedlot
Angora Feedlot Pty Ltd



Table 4 – Environmental and Land Use Conflict Risk Assessment

Environmental Value		Initial Risk	Justification	Residual Risk	Justification
Surface Water		Med-high (18) Consequences are moderate and likely.	The on-site surface water features include a drainage line adjacent to the two feedlot areas. This drainage line converges into the Peel River.	Low-Med (9) Consequences are minor and possible.	Refer to Section 4.4.
Groundwater		Low-Med (5) Consequences are minor and unlikely.	Seasonal depth to groundwater in alluvial areas may be between 1 m and 6 m. Groundwater at the feedlot site is estimated at approximately 11 m	Low (2) Consequences are minor and rare.	Refer to Section 4.5.
Land (Soil and Vegetation)		Medium (14) Consequences are minor and likely.	The clearing of scattered paddock trees will be required for construction of the feedlot and establishment of pivot irrigators. There is native vegetation in or near the areas identified for manure spreading. Soils have been identified as suitable for manure and/or effluent application.	Low-Med (10) Consequences are negligible and likely.	Refer to Section 4.6.
Community Amenity	Air	Low-Med (9) Consequences are minor and possible.	The region has a low population density and undulating landscape. Nearby dwellings are not located in low-lying areas which may be subject to katabatic odour.	Low-Med (5) Consequences are minor and unlikely.	Refer to Section 4.7.
	Acoustic	Low-Med (5) Consequences are minor and unlikely.	The noise and vibration assessment identified a low risk of noise impact from the feedlot. Noise from on-site vehicle movements has the highest potential for impacts.	Low (3) Consequences are negligible and unlikely.	
	Visual	Low-Med (6) Consequences are negligible and possible.	The feedlot will be visible at a distance from the Oxley Highway. However, it is a rural activity in a rural area.	Low (3) Consequences are negligible and unlikely.	

4.4 SURFACE WATER

4.4.1 DESCRIPTION OF ENVIRONMENTAL VALUE

Environmental values for surface waters include ecological, agricultural use, domestic use, recreational, and cultural heritage values. It is expected that water from the Peel River is used for stock, irrigation, and domestic purposes. There are two minor drainage lines on the property which converge into the Peel River. One of these is located adjacent to the CDA for the existing and proposed feedlot.

4.4.2 OBJECTIVES

The feedlot aims to achieve the following surface water objectives:

- Compliance with conditions of the EPL;
- Compliance with conditions of consent;
- Prevention of unreasonable impacts to surface water quality;
- Prevention of impacts to the bed and banks of watercourses; and
- Prevention of increases in surface water velocity.

4.4.3 POTENTIAL IMPACTS

The feedlot has the potential to cause the following impacts to surface waters:

- Increased contaminants resulting in algal blooms or damage to aquatic biodiversity and a restriction of the use of surface water for stock, irrigation, or domestic purposes; and
- Increased sediment loads because of erosion.

4.4.4 DESIGN CONSIDERATIONS

The following design considerations have been implemented to minimise the potential impact to surface waters:

- The proposed feedlot is in a CDA, which has been designed in accordance with the National Guidelines;
- The effluent system has been designed to contain runoff from the feedlot up to a 94 th percentile wet-year;
- The feedlot site and waste utilisation areas have been selected to maintain buffers to surface water features; and
- There are existing contour banks across the property for soil conservation, which reduce the velocity of water across the property.

4.4.5 MANAGEMENT PRACTICES

Table 5 describes management strategies and actions to prevent or minimise the impact of the feedlot on adjacent surface water features. Specific actions and the timing of these actions have also been identified.

Table 5 – Surface Water Management Practices

Management	Actions	Timing
Effluent holding pond	Check effluent holding pond levels.	Following a major rainfall event (>20 mm).
	Irrigate effluent from the effluent holding pond.	As soon as possible after major rainfall.
	Check sediment levels and record observed estimation.	When effluent holding pond is dry prior to summer.
	Remove sediment from the effluent holding pond.	When sediment accumulation reduces capacity by 25 %.
CDA maintenance.	Check drains, diversion bunds and effluent holding pond and sedimentation pond walls.	Following a major rainfall event (>20 mm) or monthly during extended dry periods.
	Repair any damage to the CDA.	As required and when possible following cleaning of the sedimentation pond and effluent holding pond.
Irrigation	Ensure soil moisture levels are appropriate to allow infiltration of effluent to prevent runoff. Appropriate levels determined by soil moisture probe or expert opinion. Suitable application rate determined by soil moisture.	Check levels prior to irrigation.
	Record effluent irrigation events and application rates.	Daily when irrigation occurs.
	Inspect irrigation equipment.	Prior to commencement of irrigation.
	Briefly observe irrigators during operation.	Daily when effluent is being irrigated.
	Maintain and replace irrigation equipment.	As required.
	Maintain 50 m buffers to all on-site drainage lines and creeks.	During irrigation.
Spill event	Construct temporary bunds or sediment fences downslope of the spill location to prevent or minimise effluent entering the Peel River.	Prior to or immediately following anticipated spill event.
	Notify EPL of a spill event.	During or immediately following spill event.

4.4.6 MONITORING

Sampling and analysis of effluent will occur every 6 months and in the event of a spill. As spill events are likely to occur during major flood events, the safe sampling of water quality in the Peel River is unlikely to be possible.

4.5 GROUNDWATER

4.5.1 DESCRIPTION OF ENVIRONMENTAL VALUE

Environmental values for groundwater include ecological, agricultural use, domestic use, recreational, and cultural heritage values. Due to the undulating landscape, depth to groundwater varies across the property. Groundwater depth on alluvial landscapes will vary seasonally based on the flow conditions of the adjacent creek.

According to the Water NSW real-time water data platform, alluvial groundwater depth in this area is normally approximately 5 m below ground level. However, it may be as shallow as 1 m during extended periods of rain when the landscape is saturated. However, the feedlot is not proposed on alluvial landscapes, and depth to groundwater is much greater. Groundwater works summaries for the nearest representative bore identified a low-yielding, water-bearing zone at a depth of approximately 11 m.

It is anticipated that groundwater gradients will be towards the Peel River near the feedlot and parallel with the Peel River in underlying alluvial aquifers. The installation of a piezometer network will allow for an accurate measurement of groundwater depth and flow.

4.5.2 OBJECTIVES

The feedlot aims to achieve the following groundwater objectives:

- Compliance with conditions of the EPL;
- Compliance with conditions of consent;
- Prevention of unreasonable impacts to groundwater quality.

4.5.3 POTENTIAL IMPACTS

The feedlot has the potential to cause the following impacts to groundwater:

- Increase in groundwater contaminants impacting on groundwater biodiversity or water supply to adjacent properties.

4.5.4 DESIGN CONSIDERATIONS

The following design considerations have been implemented to minimise the potential impact to groundwater:

- The CDA has been constructed with suitable materials and compaction to ensure a maximum permeability of 1×10^{-9} m/s (0.1 mm/day);
- There is adequate on-site land available for effluent utilisation and adequate land available, both on-site and off-site, for manure spreading to prevent the accumulation of nutrient in sub-soils and potential leaching into groundwater.

4.5.5 MANAGEMENT PRACTICES

Table 6 describes management strategies and actions to prevent or minimise the impact of the feedlot on underlying groundwater aquifers. Specific actions and the timing of, and person responsible, for these actions have also been identified.

Table 6 – Groundwater Management Practices

Management	Actions	Timing
CDA surface maintenance	Check drains, diversion bunds and the base of the effluent holding pond and sedimentation basin.	Following a major rainfall event (>20 mm) or monthly during extended dry periods.
	Repair any damage to the CDA.	As required and when possible following cleaning of the sedimentation basin and effluent holding pond.
Effluent and manure	Ensure effluent and manure is evenly distributed across available land.	Prior to and during application
	Ensure application rates and crop selection are determined following agronomic advice to adequately remove nutrients with the crop.	Prior to application
	Avoid the use of alluvial land for MUA.	During extended wet periods which influence seasonal groundwater depths.
	Ensure the long-term stockpiling of manure only occurs on hardstand areas within the CDA.	At all times.
	Ensure manure is not stored adjacent to utilisation areas for longer than necessary to facilitate application (i.e. less than a week). Rotate the location of these storage areas to minimise accumulation of nutrient in one spot.	Prior to manure application.
	Remove any excess manure stored adjacent to paddocks following application. Transport it back to a location within the CDA or on to the next location requiring manure application.	Following the completion of manure applications.
	Record details of irrigation and manure utilisation events (e.g. date, area, application rate, etc).	Following effluent and manure application.

4.5.6 MONITORING

Groundwater monitoring will be undertaken annually in accordance with the conditions of the EPL. Four locations for piezometers have been proposed to ensure an upgradient and down gradient location for each potential direction of groundwater flow.

4.6 LAND

4.6.1 DESCRIPTION OF ENVIRONMENTAL VALUE

The environmental values for soils and biodiversity have been combined into land management. On-site and nearby environmental values of land include the ongoing use of the land for agricultural purposes, remnant native vegetation and associated ecosystems, as well as any fauna that may be present within the landscape.

Based on the information presented in the EIS and supporting reports, the site is characterised by undulating landscapes to flat alluvial soils in the Peel River floodplain. Broadscale soil mapping incorrectly identifies the soils as Sodosols, with site-specific sampling identifying soils as Dermosols in most areas and some shallower, rocky Tenosols in the north-west portion of the property.

There are scattered remnant native trees across the property.

4.6.2 OBJECTIVES

The feedlot aims to achieve the following land objectives:

- Compliance with conditions of the EPL;
- Compliance with conditions of consent;
- Minimisation of the impact of development on the ongoing use of agricultural land;
- Minimisation of the clearing of or impact to remnant native vegetation; and
- Prevention of unreasonable impacts to the physical and chemical structure of soils.

4.6.3 POTENTIAL IMPACTS

The feedlot has the potential to cause the following impacts to land:

- Fragmentation of agricultural land through development;
- Loss of biodiversity associated with native vegetation;
- Excessive soil nutrient levels; and
- Erosion of topsoil due to the breakdown of soil structure.

4.6.4 DESIGN CONSIDERATIONS

The following design considerations have been implemented to minimise the potential impact to land:

- There is adequate agricultural land available for effluent irrigation;
- The feedlot is not located on steep (> 10 % slope) land;
- The feedlot has been located on a site which has limited native vegetation;
- Adjacent areas disturbed during construction, including the outer banks of the effluent holding pond will be revegetated with grass.

4.6.5 MANAGEMENT PRACTICES

Table 7 describes management strategies and actions to prevent or minimise the impact of the feedlot on the land including soil and native vegetation. Specific actions and the timing of these actions have also been identified.

Table 7 – Land Management Practices

Management	Actions	Timing
Soil surface	Check exposed soil within or adjacent to the CDA for erosion following rainfall events.	Following a major rainfall event (>20 mm) or monthly during extended dry periods.
	Re-seed and facilitate the re-growth of grass in areas of exposed soil (e.g. following construction or in high traffic areas)	Following construction or periodically as required.
Effluent and manure	Ensure effluent and manure is distributed evenly across available land.	Prior to and during application
	Ensure application rates and crop selection are determined following agronomic advice to ensure nutrients are removed with the crop.	Seasonally prior to planting or following harvest.
	Ensure the long-term stockpiling of manure only occurs on hardstand areas within the CDA.	At all times.
	Ensure manure is not stored adjacent to utilisation areas for longer than necessary to facilitate application (i.e. less than a week). Rotate the location of these storage areas to minimise accumulation of nutrient in one spot.	Prior to manure application.
	Remove any excess manure stored adjacent to paddocks following application. Transport it back to a location within the CDA or on to the next location requiring manure application.	Following the completion of manure applications.
	Record details of irrigation and manure utilisation events (e.g. date, area, application rate, etc).	Following effluent and manure application.
	Increase or relocate effluent irrigation areas should long-term soil nutrient trends suggest current area is not sustainable.	As required.
	Implement agronomic advice in the next crop.	Following expert review of monitoring data.
	Maintain a 20 m buffer around individual or groups of native trees.	When spreading manure
Biodiversity	Inspect adjacent native vegetation for damage which may have resulted from the feedlot or farming activities (e.g. spray drift). Investigate any potential impacts.	Annually.
	Engage a suitably qualified person to conduct a pre-clearing survey and inspect felled trees for fauna.	Prior to and following clearing.
	Separately identify and mark trees for clearing to deliberate from retained trees.	Prior to clearing.
	Where possible, plant native trees around the farm and feedlot complex.	Ongoing.
	Control weeds, pests, and feral animals on the property.	At all times.

Management	Actions	Timing
Construction	Place sediment fences downslope of all potentially disturbed areas.	Prior to construction
	Inspect contours downslope of construction areas. Remove sediment and repair as required.	Following a major rainfall event (>20 mm).
	Replace topsoil on outer batters of the effluent ponds and reseed with grass.	Following completion of construction.
Rehabilitation	Decommission the holding and backgrounding paddocks adjacent to the existing cattle yards. Convert these paddocks to short-term, low-intensity use.	Upon construction of the first new row.
	Remove infrastructure no longer required for the ongoing use of the land and remove clay liners and hardstand areas (deep ripping or root penetration). Sustainably dispose of effluent and manure on-site or off-site. Fill in the effluent system and level surface and return the land to pasture or another suitable non-polluting use.	Following cessation of the activity

4.6.6 MONITORING

Soil monitoring will be completed in accordance with EPL conditions and is expected to occur twice a year for the EUA and MUA immediately following the removal of summer or winter crops. Sampling should include multiple depths. Laboratory analyses will be completed in accordance with the EPL. Laboratory results must be reviewed by a suitably qualified person (agronomist or soil/environmental scientist). This review must include a long-term trend analysis for the effluent irrigation areas. Laboratory data must be retained for five years with summary of results retained, where possible, indefinitely (e.g. spreadsheet or database).

4.7 COMMUNITY AMENITY

4.7.1 DESCRIPTION OF ENVIRONMENTAL VALUE

Amenity is the ability for people to enjoy their lifestyle, free from unreasonable impacts from odour, dust, and noise and with limited impacts on the surrounding visual landscape. It is understood that odour, dust, noise, or visual amenity complaints have not been received in relation to the existing feedlot.

4.7.2 OBJECTIVES

The feedlot aims to achieve the following community amenity objectives:

- Compliance with conditions of the EPL;
- Compliance with conditions of consent;
- Prevention of unreasonable odour, dust, and noise impacts on nearby sensitive receptors; and
- Prevention of unreasonable impacts to the visual landscape of the locality.

4.7.3 POTENTIAL IMPACTS

The feedlot has the potential to cause the following impacts to community amenity:

- Environmental nuisance because of odour, dust and noise emissions including impacts on sleep;
- Adverse health impacts (e.g. asthma) from unreasonable dust emissions;
- Interruption of the rural landscape which is otherwise dominated by low intensity agricultural uses and scattered intensive livestock operations; and
- Increase weeds and pests in the area and on adjacent properties.

4.7.4 DESIGN CONSIDERATIONS

The following design considerations have been implemented to minimise the potential impact on community amenity:

- In accordance with the National Guidelines, the proposed feedlot complies with the required separation distances for all nearby receptors;
- Areas requiring cleaning (e.g. pens and drains) have been designed with consideration of machinery access; and
- Pen surfaces and drains are free-draining.

4.7.5 MANAGEMENT PRACTICES

Table 8 describes management strategies and actions to prevent or minimise the impact of the feedlot on community amenity. Specific actions and the timing of these actions have also been identified.

Table 8 – Community Amenity Management Practices

Management	Actions	Timing
Odour	Pen and under-fence cleaning of stocked pens.	At least every 13 weeks.
	Repair potholes and wet patches on pen surface.	As soon as possible following identification and within a month.
	Maintain a gravel stockpile on-site to facilitate pen surface repair.	At all times
	Remove sediment accumulated in sedimentation basin.	When sediment has dried following a major rainfall event (>20 mm).
Dust	Repair internal road surfaces (e.g. potholes and loose surface material) to minimise excessive dust.	As soon as possible following identification and within a month.
	Maintain a gravel stockpile on-site to facilitate road surface repair.	At all times
	Water internal roads during dry periods.	As required
Noise	Noisy activities such as feeding and heavy vehicle movements generally occur between 6 am and 6 pm.	At all times
	The only operations that occur 24 hours a day are those required for animal welfare reasons (e.g. emergency maintenance).	At all times
	On-site vehicle speed limits of 40 km/hour will be signed and enforced.	At all times

ENVIRONMENTAL MANAGEMENT PLAN

Angora Feedlot
Angora Feedlot Pty Ltd



Management	Actions	Timing
	Ongoing training and communication to ensure speed limits are observed.	Upon staff induction and annually
Visual	Inspect, maintain, and replace any visible buildings to ensure they do not become an eyesore.	As required.
Complaints	Set up and maintain a complaint register.	At all times.
	Provide a contact number in a visible location on the property entrance.	At all times.
	Undertake a brief review of weather conditions and operations following a complaint. Include potential causes and any necessary corrective actions. Provide feedback to the complainant.	Within a week of a complaint being received.
	Provide a summary of complaints to EPA.	As part of the annual return.

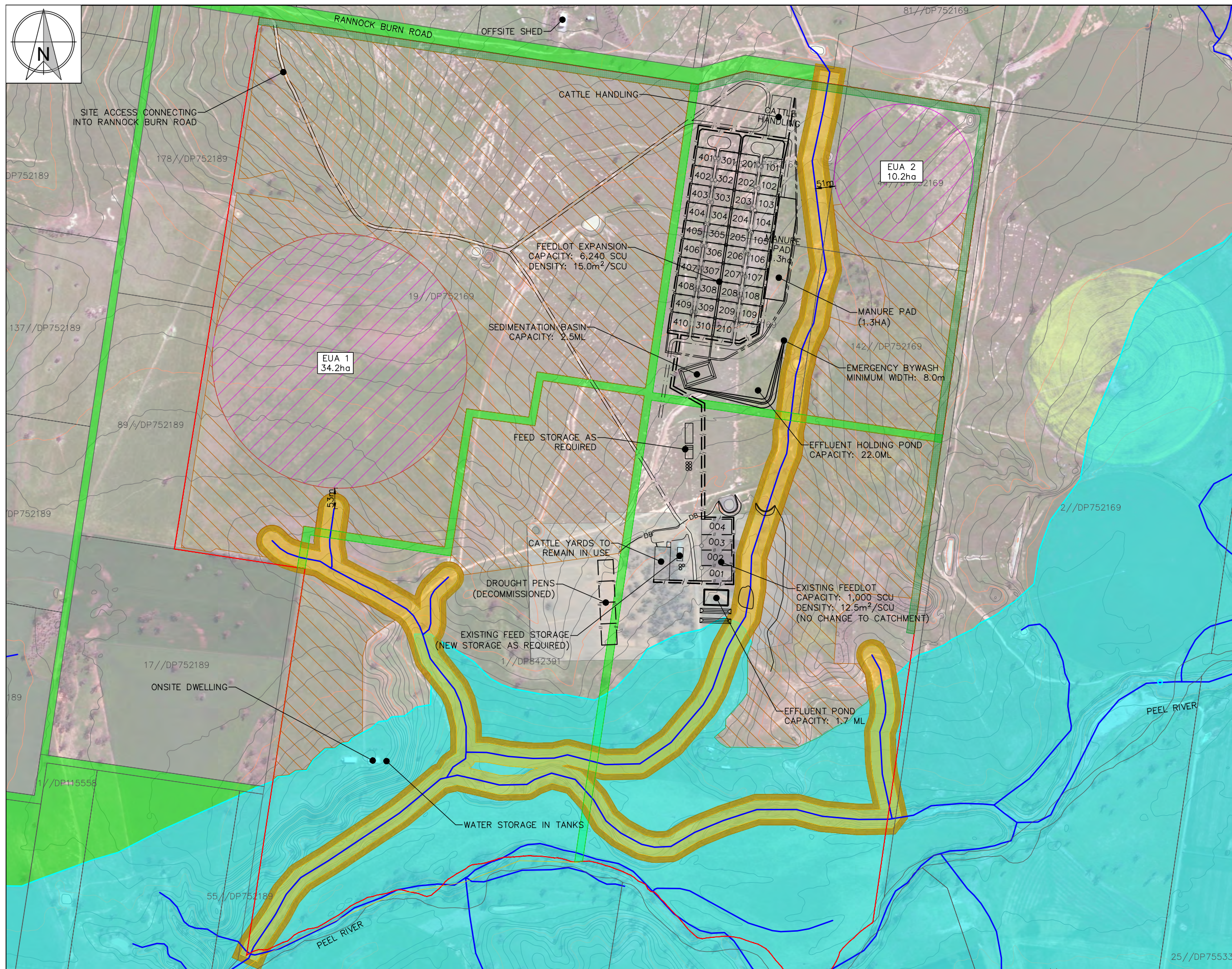
4.7.6 MONITORING

Monitoring for odour, dust, and noise will be completed if requested by TRC or EPA, or temporarily following receipt of a complaint.

APPENDIX A – ENVIRONMENT PROTECTION LICENCE

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APPENDIX B – FEEDLOT PLANS



LEGEND

NOTES:

SITE EXPANSION:

DESIGN: PENS

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

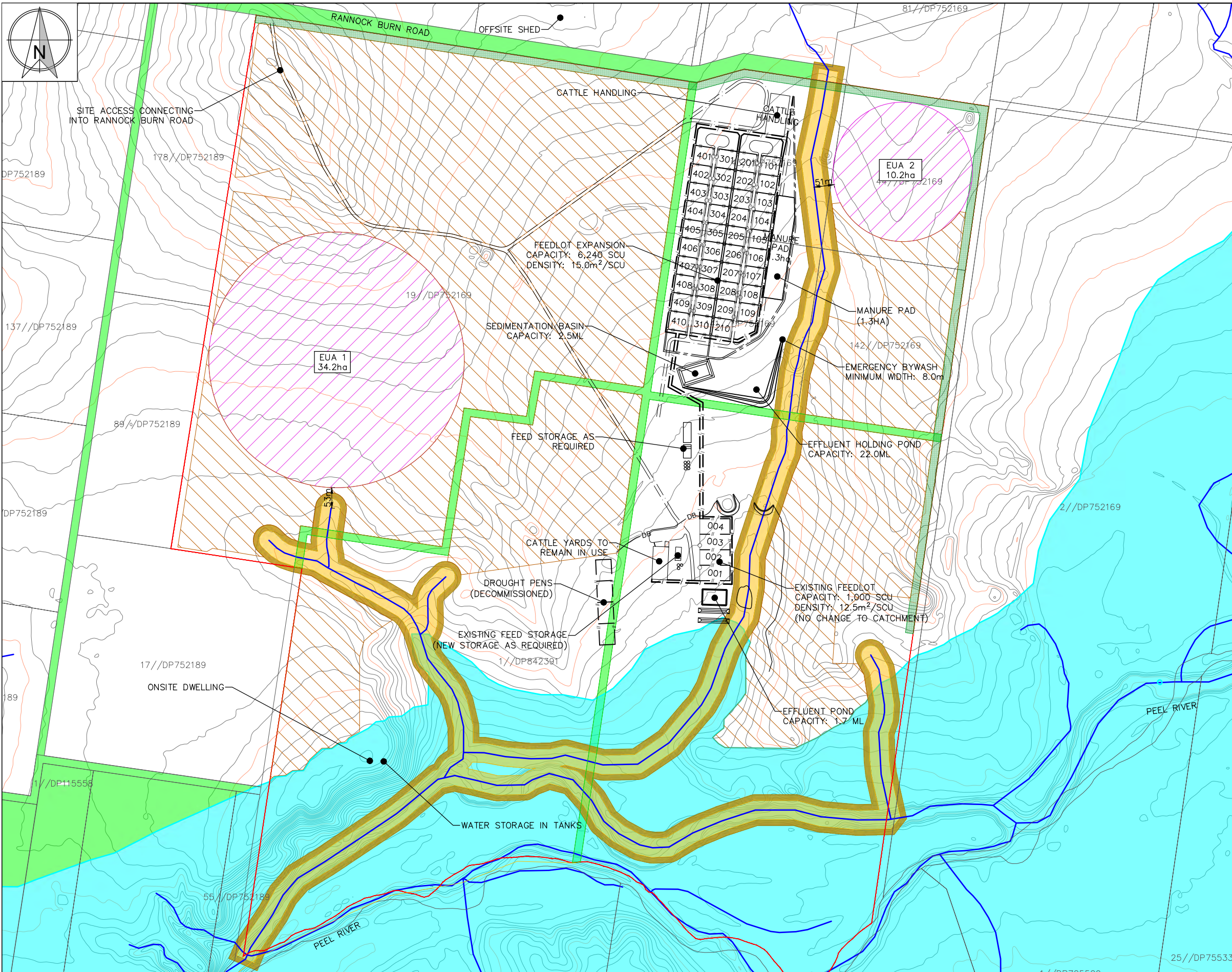
SHEET TITLE
PROPERTY PLAN – 6240 NORTH (AERIAL IMAGERY)

SCALE

0 100 200 300m

SCALE 1:5,000 (A1) 1:10,000 (A3)

DESIGNED	FOR APPROVAL ONLY				JOB CODE	BTC-001
TJS						
CHECKED					SHEET NUMBER	
MRN						A401
PROJECT MANAGER	14/06/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY		MRN	CURRENT REVISION
MRN	DATE	REV	DESCRIPTION		APP	A
REVISIONS						



- LEGEND**
- PROPERTY BOUNDARY
 - CADASTRAL BOUNDARY
 - CONTOUR EXISTING (5.0m INTERVAL)
 - CROWN ROAD EASEMENT
 - BUFFER (DRAINAGE LINE - 25m)
 - BUFFER (DRAINAGE LINE - 40m)
 - MAPPED STREAM ORDER
 - EFFLUENT REUSE AREA (44.4 HA)
 - MANURE REUSE AREA (154.4 HA)
 - VEGETATION SCREEN
 - PEN FENCE
 - CATTLE LANE
 - FEED BUNK
 - EFFLUENT DRAIN
 - FEED ROAD
 - COMMODITY ROAD
 - CLEAN WATER DIVERSION BANK
 - TRC FLOOD MODELLING

- NOTES:**
- CADASTRAL BOUNDARIES & WATERCOURSE DATA LAYERS HAVE BEEN SOURCED FROM THE SEED PORTAL. DATA EXTRACTED 28/09/2021.
 - EXISTING CONTOUR DATA OBTAINED FROM THE ELVIS PLATFORM OF PUBLICLY AVAILABLE LIDAR.
 - FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
 - THE EXISTING FEEDLOT HAS A CAPACITY OF 1,000 HEAD AT A STOCKING DENSITY OF 12.85m²/HEAD
 - THERE IS TO BE NO CHANGE TO THE CONTROLLED DRAINAGE AREA (CDA) OF THE EXISTING FACILITY.
 - EFFLUENT MANAGEMENT
 - SEDIMENT BASIN: 2.5ML
 - EFFLUENT POND: 22.0ML
 - FLOOD INUNDATION AREA SOURCED FROM TAMWORTH REGIONAL COUNCIL (TRC) DEVELOPMENT CONTROL PLAN 2010-FLOOD AFFECTED LAND SHEET 6 OF 25.

- SITE EXPANSION:**
- | | |
|----------------------|--------------------------------------|
| 1. EXISTING FEEDLOT: | 1,000 SCU @ 12.85m ² /SCU |
| 2. ROW 1: | 1,440 SCU @ 15.0m ² /SCU |
| 3. ROW 2 | 1,600 SCU @ 15.0m ² /SCU |
| 4. ROW 3 | 1,600 SCU @ 15.0m ² /SCU |
| 5. ROW 5: | 1,600 SCU @ 15.0m ² /SCU |
| 6. COMBINED | 7,240 SCU @ 14.7m ² /SCU |

- DESIGN: PENS**
- | | |
|------------------------------|-----------------------------|
| 1. STOCKING DENSITY | = 15.0 m ² /SCU |
| 2. BUNK SPACE | = 313 mm/SCU |
| 3. PENS 48.0 (W) x 50.0m (L) | = 2,400 m ² /PEN |
| 4. INDIVIDUAL PEN CAPACITY | = 160 SCU |

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
PROPERTY PLAN - 6240 NORTH

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AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

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SCALE

0 100 200 300m

SCALE 1:5,000 (A1) 1:10,000 (A3)

ANGORA FEEDLOT
PTY LTD

DESIGNED
TJS

CHECKED
MRN

PROJECT MANAGER
MRN

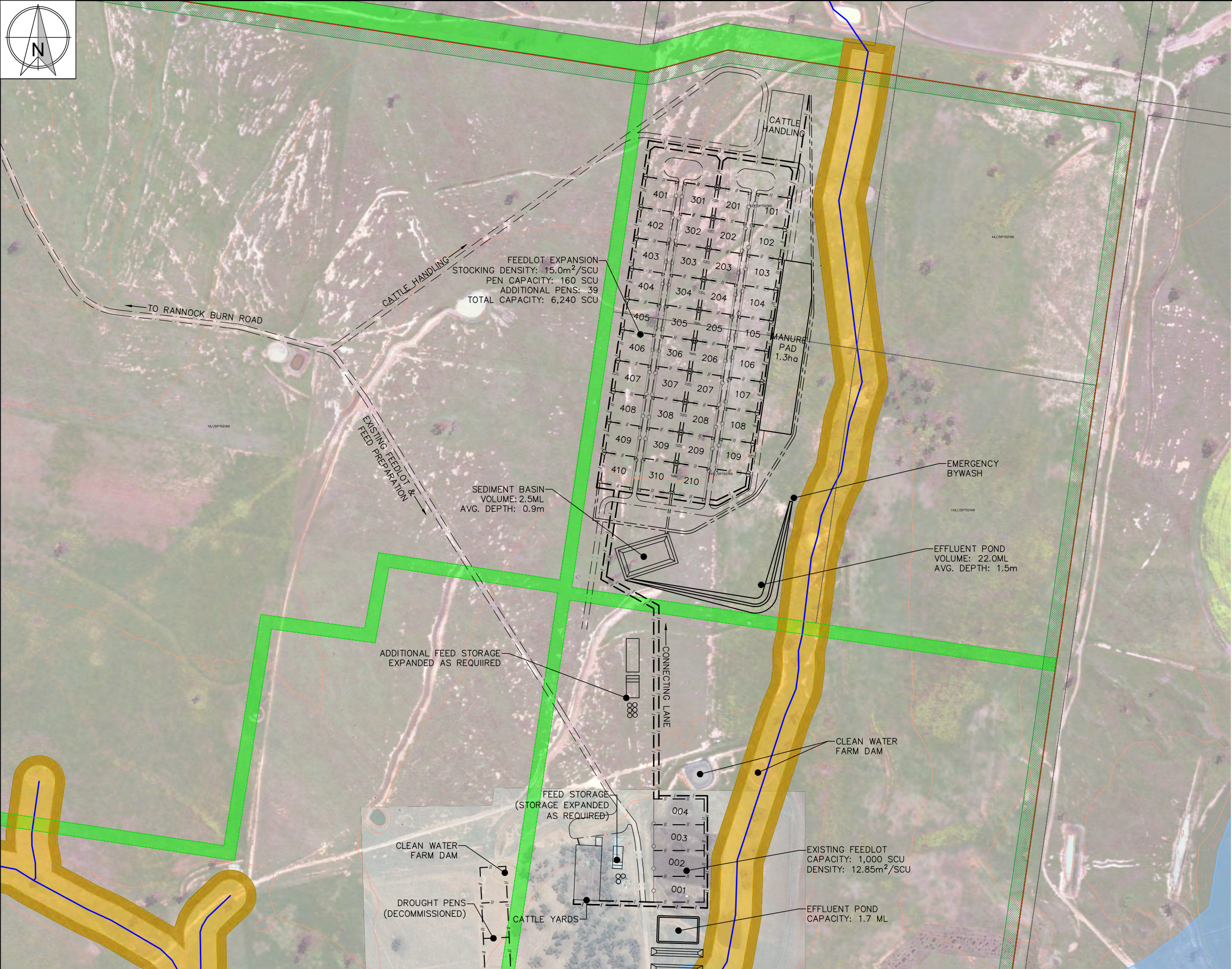
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14/08/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY		MRN	
DATE	REV	DESCRIPTION		APP	
REVISIONS					

JOB CODE
BTC-001

SHEET NUMBER
A402

CURRENT REVISION
A



LEGEND

	CADASTRAL BOUNDARY
	CONTOUR EXISTING (5.0m INTERVAL)
	BUFFER (DRAINAGE LINE – 25m)
	BUFFER (DRAINAGE LINE – 40m)
	MAPPED STREAM ORDER
	CROWN ROAD EASEMENT
	VEGETATION SCREEN
	PEN FENCE
	CATTLE LANE
	FEED BUNK
	EFFLUENT DRAIN
	FEED ROAD
	DB
	CLEAN WATER DIVERSION BANK
	TRC FLOOD MODELLING

NOTES:

- AERIAL IMAGE SOURCED THROUGH AUTOCAD MICROSOFT BING MAPPING. IMAGE ACCESS 07/10/2021, IMAGE DATE UNKNOWN.
- CADASTRAL BOUNDARIES & WATERCOURSE DATA LAYERS HAVE BEEN SOURCED FROM THE SEED PORTAL. DATA EXTRACTED 28/09/2021.
- EXISTING CONTOUR DATA OBTAINED FROM THE ELVIS PLATFORM OF PUBLICLY AVAILABLE LIDAR.
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- THE EXISTING FEEDLOT HAS A CAPACITY OF 1,000 HEAD AT A STOCKING DENSITY OF 12.85m²/HEAD
- THERE IS TO BE NO CHANGE TO THE CONTROLLED DRAINAGE AREA (CDA) OF THE EXISTING FACILITY.
- EFFLUENT MANAGEMENT
 - SEDIMENT BASIN: 2.5ML
 - EFFLUENT POND: 22.0ML.
- FLOOD INUNDATION AREA SOURCED FROM TAMWORTH REGIONAL COUNCIL (TRC) DEVELOPMENT CONTROL PLAN 2010–FLOOD AFFECTED LAND SHEET 6 OF 25.

SITE EXPANSION:

- | | |
|----------------------|--------------------------------------|
| 1. EXISTING FEEDLOT: | 1,000 SCU @ 12.85m ² /SCU |
| 2. ROW 1: | 1,440 SCU @ 15.0m ² /SCU |
| 3. ROW 2 | 1,600 SCU @ 15.0m ² /SCU |
| 4. ROW 3 | 1,600 SCU @ 15.0m ² /SCU |
| 5. ROW 5: | 1,600 SCU @ 15.0m ² /SCU |
| 6. COMBINED | 7,240 SCU @ 14.7m ² /SCU |

DESIGN: PENS

- | | |
|------------------------------|-----------------------------|
| 1. STOCKING DENSITY | = 15.0 m ² /SCU |
| 2. BUNK SPACE | = 313 mm/SCU |
| 3. PENS 48.0 (W) x 50.0m (L) | = 2,400 m ² /PEN |
| 4. INDIVIDUAL PEN CAPACITY | = 160 SCU |

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
CONCEPT PLAN – 6240 NORTH

AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

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SCALE

SCALE 1:3,000 (A1) 1:6,000 (A3)

ANGORA FEEDLOT
PTY LTD

DESIGNED
TJS

CHECKED
MRN

PROJECT MANAGER
MRN

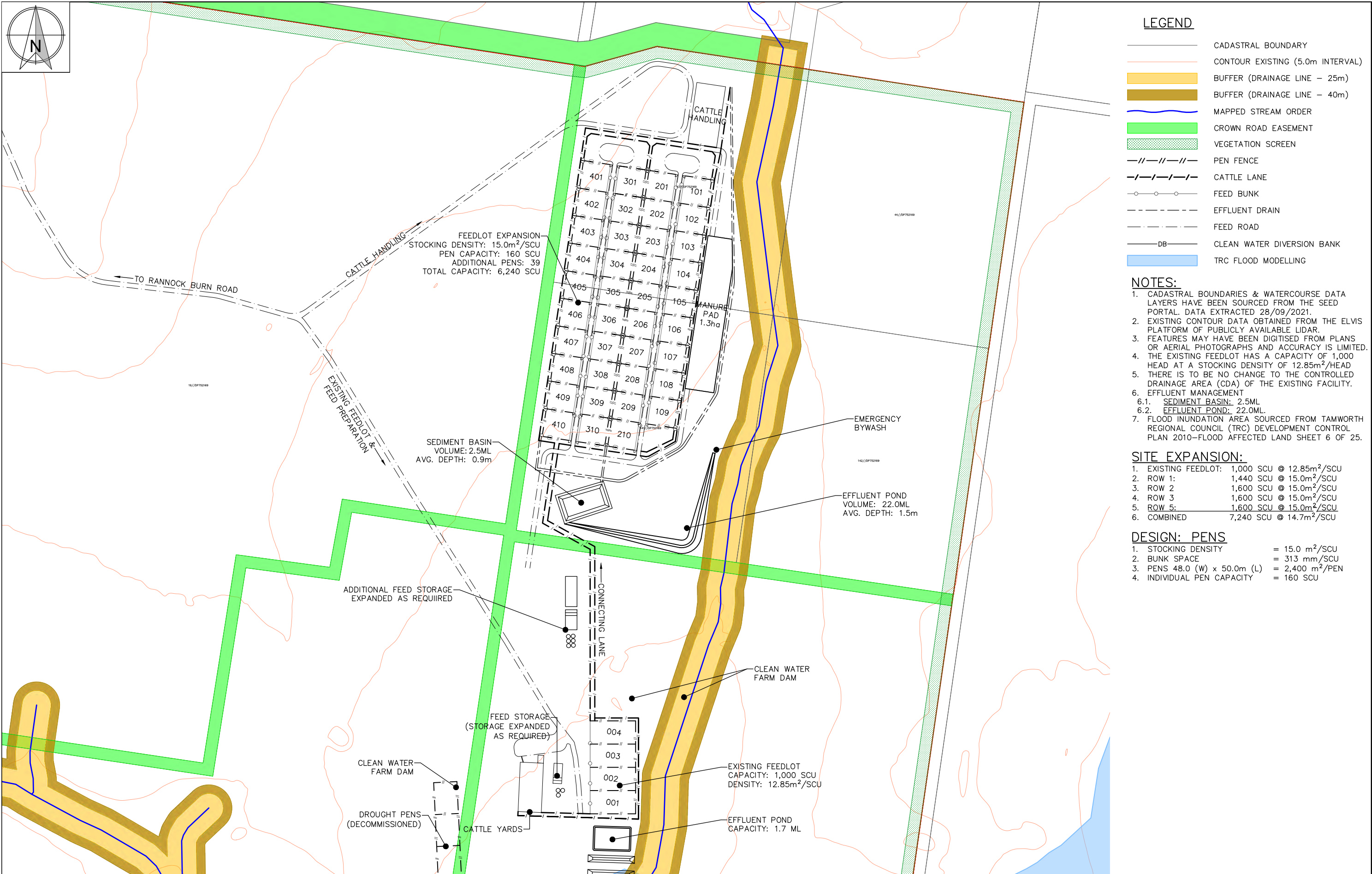
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14/08/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY		
REVISIONS				

JOB CODE
BTC-001

SHEET NUMBER
A403

CURRENT REVISION
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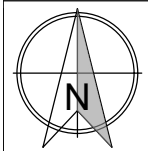
- LEGEND**
- CADASTRAL BOUNDARY
 - CONTOUR EXISTING (5.0m INTERVAL)
 - BUFFER (DRAINAGE LINE – 25m)
 - BUFFER (DRAINAGE LINE – 40m)
 - MAPPED STREAM ORDER
 - CROWN ROAD EASEMENT
 - VEGETATION SCREEN
 - PEN FENCE
 - CATTLE LANE
 - FEED BUNK
 - EFFLUENT DRAIN
 - FEED ROAD
 - CLEAN WATER DIVERSION BANK
 - TRC FLOOD MODELLING

- NOTES:**
- CADASTRAL BOUNDARIES & WATERCOURSE DATA LAYERS HAVE BEEN SOURCED FROM THE SEED PORTAL. DATA EXTRACTED 28/09/2021.
 - EXISTING CONTOUR DATA OBTAINED FROM THE ELVIS PLATFORM OF PUBLICLY AVAILABLE LIDAR.
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 - SEDIMENT BASIN: 2.5ML
 - EFFLUENT POND: 22.0ML
 - FLOOD INUNDATION AREA SOURCED FROM TAMWORTH REGIONAL COUNCIL (TRC) DEVELOPMENT CONTROL PLAN 2010–FLOOD AFFECTED LAND SHEET 6 OF 25.

- SITE EXPANSION:**
- EXISTING FEEDLOT: 1,000 SCU @ 12.85m²/SCU
 - ROW 1: 1,440 SCU @ 15.0m²/SCU
 - ROW 2: 1,600 SCU @ 15.0m²/SCU
 - ROW 3: 1,600 SCU @ 15.0m²/SCU
 - ROW 5: 1,600 SCU @ 15.0m²/SCU
 - COMBINED 7,240 SCU @ 14.7m²/SCU

- DESIGN: PENS**
- STOCKING DENSITY = 15.0 m²/SCU
 - BUNK SPACE = 313 mm/SCU
 - PENS 48.0 (W) x 50.0m (L) = 2,400 m²/PEN
 - INDIVIDUAL PEN CAPACITY = 160 SCU

<div>CLIENT</div> <div>ANGORA FEEDLOT PTY LTD</div> <div>PROJECT</div> <div>ANGORA FEEDLOT EXPANSION</div> <div>LOCATION</div> <div>RANNOCK BURN ROAD, RUSHES CREEK NSW 2346</div> <div>SHEET TITLE</div> <div>DESIGN PLAN – 6240 NORTH</div>	<div></div> <div>AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA</div> <div>PO BOX 292 TOOWOOMBA QLD 4350 PH: +61 418 446 245 E: contact@agdsa.com.au</div>	<div>SCALE</div> <div></div> <div>SCALE 1:3,000 (A1) 1:6,000 (A3)</div>	<div>ANGORA FEEDLOT PTY LTD</div>	<div>DESIGNED</div> <div>TJS</div>	<div>FOR APPROVAL ONLY</div>				<div>JOB CODE</div> <div>BTC-001</div>
				<div>CHECKED</div> <div>MRN</div>	<div></div> <div></div> <div></div> <div></div>	<div></div> <div></div> <div></div> <div></div>	<div></div> <div></div> <div></div> <div></div>	<div>SHEET NUMBER</div> <div>A404</div>	
				<div>PROJECT MANAGER</div> <div>MRN</div>	<div>14/08/2023</div> <div>DATE</div>	<div>A</div> <div>REV</div>	<div>ORIGINAL ISSUE FOR APPROVAL ONLY</div> <div>DESCRIPTION</div>	<div>MRN</div> <div>APP</div>	<div>CURRENT REVISION</div> <div>A</div>
				<div>REVISIONS</div>					



LEGEND	
	CADASTRAL BOUNDARY
	CONTOUR EXISTING (5.0m INTERVAL)
	BUFFER (DRAINAGE LINE – 25m)
	BUFFER (DRAINAGE LINE – 40m)
	MAPPED STREAM ORDER
	CROWN ROAD EASEMENT
	VEGETATION SCREEN
	CATCHMENT BOUNDARY
	MAXIMUM DRAIN LENGTH (610m)
	CLEAN WATER DIVERSION BANK
	BUFFER (DRAINAGE LINE – 25m)
	BUFFER (DRAINAGE LINE – 40m)
	PEN FENCE
	CATTLE LANE
	FEED BUNK
	EFFLUENT DRAIN
	FEED ROAD
	COMMODITY ROAD

- NOTES**
- CATCHMENT BOUNDARIES HAVE BEEN DETERMINED USING THE PUBLICLY AVAILABLE LIDAR THAT COVERS THE SITE DEVELOPMENT.
 - THE CATCHMENT OF THE ORIGINAL FEEDLOT HAS BEEN ECLUDED AS THERE WILL BE NO CHANGE TO THE PREVIOUSLY APPROVED PENS & EFFLUENT HOLDING POND.
 - FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
 - THE REQUIRED SEDIMENTATION BASIN AND EFFLUENT HOLDING POND CAPACITIES HAVE BEEN DETERMINED IN ACCORDANCE WITH THE NSW FEEDLOT GUIDELINES. THE INPUT DATA USED FOR THE SPREADSHEET CALCULATIONS IS CONSISTENT WITH THE CATCHMENT DETAILS PROVIDED IN THIS DRAWING AND THE EFFLUENT REUSE AREAS OUTLINED IN A001.
 - THE COVERED FEEDLOT PENS (SHEDS 1 & 2) ARE TO BE MANAGED TO EXCLUDE RAINFALL AND THEREFORE AVOID EFFLUENT GENERATION. AS SUCH THIS ARE HAS BEEN EXCLUDED FROM THE CONTROLLED DRAINAGE AREA THAT DRAINS INTO THE SEDIMENTATION BASIN AND EFFLUENT HOLDING POND.

CONTROLLED DRAINAGE AREA		
	PEN AREA	= 9.36 ha
	SOFT AREA	= 1.93 ha
	HARD AREA:	= 6.77 ha
	MANURE PAD AREA:	= 1.31 ha
	BASIN AREA	= 0.27 ha
	POND AREA	= 1.56 ha
TOTAL CATCHMENT		= 21.20 ha

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
CONTROLLED DRAINAGE PLAN – 6240 NORTH

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SCALE

0 40 80 120m

SCALE 1:2,000 (A1) 1:4,000 (A3)

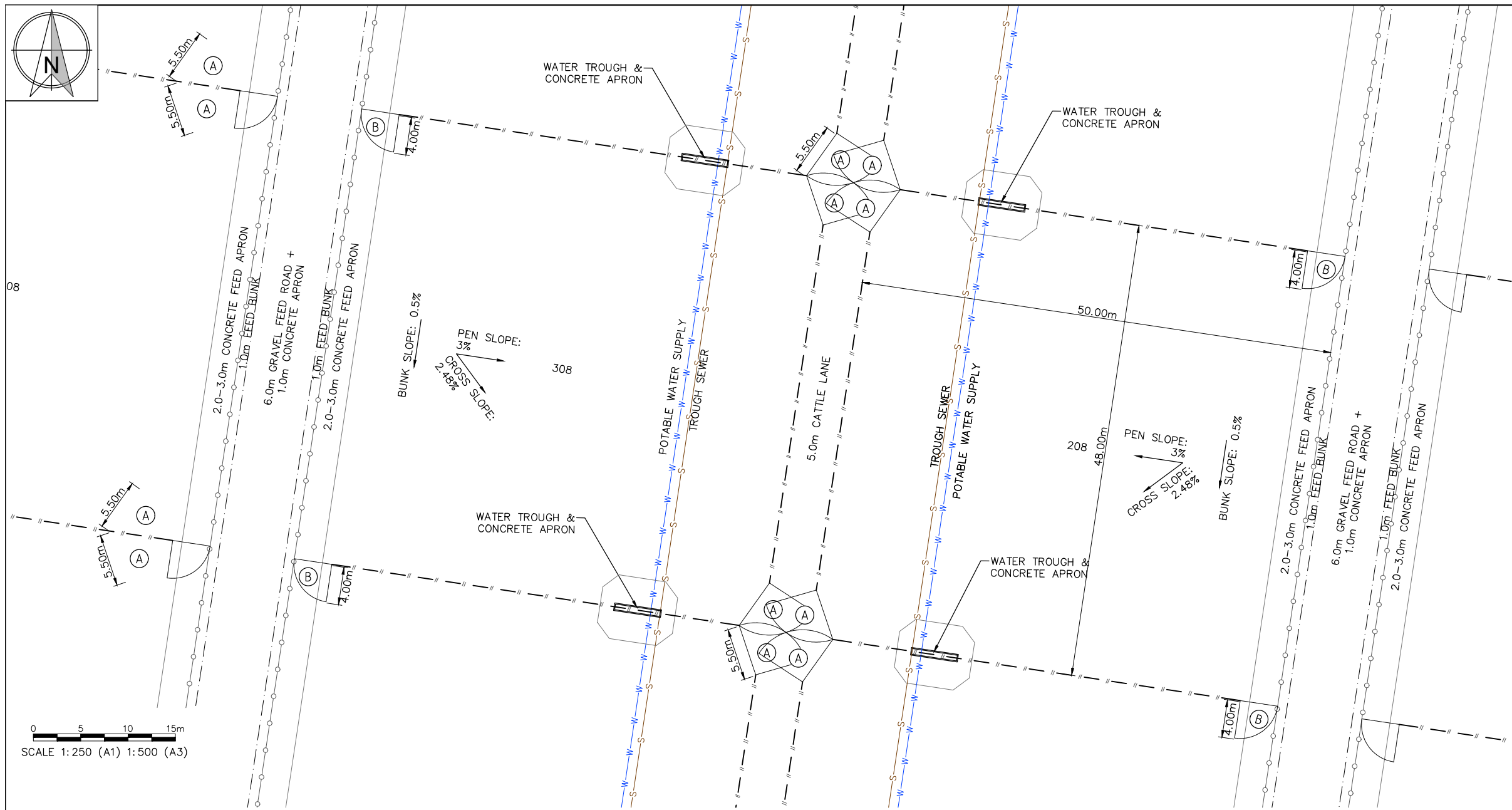
ANGORA FEEDLOT
PTY LTD

DESIGNED TJS	FOR APPROVAL ONLY				JOB CODE BTC-001
CHECKED MRN					SHEET NUMBER A405
PROJECT MANAGER MRN	14/08/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY		CURRENT REVISION A
		DATE	REV	DESCRIPTION	MRN APP
REVISIONS					

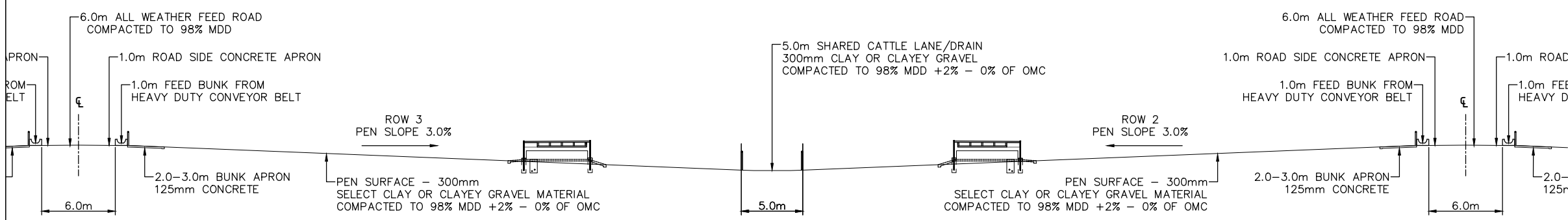
JOB CODE
BTC-001

SHEET NUMBER
A405

CURRENT REVISION
A



TYPICAL PLAN – PRODUCTION PENS



TYPICAL SECTION – PRODUCTION PENS

LEGEND

- PEN FENCE
- CATTLE LANE
- FEED BUNK
- FEED ROAD
- GATE – 4.0m ACROSS BUNK APRON
- GATE – 5.5m CATTLE ACCESS
- WATER LINE
- TROUGH SEWER LINE

MATERIALS

- THE MATERIALS USED FOR THE CONSTRUCTION OF THE COMPOST PAD SHALL BE CLASSIFIED AS EITHER CL, CI, CH, SC OR GC IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM. IT SHALL COMPLY WITH THE FOLLOWING PARTICLE SIZE & PLASTICITY LIMITS.
- PARTICLE SIZE DISTRIBUTION
 - 37.5 100
 - 19.0 70-700
 - 2.36 40-100
 - 0.075 25-90
- FINES PLASTICITY LIMITS FINES (PASSING 0.425mm)
 - LIQUID LIMIT: 30-60%
 - PLASTICITY INDEX: >10%

CONSTRUCTION REQUIREMENTS

- TOPSOIL STRIPPING SHALL BE UNDERTAKEN TO A SUITABLE DEPTH TO CLEAR THE SITE OF TREES, SCRUB, STUMPS, GRASS & ORGANIC MATTER.
- AFTER TOPSOIL STRIPPING HOLES RESULTING FROM THE STRIPPING SHALL BE FILLED.
- RIPPING TO A DEPTH OF 150mm IS TO BE UNDERTAKEN AND WATER ADDED TO ENSURE MATERIAL IS WITHIN $\pm 2\%$ OF THE OPTIMUM MOISTURE CONTENT (OMC).
- AFTER WATERING COMPACTION IS TO BE UNDERTAKEN TO PRODUCE FIELD DRY DENSITY OF AT LEAST 98% OF THE STANDARD MAXIMUM DRY DENSITY (MDD).
- SUITABLE FILL MATERIAL SHOULD BE PLACED IN LAYERS OF 200mm (PRIOR TO COMPACTION). EACH LAYER SHOULD BE TINED, WETTED TO $\pm 2\%$ OF OPTIMUM MOISTURE CONTENT (AS 1289 5.1.1) AND COMPACTED TO REACH THE REQUIRED COMPACTION RELATIVE TO THE MAXIMUM DRY DENSITY (AS1289 5.4.2).
- THE FINAL SURFACE OF THE PAD MUST HAVE A MINIMUM CBR (CALIFORNIA BEARING RATIO) OF 20, & BE OF SUFFICIENT DEPTH TO ENSURE THE INTEGRITY OF THE STRUCTURE IS MAINTAINED THROUGHOUT THE GENERAL OPERATION OF THE FEEDLOT.
- IRRESPECTIVE OF THE FINISHED PEN SURFACE, THE UNDERLYING SOILS MUST HAVE A MAXIMUM PERMEABILITY OF 1×10^{-9} m/s (0.1mm/day) FOR DISTILLED WATER WITH 1.0m OF PRESSURE HEAD.

DESIGN: PRODUCTION PENS

- STOCKING DENSITY = 15 m²/SCU
- BUNK SPACE = 300 mm/SCU
- PENS 48.0 x 47.0m = 2,400 m²/PEN
- INDIVIDUAL PEN CAPACITY = 160 SCU
- NEW PENS = 39
- CAPACITY = 6,240 SCU

DESIGN: GENERAL FACILITY

- EXPANDED PRODUCTION CAPACITY = 7,240 SCU

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
TYPICAL PEN DESIGN & CROSS SECTION

A_gDSA

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SCALE

AS SHOWN

ANGORA FEEDLOT
PTY LTD

DESIGNED
TJS

CHECKED
MRN

PROJECT MANAGER
MRN

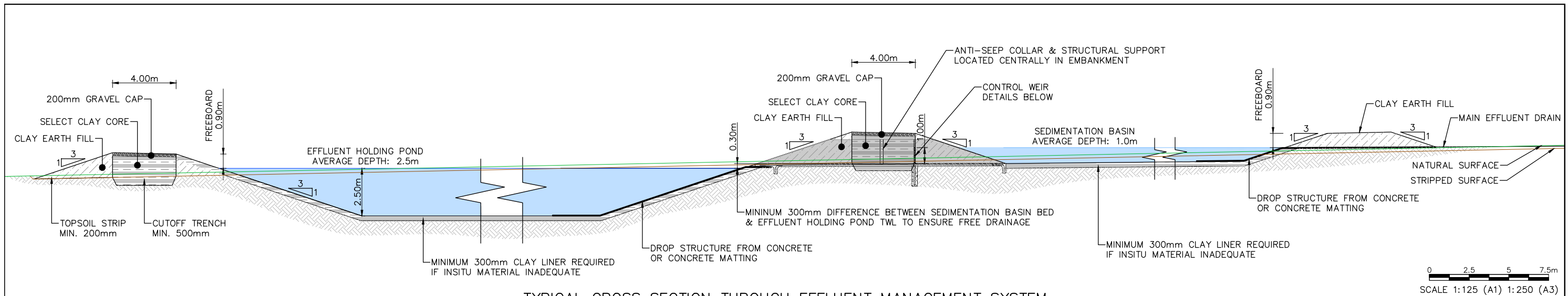
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A406

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TYPICAL CROSS SECTION THROUGH EFFLUENT MANAGEMENT SYSTEM

TABLES 1, 2 & 3 DETAIL POTENTIAL FLOW CAPACITIES OF VARIOUS DRAIN CONFIGURATIONS. A MINIMUM DRAIN WIDTH OF 2.5m IS RECOMMENDED TO ALLOW FOR EASE OF MAINTENANCE.

TABLE 1 – 0.50% DRAIN CAPACITY (m ³ /s)							
DEPTH (m)	DRAIN BED WIDTH (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.10	0.130	0.16	0.19	0.22	0.25	0.28	0.31
0.20	0.430	0.53	0.62	0.72	0.81	0.91	1.01
0.30	0.910	1.09	1.27	1.46	1.65	1.83	2.02
0.40	1.560	1.85	2.15	2.44	2.74	3.04	3.35
0.50	2.410	2.83	3.25	3.68	4.11	*4.54	*4.98

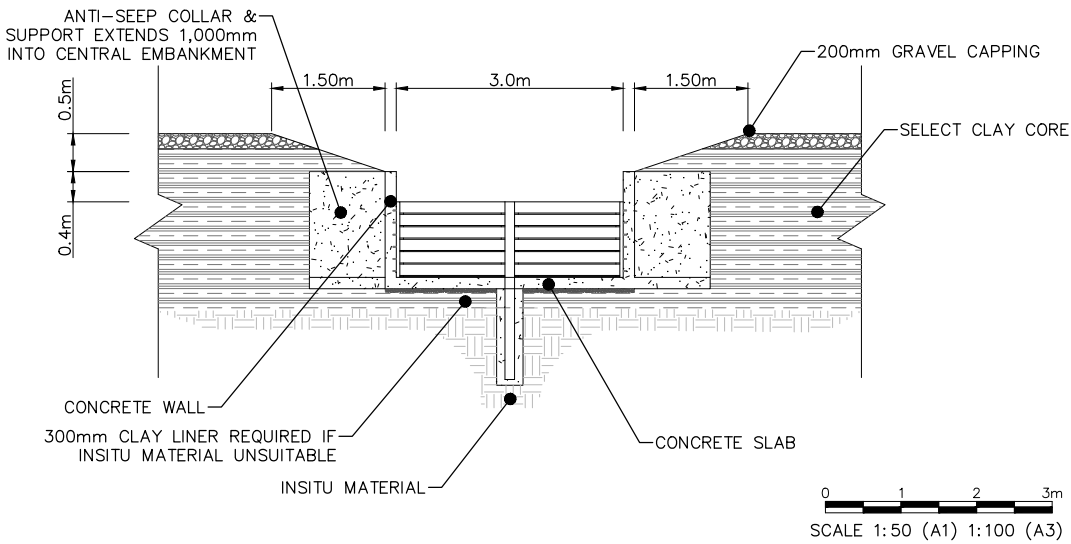
DRAINS ASSUMED TO HAVE COMPACTED GRAVEL BASE & INTERNAL BATTERS OF 1:3.
* IDENTIFIES FLOW VELOCITIES GREATER THAN 1.5 m/s WHICH REQUIRE SPECIFIC DRAIN LINING.

TABLE 2 – 0.75% DRAIN CAPACITY (m ³ /s)							
DEPTH (m)	DRAIN BED WIDTH (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.10	0.160	0.190	0.230	0.270	0.310	0.340	0.380
0.20	0.530	0.650	0.760	0.880	1	1.110	1.230
0.30	1.110	1.330	1.560	1.790	2.020	2.250	2.480
0.40	1.910	*2.27	*2.63	*2.99	*3.36	*3.73	*4.10
0.50	*2.95	*3.46	*3.98	*4.51	*5.03	*5.56	*6.09

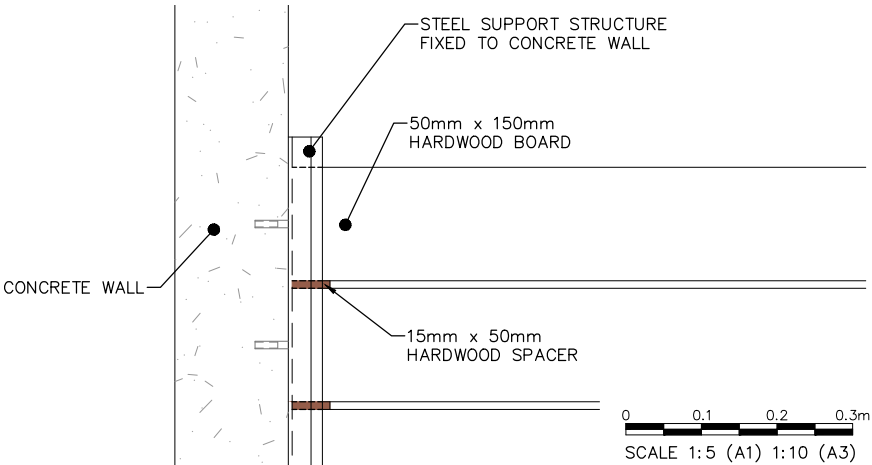
DRAINS ASSUMED TO HAVE COMPACTED GRAVEL BASE & INTERNAL BATTERS OF 1:3.
* IDENTIFIES FLOW VELOCITIES GREATER THAN 1.5 m/s WHICH REQUIRE SPECIFIC DRAIN LINING.

TABLE 3 – 1.0% DRAIN CAPACITY (m ³ /s)							
DEPTH (m)	DRAIN BED WIDTH (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.10	0.180	0.22	0.27	0.31	0.35	0.40	0.44
0.20	0.610	0.75	0.88	1.01	1.15	1.29	1.42
0.30	1.280	*1.54	*1.80	*2.06	*2.33	*2.59	*2.86
0.40	*2.20	*2.62	*3.04	*3.46	*3.88	*4.31	*4.73
0.50	*3.40	*4.00	*4.60	*5.20	*5.81	*6.42	*7.02

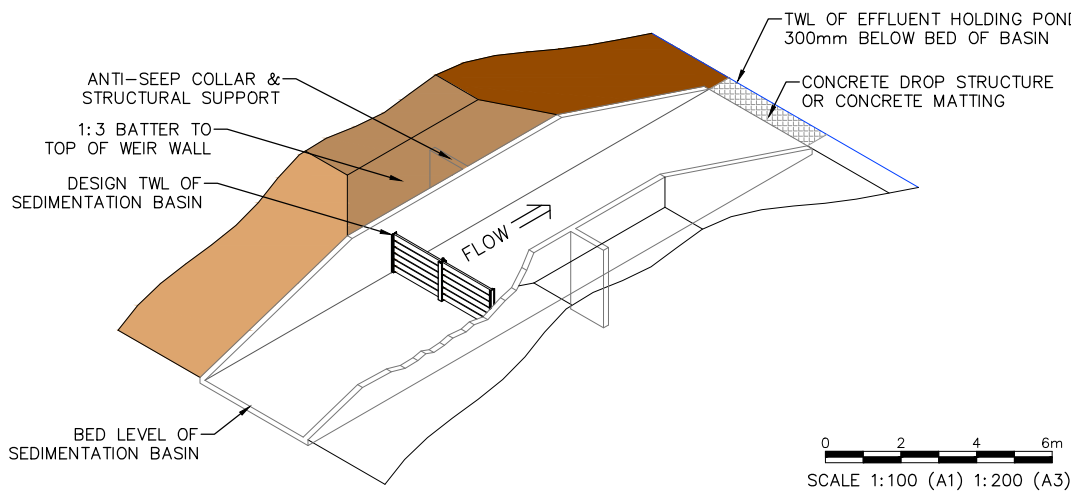
DRAINS ASSUMED TO HAVE COMPACTED GRAVEL BASE & INTERNAL BATTERS OF 1:3.
* IDENTIFIES FLOW VELOCITIES GREATER THAN 1.5 m/s WHICH REQUIRE SPECIFIC DRAIN LINING.



CONTROL WEIR – FRONT ELEVATION



WEIR BOARD INSTALLATION



WEIR INSTALLATION

TABLE 4 DETAILS THE CAPACITY OF VARIOUS RECTANGULAR WEIR CONFIGURATIONS. A MAXIMUM WEIR DEPTH OF 0.5m IS RECOMMENDED. WEIR WIDTH IS DIRECTLY PROPORTIONAL TO FLOW CAPACITY, THEREFORE, THE CAPACITY OF TWO 5.0m WEIR WIDTHS ARE EQUAL TO A SINGLE 10.0m WEIR.

TABLE 4 – WEIR CAPACITY (m ³ /s)							
DEPTH (m)	WEIR WIDTH (m)						
	2.0	2.5	3.0	3.5	4.0	4.5	5.0
0.1	0.11	0.13	0.16	0.19	0.22	0.24	0.27
0.2	0.30	0.38	0.46	0.53	0.61	0.68	0.76
0.3	0.56	0.70	0.84	0.98	1.12	1.26	1.40
0.4	0.86	1.08	1.29	1.51	1.72	1.94	2.15
0.5	1.20	1.50	1.80	2.10	2.40	2.70	3.01
0.6	1.58	1.98	2.37	2.77	3.16	3.56	3.95
0.7	1.99	2.49	2.99	3.48	3.98	4.48	4.98
0.8	2.43	3.04	3.65	4.26	4.87	5.47	6.08

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
TYPICAL EFFLUENT MANAGEMENT SYSTEM DESIGN

AgDSA

AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

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SCALE

AS SHOWN

ANGORA FEEDLOT
PTY LTD

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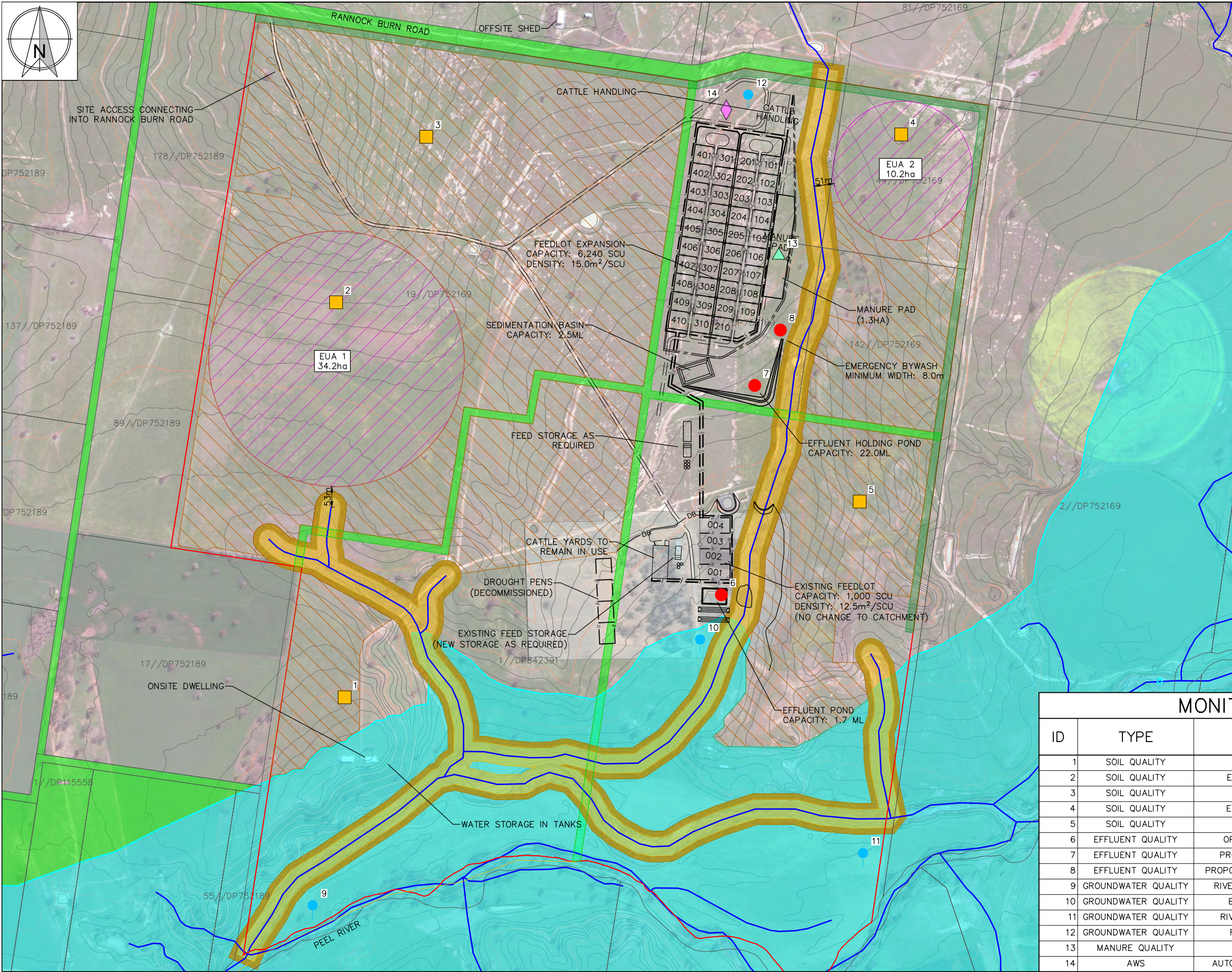
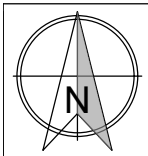
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REVISIONS

JOB CODE
BTC-001

SHEET NUMBER
A407

CURRENT REVISION
A



LEGEND

- PROPERTY BOUNDARY
- CADASTRAL BOUNDARY
- CONTOUR EXISTING (5.0m INTERVAL)
- CROWN ROAD EASEMENT
- BUFFER (DRAINAGE LINE - 25m)
- BUFFER (DRAINAGE LINE - 40m)
- MAPPED STREAM ORDER
- EFFLUENT REUSE AREA (44.4 HA)
- MANURE REUSE AREA (154.4 HA)
- VEGETATION SCREEN
- TRC FLOOD MODELLING
- MANURE QUALITY MASS MONITORING
- SOIL QUALITY MASS MONITORING
- EFFLUENT QUALITY MONITORING
- GROUNDWATER QUALITY MONITORING
- AUTOMATED WEATHER STATION

NOTES:

- AERIAL IMAGE SOURCED THROUGH AUTOCAD MICROSOFT BING MAPPING. IMAGE ACCESS 07/10/2021, IMAGE DATE UNKNOWN.
- CADASTRAL BOUNDARIES & WATERCOURSE DATA LAYERS HAVE BEEN SOURCED FROM THE SEED PORTAL. DATA EXTRACTED 28/09/2021.
- EXISTING CONTOUR DATA OBTAINED FROM THE ELVIS PLATFORM OF PUBLICLY AVAILABLE LIDAR.
- FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
- THE EXISTING FEEDLOT HAS A CAPACITY OF 1,000 HEAD AT A STOCKING DENSITY OF 12.85m²/HEAD
- THERE IS TO BE NO CHANGE TO THE CONTROLLED DRAINAGE AREA (CDA) OF THE EXISTING FACILITY.
- EFFLUENT MANAGEMENT
 - 7.1. SEDIMENT BASIN: 2.5ML
 - 7.2. EFFLUENT POND: 22.0ML.
- FLOOD INUNDATION AREA SOURCED FROM TAMWORTH REGIONAL COUNCIL (TRC) DEVELOPMENT CONTROL PLAN 2010-FLOOD AFFECTED LAND SHEET 6 OF 25.

SITE EXPANSION:

- EXISTING FEEDLOT: 1,000 SCU @ 12.85m²/SCU
- ROW 1: 1,440 SCU @ 15.0m²/SCU
- ROW 2: 1,600 SCU @ 15.0m²/SCU
- ROW 3: 1,600 SCU @ 15.0m²/SCU
- ROW 5: 1,600 SCU @ 15.0m²/SCU
- COMBINED 7,240 SCU @ 14.7m²/SCU

MONITORING POINTS

ID	TYPE	DESCRIPTION	EASTING (mE)	NORTHING (mN)
1	SOIL QUALITY	PASTURE AREA	265694	6575857
2	SOIL QUALITY	EUA 1 IRRIGATION AREA	265672	6576877
3	SOIL QUALITY	PASTURE AREA	265905	6577305
4	SOIL QUALITY	EUA 2 IRRIGATION AREA	267132	6577311
5	SOIL QUALITY	PASTURE AREA	267024	6576363
6	EFFLUENT QUALITY	ORIGINAL EFFLUENT POND	26667	6576122
7	EFFLUENT QUALITY	PROPOSED EFFLUENT POND	266753	6576662
8	EFFLUENT QUALITY	PROPOSED EFFLUENT POND SPILL	266819	6576806
9	GROUNDWATER QUALITY	RIVER FLATS DOWN GRADIENT	265611	6575308
10	GROUNDWATER QUALITY	BELOW EFFLUENT POND	266612	6575994
11	GROUNDWATER QUALITY	RIVER FLATS UP GRADIENT	267033	6575443
12	GROUNDWATER QUALITY	FEEDLOT UP GRADIENT	266736	6577401
13	MANURE QUALITY	MANURE PAD	266815	6576998
14	AWS	AUTOMATED WEATHER STATION	266679	6577374

CLIENT
ANGORA FEEDLOT PTY LTD

PROJECT
ANGORA FEEDLOT EXPANSION

LOCATION
RANNOCK BURN ROAD, RUSHES CREEK NSW 2346

SHEET TITLE
ENVIRONMENTAL MONITORING PLAN - 6240 NORTH

AgDSA
AGRICULTURAL DEVELOPMENT
SERVICES AUSTRALIA

PO BOX 292
TOOWOOMBA QLD 4350
PH: +61 418 446 245
E: contact@agdsa.com.au

SCALE

0 100 200 300m

SCALE 1:5,000 (A1) 1:10,000 (A3)

ANGORA FEEDLOT
PTY LTD

DESIGNED
TJS

CHECKED
MRN

PROJECT MANAGER
MRN

FOR APPROVAL ONLY

JOB CODE
BTC-001

SHEET NUMBER
A408

CURRENT REVISION
A

DATE	REV	DESCRIPTION	MRN	APP
14/08/2023	A	ORIGINAL ISSUE FOR APPROVAL ONLY		
REVISIONS				

APPENDIX I – HEAT LOAD ASSESSMENT

RAP Version 2.1 | 21st June 2023

The risk assessment program or RAP is a tool to help feedlot operators assess their potential risk of a heat event at their site based on historical climatic conditions, cattle characteristics and feedlot management practices.

Results

Results calculated on 2023-06-21 04:43:06 PM

HLI threshold: 91

AHLU Risk Level: 91

Years analysed: 33

Event duration	Frequency of High	Frequency of Extreme
2 days	1-2 events in 34 years	Less than 1 event in 33 years
3 days	Less than 1 event in 33 years	Less than 1 event in 33 years
4 days	Less than 1 event in 33 years	Less than 1 event in 33 years
5 days	Less than 1 event in 33 years	Less than 1 event in 33 years
6 days	Less than 1 event in 33 years	Less than 1 event in 33 years
7 or more days	Less than 1 event in 33 years	Less than 1 event in 33 years

Over a 10 year period, this site would be expected to experience:

At least 1 days of high or greater risk that includes 0 days of extreme risk

Parameters

Parameter	Value
Site	Tamworth
Period analysed	Long Term
Cattle type	Bos taurus
Coat colour	Black
Health status	Healthy
Number of days on feed	80 - 130
Amount of shade	2.0 - 3.0
Trough water temperature	20 - 30 degrees
Pen class	Class 1
Extra water troughs installed	No
Heat load ration fed	No
Wet manure removal	No

User Notes

APPENDIX J – NOISE AND VIBRATION



Noise & Vibration Assessment for proposed Angora Feedlot Expansion

Prepared for:

AgDSA



Project:	Feedlot Expansion (cattle) 'Angora'
Project Number:	20220044A
Location:	Rannock Burn Road, Rushes Creek, NSW
Client:	Planning & Environmental Compliance, AgDSA
Date:	November 2023







DOCUMENT CONTROL

REVIEW RECORD

Revision	Date	Status	Prepared	Reviewed	Approved
1	31/03/2023	Initial	MH	BH	AH
2	16/10/2023	Final plan revision (rev B)	AD	BH	AH
3	17/11/2023	Final	AD	BH	AH

APPROVAL / SIGN OFF

ISSUE				
	Name	Position	Signature	Date
Prepared by:	Michael Hall	Project Manager		31/03/2023
Revision by:	Andrew Durrer	Senior Engineer		17/11/2023
Reviewed by:	Ben Hall	Principal Consultant		17/11/2023
Approved by:	Asbjorn Hansen (RPEQ: 21838)	Associate Engineer		17/11/2023
Comments:				

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EXECUTIVE SUMMARY

Noise and vibration impacts from the proposed cattle feedlot expansion at 'Angora' at Rannock Burn Road, Rushes Creek, NSW, postcode 2346, Lot 1 DP 842391 and Lots 19, 43, 44 141 and 142 DP 752169, have been assessed in accordance with the specified NSW Planning Secretary's Environmental Assessment Requirements SEAR 1696 (EF22/7962).

The result of this assessment indicates the proposed cattle feedlot expansion at 'Angora' at Rannock Burn Road, Rushes Creek, NSW can be constructed and operated without significant noise or vibration impacts on the surrounding noise and vibration sensitive receptors.

This assessment addresses the key noise and vibration issues as outlined in the NSW Planning Secretary's Environmental Assessment Requirements (SEAR) 1696, including:

- a description of all potential noise and vibration sources during construction and operation, including road traffic noise;
- a noise and vibration assessment in accordance with the relevant Environment Protection Authority (EPA) guidelines; and
- a description and appraisal of noise and vibration mitigation and monitoring measures.

This Environmental Assessment for noise and vibration for the proposed development, addresses the following requirements as outlined by the NSW Environment Protection Authority (EPA – DOC22/469304). The following points summarise the outcomes for the requirements listed in Attachment A, Section 4 regarding Noise and Vibration for the proposed expansion of the existing feedlot to accommodate 1,400 head of cattle and construction of a new feedlot to accommodate 9,500 head of cattle at 'Angora', Rannock Burn Road, Rushes Creek, NSW, in reference to SEAR 1696:

1. the construction noise associated with the proposed development conforms to the Interim Construction Noise Guideline (DECC, 2009), (ICNG);
2. the predicted vibration from all activities (including construction and operation) to be undertaken on the premises are in compliance with the guidelines contained in the 'Assessing Vibration: a technical guideline (DEC, 2006)';
3. no blasting is required for this project. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be assessed and demonstrated to be capable of complying with the guidelines contained in Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990);
4. operational noise from all industrial activities (including private haul roads) to be undertaken on the premises conforms to the guidelines contained in the NSW Noise Policy for Industry (EPA, 2017), (NPfI); and
5. noise on public roads from increased road traffic generated by land use developments conforms to the requirements of the guidelines contained in the NSW Road Noise Policy (RNP) and associated application notes (EPA, 2011).

This noise and vibration assessment has determined the noise criteria (project noise trigger levels) for the site as defined by the NPfI.



This noise assessment indicates the site is predicted to comply with the project noise criteria for both construction and operation activity. This Noise Assessment concludes that noise mitigation is not required for compliance with the project noise trigger levels for both construction and operation activity for the proposed cattle feedlot expansion at '*Angora*' at Rannock Burn Road, Rushes Creek, NSW.

In summary, the acoustic amenity of the area will not change significantly as a result of the proposed cattle feedlot expansion.



1 INTRODUCTION

Matrix Acoustics Pty Ltd was engaged by Agricultural Development Services Australia Pty Ltd (AgDSA), to assess noise and vibration impacts for the proposed cattle feedlot expansion at 'Angora' (the Project) on Rannock Burn Road, Rushes Creek, NSW, postcode 2346 on Lot 1 DP 842391 and Lots 19, 43, 44 141 and 142 DP 752169.

The 'Angora' property is situated approximately 40 kilometres North-West of Tamworth (approximately halfway between Tamworth and Gunnedah, NSW). The 'Angora' property operates an existing cattle feedlot for up to 1,000 head.

Figure 1-1 shows the general location of the 'Angora' property, which is situated approximately halfway between Tamworth and Gunnedah.

Figure 1-2 shows the existing 'Angora' property boundary in relation to the Peel River, Oxley highway, Rushes Creek Road and Rannock Burn Road. The figure indicates the location of the existing cattle feedlot.

The existing feedlot is proposed to expand to accommodate 1,400 head. In addition, it is proposed to construct a new cattle feedlot to accommodate 9,500 head. Therefore, the total proposed cattle feedlot operation could accommodate 10,900 head.

This noise and vibration assessment has been undertaken to determine the noise and vibration impacts for the proposed total cattle feedlot expansion of 10,900 head.

This noise and vibration assessment considers both the operation and construction of the new cattle feedlot facility for the total proposed expansion of the feedlot of 10,900 head.

The NSW Department of Planning and Environment provided the Planning Secretary's Environmental Assessment Requirements (SEAR) 1696 with document reference number EF22/7962. This document provides the requirements for the preparation of an Environmental Impact Statement (EIS) for the Project development proposal.

The SEAR 1696 states that the proposal is both designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979 and requires an approval under the Protection of the Environment Operations Act 1997.

This noise and vibration assessment objectives are:

- to determine the predicted noise and vibration impacts on sensitive receptors located near to the Project for both construction and operational phases;
- to determine the levels of mitigation likely to be required, if applicable, to enable compliance with the NSW Planning Secretary's Environmental Assessment Requirements; and
- to provide relevant noise and vibration information for the preparation of an Environmental Impact Statement (EIS) for the Project development proposal.

This noise and vibration assessment addresses the environmental operational noise impact of the proposed project in accordance with the NPfI.

This noise and vibration assessment addresses the environmental construction noise impact for two noise intensive construction scenarios in accordance with the ICNG.



This noise and vibration assessment addresses the environmental operational and construction vibration impact of the proposed project in accordance with the NSW Assessing Vibration: a technical guideline (DEC, 2006).

The project legislative context is further discussed in section 2 of this report.

Figure 1-1 *Angora property located in Rushes Creek, NSW*

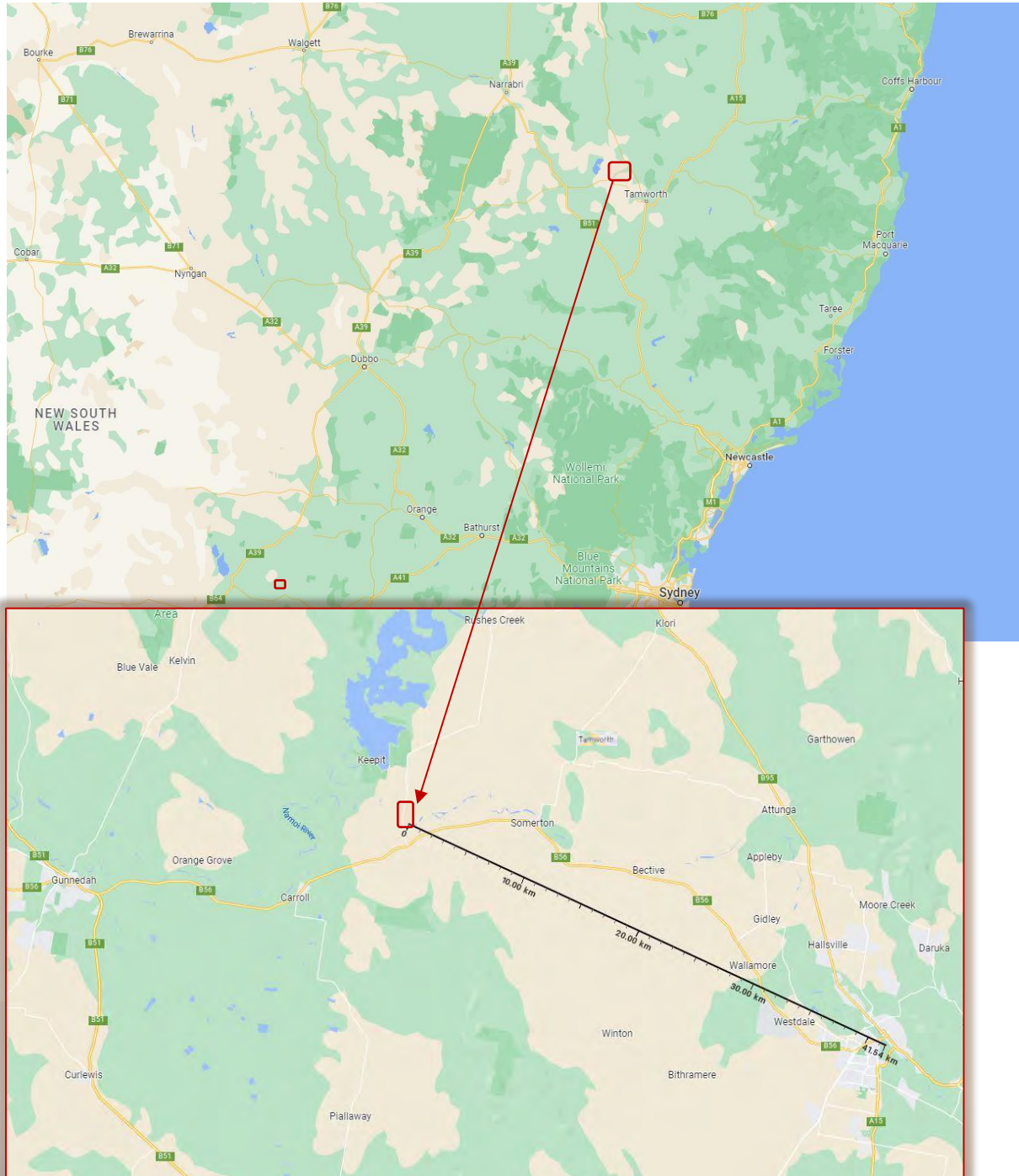
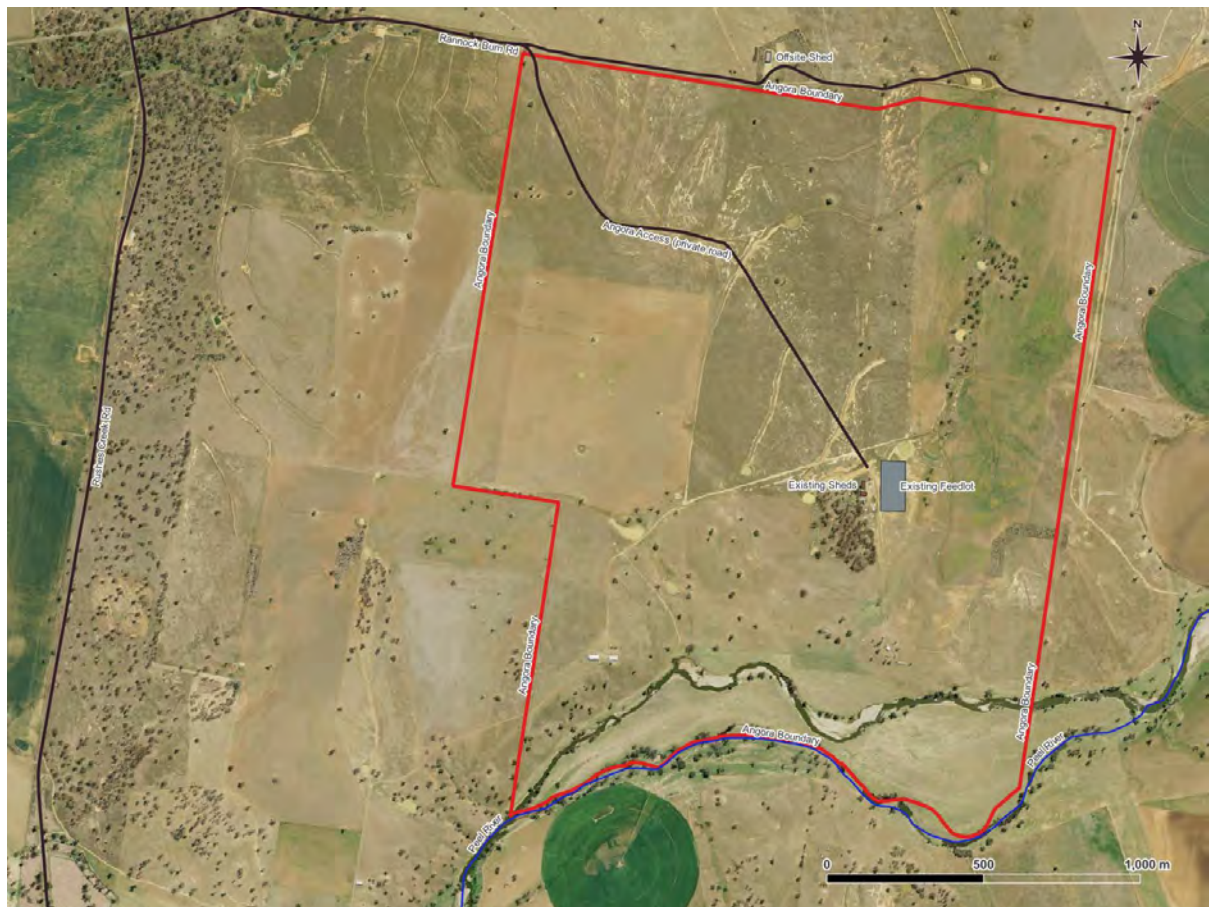




Figure 1-2 Angora property with existing cattle feedlot





2 PROJECT CRITERIA

2.1 OBJECTIVES AND PERFORMANCE OUTCOMES

Matrix Acoustics Pty Ltd was advised that the Project proposal is both designated and integrated development, under Part 4 of the Environmental Planning and Assessment Act 1979 and requires an approval under the Protection of the Environment Operations Act 1997.

The Project criteria are based on the NSW Department of Planning and Environment SEAR 1696 (EF22/7962) and the NSW Department of Urban Affairs and Planning: Cattle Feedlots - EIS Guideline. This report includes:

- a description of all potential noise and vibration sources during construction and operation, including road traffic noise;
- noise and vibration impact assessment in accordance with the relevant Environment Protection Authority (EPA) guidelines; and
- noise and vibration mitigation and management.

The NSW Department of Planning and Environment consulted with the EPA to prepare SEAR 1696. The EPA considered the details of the proposed Project (as supplied from the NSW Department of Planning and Environment) and issued requirements for general terms of approval in correspondence on 28th June, 2022 (Document reference: DOC22/469304). This document outlines the EPA's key information requirements for the proposed Project, which includes an adequate assessment of various environmental disciplines. This document specifies that potential noise and vibration impacts relating to the proposed development requires assessment regarding the proximity to sensitive receptors and the impact of any noise sources associated with the Project. Furthermore, relevant guidelines as listed in Attachment A of DOC22/469304, address specific issues for Noise and Vibration.

Attachment A: Environmental Assessment Requirements – SEARS 1696 – Bottlejac Trading Company– Feedlot Expansion – 'Angora', Rannock Burn Road, Rushes Creek states:

"the Environmental Assessment (EA) must address the requirements of Section 45 of the Protection of the Environment Operations Act 1997 (POEO Act) by determining the extent of each impact and providing sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL)."

Attachment A of the EPA DOC22/469304 also states the following:

"Impacts related to noise environmental issues need to be assessed, quantified and reported regarding the noise impacts associated with operational noise, particularly machinery and plant movements.

The EA must assess the following noise and vibration aspects of the proposed development

4.1. Construction noise associated with the proposed development should be assessed using the Interim Construction Noise Guideline (DECC, 2009). These are available at:

<https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline>

4.2. Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the Assessing Vibration: a



technical guideline (DEC, 2006). These are available at: <https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration>

4.3. If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990). These are available at: <https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline>

4.4. Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the NSW Noise Policy for Industry (EPA, 2017). [https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-\(2017\)](https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017))

4.5. Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the NSW Road Noise Policy and associated application notes (EPA, 2011). <https://www.epa.nsw.gov.au/your-environment/noise/transport-noise>

The NSW Department of Planning and Environment also consulted the NSW Department of Primary Industries (DPI) Agriculture regarding any additional requirements to inform the EIS for the proposed Project. NSW DPI Agriculture correspondence on 27th June, 2022 (document reference: OUT22/8859) indicated that industry guidelines and resource information listed in Attachment B of the correspondence, should also be considered when preparing the EIS. The guidelines from Attachment B that relate to noise and vibration have been summarised in the following list:

- I. Land Use Conflict Risk Assessment Guide: <https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment2/lucra>
- II. Planning Guidelines, Intensive Livestock Agriculture Development: <https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/Policy-and-legislation/Primary-Production/planning-guidelines-intensive-livestock-agricultural-development-2019-02-28.pdf?la=en>
- III. National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition: https://www.feedlots.com.au/_files/ugd/f25d7a_e63ccd7008c34ccc94e4d278713d5abd.pdf
- IV. ALFA Industry Resources: <https://www.feedlots.com.au/resources>
- V. Australian Animal Welfare Standards and Guidelines: <http://animalwelfarestandards.net.au/>
- VI. National Beef Cattle Feedlot Environmental Code of Practice: https://www.feedlots.com.au/_files/ugd/f25d7a_9f5490f89b894f4cb3d8fdcad5f37e4.pdf

2.2 SEAR REQUIREMENTS

Each of the required items from the SEAR 1696 (EF22/7962) and EPA DOC22/469304 relating to noise and vibration emissions from the project, and where they are specifically addressed in this report are shown in Table 2-1.

**Table 2-1 SEAR requirements in Report**

SEAR Requirement	Description	Report section
Attachment A of EPA DOC22/469304 4.1	<i>Construction noise associated with the proposed development should be assessed using the Interim Construction Noise Guideline (DECC, 2009).</i>	Section 3 to 7
Attachment A of EPA DOC22/469304 4.2	<i>Vibration from all activities (including construction and operation) to be undertaken on the premises should be assessed using the guidelines contained in the Assessing Vibration: a technical guideline (DEC, 2006).</i>	Section 3 to 6 and Section 9
Attachment A of EPA DOC22/469304 4.3	<i>If blasting is required for any reasons during the construction or operational stage of the proposed development, blast impacts should be demonstrated to be capable of complying with the guidelines contained in Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC, 1990).</i>	Blasting is not required for this EIS
Attachment A of EPA DOC22/469304 4.4	<i>Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises should be assessed using the guidelines contained in the NSW Noise Policy for Industry (EPA, 2017).</i>	Section 3 to 8
Attachment A of EPA DOC22/469304 4.5	<i>Noise on public roads from increased road traffic generated by land use developments should be assessed using the guidelines contained in the NSW Road Noise Policy and associated application notes (EPA, 2011).</i>	Section 8
NSW Department of Urban Affairs and Planning	<i>Cattle Feedlots - EIS Guideline and refers to Environmental Noise Control Manual (EPA, 1994)</i>	Throughout
Land Use Conflict Risk Assessment Guide	Rural amenity regarding impact of noise from machinery on neighbours	Throughout
Planning Guidelines, Intensive Livestock Agriculture Development	Refers to NSW Noise Policy for Industry (EPA, 2017)	Throughout
National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition	Section 2.7.3 Noise	Throughout
ALFA Industry Resources	Refers to National Guidelines for Beef Cattle Feedlots in Australia, 3rd Edition	Throughout
Australian Animal Welfare Standards and Guidelines	Discusses design of yards in section G5.5	Throughout
National Beef Cattle Feedlot Environmental Code of Practice	Discusses recommendations for noise activity	Throughout



3 SENSITIVE RECEPTORS

The “Angora” site is identified as Lot 1 DP 842391 and Lots 19, 43, 44 141 and 142 DP 752169 on Rannock Burn Road, Rushes Creek, NSW 2346.

It is understood that all land within the locality of the “Angora” property is used for agricultural purposes, varying from grazing and dryland farming and has therefore not been considered noise sensitive for the purposes of this assessment.

A sensitive receptor is a lawful and permanent structure erected in a land-use zone that permits residential use (or for which existing use rights under the EP&A Act apply) where a person/s permanently reside and is not, nor associated with, a commercial undertaking such as caretakers’ quarters, hotel, motel, transient holiday accommodation or caravan park from which a development can be heard.

Four noise sensitive receptors have been identified as rural-residential dwellings situated around the “Angora” property. The location of these sensitive receptors ranges from the Eastern side to the South-Western side of the “Angora” property. Details of the project sensitive receptors are summarised in Table 3-1. Figure 3-1 shows the location of the project sensitive receptors.

The nearest receptor is nominated as receptor 4, and is located approximately two kilometres to the East of the proposed cattle feedlot expansion site.

Table 3-1 *Project Sensitive Receptors*

Receptor ID	Address	Distance from project (m)	Coordinates (MGA)	
			Easting	Northing
1	Rushes Creek Rd, Rushes Creek NSW 2346	2775	264880	6574818
2	Oxley Highway, Somerton NSW 2340	2400	267159	6574509
3	Oxley Highway, Somerton NSW 2340	2500	268112	6574711
4	Oxley Highway, Somerton NSW 2340	2000	268696	6576195
<i>Caretaker¹</i>	<i>Rushes Creek Rd, Rushes Creek NSW 2346</i>	<i>1550</i>	<i>265757</i>	<i>6575694</i>

1. A caretaker dwelling is located on the “Angora” property and is not considered a sensitive receptor.

Sensitive receptors located on the Oxley Highway will experience an elevated background noise level due to existing road noise.



Figure 3-1 *Location of Angora property in relation to nearby receptors*

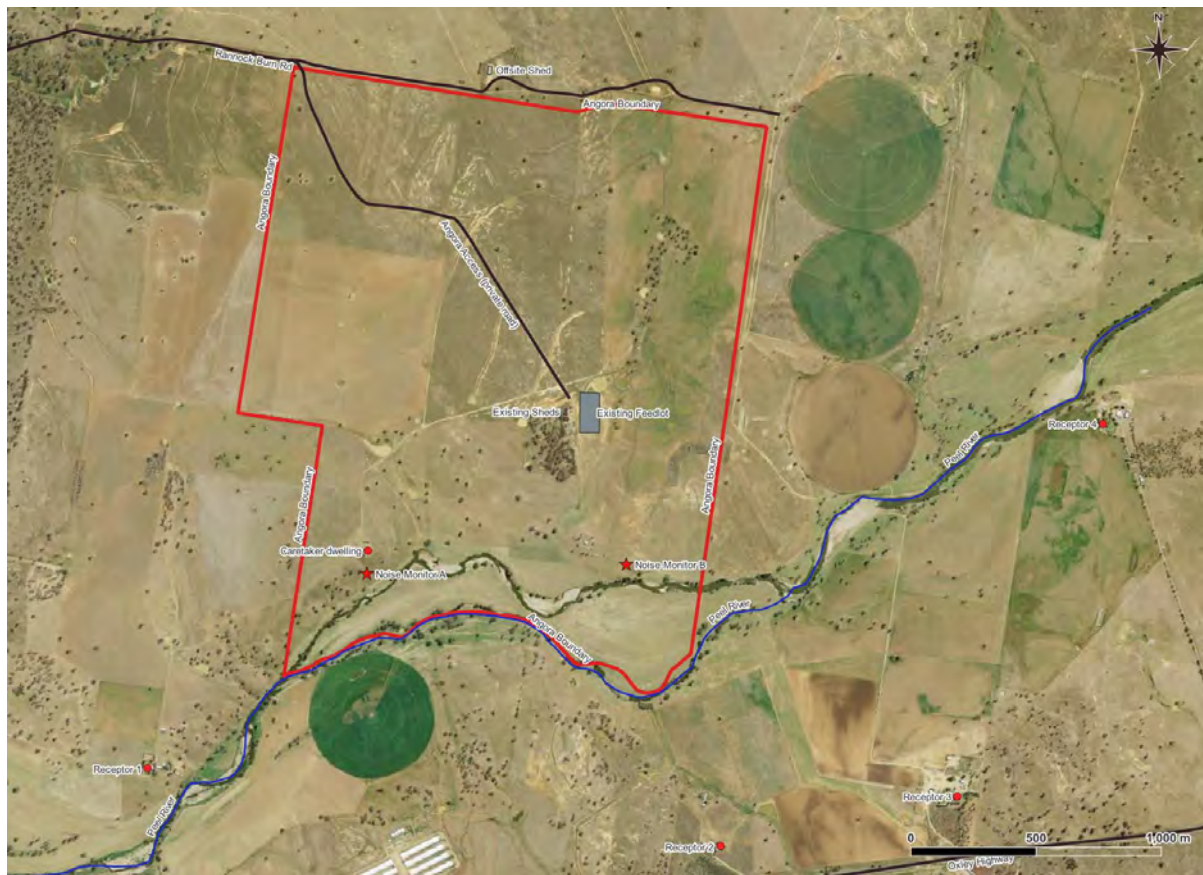


Figure 3-1 shows the Angora property in a Rural Landscape. The nearest receptor (nominated as Receptor 4) is located approximately two kilometres from the proposed cattle feedlot expansion site. The image also shows that all the nearest receptors are impacted by the Oxley Highway and other rural activity in the area. Figure 3-1 also shows the care-taker dwelling located on the Angora property and the two noise monitoring locations.



4 EXISTING NOISE ENVIRONMENT

4.1 AMBIENT NOISE MONITORING

Noise monitoring was conducted from Tuesday 15 November to Tuesday 29 November 2022 at two locations. Figure 3-1 shows the location of noise monitor A (located near the care taker dwelling) and noise monitor B (located at what is known as the “gravel pit”). It must be noted that no work was being conducted at the gravel pit during noise monitoring. Both noise monitors were located near the Peel River. Weather data for this noise monitoring period was obtained from a weather station which was located with noise monitor A.

Image 4-1 shows a picture of the noise monitor with weather station (indicated with red circle) with the Peel River shown in the background.

Image 4-1 *Noise monitor A with weather station*





Image 4-2 *Noise monitor B, located at the “gravel pit” on the Angora property*



Noise monitor A displayed significantly higher noise levels when compared with noise monitor B. It was noted that elevated sound pressure levels were experienced at noise monitor A due to the turbulent flow of the flooding Peel River.

Noise monitor B was used at a more conservative and representative data set for the background noise levels of this area. Table 4-1 presents a summary of the recorded noise levels for noise monitor B “gravel pit”. Appendix A present the detailed noise records.

Attended noise monitoring at noise monitor B “gravel pit” was conducted on the 15th of November. The acoustic environment consisted of noise from the Peel River, bird noise, insect noise, Oxley Highway noise. Noise from the existing “Angora” cattle feedlot was not evident at noise monitoring location B. This location was considered representative of the existing rural acoustic environment.



Table 4-1 *Summary of ambient noise records at the “gravel pit”*

Date	Hourly L90 10th Percentile			Average Leq		
	Day	Evening	Night	Day	Evening	Night
15/11/2022	n/a ¹	47.4	43.5	n/a ¹	51.4	47.3
16/11/2022	41.2	41.4	39.8	46.3	45.0	43.2
17/11/2022	36.9	40.1	39.6	42.8	45.7	43.8
18/11/2022	34.6	42.1	38.6	41.7	50.4	47.5
19/11/2022	33.3	41.7	44.5	41.7	52.3	52.4
20/11/2022	38.5	39.4	37.6	44.8	47.5	43.8
21/11/2022	35.3	38.0	36.7	45.9	44.0	40.7
22/11/2022	35.8	38.4	35.7	42.4	42.0	40.1
23/11/2022	33.7	38.4	36.5	41.8	46.0	44.4
24/11/2022	32.7	40.0	38.0	43.5	50.0	47.3
25/11/2022	32.2	39.2	37.0	40.1	48.5	46.6
26/11/2022	30.7	38.2	37.2	40.1	47.4	47.8
27/11/2022	31.4	39.6	35.3	42.4	48.8	46.9
28/11/2022	34.4	39.0	37.1	42.6	45.8	41.3

1. Incomplete data excluded due to set-up or pack-up of noise monitor



5 PROJECT CRITERIA

5.1 NOISE CRITERIA

The NPfI provides guidance on the assessment of operational noise impacts and the determination of noise criteria (the project noise trigger level) for a proposed development.

5.1.1 Operational Noise Criteria

The NPfI provides suitable criteria for sensitive receptors and details methodologies for the assessment and management of operational noise emissions from industrial premises within NSW.

Within the NPfI, noise emissions are considered in various assessment periods defined as the day, evening, and night to reflect the sensitivity associated with the impacts of the noise.

The assessment periods defined by the EPA are included within Table 5-1.

Table 5-1 *EPA Defined Assessment Periods*

EPA Assessment Period	Relevant Days	Relevant Time Periods
Day	Monday to Saturday	7:00am to 6:00pm
	Sunday	8:00am to 6:00pm
Evening	All Days	6:00pm to 10:00pm
Night	Monday to Saturday	10:00pm to 7:00am
	Sunday	10:00pm to 8:00am

When addressing noise emissions associated with the commercial / industrial uses, the NPfI defines project trigger levels which are used to consider potential impacts at sensitive receptors.

The levels are determined based on consideration of what the NPfI refers to as the 'Project Intrusiveness Noise Level', and the 'Project Amenity Noise Levels'. The project trigger levels then adopt the lower and more stringent of the determined values.

For sensitive receptors, the trigger levels are assessed at the most affected point within site boundaries, or within 30 metres of dwellings where the dwellings are setback from boundaries.

5.1.1.1 Project Noise Trigger

The project noise trigger level is the lower value of the intrusiveness noise level and the amenity noise level. The intrusiveness noise aims to protect against significant changes in noise levels and the amenity noise level aims to protect against cumulative noise impacts from proposed and existing industry. It should be noted that a Project noise trigger level is not a noise limit, rather where it is determined that a project noise trigger level is exceeded all feasible and reasonable noise mitigation measures should be investigated with the goal of achieving the project noise trigger level.

5.1.1.2 Project intrusiveness noise level

The intrusiveness of a noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed



the rating background noise level (RBL) by more than 5 dB when beyond a minimum threshold. Table 5-2 presents the minimum RBL thresholds in relation to a development as outlined in the NPfI as well as the measured RBL.

Table 5-2 Minimum threshold and measured RBLs

Time of day	Minimum RBL threshold noise levels, dBA	Measured RBL, dBA
Day	35	34
Evening	30	40
Night	30	37

Table 5-3 presents the derived RBLs and the project intrusiveness noise levels. It should be noted that the intrusiveness noise levels are only applicable to residential receptors.

Table 5-3 Project RBLs and project intrusiveness noise levels

Time of day	Project RBLs in the area around the proposed development, dBA	Project intrusiveness noise levels ($L_{Aeq,15min}$ dBA)
Day	35	40 (35 + 5)
Evening	40	45 (40 + 5)
Night	37	42 (37 + 5)

5.1.1.3 Project amenity noise level

The recommended amenity noise level is the noise level target for total industrial noise at a receptor and is determined based on the existing acoustic environment, the receptor type and existing industrial activities in the area of the proposed development.

The project amenity noise level represents the noise level target for noise from a single development. It aims to limit the cumulative noise impacts from other industries and developments on all types of receptors. The project amenity noise level is determined by a 5 dBA subtraction from the recommended amenity noise level for receptors that are not impacted by more than four individual industrial noise sources.

The project amenity noise level may be modified in the following cases:

- developments in areas of high traffic noise levels;
- developments located near or inside an existing industrial cluster;
- where the project amenity noise level is at least 10 dBA lower than the existing industrial noise level; and
- where there are no other existing or proposed industries within the development area.

Table 5-4 outlines the recommended amenity noise levels for various receptor types as defined in the NPfI.

Table 5-4 NPfI amenity noise levels

Type of Receiver	Noise amenity area	Time of day	Recommended amenity noise level - L_{Aeq} , dB(A)
Residential	Rural	Day	50
		Evening	45
		Night	40



5.1.1.4 *Maximum noise level events*

The NPfI recommends a maximum noise level assessment to assess the potential for impact on sleep, hence noise disturbance that can cause awakening. An initial screening test for the maximum noise levels events should be assessed to the following levels.

- L_{Aeq} (15 min) 40 dBA or the prevailing RBL plus 5 dB, whichever is greater; and/or
- L_{AFmax} 52 dBA or the prevailing RBL plus 15 dB, whichever is greater.

If the screening test indicates there is a potential for sleep disturbance, then a detailed maximum noise level assessment should be undertaken. The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

5.1.2 *Construction Noise Criteria*

Construction noise has been identified as a major environmental issue within NSW. Noise sources associated with demolition, remediation, renewal, and maintenance can generate high noise levels and have the potential to impact adversely on the surrounding acoustic environment including sensitive receptor locations.

Construction noise associated with the proposed development at “Angora” requires assessment in accordance to the ICNG.

The ICNG provides methodologies of assessing and managing the potential impacts of construction noise on residences and other sensitive land uses.

The main objectives of the ICNG are to:

- identify and minimise noise from construction works;
- apply ‘feasible’ and ‘reasonable’ work practices to minimise construction noise impacts;
- encourage construction to be undertaken only during the ‘recommended standard hours’; unless approval is given for works that cannot be undertaken during these hours; and
- streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage.

The Guideline presents two methodologies for assessing construction noise impacts expressed as either quantitative or qualitative and which vary based generally on the project duration.

For short duration projects (less than 3 weeks), the qualitative assessment procedures are deemed applicable, which require the proponent to consider the Guideline’s checklist of work practices to minimise noise and implement appropriate strategies.

For projects of longer duration, the quantitative assessment procedure is recommended which includes derivation of ‘noise management levels’ (NML) and noise predictions to consider the potential noise impacts at sensitive receptor locations.

The NMLs are determined based on an emergence of the construction noise impacts above the RBLs defined within the NPfI for the ‘recommended standard hours’ as shown Table 5-5.

This assessment will use the quantitative assessment method as outlined in ICNG.

5.1.2.1 *Recommended standard hours*

The recommended standard hours for construction work are shown in Table 5-5.

**Table 5-5** *Recommended standard hours for construction work*

Work type	Recommended standard hours of work ¹
Normal construction	Monday to Friday 7 am to 6 pm
	Saturday 8 am to 1 pm
	No work on Sundays or public holidays
Blasting	Monday to Friday 9 am to 5 pm
	Saturday 9 am to 1 pm
	No blasting on Sundays or public holidays

1. The relevant authority (consent, determining or regulatory) may impose more or less stringent construction hours.

5.1.2.2 Quantitative Noise Assessment at receptors

Table 5-6 sets out management levels for noise at residences and how they are to be applied. Restrictions to the hours of construction may apply to activities that generate noise at residences above the 'highly noise affected' noise management level.

In Table 5-6 the rating background level (RBL) is used when determining the management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the Glossary (Section 11).

As a guide, the difference between the internal noise level and the external noise level is typically 10 dB with windows open for adequate ventilation.

**Table 5-6** *Noise at residences using quantitative assessment*

Time of day	Management level $L_{Aeq}(15\text{ min})^1$	How to apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. <ul style="list-style-type: none">• 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(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. <ul style="list-style-type: none">• 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:<ol style="list-style-type: none">1. 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)2. if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	<ul style="list-style-type: none">• 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.

1. Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

The NMLs are not mandatory limits, however where construction noise levels are predicted to exceed the NMLs, it is considered appropriate that the proponent implement feasible and reasonable work practices to minimise the potential impacts on noise sensitive receptors.



Guidance regarding what is considered feasible and reasonable is contained within the ICNG and generally relates to practical implementation and ongoing maintenance requirements associated with the proposed treatment.

Where appropriate, the ICNG also requires consideration of ground borne noise impacts at residential receptors as well as the potential for noise emissions to cause sleep disturbance at residential receptors during the night time periods.

This assessment will not consider ground-borne noise impacts given the large distance between the noise source and the closest sensitive receptor to the site.

The ICNG also includes guidance regarding potential construction noise impacts on other commercial and industrial premises located within proximity of the subject site. It's understood that all land within the locality of the subject site is used for agricultural purposes varying from grazing and dryland farming and has therefore not been considered noise sensitive for the purposes of this assessment.

Potential impacts at residential receptors have therefore been the focus of the construction noise assessment and are considered further in this report.

5.2 VIBRATION CRITERIA

The potential impact of vibration from all activities, including operation and construction, at the proposed expansion of the Angora cattle feedlot in NSW has been assessed using guidelines from Assessing Vibration – a technical guideline (DEC 2006).

Note: No blasting is required for the construction of the proposed Angora feedlot. A blasting assessment has not conducted.

5.2.1 Vibration Assessment Methodology

The 'Assessing Vibration: a technical guideline (FEB, 2006)' states that vibration prediction procedures used for predicting groundborne vibration can be based on a combination of measurement and the use of formulas derived from actual experience. Examples of such assessment procedures are included in documents such as the US Federal Transit Administration's Transit noise and vibration impact assessment (1995) and the Transport Research Laboratory's Groundborne vibration caused by mechanised construction works (Hiller & Crabb, 2000).

For long term exposure a more stringent criteria has been applied. Australian Standard AS2670.2 – *Evaluation of human exposure to whole-body vibration Part 2: Continuous and shock induced vibration in buildings (1-80Hz)* presents guidance with respect to the annoyance (nuisance) of human beings subject to building vibration. The information is given for the three orthogonal axes with X being forwards and backwards, Y being left and right, and Z being foot to head. Table 5-7 presents the most stringent vibration criteria from AS2670.2. It is noted that these values are typically the threshold at which it is unlikely that any occupant would experience annoyance.

Table 5-7 Human comfort long term vibration limits to minimise annoyance

Axis	Root mean Square (RMS) Velocity (mm/s)
X	0.18
Y	0.18
Z	0.1



6 PROJECT SPECIFIC CRITERIA

6.1 PROJECT SPECIFIC OPERATIONAL NOISE CRITERIA

The conducted noise monitoring shows that the area has RBLs at or above the minimum assumed RBLs as outlined in the NPfI.

The area where the nearest noise sensitive receptors are located is considered rural. The subjective assessment of the acoustic environment in the area of the receptors is therefore consistent with the NSW planning portal description of a rural area.

Table 6-1 shows the amenity and intrusiveness project noise trigger levels as determined based on the derived existing ambient noise levels.

Table 6-1 *Project intrusive noise and Project amenity noise levels*

Time of day	Intrusive noise level (LAeq,15min dB[A])	Project amenity noise levels (LAeq,15min dB[A])
Day	40 (35 + 5)	48 (50 – 5 + 3)
Evening	45 (40 + 5)	43 (45 – 5 + 3)
Night	42 (37 + 5)	38 (40 – 5 + 3)

The project noise trigger level is the lower value of the intrusiveness and amenity noise levels. The project noise trigger levels are defined in Table 6-2.

Table 6-2 *Project Noise Trigger levels*

Time of day	Noise trigger levels
Day LAeq,15min	40
Evening LAeq,15min	43
Night LAeq,15min	38
Night LAFmax	52

6.2 PROJECT SPECIFIC CONSTRUCTION NOISE CRITERIA

The conducted noise monitoring shows that the area has RBLs at or above the minimum assumed RBLs as outlined in the NPfI. Table 5-2 provides the measured RBLs associated with this project.

Table 6-3 provides the noise management levels for the proposed construction noise assessment. These levels are derived from Table 5-6, which outlines the construction noise criteria in accordance with the ICNG.

Table 6-3 *Residential receptor Noise Management Level for Construction*

Descriptor	NPfI Defined Assessment Period (LAeq,15min dB[A])		
	Day	Evening	Night
Recommended Standard Hours	45	N/A	N/A
Outside Recommended Standard Hours	40	45	42

6.3 PROJECT SPECIFIC VIBRATION CRITERIA

Refer section 5.2 for the vibration criteria applied to this project.



7 NOISE ASSESSMENTS

This report assesses both construction noise and operational noise associated with the proposed development. This includes sources from all industrial activities (including private haul roads) proposed to be undertaken on the premises as well as construction activities associated with the feedlot expansion. The construction noise assessment considers two construction scenarios:

- preliminary clearing and earthworks; and
- soil compaction and concrete works.

Noise levels were predicted using the SoundPlan noise modelling software and the CONCAWE noise propagation model. Features which affect the predicted noise level that are considered in the noise modelling include:

- equipment sound power levels and locations;
- screening from structures;
- receiver locations;
- ground topography;
- noise attenuation due to geometric spreading;
- ground absorption; and
- atmospheric absorption.

The model was populated with 3-D topography of the project and surrounding area, extending past the nearest assessment locations. Noise modelling representing the worst-case noise levels has been adopted for the assessment location.

7.1 NOISE MODEL INPUTS AND ASSUMPTIONS

Table 7-1 presents the inputs and assumptions that were used for the noise model.

Table 7-1 *Noise model inputs and assumptions*

Modelling element	Input / assumption. Source reference
Ground elevation geometry	Elevation data: <ul style="list-style-type: none">• ELVIS - Elevation and Depth - Foundation Spatial Data
Ground absorption	100% over soft ground
Methodology	CONCAWE
Weather conditions	Daytime/evening: Stability categories D with 3 m/s winds Night-time: Stability category F with 2 m/s winds
Humidity	Daytime/evening: Humidity 60%, Temperature 20 °C Night-time: Humidity 90%, Temperature 10 °C
Wind direction	From noise source to receptor
Receiver height	1.5 m above ground (30m from residential building)



7.1.1 Operational Noise assessment

Operational noise from all industrial activities (including private haul roads and private railway lines) to be undertaken on the premises using the guidelines contained in the NPfI.

7.1.1.1 Operational Noise sources

Operational noise sources were provided by AgDSA in drawings BTC-001 A401-A408 and operational plant items detailed in correspondence on 23 August 2023.

Operational noise includes cattle handling facilities, tractors, loaders, light vehicles, delivery of feedstock, clearing cattle pens, machinery workshop and a feed mill. The feed mill includes steeped grain elevators, flaked grain elevators, silo augers, wetting augers, weighing and transferring augers, along with associated conveyors and pneumatic valves, main cyclone fan and two 30kW R&R flaking mills.

Table 7-2 details the noise sources included in the noise model including the sound power level (SWL) for the operational phase of the fully expanded feedlot. Noise levels in the table have been obtained from similar projects and are assumed to be applicable to this project.

Figure 7-1 shows the location of noise sources modelled for the operation of the proposed cattle feedlot expansion. Figure 7-2 indicates the full operational areas of the proposed cattle feedlot for the Angora property including effluent disposal areas.

Table 7-2 Sound power levels for Operation

OPERATION	Equipment	SWL dBA	Operational Periods ¹
Machinery Workshop	Equipment in Machinery Workshop	85	Day
Feedlot expansion pens	Tractor clearing pens x2	107	Day
Loading at Handling Facility	Forklift	106	Day
	Front end loader	113	
Feed Mill - including: < 1kW Motors x4 1kW - 5 kW motors x11 5kW - 10kW motors x2 30kW motors x2	Screw conveyors x9	71	Day, Evening, Night
	Compressor	83	
	Bucket elevator x2	75	
	Cyclone dust separator	72	
	Flaking mill	84	
	Pneumatic valves	85	
Heavy truck movements²	Trucks (x2)	62	Day

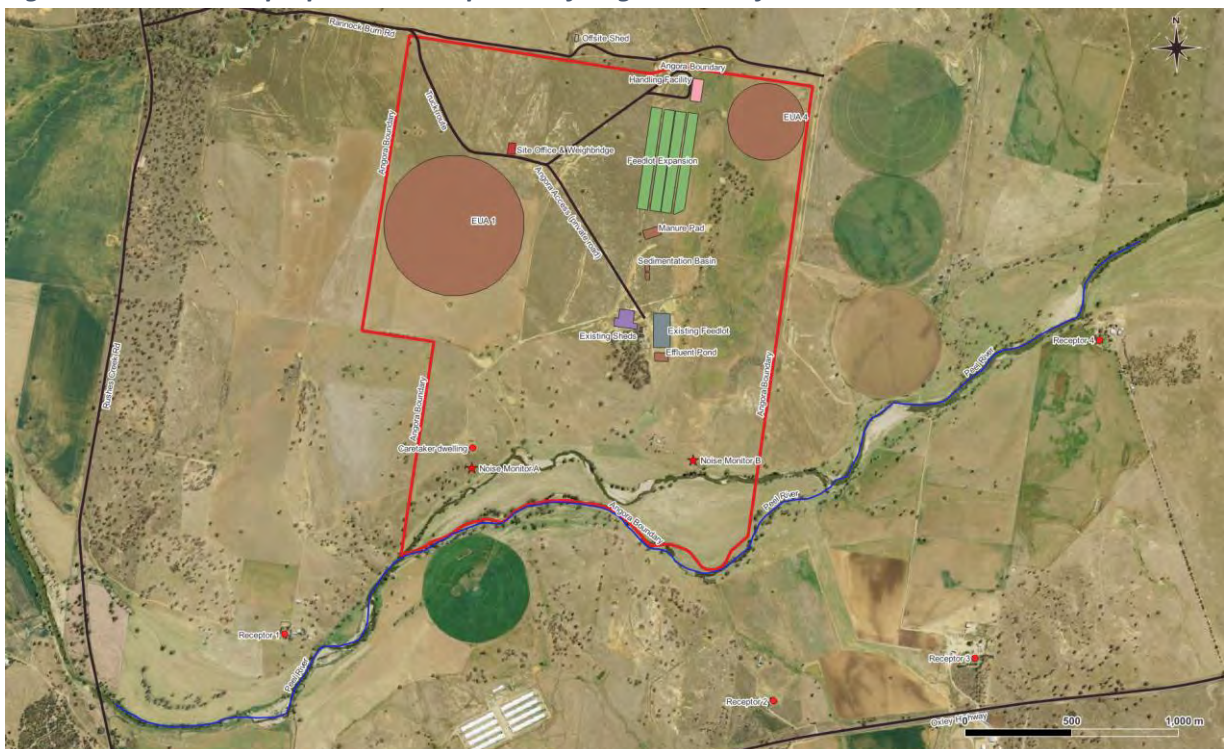
1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: 10 pm to 7 am.
2. See section 7.1.1.2 for detailed explanation.



Figure 7-1 Noise source locations for the proposed Angora feedlot expansion



Figure 7-2 Total proposed development of Angora cattle feedlot





7.1.1.2 Heavy Vehicle Movements for Operational Noise sources

Cattle in a feedlot make very little noise. The main noise sources during operation would be dominated by vehicle movements. Trucking noise would be a regular noise occurring on a daily basis. The buffer zone available around the site is in the order of 2 kms before noise would disturb neighbouring residences. No direct heavy vehicle movement data was received for the project. The following section details our assumptions on which the traffic noise assessment is based.

The expansion of the existing feedlot will generate additional traffic when compared to current traffic generated from the site. The heavy vehicle traffic will consist of grain deliveries and cattle trucks. The grain and cattle truck deliveries to the site will consist of existing trucks being diverted to the feedlot site. The light vehicle traffic will include staff and service vehicles.

The additional traffic associated with the proposed development is considered to represent a minimal increase to the existing traffic along Rushes Creek Rd and the B56 Oxley Highway. Traffic will enter/exit Angora from Rannock Burn Road. The existing entrance road is gravelled to provide all-weather access to the feedlot.

The anticipated numbers of heavy vehicle movements that will be generated by the proposed 10,900 head feedlot operation when operating at a 100% and 80% capacity have been calculated using the following assumptions:

- movement is one-way (i.e. a truck entering and leaving is considered two movements);
- cattle trucks enter and leave full;
- average cattle stay: 90 days;
- average cattle weight in: 350Kg;
- average cattle weight out: 550Kg;
- feed ration consumption will be approximately 13.5 kg per head per day, based on cattle feed consumption of 3% of cattle weight where average cattle weight is 450kg;
- all cattle and feed transport is based on dual-decker B-Doubles with a maximum load capacity of 92 head (IN) and 68 head (OUT);
- 1 head of cattle will produce 1,000 tonnes of manure per year, and that all manure will be transported off site using 4 axle prime mover and semi-trailer combination trucks, which have a carrying capacity of 30 tonnes;
- each pen is utilised for the equivalent of four separate lots of cattle each year; and
- some seasonal variations will occur.

Table 7-3 outlines the anticipated numbers of heavy-vehicle movements that are generated by the existing feedlot operation, and are predicted to be generated by the proposed expansion. It should be noted that traffic generation has been calculated for the feedlot operating at 100% and 80% capacity, it is more likely that the feedlot will operate at 80% occupancy.

The calculations outlined in Table 7-3 assume that all manure produced on site will be transported offsite. However, it is likely that a proportion of manure produced on site will be retained for use on site (as nominated in the EUA areas as seen in Figure 7-2). As such, calculations indicate a 'worst case' traffic volume scenario. It is likely that actual traffic volumes generated by the proposed development will be lower than those predicted.

**Table 7-3** *Predicted Heavy vehicle traffic for Angora feedlot*

Traffic Movements		
	Existing Feedlot (1,000 head)	Proposed Feedlot (10,900 head)
Maximum Occupancy (100%)		
Head Processed Annually	3,960	45,200
Cattle Truck Movements	101 Annually	1,156 Annually
	1.9 / week	22.2 / week
	< 1 / weekday	4.5 / weekday
Feed Truck Movements	162 Annually	1,856 Annually
	3 / week	35.6 / week
	< 1 / weekday	7.1 / weekday
Manure Truck Movements	33 Annually	377 Annually
	< 1 / week	7.2 / week
	< 1 / weekday	1.5 / weekday
Total Truck Movements	297 Annually	3,389 Annually
	6 / week	65 / week
	1.1 / weekday	13 / weekday
Maximum Occupancy (80%)		
Head Processed Annually	3,168	36,160
Cattle Truck Movements	81 Annually	925 Annually
	1.6 / week	17.8 / week
	< 1 / weekday	3.6 / weekday
Feed Truck Movements	130 Annually	1,485 Annually
	2.5 / week	28.5 / week
	< 1 / weekday	5.7 / weekday
Manure Truck Movements	26 Annually	301 Annually
	< 1 / week	5.8 / week
	< 1 / weekday	1.2 / weekday
Total Truck Movements	238 Annually	2,710 Annually
	4.6 / week	52.1 / week
	1 / weekday	10.4 / weekday

The SoundPlan model includes the maximum truck movements for the proposed feedlot expansion. Table 7-3 indicates 13 truck movements per day for the proposed feedlot of 10,900 head. The SoundPlan model includes noise emissions for two truck movements in a 15min period to represent the operational heavy vehicle noise activity for the proposed feedlot expansion. This is a considered conservative figure for the operational noise predictions.

The truck route has been modelled on Rannock Burn Road (from the intersection of Rushes Creek Road and Rannock Burn Rd) and along the Angora private haul road to the proposed onsite cattle handling facility. Truck noise emissions have been modelled with a speed of 40 km/hr on the gravel roads. Figure 7-3 shows the heavy vehicle truck route used in the SoundPlan noise model.

**Figure 7-3** *Proposed operational heavy vehicle truck route*

7.1.1.3 Predicted Operational noise levels

Table 7-4 provides a summary of the predicted operational noise levels at the four closest sensitive receptors adjacent to the project. Sensitive receptors are defined in section 3 of this report.

Table 7-4 *Predicted Operational noise levels and noise criteria*

Receptor	Day criterion, dBA	Predicted daytime noise level, dBA	Evening criterion, dBA	Predicted evening noise level, dBA	Night Criterion, dBA	Predicted night-time noise level, dBA
1	40	28	43	7	38	7
2	40	30	43	12	38	12
3	40	29	43	8	38	8
4	40	32	43	10	38	10
Caretaker	40	36	43	21	38	21

Table 7-4 indicates the predicted noise levels for sensitive receptors outside the Angora property comply with the project noise trigger levels. The expanded feedlot can as such operate continuously at the site without the need for noise mitigation measures. Appendix B presents noise maps of the predicted operational noise levels.

7.1.1.4 Sleep Disturbance Assessment

The potential for sleep disturbance from maximum noise level events from premises during the night-time period forms part of this assessment. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

The NPfI states that, “where the subject development/premises night-time noise levels at a residential location exceed:



- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

a detailed maximum noise level event assessment should be undertaken.”

Pneumatic valves are the highest level impulsive noise source to operate in the feed mill in the evening or night periods. The noise model has assumed a sound power level of 95 dBA for the activation of pneumatic valves.

At the nearest receptor (the Caretaker dwelling), the noise level is predicted to be 21 dBA. This is well below the project noise trigger level of L_{AFmax} 52 dBA. Therefore, sleep disturbance is within the noise trigger level.

The closest residence not associated with the feedlot operation is located at a distance of approximately 2 km south south-east of the site. Noise attenuation over this distance is significant and therefore noise emissions from the mill, including trucks and milling operations are not predicted to disturb the amenity at this residence.

Noise attenuation between the feedlot site and the closest receptor has been determined to be sufficient based on the available buffer distances to meet the above criteria.

7.1.2 Construction Noise assessment

The magnitude of off-site noise impacts associated with construction would be dependent upon a number of factors such as:

- the intensity and location of construction activities;
- the type of equipment used;
- existing local noise sources;
- intervening terrain; and
- the prevailing weather conditions.

During any given period, the machinery items to be used in the study area would operate at maximum power for only brief stages. At other times, the machinery may produce lower sound levels while carrying out activities not requiring full power. It is highly unlikely that all construction equipment would be operating at their maximum power levels at any one time and certain types of construction machinery would be present in the study area for only brief periods during construction.

It is understood that the construction works associated with the proposal will generally involve the creation of the proposed cattle yard pens, along with a site office with weighbridge, feedlot sheds, silage pits, hay shed, machinery workshop and a feed mill. The proposed feedlot expansion is shown in Figure 7-1 and Figure 7-2.

The parameters for predicting construction noise impacts are summarised in the following points:

- all construction equipment noise sources (including associated sound power levels) related to the proposed construction works are outlined in Table 7-5;
- the location of the construction noise sources is shown in Figure 7-1, and the height of noise sources has been modelled at 1.5 metres above ground level;
- airborne noise has been calculated in this assessment;
- two construction scenarios have been assessed;
- sensitive receptors are shown in Figure 3-1;
- site features (including topography, buildings and surrounding land uses) that affect noise propagation has been included in the SoundPlan model;



- proposed construction hours are assumed to be standard hours; and
- no other concurrent construction works in the vicinity have been included as additional noise.

7.1.2.1 Construction Noise Scenarios

The construction noise assessment considers two construction scenarios. The construction scenarios include preliminary clearing and earthworks, along with soil compaction and concrete works, refer Table 7-5 for construction scenarios.

7.1.2.2 Construction Noise sources

The construction equipment for each scenario, along with the associated sound power level is summarised in Table 7-5. This table details the noise sources included in the noise model together with the sound power level (SWL) for each equipment item. Noise levels in the table have been obtained from similar projects and are assumed to be applicable to this project.

The construction of the proposed feedlot expansion is considered a reasonably small project. It is expected that a maximum of up to six construction equipment items will be in operation at any given time during for each construction scenario. The noise model has included six items for each construction scenario, these items have been nominated in Table 7-5.

Table 7-5 Sound power levels for Construction scenarios

CONSTRUCTION Scenario	Equipment	SWL dBA re 10-12 W
Scenario 1 Earthworks, spoil removal	20t Excavator	107
	Truck & Dog	105
	14t Roller	108
	Dump Truck	117
	Dozer	108
	Scraper	116
Scenario 2 Compaction and formation	Truck and dog	105
	20t excavator	107
	Grader	110
	Water truck	107
	Concrete Truck	109
	Concrete Pump	108



7.1.3 Predicted Construction Noise levels and noise criteria for Construction Scenarios

Table 7-6 shows the predicted L_{Aeq} noise levels and the noise criteria for the day, evening and night-time periods without noise mitigation measures.

Table 7-6 *Predicted Construction noise levels and noise criteria for Scenario 1*

Receptor	Day criterion, dBA	Predicted daytime noise level, dBA	Evening criterion, dBA	Predicted evening noise level, dBA	Night Criterion, dBA	Predicted night-time noise level, dBA
1	45	34.2	45	34.2	42	n/a
2	45	35.0	45	35.0	42	n/a
3	45	33.7	45	33.7	42	n/a
4	45	35.9	45	35.9	42	n/a
Caretaker	45	42.2	45	42.2	42	n/a

Table 7-6 indicates the predicted construction scenario 1 noise levels for sensitive receptors comply with the project construction noise criteria. Construction scenario 1 can as such operate at the site without the need for noise mitigation measures in standard hours. Appendix B presents noise maps of the predicted noise levels. It is advised that construction works are limited to standard hours.

Table 7-7 *Predicted Construction noise levels and noise criteria for Scenario 2*

Receptor	Day criterion, dBA	Predicted daytime noise level, dBA	Evening criterion, dBA	Predicted evening noise level, dBA	Night Criterion, dBA	Predicted night-time noise level, dBA
1	45	30.1	45	30.1	42	n/a
2	45	30.8	45	30.8	42	n/a
3	45	29.4	45	29.4	42	n/a
4	45	31.5	45	31.5	42	n/a
Caretaker	45	38.3	45	38.3	42	n/a

Table 7-7 shows the predicted construction scenario 2 noise levels for sensitive receptors comply with the project construction noise criteria. Construction scenario 2 can as such operate continuously at the site without the need for noise mitigation measures. Appendix B presents noise maps of the predicted noise levels. It is advised that construction works are limited to standard hours.



8 NOISE ON PUBLIC ROADS

Vehicle movements during the construction phase will generally be limited to light vehicles associated with contractors who may be required for minor assistance during the expansion of the feedlot. A nominal two light vehicles per day (4 trips) accessing the site has been assumed for both construction and operation. It has also been assumed that during a peak day there will be a doubling of light vehicle movements.

The described light vehicles will generate negligible noise emissions and would not require consideration at the relevant residential receptor given the significant distance separation.

It is understood that operational traffic generation will likely be the more relevant source of noise. Table 7-3 indicates the predicted heavy vehicle traffic for the proposed expansion of the Angora Feedlot. This shows an additional 13 truck movements per day.

Traffic volumes provided by Transport for NSW for the Oxley Highway indicate 3,354 average daily traffic count, with 23% heavy vehicle volume. This equates to approximately 771 truck and 2583 light vehicles movements per day.

The total increase in heavy vehicles on the Oxley Highway represents a 1.66% increase to the existing traffic volumes. The described increase represents a modest change in the existing traffic volumes and would not be expected to impact adversely on the acoustic environment.



9 VIBRATION ASSESSMENT

9.1 VIBRATION SOURCES

The potential sources of vibration on the cattle feedlot site include the construction of new facilities, the operation of machinery such as tractors, trucks, and other heavy vehicles, operation of the feedmill as well as the movement of cattle and personnel on the site.

Table 9-1 and Table 9-2 nominate the equipment expected to be used for both operation and construction of the proposed cattle feedlot. The tables show the most significant vibration source is the 14t vibratory roller.

Table 9-1 *Operation Equipment with reference vibration levels*

OPERATION	Equipment	Vibration level @ 2m ref (mm/s)
	Machinery Workshop	0.11
	Tractor clearing pens x2	0.33
	Forklift	0.33
	Front end loader	0.33
Feed Mill - including: < 1kW Motors x4 1kW - 5 kW motors x11 5kW - 10kW motors x2 30kW motors x2	Screw conveyors x9	0.11
	Compressor	0.11
	Bucket elevator x2	0.11
	Cyclone dust separator	0.11
	Flaking mill	0.11
	Pneumatic valves	0.11

Table 9-2 *Construction Equipment with reference vibration levels*

Construction Scenario	Equipment	Vibration level @ 2m ref (mm/s)
Scenario 1: Earthworks, spoil removal	20t Excavator	0.33
	Truck & Dog	0.33
	14t Vibratory Roller	21.2
	Dump Truck	0.33
	Skid Steer Loader	0.33
	Dozer	9.78
	Scraper	1.52
	Front End Loader	0.33
Scenario 2: Compaction and formation	Grader	0.33
	Truck and dog	0.33
	20t excavator	0.33
	Grader	0.33
	Water truck	0.33
	12t roller	12.25
	Skid steer loader	0.33
	Concrete Truck	0.33
	Concrete Pump	0.33



9.2 VIBRATION ASSESSMENT

This vibration assessment follows the procedures included in the US Federal Transit Administration's Transit noise and vibration impact assessment (1995) and the Transport Research Laboratory's Groundborne vibration caused by mechanised construction works (Hiller & Crabb, 2000).

The vibration criteria for long term vibration exposure have been applied from Australian Standard AS2670.2 – *Evaluation of human exposure to whole-body vibration Part 2: Continuous and shock induced vibration in buildings (1-80Hz)*. This Australian standard presents guidance with respect to the annoyance (nuisance) for human beings.

Vibratory compaction is the highest vibration generating activity listed in the project operations. Refer section 9.1 of the report for vibration sources relating to operation and construction of the proposed cattle feedlot.

A 14t vibratory roller is predicted to generate 21.2mm/s peak particle velocity (PPV) values at a reference distance of 2 metres, when using the vibration prediction method contained in Chapter 7 of the US Federal Transit Administration (FTA) document entitled '*Transit noise and vibration impact assessment manual, 2018*'.

Where:

PPV = resulting peak particle velocity (mm/s)

PPV_{source} = source reference peak particle velocity (mm/s @ 7.6m)

D = distance (ft)

K = ground factor (note: a standard ground factor (K) of 1.1 has been adopted for this assessment)

To achieve the minimum long term vibration criterion of 0.1 mm/s, the vibratory roller would be required to be at least 282 metres from a vibration sensitive receptor. Table 9-3 provides the approximate distances from the proposed project operation and construction activity in relation to the nearby sensitive receptors.

Table 9-3 Sensitive receptor compliance with vibration criteria

Sensitive Receptor Number	Address	Approx distance from vibration source to receptor (m)	Minimum compliance distance (m)	Complies with vibration criteria
1	Rushes Creek Rd, Rushes Creek NSW 2346	2775	282	YES
2	Oxley Highway, Somerton NSW 2340	2400	282	YES
3	Oxley Highway, Somerton NSW 2340	2500	282	YES
4	Oxley Highway, Somerton NSW 2340	2000	282	YES
Caretaker	Rushes Creek Rd, Rushes Creek NSW 2346	1550	282	YES

Table 9-3 shows that all sensitive receptors are located at a distance greater than 282 metres from the highest vibration source relating to the project. It is therefore concluded that vibration emissions from both operation and construction of the proposed project will not impact the surrounding sensitive receptors and that vibration levels will be in compliance with the recommended guidelines.



10 CONCLUSION

A noise and vibration assessment have been assessed in accordance with the specified NSW Planning Secretary's Environmental Assessment Requirements SEAR 1696 (EF22/7962) to determine the noise impacts associated with the proposed expansion of the Angora cattle feedlot installation on Rannock Burn Road, Rushes Creek, NSW, postcode 2346 on Lot 1 DP 842391 and Lots 19, 43, 44 141 and 142 DP 752169.

The 'Angora' property operates an existing cattle feedlot for up to 100 head. The existing feedlot is proposed to expand to accommodate 1,400 head. In addition, it is proposed to construct a new cattle feedlot to accommodate 9,500 head. Therefore, the total proposed cattle feedlot operation could accommodate 10,900 head.

The objectives of this noise and vibration assessment have:

- determined the predicted noise and vibration impacts on sensitive receptors located near to the Project for both construction and operational phases;
- determined the levels of mitigation likely to be required, if applicable, to enable compliance with the NSW Planning Secretary's Environmental Assessment Requirements; and
- provide relevant noise and vibration information for the preparation of an Environmental Impact Statement (EIS) for the Project development proposal.

The results of this assessment confirms that construction noise associated with the proposed development conforms to the NSW Interim Construction Noise Guideline (DECC, 2009).

The vibration from all activities (including operation and construction) to be undertaken as part of the cattle expansion proposal on the 'Angora' property are in compliance with the guidelines contained in the NSW 'Assessing Vibration: a technical guideline (DEC, 2006)'.

No blasting is required for this project, therefore a blasting assessment has not been conducted.

Operational noise from all industrial activities (including private haul roads) to be undertaken on the premises conforms to the guidelines contained in the NSW Noise Policy for Industry (EPA, 2017).

Noise on public roads from increased road traffic generated by land use developments conforms to the requirements of the guidelines contained in the NSW Road Noise Policy and associated application notes (EPA, 2011).

The assessment has determined the noise criteria (project noise trigger levels) for the site. The project noise trigger levels are as follows:

- Daytime: $L_{Aeq,15min}$ 40 dBA
- Evening: $L_{Aeq,15min}$ 43 dBA
- Night-time: $L_{Aeq,15min}$ 38 dBA
- Night-time: L_{AFmax} 52 dBA

The noise assessment shows that the site is predicted to be in compliance with the project noise criteria. No noise mitigation is required for compliance with the project noise trigger levels for both construction and operation.

Acoustic amenity of the area will not change significantly as a result of the proposed cattle feedlot expansion.



11 GLOSSARY

NSW Noise Policy for Industry Glossary:

Term	Definition
Above ground level (AGL)	Above ground level.
A-weighted	See dB(A).
Ambient noise	The all-encompassing noise associated within a given environment. It is the composite of sounds from many sources, both near and far.
Amenity noise level	See the fourth column of Table 2.2 of NPfI.
Annoyance	An emotional state connected to feelings of discomfort, anger, depression and helplessness. It is generally measured by means of the ISO15666 defined questionnaire (EEA, 2010).
Assessment period	The period in a day over which assessments are made: day (7 am to 6 pm); evening (6 pm to 10 pm); or night (10 pm to 7 am).
Assessment background level (ABL)	The single-figure background level representing each assessment period: day, evening and night (that is, three assessment background levels are determined for each 24-hour period of the monitoring period). Its determination is by the methods described in Fact Sheet B.
Background noise	The underlying level of noise present in ambient noise, generally excluding the noise source under investigation, when extraneous noise is removed. This is described using the LAF90 descriptor.
Best available technology economically achievable (BATEA)	Equipment, plant and machinery incorporating the most advanced and affordable technology available to minimise noise output.
Best management practice (BMP)	Adoption of particular operational procedures that minimise noise while retaining productive efficiency.
C-weighted	C-weighting is an adjustment made to sound-level measurements that takes account of low-frequency components of noise within the audibility range of humans.
Cluster of industry	An industrial/port estate, area, zone, or proposed area or zone where more than three separate industrial uses are co-located in a contiguous fashion and are operating or proposed to operate.
Compliance	The process of checking that source noise levels meet with the noise limits in a statutory context.
Construction activities	Activities that are related to the establishment phase of a development and that will occur on a site for only a limited period of time.
Cumulative industrial noise level	The total level of noise from all industrial sources.
Day	The period from 7 am to 6 pm (Monday to Saturday) and 8 am to 6 pm (Sundays and public holidays).
Decibel (dB)	A measure of sound level. The decibel is a logarithmic way of describing a ratio. The ratio may be power, sound pressure, voltage, intensity or other parameters. In the case of sound pressure, it is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure squared to a reference sound pressure squared.



Term	Definition
decibel (A-weighted; dB[A])	Unit used to measure ‘A-weighted’ sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
EP&A Act	Environmental Planning and Assessment Act 1979.
Evening	Refers to the period from 6 pm to 10 pm.
Extraneous noise	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.
Feasible and reasonable mitigation	As defined in Fact Sheet F.
Greenfield site	Undeveloped land.
High traffic amenity level	See Section 2.4.1.
Impulsive noise	Noise with a high peak of short duration, or a sequence of such peaks.
Industrial noise sources	As defined in Section 1.4.
Intrusive noise	Refers to noise that intrudes above the background level by more than 5 decibels. The intrusiveness noise level is set out in Section 2.3.
LAF90,15min dB	The A-weighted sound pressure level measured using fast time weighting that is exceeded for 90% of the time over a 15-minute assessment period. This is a measure of background noise.
LAF90,(day, evening, night) dB	The A-weighted sound pressure level measured using fast time weighting that is exceeded for 90% of the time over a day, evening or night-time assessment period. This is a measure of background noise.
LAF90,(shoulder period) dB	The A-weighted sound pressure level measured using fast time weighting that is exceeded for 90% of aggregate sound pressure level data for the equivalent of one week’s worth of valid data taken over the shoulder period.
LAeq,T	The time-averaged sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, with a measurement time interval T, has the same mean square sound pressure level as a sound under consideration with a level that varies with time (AS1055.1-1997).
LAmaz	The maximum sound pressure level of an event measured with a sound level meter satisfying AS IEC 61672.1-2004 set to ‘A’ frequency weighting and fast time weighting.
Low frequency	Noise containing major components in the low-frequency range (10 hertz [Hz] to 160 Hz) of the frequency spectrum.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street (Bies and Hansen, 1996).
Median	The middle value in a number of values sorted in ascending or descending order. Hence, for an odd number of values, the value of the median is simply the middle value. If there is an even number of values, the median is the arithmetic average of the two middle values.
Meteorological conditions	Wind and temperature-inversion conditions.



Term	Definition
Noise impact assessment (NIA)	The component of an Environmental Impact Statement, Environmental Assessment, Statement of Environmental Effects, or licence application that considers the impacts of noise resulting from a development or activity.
Noise limits	Enforceable noise levels that appear in conditions on consents and licences. The noise limits are based on achievable noise levels which the proponent has predicted can be met during the environmental assessment.
Night	The period from 10 pm to 7 am (Monday to Saturday), and 10 pm to 8 am (Sundays and public holidays).
Noise-sensitive land uses	Land uses that are sensitive to noise, such as residential areas, churches, schools and recreation areas.
Non-compliance	Any exceedance of a consent/licence limit is considered a non-compliance. However, the type of regulatory action taken by a regulatory authority will depend on a number of factors, in accordance with the authority's prosecution policies and guidelines.
Non-mandatory	In this policy this means not required by legislation. The policy specifies project noise trigger levels to be strived for, but the legislation does not make these levels compulsory. However, the policy will be used as a guide to setting statutory (legally enforceable) limits for licences and consents.
Operator	Noise-source manager.
Performance-based goals	Goals specified in terms of the outcomes/performance to be achieved, but not in terms of the means of achieving them.
Premises	As defined in the Protection of the Environment Operations Act 1997.
Project noise trigger levels	Target noise levels for a particular noise-generating facility. They are based on the most stringent of the project intrusiveness noise level or the project amenity noise level.
Proponent	The developer of the industrial noise source.
POEO Act	Protection of the Environment Operations Act 1997
Rating background noise level (RBL)	The overall, single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period (as opposed to over each 24-hour period used for the assessment background level). This is the level used for assessment purposes. See Fact Sheets A & B.
Residence	A lawful and permanent structure erected in a land-use zone that permits residential use (or for which existing use rights under the EP&A Act apply) where a person/s permanently reside and is not, nor associated with, a commercial undertaking such as caretakers' quarters, hotel, motel, transient holiday accommodation or caravan park.
Reasonably most-affected location	Locations that experience (or will experience) the greatest noise impact from the noise source under consideration. In determining these locations, one needs to consider existing background levels, exact noise source location(s), distance from source (or proposed source) to receiver, and any shielding between source and receiver. This should not be construed to mean that limits only apply at the worst, most-affected location.
Receiver	The noise-sensitive land use at which noise from a development can be heard.



Term	Definition
Significant meteorological effects	In relation to temperature inversions, this means at least 30% of the total night-time during the winter months. In relation to wind speeds this means at least 30% of the time or more in any assessment period (day, evening, night) in any season.
Sleep disturbance	Awakenings and disturbance to sleep stages.
Spectral characteristics	The frequency content of noise.
Temperature inversion	An atmospheric condition in which temperature increases with height above the ground.
Temporal variation of noise	Variation in noise levels over time.
Tenth (10th) percentile method	See Fact Sheet B.
Time of maximum impact	The time during which the difference between the background noise level and the source noise is expected to be greatest.
Tonality	Noise containing a prominent frequency and characterised by a definite pitch.
Transportation	Includes road, rail and air traffic.
Very noise-enhancing meteorological conditions	Meteorological conditions outside of the range of either standard or noise-enhancing meteorological conditions as adopted in the noise impact assessment following the procedures in Fact Sheet D.

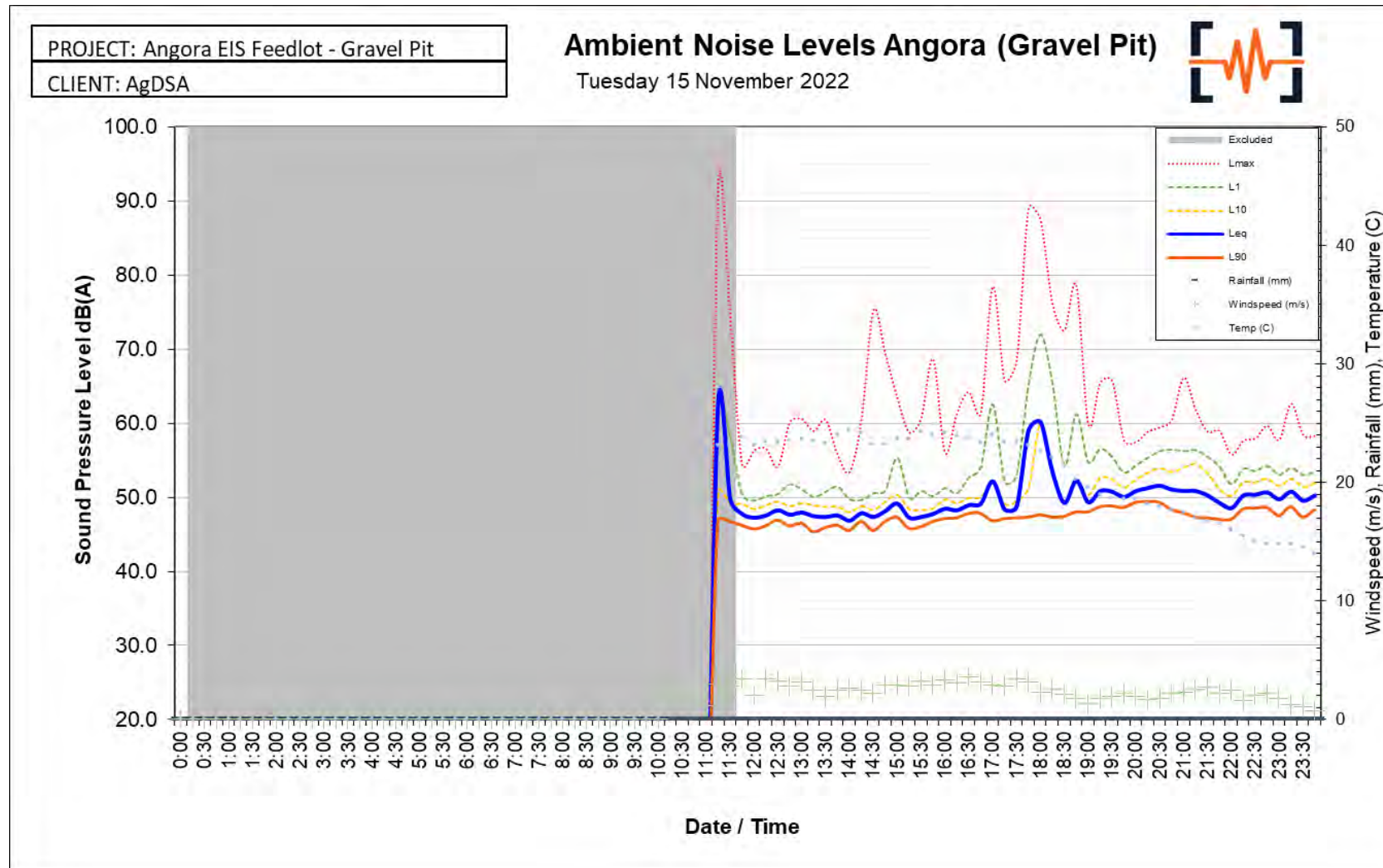


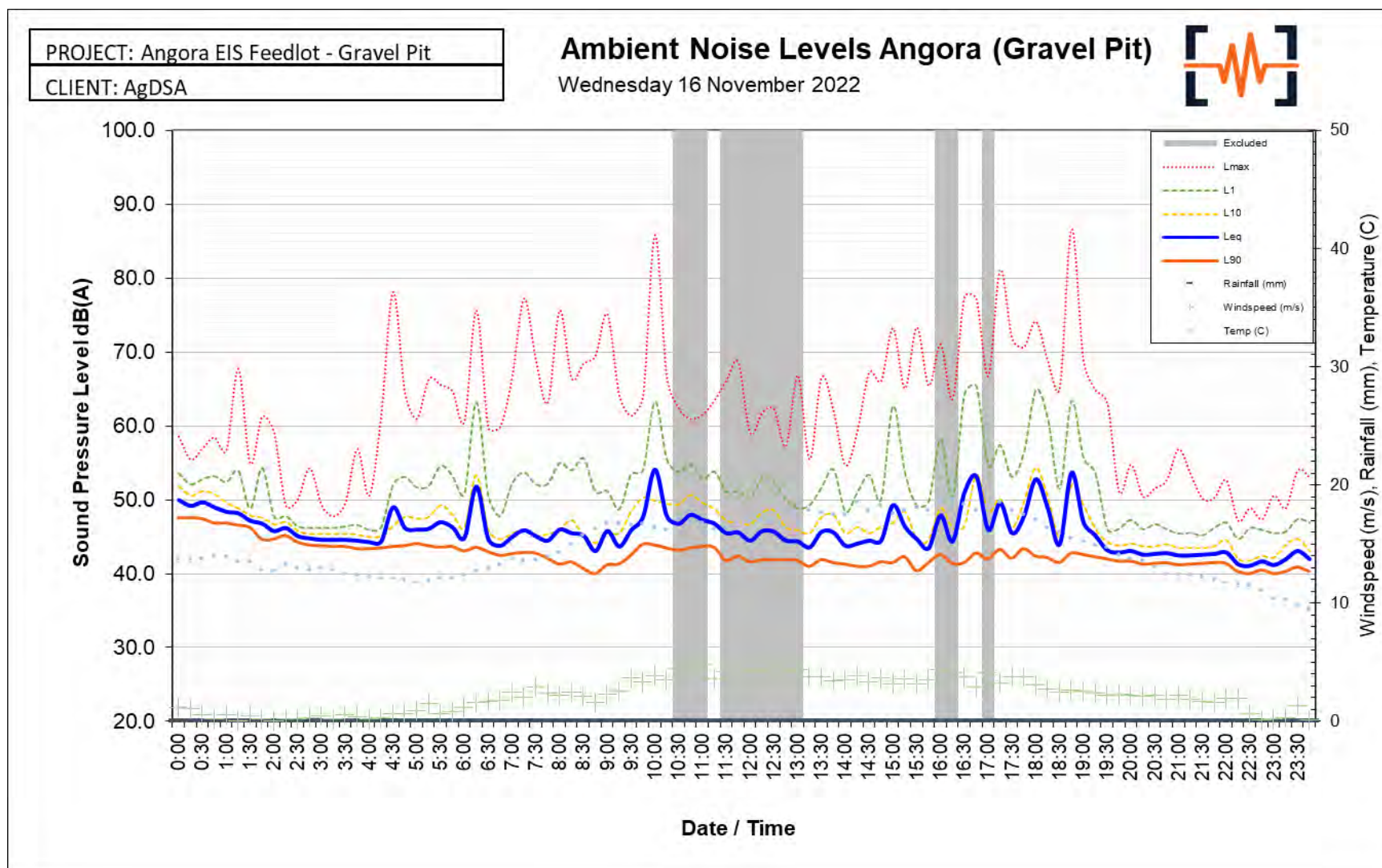
NSW Assessing Vibration: a technical guideline Glossary:

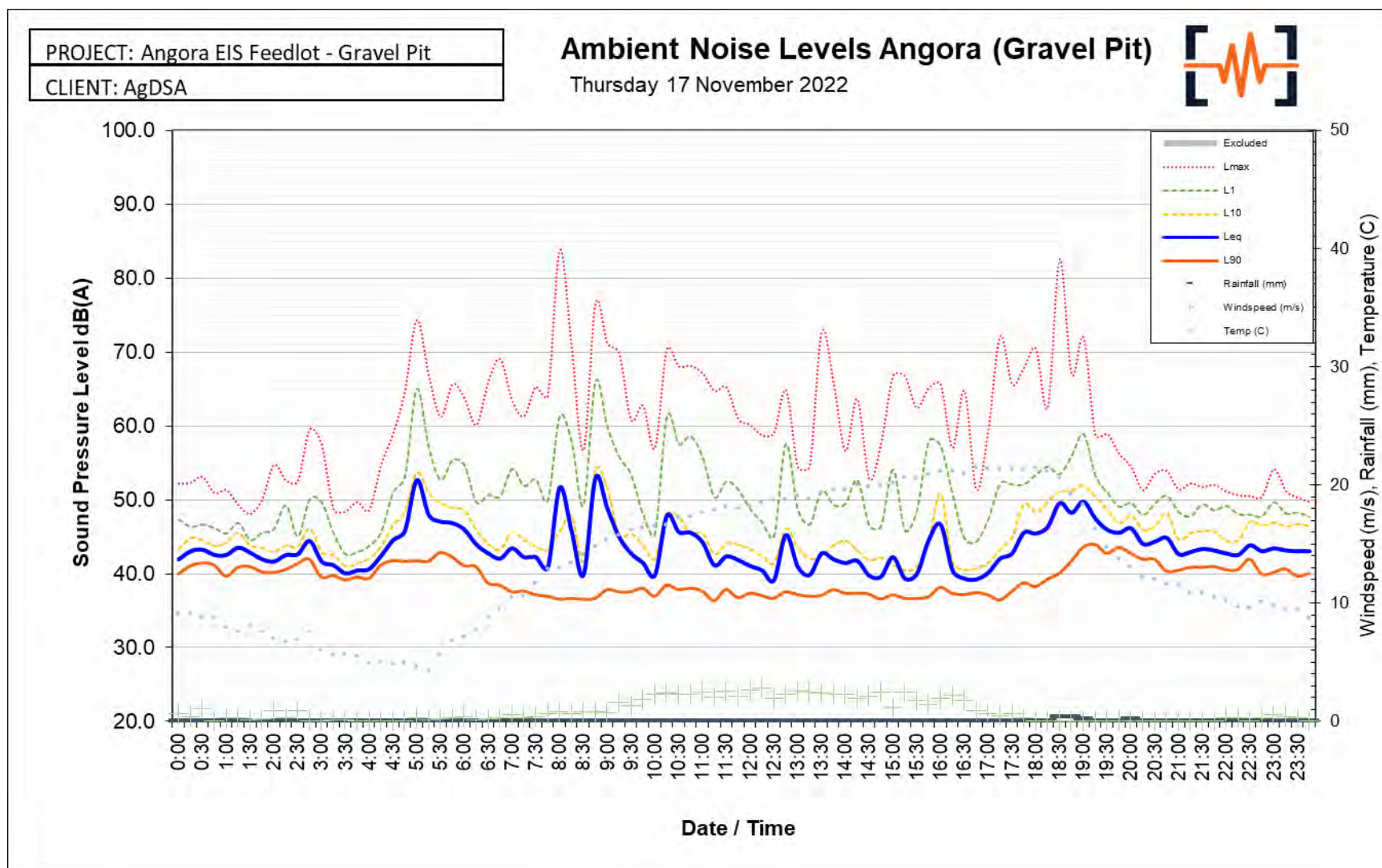
Term	Definition
Term	Definition
Annoyance	Type of reaction felt by humans in response to vibration. The degree of annoyance felt by an individual may be assessed by using social survey Techniques
Best management practices (BMP)	The adoption of particular operational procedures that minimise vibration impacts effects while retaining productive efficiency
Best available technology economically achievable (BATEA)	Equipment, plant and machinery that incorporates the most advanced and affordable technology to minimise vibration output
Comfort	Subjective state of wellbeing in relation to an induced environment such as mechanical vibration (or shock). Comfort connotes the absence of disturbing or intrusive factors.
Crest factor	The ratio between the peak level and the rms value of a signal.
DEC	Department of Environment and Conservation
eVDV	Estimated vibration dose value
Feasible and reasonable measures	Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors: <ul style="list-style-type: none">• vibration mitigation benefits (amount of vibration reduction provided, number of people protected)• cost of mitigation (cost of mitigation versus benefit provided)• community views (aesthetic impacts and community wishes)• vibration values for affected people (existing and future vibration values, and changes in vibration values)
Resonance	Resonance of a system in forced oscillation exists when any change in the frequency of excitation causes a decrease in a response of the system
rms	Root mean square
VDV	Vibration dose value
Vibration isolator	A support whose function is to attenuate the transmission of vibration in a frequency range
x-axis vibration	(pertaining to whole-body vibration) Mechanical vibration acting along the postero-anterior (back-to-front) axis of the human body.
y-axis vibration	(pertaining to whole-body vibration) Mechanical vibration acting laterally (sideways) upon the body.
z-axis vibration	(pertaining to whole-body vibration) Mechanical vibration acting along the caudocephalic (foot-to-head) axis of the human body.

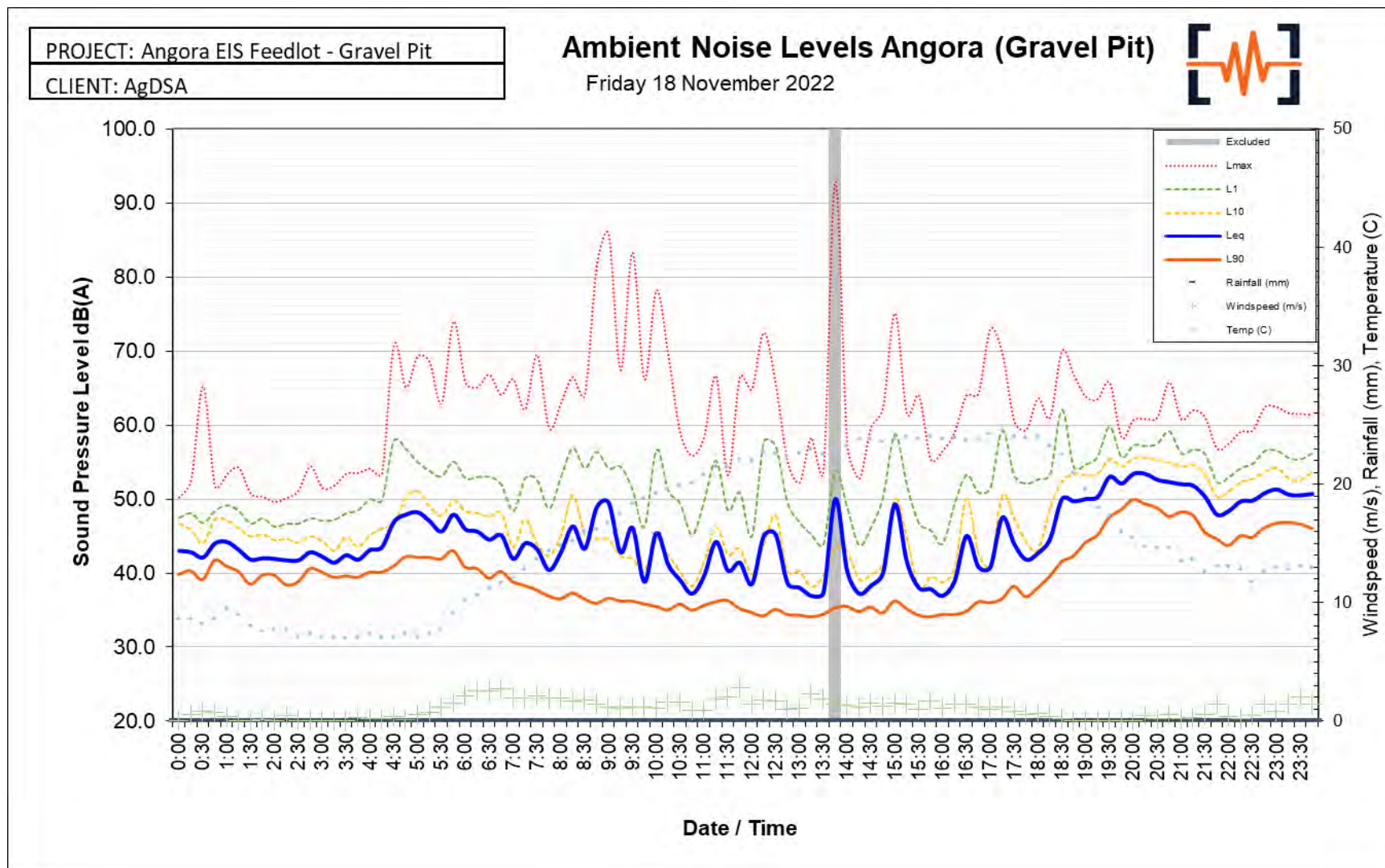


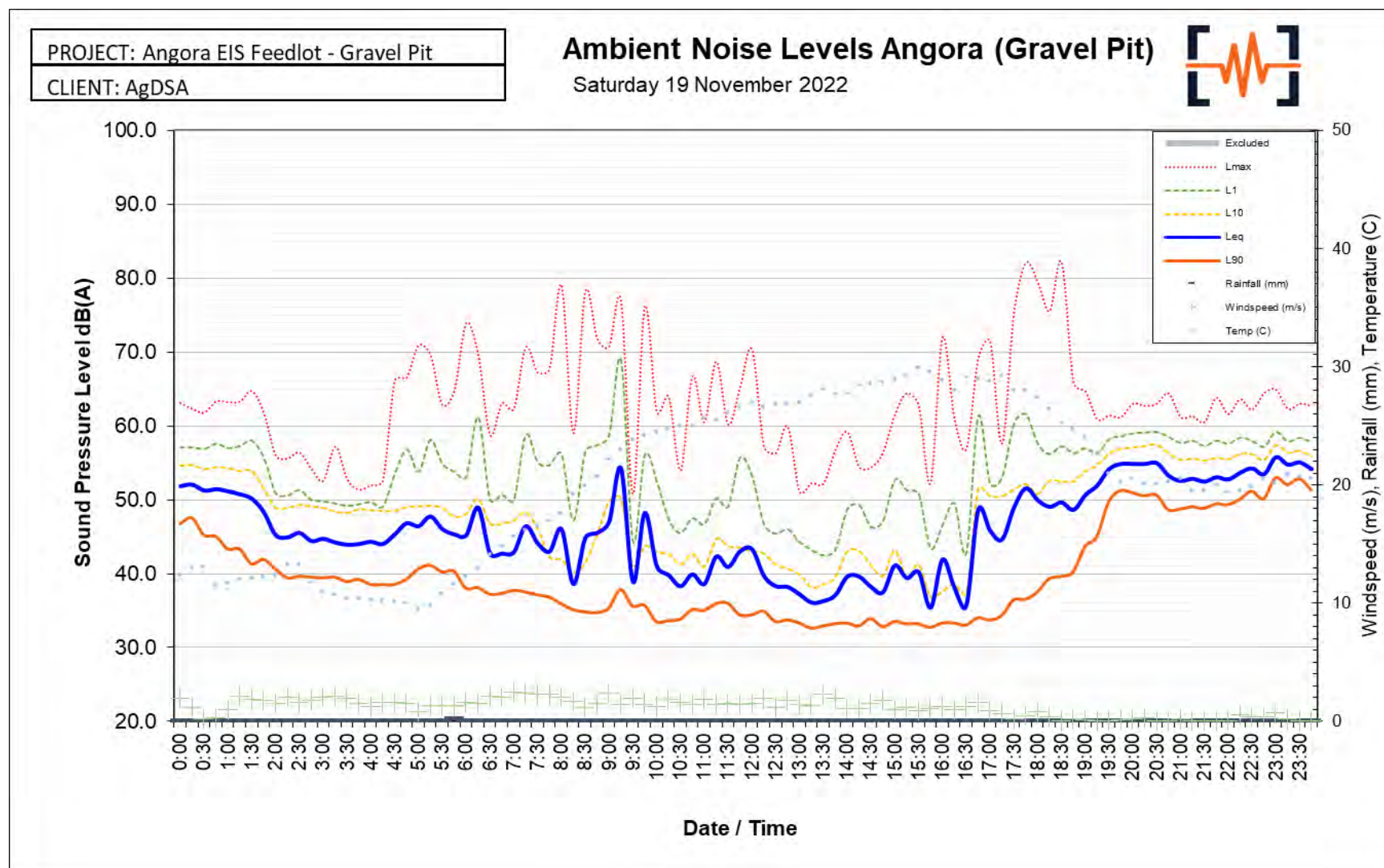
APPENDIX A – NOISE RECORDS

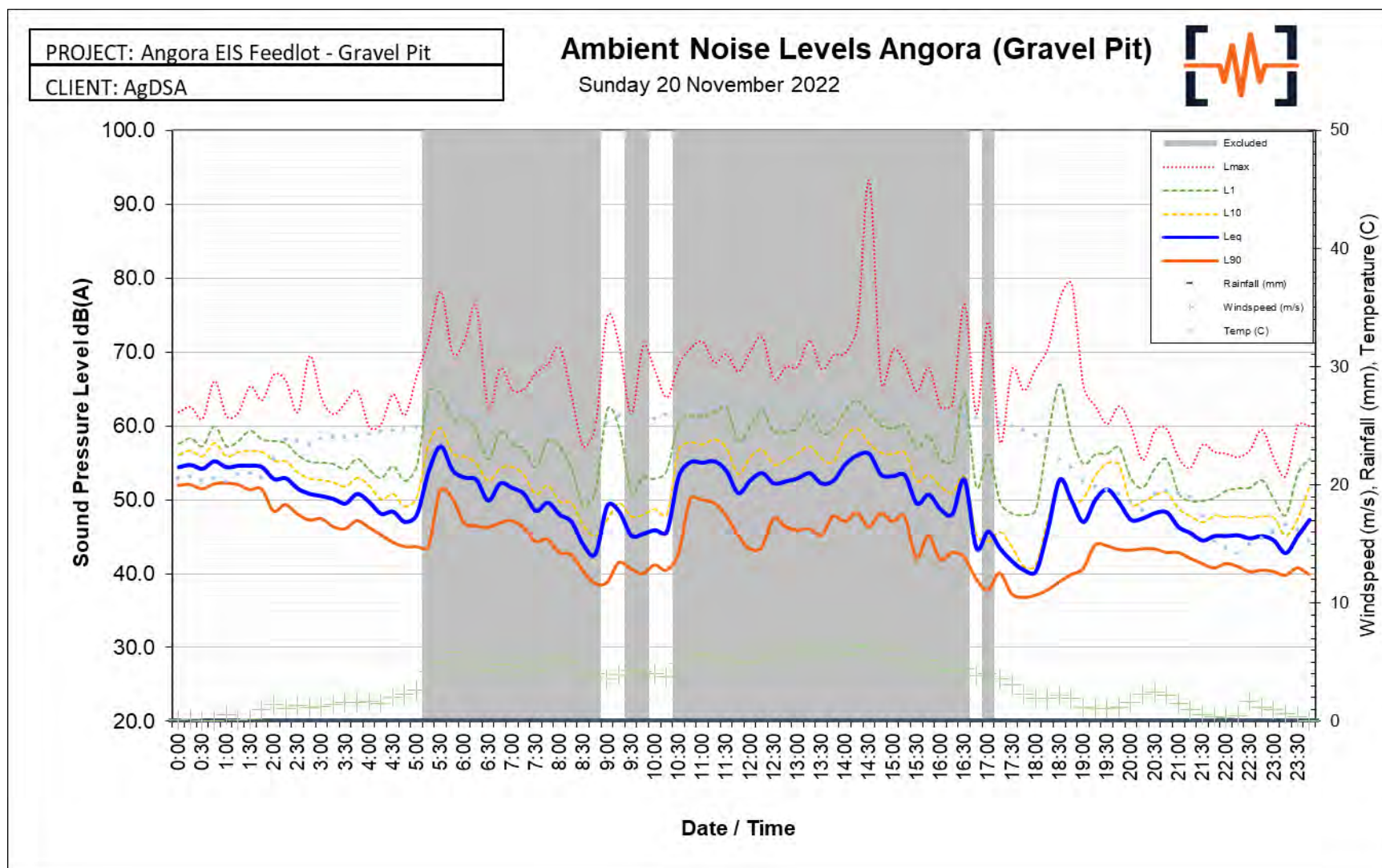


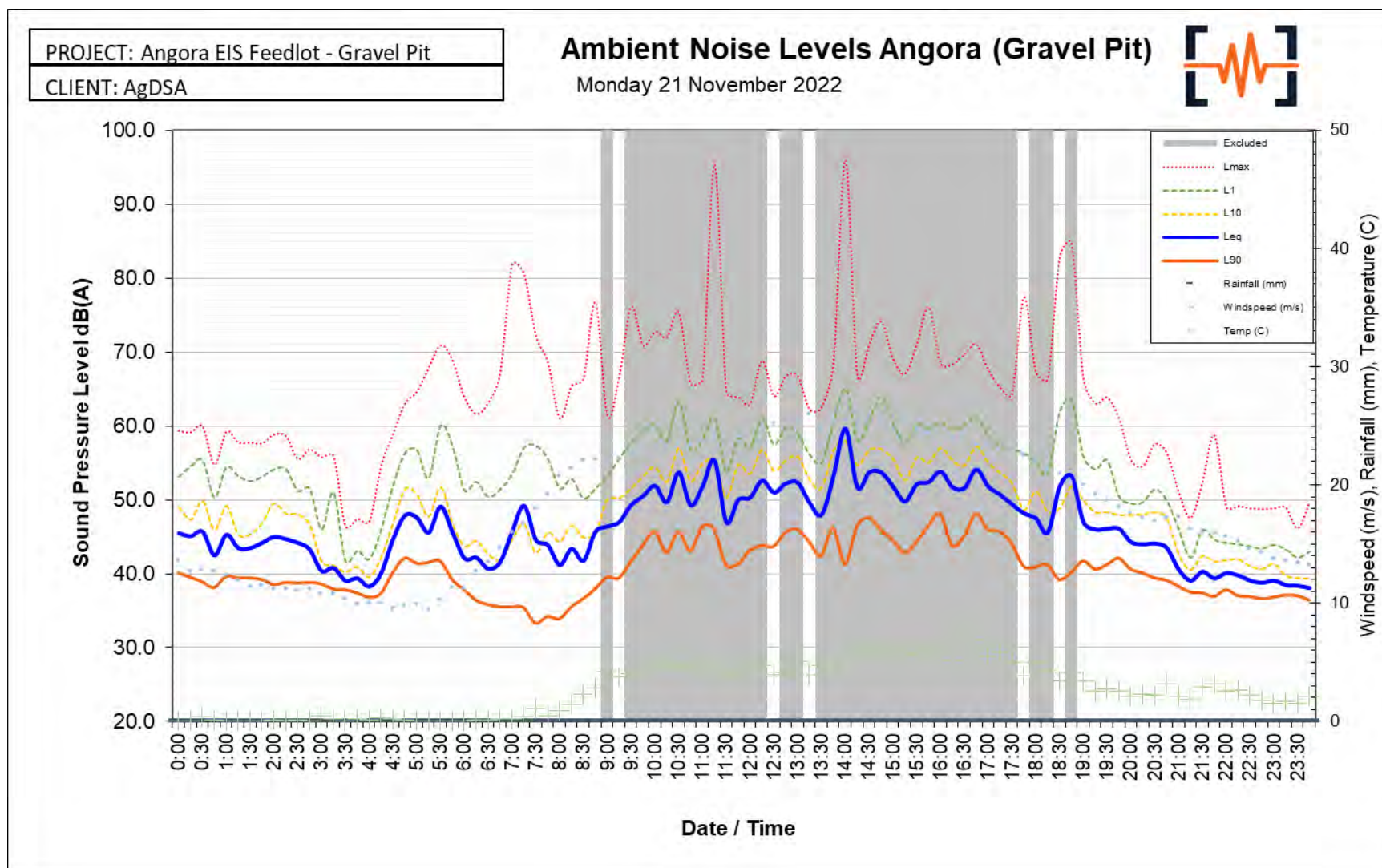


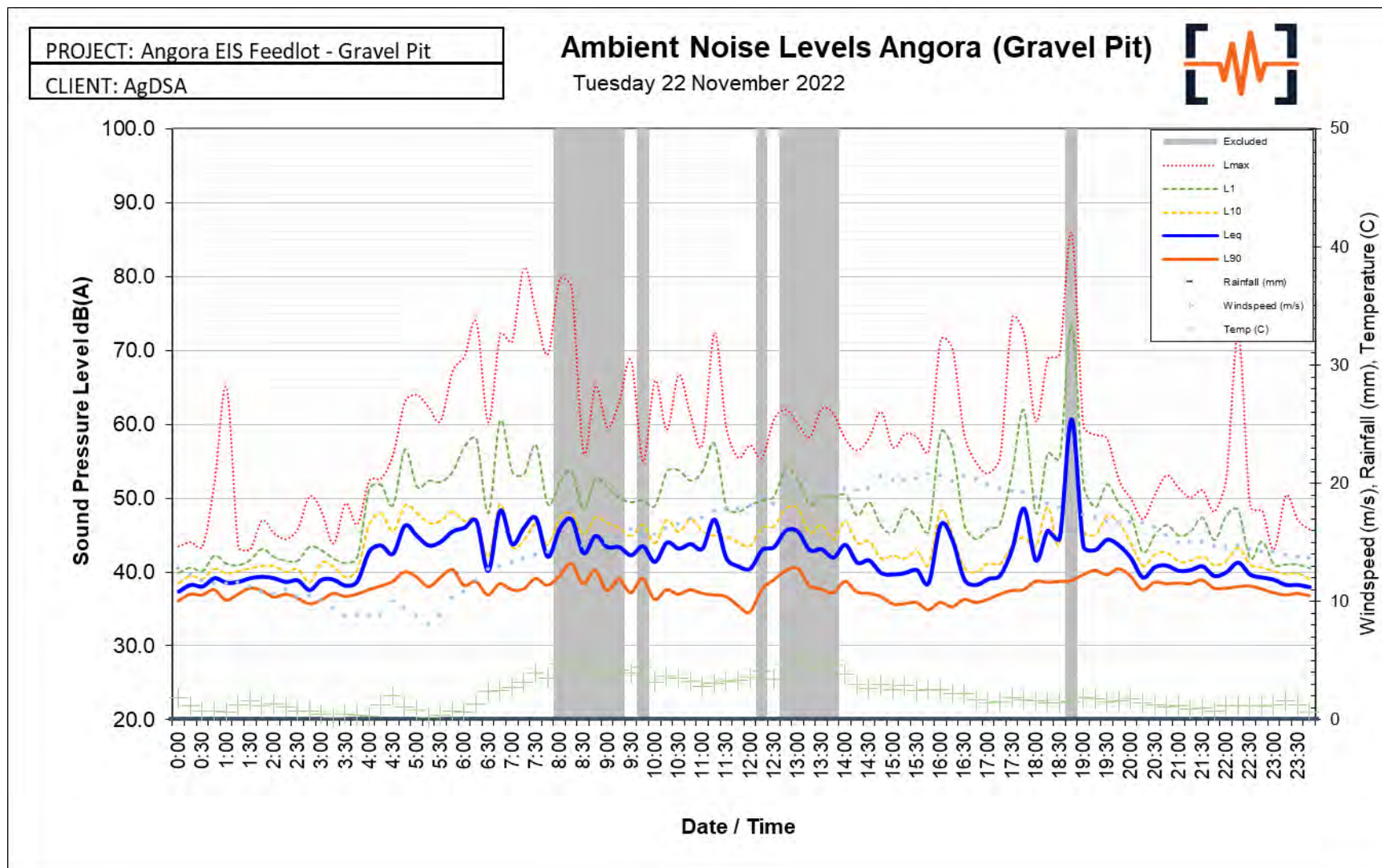


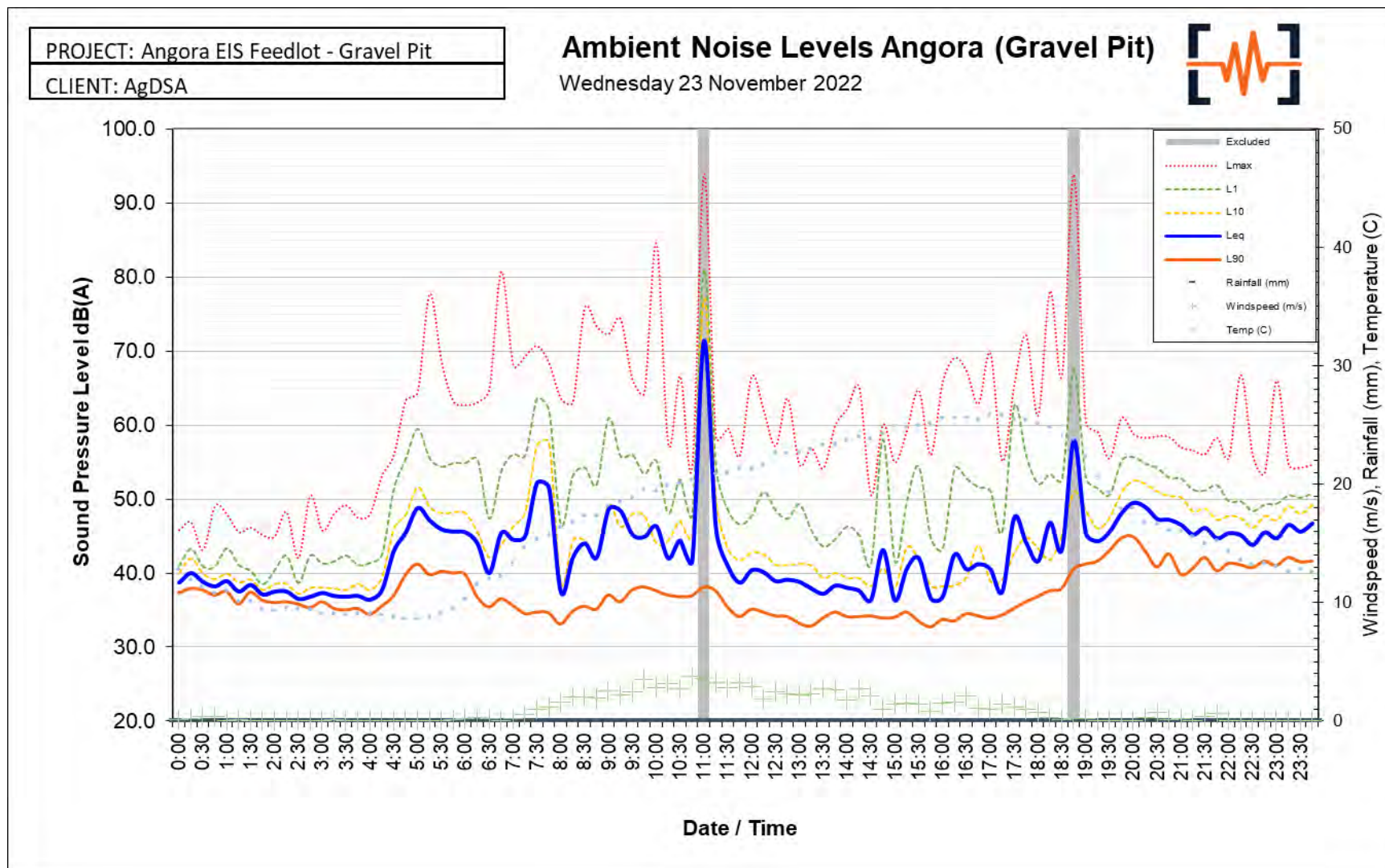


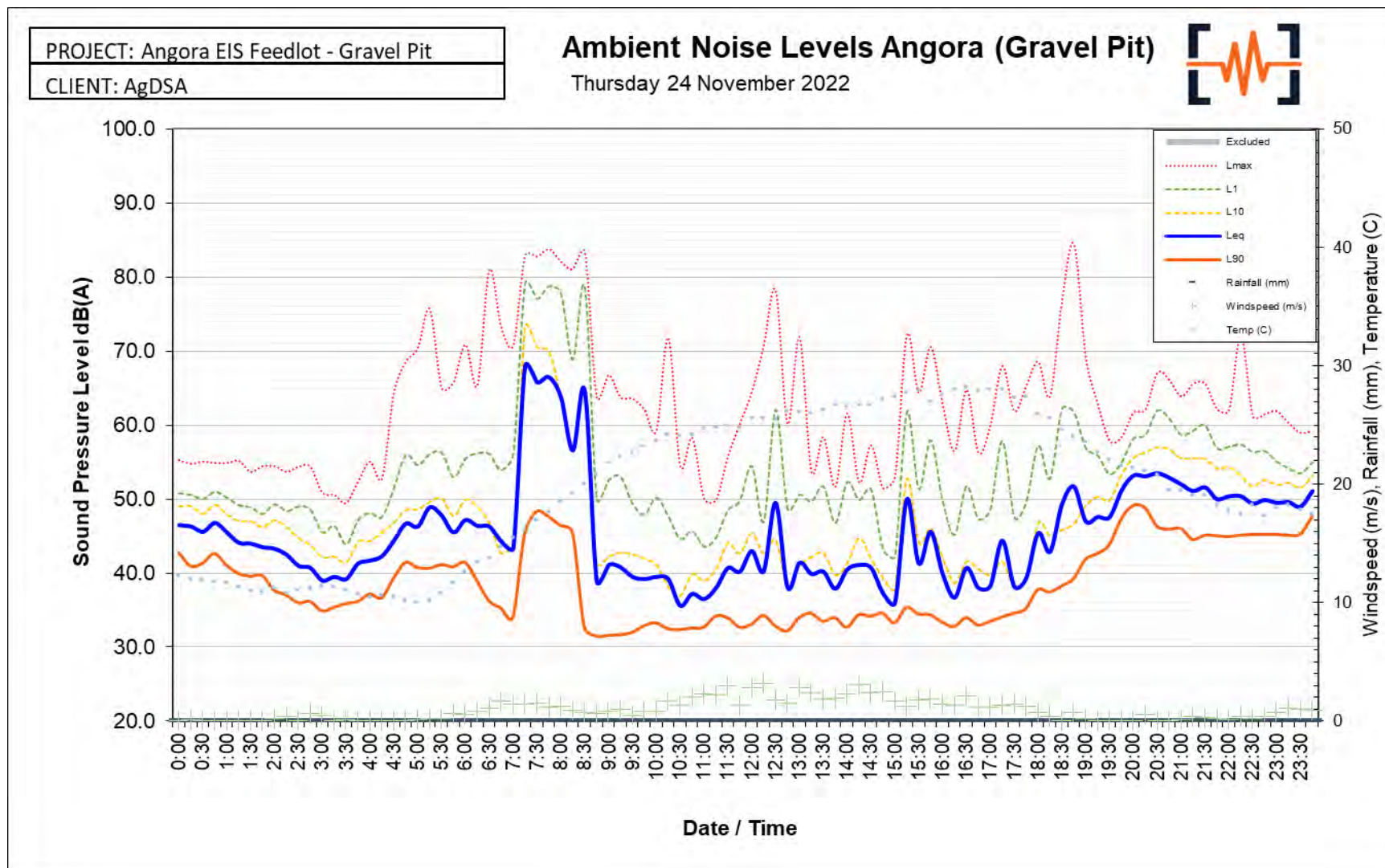


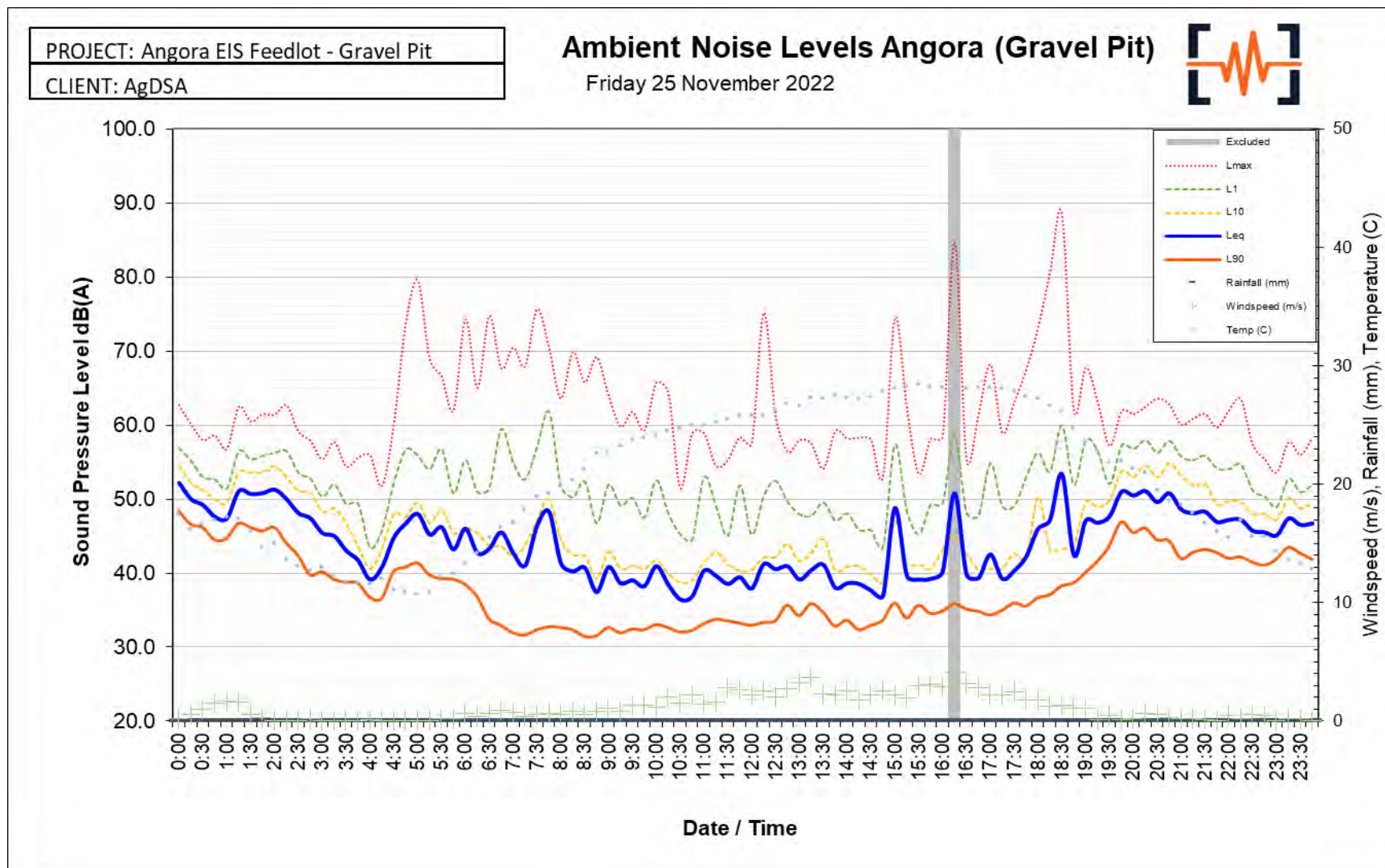


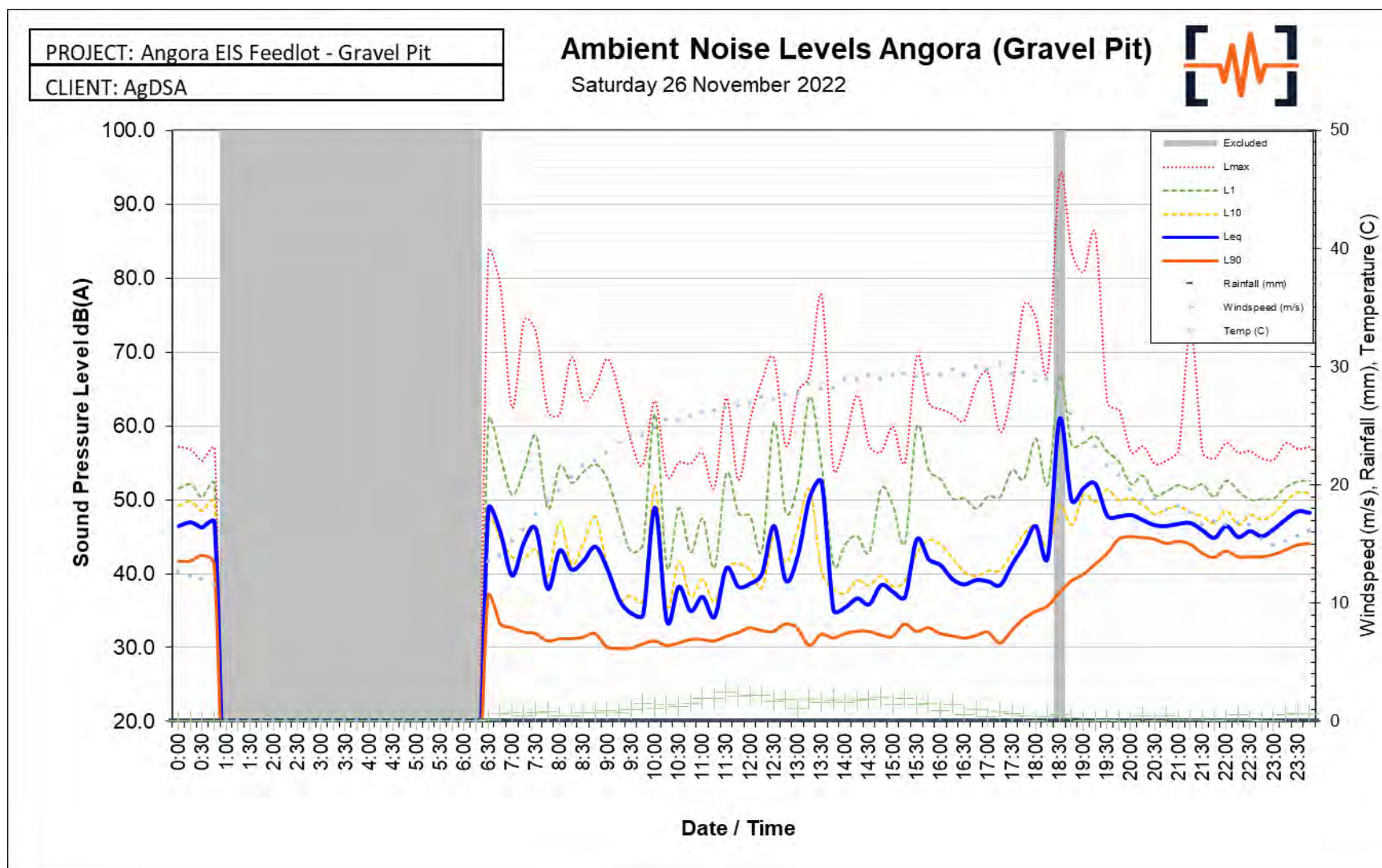


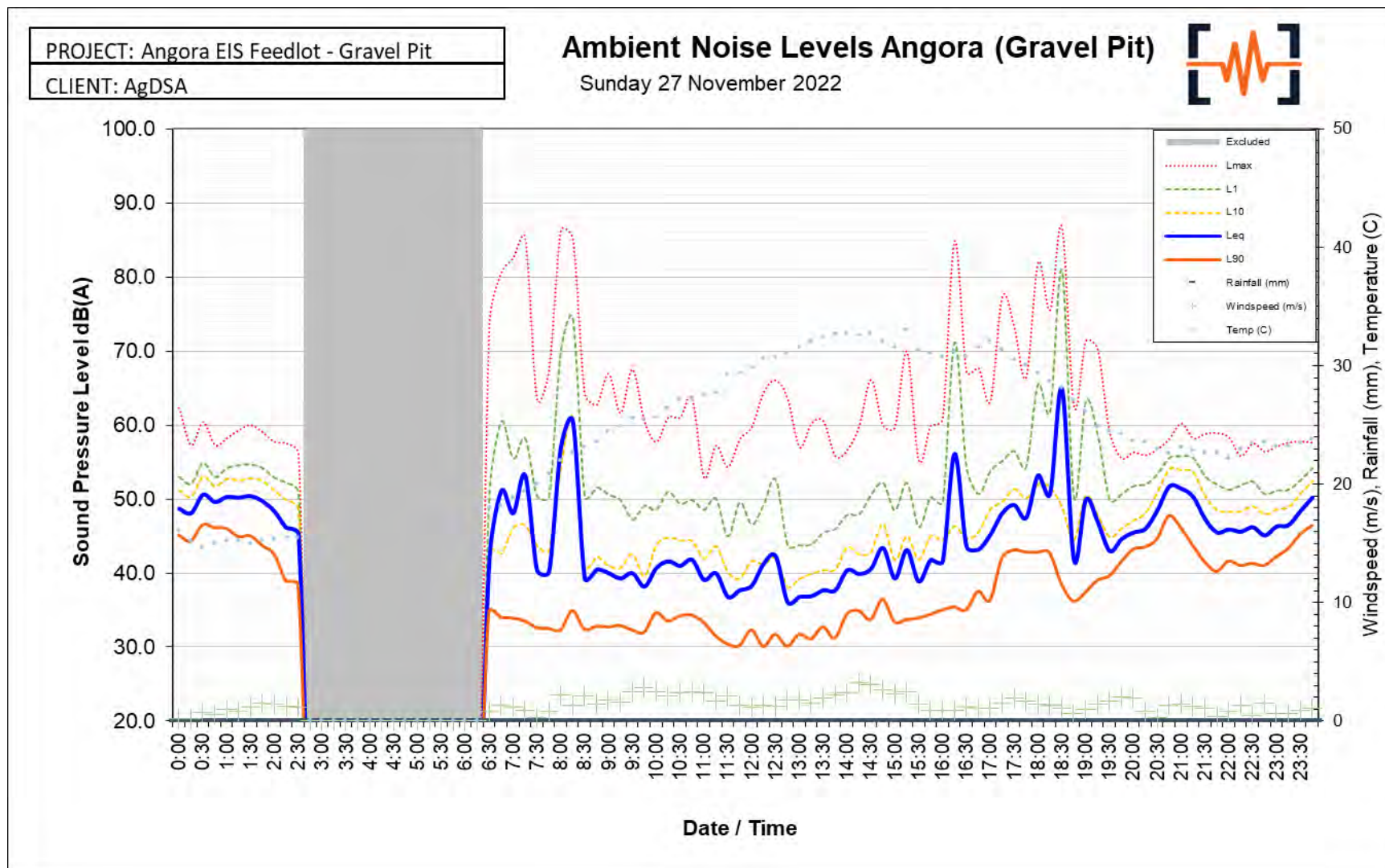


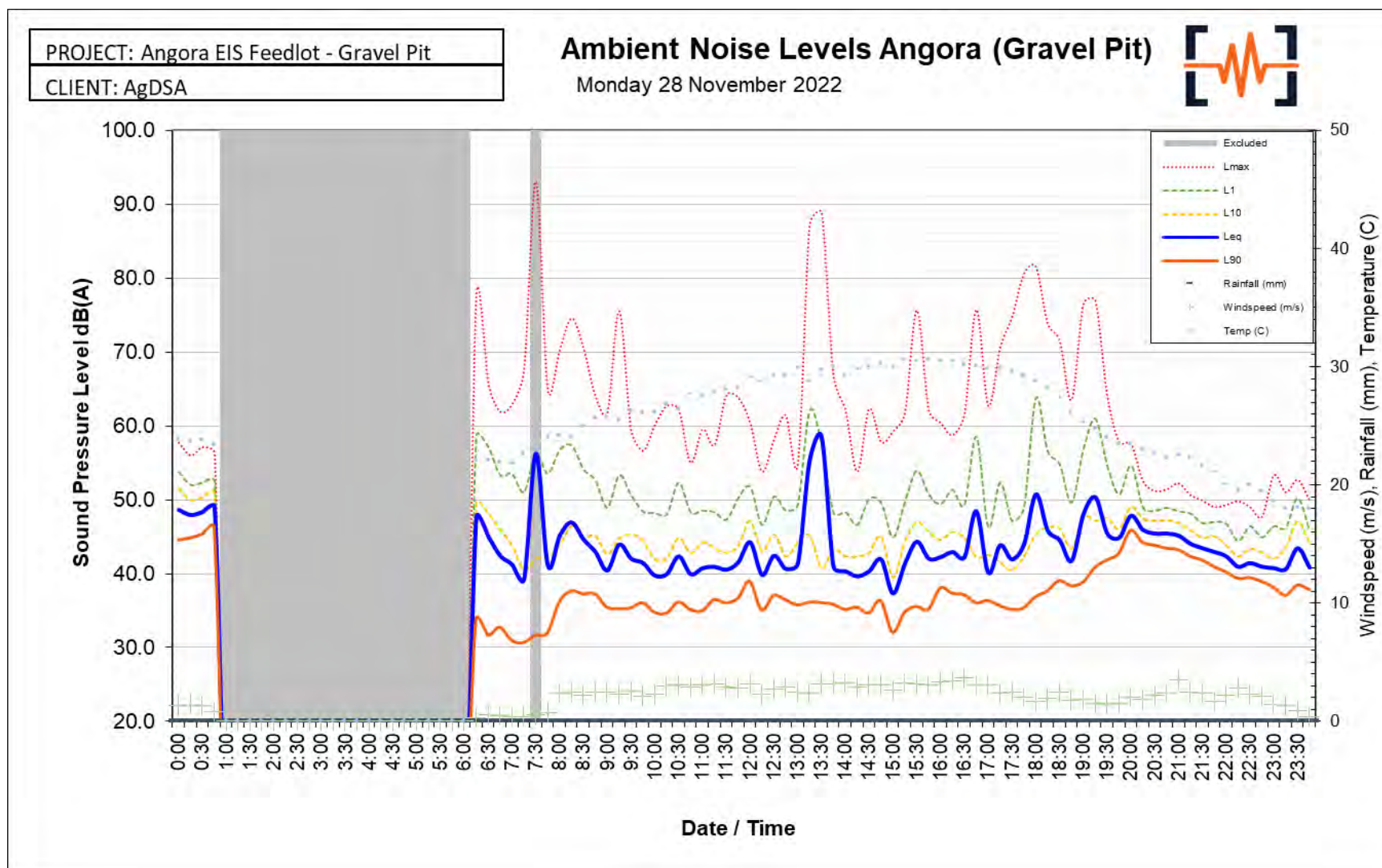


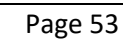








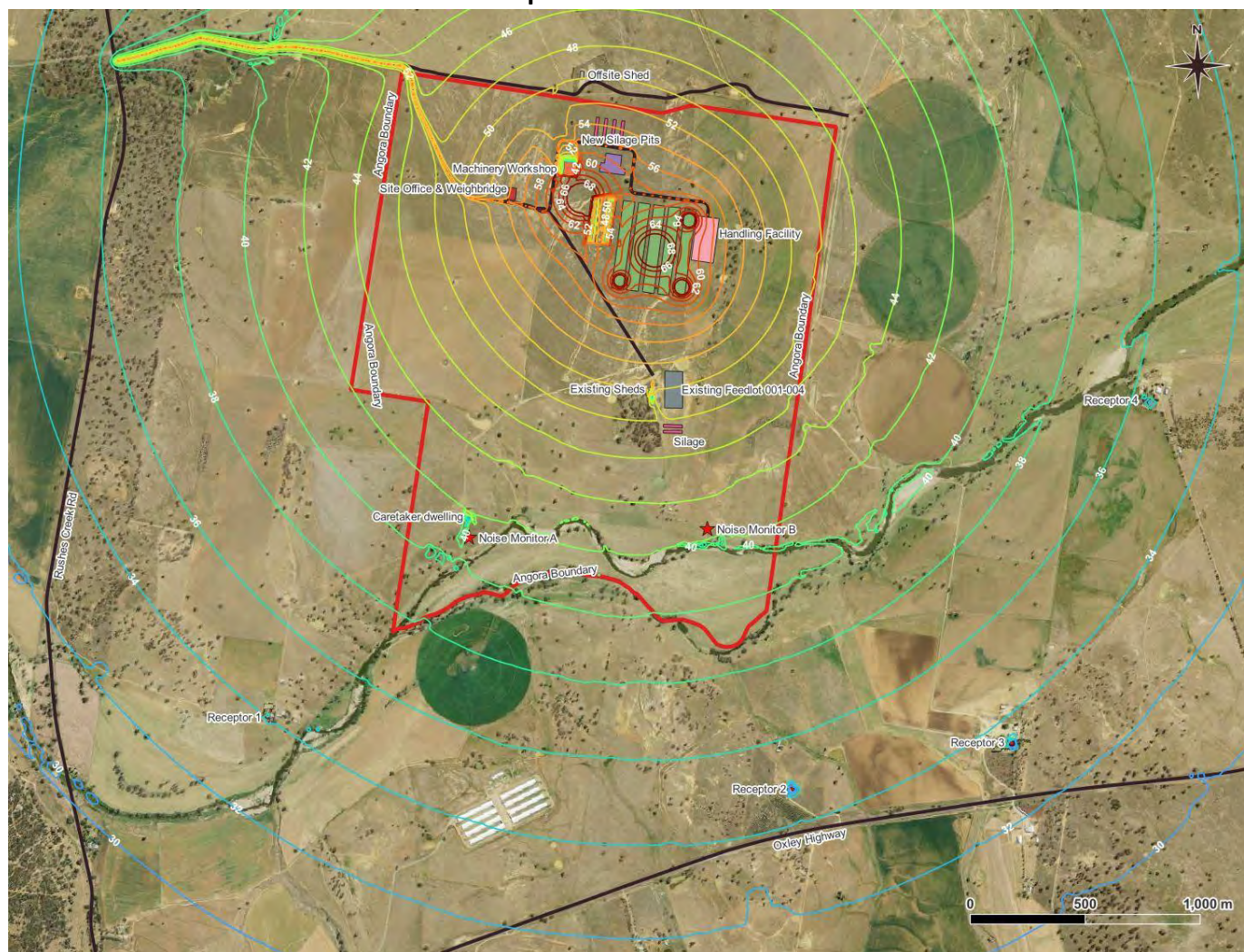






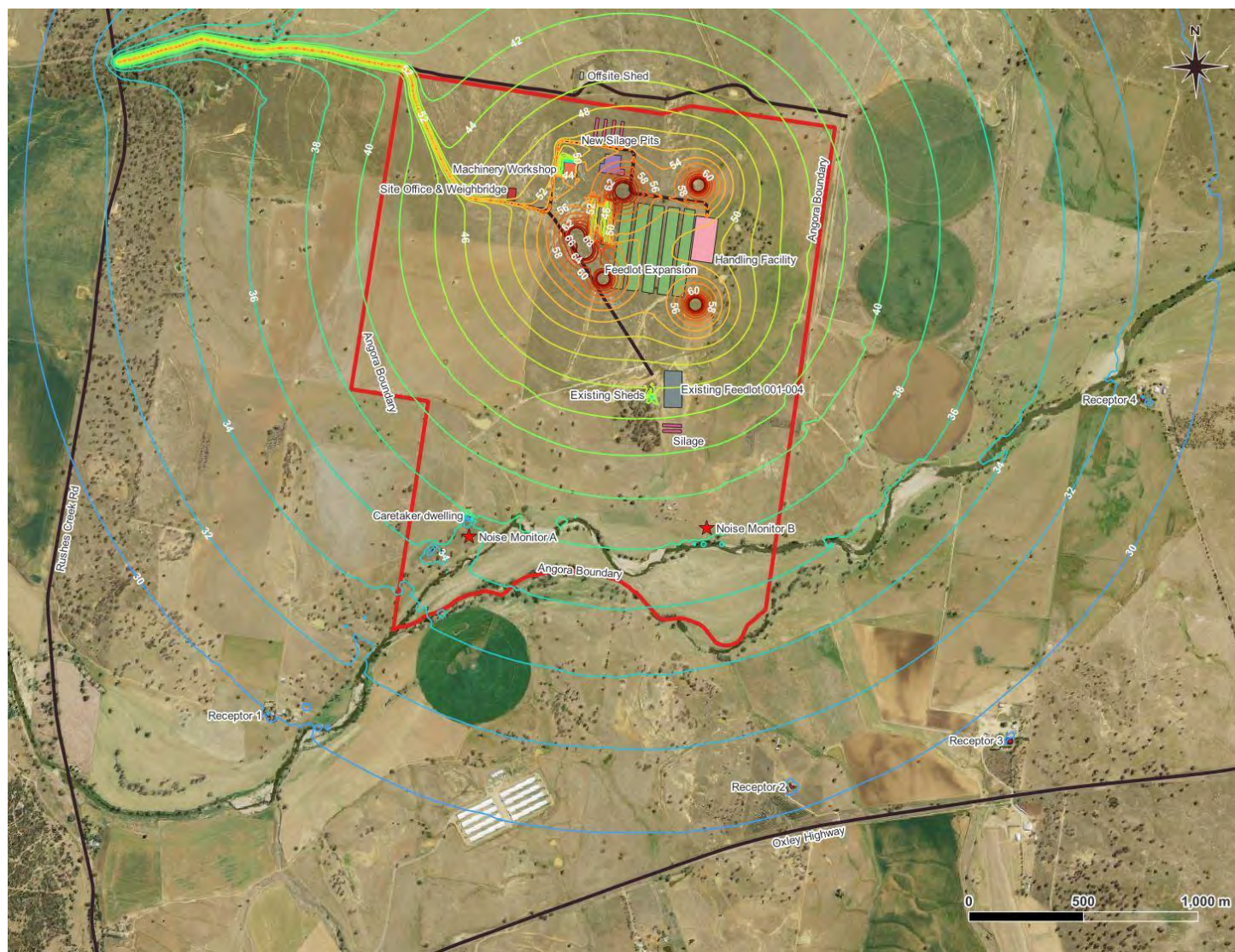
APPENDIX B – NOISE MAPS

Construction Scenario 1: Noise Contour Map



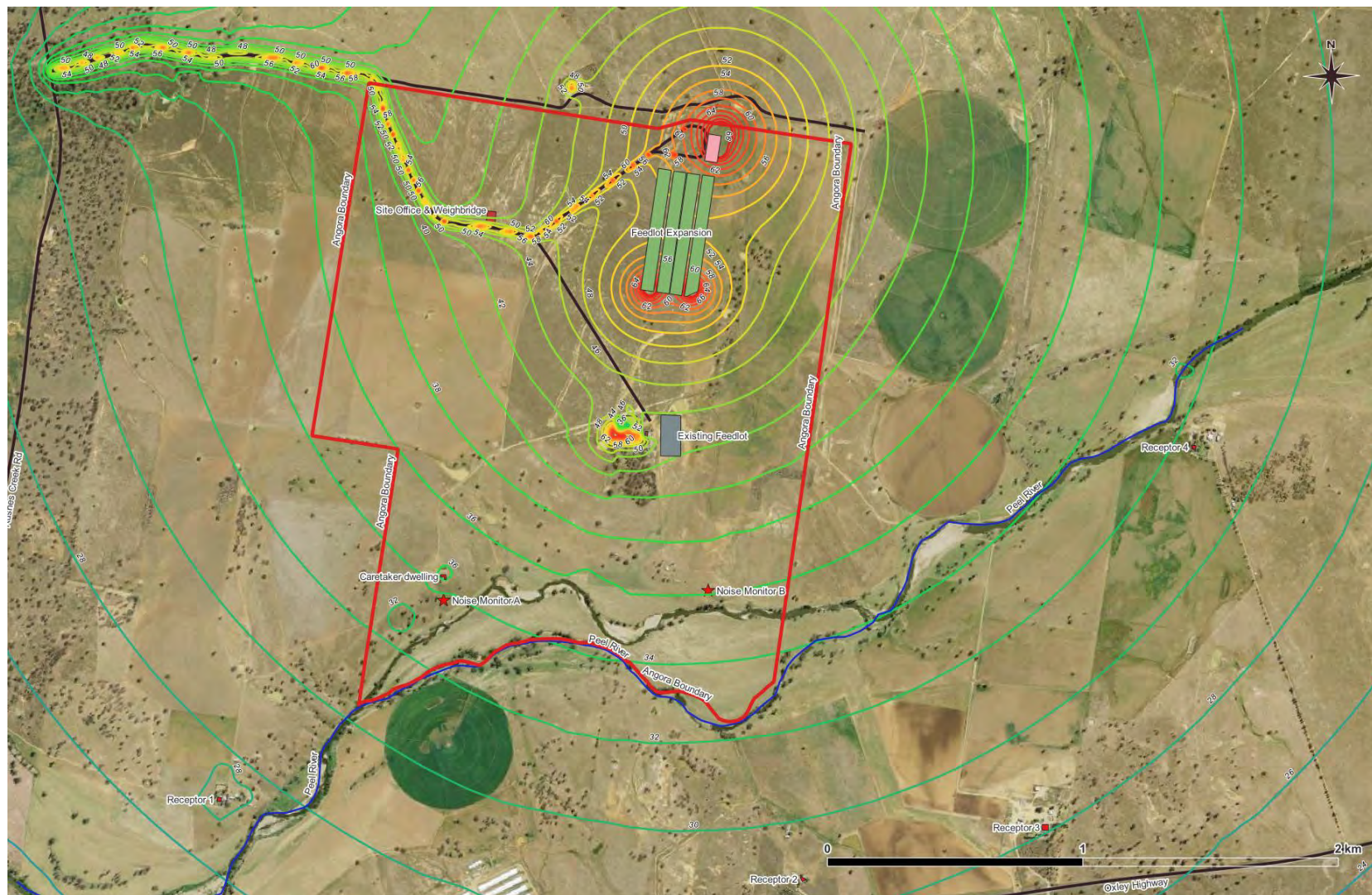


Construction Scenario 2: Noise Contour Map





Full Expansion Angora Feedlot Operations: Noise Contour Map



APPENDIX K – SOIL INVESTIGATION REPORT

Soil Investigation and Sampling for the proposed Angora Feedlot expansion



ANGORA FEEDLOT

**Prepared for: Agricultural Development Services Australia Pty Ltd
Attention: Matt Norton**

May 2023

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1 Introduction

Angora Feedlot Pty Ltd owns and operates the Angora beef cattle feedlot on their property at Rushes Creek in the western part of the Tamworth regional council area of New South Wales.

JG Environmental was engaged to undertake an assessment of the soils in the proposed effluent utilisation areas through on-site assessment including taking soil cores and samples for analyses.

This report presents the soil findings, analysis results and land/soil capability assessment.

2 Description of the Existing Environment

2.1 Location of Subject Land

The subject land is located on Rannock Burn Road, Rushes Creek approximately 16 km by road west of the township of Somerton in the far west of the Tamworth Regional Council region of New South Wales.

Figure 1 is a locality plan showing the proximity of the property to nearby towns and roads.

2.2 Climate

Climate data for the locality was obtained from the SILO database operated by the Bureau of Meteorology (BOM). Daily climate data for the site for 100 years is summarised in Table 1. The mean annual rainfall is just 586 mm/year, whilst the mean annual pan evaporation is 1,838 mm/year.

Table 1: Climatic Data for Rushes Creek (-30.9 deg S 150.55 deg E)

Month	Mean Rainfall (mm)	Pan Evaporation (mm)	Net Evaporation (mm)	Max Temp (°C)	Min Temp (°C)	Rad (MJ/m ² /d)
Jan	75.8	250.4	174.6	32.7	17.8	24.5
Feb	61.7	201	139.2	31.9	17.5	22.3
Mar	43.6	186.5	142.9	29.8	15.1	19.7
Apr	34	126.4	92.4	25.5	10.7	16.1
May	38.1	84.5	46.3	20.9	6.7	12.4
Jun	39.2	57.8	18.6	17.3	4.1	10.4
Jul	38.5	64.1	25.5	16.5	2.8	11.6
Aug	36.4	92.1	55.7	18.4	3.6	15.2
Sep	38.2	130.4	92.2	21.9	6.3	19.2
Oct	51.1	179.1	128.1	25.7	10.2	22.2
Nov	63.4	214.1	150.7	28.9	13.6	24.2
Dec	66	251.8	185.8	31.5	16.2	25.2
Year	586.1	1838.1	1252.1	25.1	10.4	18.6

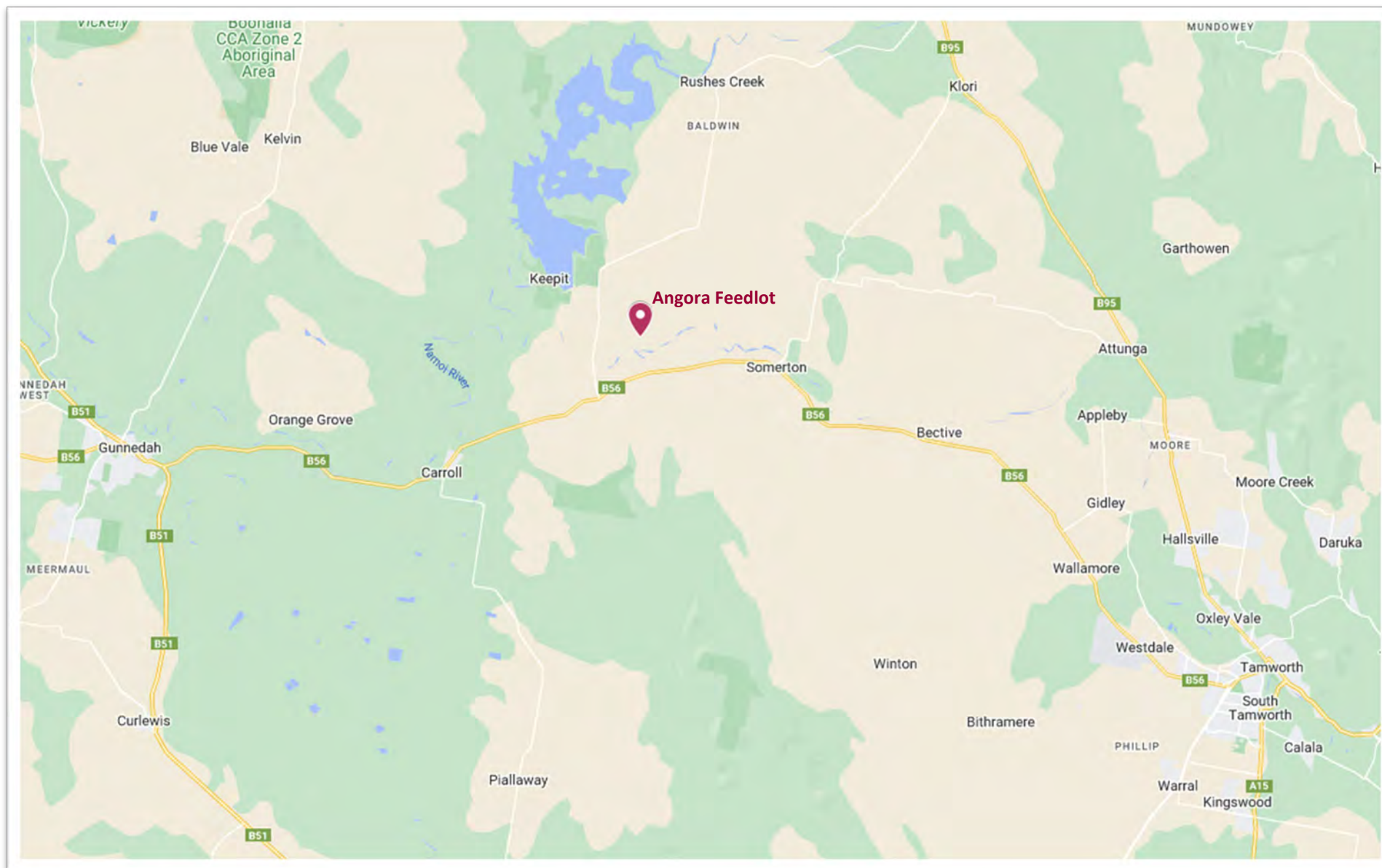


Figure 1: Locality Plan

2.3 Land Resource Information

The review of broadscale data, including the NSW Governments eSpade portal and the NSW Soil and Land Information System (SALIS), found no existing data. This includes soil landscape, soil and land resources and land system mapping. Despite no mapping or published reports, there is an eSpade layer titled Statewide land and soil mapping which shows soil types in the area are Sodosols (Solodic soils). However, the data confidence for this layer is stated as being “low”.

2.4 Site Specific Soil Information

Since no data exists to assist with property scale planning and management, a brief site-specific soil and land assessment by Mr Justin Galloway (Certified professional soil scientist) was undertaken in the proposed effluent and manure utilisation areas. This included sampling from representative soil profiles to provide not only physical, but also chemical data for input to the water and nutrient balance assessment.

A total of 14 sites were described to a depth of up to 120 cm using a 5 cm diameter soil push tube that removed intact soil cores. The soil assessment confirmed the proposed effluent utilisation area (Area A and B on Figure 8) is dominated by deep brown and reddish brown clay soils (Dermosols). These soils are currently used for various forage crops.

The dominant soil observed (mostly in mid and lower slope positions) in Area C was a moderately deep to deep (75 to 120+cm) brown Dermosol. These soil types are considered an intergrade between the deeper soils of Area A and B and the shallower soils described in Area D. These soil types may have been brown Chromosols in the past. However, development including cultivation, cropping and improved pastures have mixed the topsoil and the once thin loamy surface is now incorporated into a thicker clay loam to light clay topsoil. These soils have been occasionally cultivated and are the dominant improved pasture paddocks on the property.

Soils observed in the north-western part of the property (Area D) were shallow to moderately deep soils (Tenosols or Rudosols) with occasional rock outcrop. These soils were either in upper slope positions or crests and are outside the proposed effluent reuse areas. Areas containing these shallow soils are unsuitable for cropping.

Photographs of the various typical soil profiles observed within the proposed effluent utilisation areas are shown below in Figure 3. The existing landscape around soil observation and sampling sites are shown in Figures 4 to 8. Typical profile descriptions of the dominant soil types are provided in Tables 4, 5 and 6.



Figure 2: Soil Observation and Sampling Locations

Figure 3: Typical Soil Profiles Observed



Table 2: Dominant soil (Dermosol) in Area A - Typical Description

Profile Diagram	Description
	A1/Ap: Brown to dark brown (7.5YR 3-4/3-3) light to medium clay; moderate to strong angular/subangular blocky structure; field pH 6.0-6.5; clear change to
	B21: Brown to dark brown (7.5YR 3-4/3-3) medium to medium heavy clay; moderate to strong angular/subangular blocky, rarely few gravels; field pH 7.0-8.0; gradual/diffuse change to
	B22/23: Brown to dark brown (7.5YR 3-4/3-3) light medium to medium heavy clay; moderate to strong prismatic and lenticular structure with slickensides; few fine to coarse calcareous segregations; field pH 8.0-9.0.

Table 3: Dominant soil (Dermosol) in Area B - Typical Description

Profile Diagram	Description
	A1: Brown to dark brown (10YR 3-4/3-4; clay loam to light clay; moderate polyhedral or subangular blocky structure; few fine gravels; field pH 6.0-6.5; clear to gradual to -
	B21: Brown to olive brown (10YR 3-4/4, 2.5Y 4/3-4); light medium clay; moderate subangular blocky structure; few fine gravels; field pH 7.5-8.0; gradual change to -
	B22: Brown to olive brown (10YR 3-4/4, 2.5Y 4/3-4); medium to medium heavy clay; weak prismatic structure, occasionally few faint mottles; few calcareous and/or manganiferous nodules; field pH 8.0-9.0; gradual to diffuse to -
	C/R: Where present, massive, weak saprolite to strong rock, weathering in situ.

Table 4: Dominant Soil (Tenosol) in Area D - Typical Description

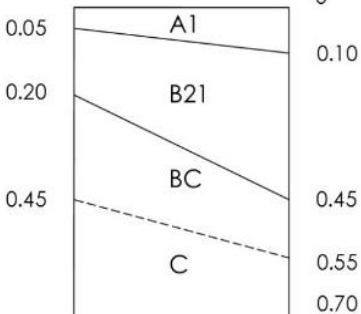
Profile Diagram	Description
 <p>The diagram shows a soil profile with four horizons: A1 (from 0 to 0.05), B21 (from 0.05 to 0.20), BC (from 0.20 to 0.45), and C (from 0.45 to 0.70). The boundaries are indicated by lines, with a dashed line for the C horizon boundary.</p>	<p>A1: Brown to dark brown (10YR 3-4/4; clay loam to light clay; moderate subangular blocky structure; few to common fine gravels; field pH 6.5-7.5; clear change to</p> <hr/> <p>B21: Dull yellowish brown (10YR 5/3-4) light to medium clay; weak to moderate subangular blocky structure; common to many fine and medium gravels; field pH 7.5-8.5; gradual change to</p> <hr/> <p>BC: Where present, dull yellowish brown (10YR 5/3-4) light to medium clay; weak angular/subangular blocky structure; many fine and medium gravels; field pH 7.5-8.5.</p> <hr/>
	<p>C/R: Weak to moderate, massive saprolite.</p>



Figure 4: Soil Groupings based on Landuse



Figure 5: Typical landscape in north-eastern paddocks of the property (TP1)



Figure 6: Typical landscape observed in Area C (near TP2)



Figure 7: Typical landscape in pivot area (near TP4)



Figure 8: Typical landscape in pivot area (near TP5)

2.5 Soil Sampling and Analysis

Representative soil profiles (refer Figure 2) were sampled at 0-10, 0-20, 20-40, 40-70 and 70-100cm depths. The samples were submitted to the Environmental Analysis Laboratory (EAL), a NATA and ASPAC accredited laboratory located at the Southern Cross University in Lismore, for analysis.

The analysis results are given in the following series of tables (Table 5 through Table 9). The full laboratory results are also presented in Appendix A.

Table 5: Soil Analysis Results (TP1)

Parameter	Unit	0-10cm	0-20cm	20-40cm	40-70cm	70-100cm
pH		5.96	6.33	7.29	7.47	8.44
Electrical Conductivity	dS/m	0.075	0.049	0.046	0.055	0.163
Total Carbon	%	1.6	1.2	1.0	0.81	1.3
Nitrogen (Total)	%	0.17	0.14	0.13	0.12	0.10
Nitrogen (Nitrate)	mg/kg	23	8.9	1.2	0.80	0.76
Nitrogen (Ammonium)	mg/kg	5.2	1.5	1.0	0.91	0.58
Phosphorus (Total)	mg/kg	419	267	229	397	436
Phosphorus (Colwell)	mg/kg	47	11	4.8	5.1	4.8
Phosphorus (Bray)	mg/kg	17	3.7	1.6	1.5	1.4
Phosphorus Sorption	mg P/kg	190	297	422	414	364
Exch. Calcium	cmol+/kg	12	18	24	22	26
Exch. Magnesium	cmol+/kg	5.4	7.4	9.5	8.6	6.4
Exch. Potassium	cmol+/kg	0.92	0.47	0.43	0.43	0.33
Exch. Sodium	cmol+/kg	0.12	0.27	0.49	0.48	0.45
Exch. Aluminium	cmol+/kg	0.02	0.02	<0.01	<0.01	0.01
Cation Exch. Capacity	cmol+/kg	19	26	34	32	33
Exchangeable Sodium	%	0.6	1.0	1.4	1.5	1.4

Table 6: Soil Analysis Results (TP2)

Parameter	Unit	0-10cm	0-20cm	20-40cm	40-70cm	70-100cm
pH		6.18	6.50	7.48	7.55	8.94
Electrical Conductivity	dS/m	0.064	0.031	0.042	0.040	0.475
Total Carbon	%	1.2	1.4	1.3	1.1	0.79
Nitrogen (Total)	%	0.14	0.13	0.16	0.14	0.07
Nitrogen (Nitrate)	mg/kg	17	2.8	0.80	0.36	1.2
Nitrogen (Ammonium)	mg/kg	1.1	1.0	0.65	1.4	0.61
Phosphorus (Total)	mg/kg	310	270	236	283	171
Phosphorus (Colwell)	mg/kg	18	12	4.4	5.3	6.3
Phosphorus (Bray)	mg/kg	3.7	2.0	1.4	1.2	2.1
Phosphorus Sorption	mg P/kg	126	173	419	470	357
Exch. Calcium	cmol+/kg	6.8	9.5	27	18	31
Exch. Magnesium	cmol+/kg	2.6	4.3	14	8.4	14
Exch. Potassium	cmol+/kg	0.53	0.58	0.53	0.34	0.41
Exch. Sodium	cmol+/kg	0.11	0.13	0.61	0.40	9.4
Exch. Aluminium	cmol+/kg	0.01	0.02	0.02	0.02	0.02
Cation Exch. Capacity	cmol+/kg	10	15	42	27	55
Exchangeable Sodium	%	1.1	0.9	1.4	1.5	17

Table 7: Soil Analysis Results (TP3)

Parameter	Unit	0-10cm	0-20cm	20-40cm	40-70cm
pH		6.46	6.24	8.48	8.94
Electrical Conductivity	dS/m	0.073	0.041	0.161	0.191
Total Carbon	%	2.0	1.5	1.3	1.1
Nitrogen (Total)	%	0.19	0.15	0.10	0.07
Nitrogen (Nitrate)	mg/kg	12	2.6	0.94	0.40
Nitrogen (Ammonium)	mg/kg	5.9	3.7	1.1	0.43
Phosphorus (Total)	mg/kg	562	499	207	158
Phosphorus (Colwell)	mg/kg	42	22	4.0	2.8
Phosphorus (Bray)	mg/kg	25	8.9	1.2	1.0
Phosphorus Sorption	mg P/kg	95	179	593	591
Exch. Calcium	cmol+/kg	6.6	9.1	25	20
Exch. Magnesium	cmol+/kg	2.0	2.6	7.8	9.6
Exch. Potassium	cmol+/kg	1.7	0.94	0.31	0.21
Exch. Sodium	cmol+/kg	0.11	0.16	0.51	1.3
Exch. Aluminium	cmol+/kg	0.02	0.02	0.02	0.02
Cation Exch. Capacity	cmol+/kg	10	13	34	32
Exchangeable Sodium	%	1.0	1.3	1.5	4.2

Table 8: Soil Analysis Results (TP4)

Parameter	Unit	0-10cm	0-20cm	20-40cm	40-70cm	70-100cm
pH		6.11	7.09	8.84	9.03	8.39
Electrical Conductivity	dS/m	0.150	0.121	0.258	0.441	0.114
Total Carbon	%	1.8	1.6	1.00	0.94	0.48
Nitrogen (Total)	%	0.16	0.16	0.11	0.08	0.08
Nitrogen (Nitrate)	mg/kg	50	28	2.8	1.4	1.3
Nitrogen (Ammonium)	mg/kg	3.7	2.3	1.3	0.77	0.76
Phosphorus (Total)	mg/kg	449	367	211	154	185
Phosphorus (Colwell)	mg/kg	58	36	6.2	5.3	4.8
Phosphorus (Bray)	mg/kg	20	8.5	1.6	1.7	1.1
Phosphorus Sorption	mg P/kg	302	379	477	444	615
Exch. Calcium	cmol+/kg	13	14	22	26	14
Exch. Magnesium	cmol+/kg	5.8	6.3	9.5	11	9.1
Exch. Potassium	cmol+/kg	1.0	0.74	0.37	0.36	0.78
Exch. Sodium	cmol+/kg	0.92	1.4	3.4	5.7	0.30
Exch. Aluminium	cmol+/kg	0.02	0.02	0.02	0.02	0.02
Cation Exch. Capacity	cmol+/kg	20	22	35	43	24
Exchangeable Sodium	%	4.5	6.2	9.7	13	1.2

Table 9: Soil Analysis Results (TP5)

Parameter	Unit	0-10cm	0-20cm	20-40cm	40-70cm	70-100cm
pH		5.70	7.17	8.32	8.27	8.39
Electrical Conductivity	dS/m	0.323	0.181	0.118	0.085	0.106
Total Carbon	%	3.1	1.8	0.91	0.57	0.57
Nitrogen (Total)	%	0.27	0.14	0.10	0.09	0.09
Nitrogen (Nitrate)	mg/kg	120	29	3.0	1.5	1.6
Nitrogen (Ammonium)	mg/kg	42	1.5	0.88	0.34	0.82
Phosphorus (Total)	mg/kg	667	359	225	204	184
Phosphorus (Colwell)	mg/kg	181	24	5.8	5.0	5.5
Phosphorus (Bray)	mg/kg	73	7.3	1.5	1.3	1.3
Phosphorus Sorption	mg P/kg	176	390	600	620	627
Exch. Calcium	cmol+/kg	10	18	20	17	17
Exch. Magnesium	cmol+/kg	3.6	3.7	5.2	8.8	11
Exch. Potassium	cmol+/kg	2.4	2.0	0.91	0.89	1.1
Exch. Sodium	cmol+/kg	0.07	<0.065	0.08	0.16	0.25
Exch. Aluminium	cmol+/kg	0.01	0.02	0.02	0.02	0.02
Cation Exch. Capacity	cmol+/kg	16	24	26	27	29
Exchangeable Sodium	%	0.5	0.3	0.3	0.6	0.9

Table 10: Soil Analysis Results (TP6)

Parameter	Unit	0-10cm	0-20cm	20-40cm	40-70cm	70-100cm
pH		6.07	7.69	8.32	8.72	9.05
Electrical Conductivity	dS/m	0.118	0.243	0.179	0.183	0.323
Total Carbon	%	2.1	1.7	1.2	0.90	0.92
Nitrogen (Total)	%	0.18	0.13	0.13	0.10	0.07
Nitrogen (Nitrate)	mg/kg	31	4.2	1.5	0.70	0.38
Nitrogen (Ammonium)	mg/kg	5.9	2.3	1.3	<0.1	0.23
Phosphorus (Total)	mg/kg	436	320	202	144	153
Phosphorus (Colwell)	mg/kg	41	8.4	4.8	2.8	2.6
Phosphorus (Bray)	mg/kg	12	1.7	1.2	1.1	<1
Phosphorus Sorption	mg P/kg	181	430	517	596	534
Exch. Calcium	cmol+/kg	9.4	22	22	23	19
Exch. Magnesium	cmol+/kg	4.0	5.8	9.6	12	13
Exch. Potassium	cmol+/kg	1.5	0.54	0.45	0.32	0.26
Exch. Sodium	cmol+/kg	0.17	0.28	0.68	1.4	2.7
Exch. Aluminium	cmol+/kg	0.02	<0.01	<0.01	<0.01	<0.01
Cation Exch. Capacity	cmol+/kg	15	29	33	37	35
Exchangeable Sodium	%	1.1	1.0	2.1	3.9	7.8

2.6 Brief Soil Analyses Interpretation and Discussion

The following provides a brief interpretation and discussion of the soil analysis results.

2.6.1 pH

The surface (0-20 cm) pH for samples collected and analysed in February 2023 range from 6.1 (slightly acid) at TP6 to 7.2 (neutral) at TP5. The subsoil (70-100 cm) pH ranges from 8.4 (moderately alkaline) at TP5 to 9.0 (strongly alkaline) at site TP6. Surface soil pH measured at the representative sites is considered acceptable for pasture and crop growth.

2.6.2 Nitrogen

Results for soil samples collected and analysed in February 2023 show that total nitrogen in the surface (0-20 cm) ranges from 1300 mg/kg to 1,600 mg/kg. The total nitrogen concentrations are considered low to moderate (Hazelton and Murphy 2016). Whilst the majority of the total nitrogen is not immediately available to plants, adequate concentrations will ensure soil microbes can mineralise the organic reserves to plant-available forms such as ammonium and nitrate.

Nitrate nitrogen in the surface (0-20 cm) ranges from 3 mg/kg to 28 mg/kg. Results from the recent sampling shows that all but two of the surface nitrate concentrations are considered deficient and a plant response to nitrogen additions is highly likely (Hazelton and Murphy 2016). Adequate available nitrogen will maximise crop growth and maximise nutrient uptake, especially of phosphorus. The

subsoil (70-100 cm) nitrate nitrogen concentrations measured in samples collected in February 2023 range from <1 mg/kg to 2 mg/kg.

2.6.3 Phosphorus

The available (Colwell) phosphorus concentrations measured for the surface soil (0-20 cm) ranges from 8 mg/kg at monitoring site TP6 to 36 mg/kg at monitoring site TP4. The subsoil (70-100 cm) available (Colwell) phosphorus concentrations measured in samples collected in February 2023 range from 3 mg/kg to 6 mg/kg.

2.6.4 Phosphorus Sorption Capacity

The behaviour of labile inorganic phosphorus in soils is dominated by sorption and desorption processes (Hazelton and Murphy 2016). The amount of phosphorus (P) that a soil will remove from solution (be absorbed) is critical for effluent disposal, to ensure long term sustainability. The phosphorus adsorption capacity is the ability of a soil material to sorb P compounds onto soil particles thereby rendering the P unavailable to plants and immobilising it within the soil itself.

The surface soil (0-20 cm) phosphorus sorption results range from 173 up to 430 mg/kg, with a mean of 308 mg/kg. As for the subsoil (70-100 cm), phosphorus sorption results range from 357 up to 627 mg/kg, with a mean of 500 mg/kg. The phosphorus sorption levels are very good and suggest a good capacity to safely store excess phosphorus.

2.6.5 Salinity

Salinity refers to the dissolved salts in a liquid or in soil solution and is usually measured by electrical conductivity. Salt is mostly added to the soil through soil formation, hydrologic processes and rainfall (Shaw et al. 1994). However, effluent irrigation can add significant quantities of salt to the soil.

The electrical conductivity measured in the surface soil samples range from 0.03 dS/m (very low) to 0.24 dS/m (low). The subsoil electrical conductivity results range from 0.11 dS/m (low) to 0.48 dS/m (medium).

If soil conductivity for these soil types becomes very high (>0.76 dS/m in surface or >0.96 dS/m in subsoil), it may restrict potential rooting depth, decrease plant available water and reduce crop performance in species, which are not classed as 'tolerant' (DNR 1997).

2.6.6 Sodicity

Soil sodicity occurs when the ratio of exchangeable sodium ions to other exchangeable cations is sufficient to influence the swelling and dispersion behaviour of soils (Rengasamy and Churchman 1999). Sodicity can cause a range of land management issues and the soils exchangeable sodium percentage (ESP) is the easiest and best indicator of soil sodicity. A soil is considered non-sodic if ESP is less than 6 %, marginally sodic to sodic if ESP is between 6 and 14 % and strongly sodic if ESP is greater than 14 % (Northcote and Skene 1972).

The surface soil (0-30 cm) ESP results range from ≤1 % at several sites to 4.5 % at site TP4. The subsoil ESP results range from 1 % to 17 %. All surface sites are considered non-sodic. Similarly, all deep subsoil (70-100cm) sites are considered non-sodic, with the exception of TP4, which is considered marginally sodic. For classification purposes, all except one site (TP4) are non-sodic in the

20-40cm sample. Therefore, are not considered Sodosols as per eSpade. Site TP4 is also not a Sodosol, since it does not have a clear or abrupt textural B-horizon.

High sodicity can cause potential problems such as surface sealing and poor infiltration. If sodicity issues are observed, the surface soil may benefit from gypsum (or similar) amendment applications. The addition of this type of soil amendment displaces some of the sodium cations and replace them with calcium, improving the cation imbalance and alleviating potential problems such as surface sealing and poor infiltration.

3 Land/Soil Capability and Suitability

3.1 Land Capability Assessment

Land capability is the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources.

An updated land and soil capability (LSC) assessment scheme titled “The Land and Soil Capability Scheme—a general rural land evaluation scheme for NSW” (OEH 2012) was implemented after building on previous assessment methodologies.

The following summarises the concepts and methodology of the LSC scheme.

The LSC assessment scheme uses the biophysical features of the land and soil including landform position, slope gradient, drainage, climate, soil type and soil characteristics to derive detailed rating tables for a range of land and soil hazards. These hazards include water erosion, wind erosion, soil structure decline, soil acidification, salinity, waterlogging, shallow soils and mass movement. Each hazard is given a rating between 1 (best, highest capability land) and 8 (worst, lowest capability land). The final LSC class of the land is based on the most limiting hazard.

The LSC class gives an indication of the land management practices that can be applied to a parcel of land without causing degradation to the land and soil at the site and to the off-site environment. High impact practices require good quality, high capability land, such as LSC classes 1 to 3, while low impact practices can be sustainable on poorer quality, lower capability land, such as LSC classes 5 to 8. As land capability decreases, the management of hazards requires an increase in knowledge, expertise and investment. In lands with lower capability, the hazards cannot be managed effectively for some land uses.

The definitions and descriptions for each LSC class are outlined in Table 11.

Table 11: Land and soil capability classes – general definitions (OEH 2012)

LSC Class	General Definition
Land capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation)	
1	Extremely high capability land: Land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices.
2	Very high capability land: Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.
3	High capability land: Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)	
4	Moderate capability land: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	Moderate–low capability land: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
Land capable for a limited set of land uses (grazing, forestry and nature conservation, some horticulture)	
6	Low capability land: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation
Land generally incapable of agricultural land use (selective forestry and nature conservation)	
7	Very low capability land: Land has severe limitations that restrict most land uses and generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.
8	Extremely low capability land: Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation.

3.1.1 Summary of Land Capability

A summary of the assessment of hazards and land capability classes are shown below in Table 12. The table shows the hazards and classes for both NSW broad scale data (as shown on eSpade - <https://www.environment.nsw.gov.au/eSpade2Webapp/>) and the same for the site specific soil investigation, including soil sampling and analysis. The eSpade portal shows that despite no broad scale land information covers the property, soils are identified as Sodosols (Solodic soils) albeit with low confidence. Hence why given an overall LSC capability of 4 (Moderate capability land: Land has moderate to high limitations). The onsite investigations and sampling show soils are not these soil types and have much more favourable physical and chemical properties.

The results show that the soils identified in the proposed effluent and/or manure areas (refer Figure 9) are considered high and very high capable land capable of a wide variety of land uses. The land has slight to moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using readily available and widely accepted management practices. Similarly, the proposed manure reuse areas are also considered high capable land (LSC 3). However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.

The upper slope and crest soils in the north-western parts of the property (Figure 9) are considered moderate to low capability land, which has moderate to very high limitations for high-impact land uses. This will generally restrict land management options for high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology. The main hazards for this land are shallow to moderately deep soils with occasional rock outcrop.

Table 12: Summary of hazards and LSC classes

Main Hazard	eSpade* (low confidence)	Effluent and/or manure (cultivation)	Manure (limited cultivation)	Manure (no cultivation)
water erosion, inc. sheet, rill and gully erosion	3	2-3	2-3	3
wind erosion	2	2	2	2
soil structure decline	4	2-3	3-4	4
soil acidification	4	2	3	4
salinity	2	1	2	1
waterlogging	2	2	2	1
shallow soils and rockiness	3	1	2-3	4-6
mass movement	1	1	1	1
Overall LSC Capability	4	2-3	3-4	4-6

* <https://www.environment.nsw.gov.au/eSpade2Webapp/>



Figure 9: Land Capability Summary and Landuse

3.2 Effluent Reuse Suitability

Selecting a suitable site is important for successfully establishing an effluent irrigation system that complies with the principles and guidelines set out in the Environmental Guidelines – Use of effluent by irrigation (DEC 2004). The suitability of a particular site depends on both landform and soil factors.

Detailed soil investigations were undertaken and confined to potentially suitable sites identified from the preliminary investigations. The aim of the detailed survey is to (a) confirm the suitability of the proposed irrigation site and (b) identify ‘moderate’ and/or ‘severe’ soil limitations.

Landform and soil properties that describe sites likely to be suitable for effluent irrigation are shown below in Table 13 and Table 14. Surface and subsoil properties both need to be considered. Where a soil property limitation is considered ‘slight’, no soil amelioration is generally required. If the property limitation is considered ‘moderate’, some soil amelioration or a management response is required, for example, application of gypsum to a sodic (dispersive) soil, lime to an acidic soil, or careful irrigation of poorly drained or excessively well drained soil. Where a limitation is considered ‘severe’, the site may be unsuited to irrigation of some or all potential effluent products (DEC 2004).

Table 13: Landform requirements for effluent irrigation systems (DEC 2004)

Property	Nil or Slight	Moderate	Severe	Restrictive Feature
Slope (%) (for following irrigation methods)				
– flood/surface	< 1	1–3	> 3	excess runoff and erosion risk
– sprinkler/spray	< 6	6–12	> 12	
– trickle/microspray	< 10	10–20	> 20	
Flooding	none or rare	Occasional	frequent	limited irrigation opportunities
Landform	crests, convex slopes and plains	concave slopes and foot-slopes	drainage lines and incised channels	erosion and seasonal water-logging risk
Surface rock outcrop (%)	Nil	0–5	> 5	interferes with irrigation and/or cultivation

Table 14: Typical soil characteristics for effluent irrigation systems (DEC 2004)

Property	Nil or Slight	Moderate	Severe	
Exchangeable sodium percentage (0–40 cm)	0–5	5–10	> 10	structural degradation and waterlogging
Exchangeable sodium percentage (40–100 cm)	< 10	>10	-	structural degradation and waterlogging
Salinity as electrical conductivity (ECe) (dS/m at 0–70 cm)	< 2	2–4	> 4	excess salt may restrict plant growth
Salinity measured as electrical conductivity (ECe) (dS/m at 70–100 cm)	< 4	4–8	> 8	excess salt may restrict plant growth; potential seasonal groundwater rise
Depth to top of seasonal high water table (metres)	> 3	0.5–3	< 0.5	poor aeration, restricts plant growth, risk to groundwater
Depth to bedrock or hardpan	> 1	0.5–1	< 0.5	restricts plant growth, excess runoff, waterlogging
Available water capacity (AWC, mm/m)	> 100	< 100	-	little plant-available water in reserve, risk to groundwater
Soil pH _{CaCl2} (surface layer)	> 6–7.5	3.5–6.0 > 7.5	< 3.5	reduces optimum plant growth
Cation capacity (CEC, cmol (+)/kg, exchange average 0–40 cm)	> 15	3–15	< 3	unable to hold plant nutrients
Emerson aggregate test (0–100cm)	4, 5, 6, 7, 8	2, 3	1	Poor structure
Phosphorus (P) sorption (kg/ha at total 0–100 cm)	high	moderate	Low	unable to immobilise any excess phosphorus

3.2.1 Summary of Suitability

Table 15 below summarises the assessment of landform hazards for effluent reuse. The results show that for a sprinkler/spray irrigation system the proposed effluent and manure reuse soils have nil to slight ratings and are suitable. The soils occurring in the upper slopes and crests have moderate to severe hazard ratings for irrigation method and rock outcrop. However, these may be suitable for manure reuse with appropriate management actions.

Table 15: Assessment of landform requirements outlined in DEC (2004)

Property	Effluent and/or manure (cultivation)	Manure (limited cultivation)	Manure (no cultivation)
Slope (%) (for following irrigation methods)			
– flood/surface	Moderate	Moderate	Severe
– sprinkler/spray	Nil/slight	Nil/slight	Moderate
– trickle/microspray	Nil/slight	Nil/slight	Nil/slight
Flooding	Nil/slight	Nil/slight	Nil/slight
Landform	Nil/slight	Nil/slight	Nil/slight
Surface rock outcrop (%)	Nil/slight	Nil/slight	Moderate to Severe

In addition to the landform hazards, Table 16 below summarises the assessment of soil characteristic hazards for effluent reuse.

The soils proposed for effluent reuse (Area A and B) are assessed as being suitable, having nil/slight limitations for all identified soil hazards except for ESP in the subsoil. One of the three soil analysis sites in the area had ESP slightly exceeding the 10% limit in the subsoil.

The soils in the manure reuse area (Area C) have nil/slight limitations for all hazards except a nil/slight to moderate hazard for ESP and depth to bedrock. Some occurrences of soils within the mid slope position were identified as having weathered bedrock at ~80-90cm depth. These minor occurrences should not cause any issues for effluent reuse considering the infrequent and low volumes of effluent proposed. However, management should prioritise the use of the deeper soils where possible.

Soils within Area D have a moderate to severe hazard rating for soil depth and hence P sorption with all other parameters assessed as nil/slight. Soils identified within the upper slope areas are dominated by shallow soils (<50cm deep) and should be excluded from effluent reuse.

Table 16: Assessment of soil characteristic requirements outlined in DEC (2004)

Property	Effluent and/or manure (cultivation)	Manure (limited cultivation)	Manure (no cultivation)
Exchangeable sodium percentage (0–40 cm)	Nil/slight	Nil/slight	Nil/slight
Exchangeable sodium percentage (40–100 cm)	Nil/slight to Moderate	Nil/slight to Moderate	Nil/slight
Salinity as electrical conductivity (ECe) (dS/m at 0–70 cm)	Nil/slight	Nil/slight	Nil/slight
Salinity measured as electrical conductivity (ECe) (dS/m at 70–100 cm)	Nil/slight	Nil/slight	Nil/slight
Depth to top of seasonal high water table (metres)	Nil/slight	Nil/slight	Nil/slight
Depth to bedrock or hardpan	Nil/slight	Nil/slight to Moderate	Moderate to Severe
Available water capacity (AWC, mm/m)	Nil/slight	Nil/slight	Moderate
Soil pH _{CaCl2} (surface layer)	Nil/slight	Nil/slight	Nil/slight
Cation capacity (CEC, cmol (+)/kg, exchange average 0–40 cm)	Nil/slight	Nil/slight	Moderate
Emerson aggregate test (0–100cm)	Nil/slight	Nil/slight	Nil/slight
Phosphorus (P) sorption (kg/ha at total 0–100 cm)	Nil/slight	Nil/slight	Moderate to Severe

5 Summary

The sustainable reuse of feedlot effluent can be accommodated on the Angora Feedlot site with allowance for appropriate holding pond capacity and irrigation infrastructure.

Our main conclusions are listed below.

1. The land proposed for effluent reuse (Area A & B) is dominated by deep reddish brown/brown Dermosols. The soils are currently cultivated and used for a range of crops. These soils have been assessed as high to very highly capable land using accepted management practices.
2. The current/future cropping regime and/or improved pastures proposed for the effluent reuse areas are suitable for the reuse of feedlot effluent generated at the site. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
3. The environmental impacts from the reuse of feedlot effluent applied to land is considered entirely manageable with good management practices and ongoing monitoring.

6 References

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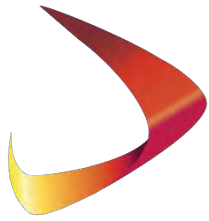
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Appendix A: Soil Analysis Results

APPENDIX L – BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT



Premise

AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA PTY LTD

Biodiversity Development Assessment Report

ANGORA FEEDLOT

Report No: 223029/001

Rev: B

27 February 2024

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DOCUMENT AUTHORISATION					
Revision	Revision Date	Report Details			
001A	13/12/23	Biodiversity Development Assessment Report – Draft for Review			
001B	27/02/23	Biodiversity Development Assessment Report – Final			
Prepared By		Reviewed By		Authorised By	
Michelle Lindsay		Sally Kirby		Sally Kirby	

EXECUTIVE SUMMARY

Project Description

The Angora Feedlot (the Project) is proposed to be located at 'Annabrae', Rannock Burn Road, Rushes Creek NSW, within Tamworth Regional Council Local Government Area (LGA). The Subject Land includes Lot 19, 43, 44, 141 and 142 DP752169 and partial Lot 7300 DP1134279 and Lot 1 DP842391. The Project involves the expansion of an existing feedlot (current capacity: 1,000 head of cattle) and the construction of a new feedlot. The total capacity of the Angora Feedlot will be 9,500 head of cattle.

The Project is a Part 4 activity under the Commonwealth *Environmental Planning and Assessment Act 1979* (EP&A Act). It will result in the loss of 24.21 ha of native vegetation which exceeds the minimum clearing threshold of 1 ha for a property with a minimum lot size of 400 ha. The Biodiversity Offset Scheme (BOS) therefore applies, and a Biodiversity Development Assessment Report (BDAR) is required to be prepared by an accredited assessor using the Biodiversity Assessment Method (BAM).

Proposed development associated with the Project includes:

- Two effluent reuse areas (44.4ha);
- Arrival, dispatch and handling facilities including feedlots, a manure pad (1.31 ha), retention of existing pens and handling yards for short term use;
- 2.5ML sedimentation basin (0.27 ha) and a 22ML effluent pond (1.56ha);
- Vegetation screens along Rannock Burn Road and the eastern perimeter of the site;
- Site access connecting the north-western corner of the site to Rannock Burn Road via an internal road; and
- Infrastructure associated with a feedlot including silage pits and a hay shed, upgraded feed mill and additional feed storage.

Proposed development associated with the existing feedlot includes:

- Upgraded feed mill infrastructure and additional silos with a limited footprint change.

Premise Australia Pty Ltd (Premise) was engaged by Agriculture Development Services Australia Pty Ltd (AgDSA) in September 2022 to assess the potential environmental impact associated with the Project. Premise has prepared this BDAR to assess the impact of the Project on biodiversity values, threatened species, threatened ecological communities and their habitats under the *NSW Biodiversity Conservation Act 2016* (BC Act) and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The BDAR also documents measures taken or proposed to avoid, minimise or mitigate potential impacts to threatened entities and calculates the number and class of any biodiversity credits that need to be offset to achieve a "no net loss" of biodiversity using the BAM Credit Calculator (BAM-C) (DPIE 2020b).

Associated case file numbers within the BAM-C include:

- BAM-C 00044705/BAAS21027/23/00044706 (Revision 0) – Part 4 Developments (General)
- BAM-C 00044705/BAAS21027/23/00044925 (Revision 0) – Scattered Trees Assessment

Methods

The BAM outlines the methodology that underpins the NSW Biodiversity Offset Scheme established under Part 6 of the BC Act. The BAM requires the use of an online program (the BAM Credit Calculator) to assess the biodiversity impacts and determine the biodiversity offset requirements for those impacts. Stage 1

summarises the biodiversity values of the Subject Land, and Stage 2 assesses potential impacts on biodiversity, describes impact avoidance and mitigation measures and determines offset requirements.

Fifteen (15) VI Plots were undertaken within the Affected Land Parcel in accordance with BAM Subsection 4.2.1 to provide floristic and structural data, assess the conservation value of vegetation and calculate the Vegetation Integrity scores of each vegetation zone. Ten (10) VI Plots were retained in the BAM-C.

Native Vegetation

The Subject Land is 75.93 hectares (ha), of which 0.94 ha is remnant woodland, 0.33 is remnant scattered trees, 8.56 ha is Derived Native Grassland (DNG), 14.95 ha is exotic grassland, 5.23 ha is cropped land and 45.92 ha is infrastructure. All vegetation will be removed for construction activities related to the Project.

Native vegetation on the Subject Land is considered to be *Plant Community Type (PCT) 101 Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion* was divided into the following six (6) Vegetation Zones (VZ):

- VZ1: Woodland in good condition (0.15 ha)
- VZ2: Woodland in moderate condition (0.78 ha)
- VZ3: Derived Native Grassland (DNG) in moderate condition (0.36 ha)
- VZ4: DNG in poor condition (8.20 ha)
- VZ5: Scattered Trees (0.33 ha, 14 trees)
- VZ6: Exotic grassland (14.95 ha)

Threatened Ecological Communities

PCT 101 is associated with four Threatened Ecological Communities (TECs):

- *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions Endangered Ecological Community (EEC)* listed on the BC Act;
- *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions EEC* listed on the BC Act;
- *Poplar Box Grassy Woodland on Alluvial Plains EEC* listed on the EPBC Act; and
- *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community (CEEC)* listed on the EPBC Act.

PCT 101 Woodland (good) and PCT 101 Woodland (moderate), along the access road, are considered to be *Poplar Box Grassy Woodland on Alluvial Plains EEC* under the EPCT Act as they meet the key diagnostic characteristics and minimum condition thresholds. The DNG and exotic grassland is not considered to be TEC.

Scattered Trees

Fourteen (14) isolated scattered trees, including eleven (11) *Eucalyptus populnea subsp. Bimbil* (Poplar Box), one (1) *Eucalyptus albens* (White Box), one (1) *Eucalyptus dealbata* (Tumbledown Red Gum) and one (1) *Alectryon oleifolius* (Western Rosewood) were identified on the Subject Land. These trees were measured and assessed for habitat value (i.e., presence of hollows and nests). The fourteen (14) trees (including thirteen hollow-bearing trees) have been assessed using the Streamlined Assessment Module – Scattered Trees Assessment in accordance with Appendix B of the BAM (2020).

Threatened Species

Database searches and literature review were used to refine the threatened species to be considered in the BDAR:

- Ecosystem credit species:
 - Thirty-seven (37) identified as potentially occurring on the Subject Land;
 - Twenty-nine (29) retained for further consideration; and
 - Eight (8) eliminated on the basis of no suitable habitat (i.e., species is not associated with PCT 101 or does not occur in the Peel IBRA sub-region), habitat constraints, microhabitat requirements or degraded microhabitat and habitat constraints.
- Species credit species:
 - Thirty-six (36) identified as potentially occurring on the Subject Land including:
 - three (3) flora and one (1) fauna species were retained for targeted survey; and
 - Thirty-two (32) were eliminated on the basis of no suitable habitat (i.e., species is not associated with PCT 101 or does not occur in the Peel IBRA sub-region), habitat constraints, microhabitat requirements or degraded microhabitat and habitat constraints.

Site investigations were undertaken in January and February 2023. No threatened flora or fauna species or their habitats were identified on the Subject Land and no further assessment was required.

Serious and Irreversible Impacts (SAII)

The determination of a Serious And Irreversible Impact (SAII) on biodiversity values is to be made by the decision-maker in accordance with the four principles set out in the Biodiversity Conservation Regulation (2017) (BC Reg). Four (4) threatened species were identified as at risk of SAII including two birds (Swift Parrot and Regent Honeyeater) and one bat (Large Bent-winged Bat). The Subject Land contains potential foraging habitat for the Swift Parrot (1.26 ha), Regent Honeyeater (1.26 ha) and Large Bent-winged Bat (0.94 ha), however there is no suitable breeding habitat. The loss of foraging habitat will not contribute significantly to the risk of these species becoming locally or regionally extinct, and it was concluded that the Project would not have a SAII on these threatened species.

Matters of National Environmental Significance (MNES)

Thirty-seven (37) flora and fauna species recognised as MNES under the EPBC Act were identified during database searches as potentially occurring on the Subject land. Of these, six (6) were considered likely to utilise the Subject Land for foraging and have been assessed under Commonwealth guidelines: Regent Honeyeater, White-throated Needle-tail, Swift Parrot, Corben's Long-eared Bat and Grey-headed Flying-fox. PCT 101 Woodland (Good) and PCT 101 Woodland (Moderate) along the access road, meet the minimum condition thresholds for classification as *Poplar Box Grassy Woodland on Alluvial Plains Endangered Ecological Community* under the EPBC Act. The Project is considered unlikely to have a significant impact on the eight MNES species and the TEC, and referral to the Commonwealth is not considered necessary.

Measure to Avoid and Minimise

Project Location:

Opportunities to avoid and minimise impacts were considered during the planning stage of the Project. The Project is proposed on land zoned as RU1 Primary Production in an agriculture dominated area between Gunnedah and Tamworth. The Project's location is considered opportunistic given the current land use as an existing feedlot with the capacity to expand. The Subject Land is connected to an existing road network which is to be widened to accommodate for the increased traffic to and from the site. The road alignment

has been designed to avoid the need to clear remnant vegetation along the roadside, with the exception of one White Box tree. Indirect impacts can be avoided through site management during construction (i.e., machinery operation during daylight hours, de-mark construction areas and provide signage so adjacent habitat is protected, relocate any displaced fauna).

Project Design:

The Project has been designed to avoid sensitive native vegetation and potential threatened species habitat where possible. The buffer applied to the access road was reduced from 10-20 m to 4-5 m to reduce the extent of Poplar Box Woodland EEC to be cleared.

Direct Impacts

The direct impacts of the Project include the removal of 24.21 ha of native vegetation, including the removal of fourteen (14) scattered trees and up to 24.21 ha of potential foraging habitat for twenty-seven (27) threatened birds and bats.

Indirect Impacts

Indirect impacts of the Project include the temporary disruption to adjacent habitat during construction associated with noise, dust and light. There is also a risk of spread of weeds and pathogens into surrounding areas, and increased pressure on food and shelter resources in adjacent vegetation as wildlife may be displaced when vegetation is removed from the Subject Land.

Prescribed Impacts

One prescribed biodiversity impact (vehicle strike) was identified as relevant to the Project. The expansion of the facility from 1,000 to 9,500 head of cattle will increase road activity during both construction and operational phases of the Project. Twenty (20) species are considered at risk of potential vehicle strike impacts. These species are generally highly mobile, potentially utilising woodland on the Subject Land as a minor component of their broader foraging range. Therefore, the prescribed impacts of the Project are unlikely to be significant in the context of the broader landscape.

There are no identified migratory flight paths traversing the Subject Land. The Project will not impact the movement of threatened species that maintains their lifecycle. There would be no impact on wind turbines or rocky habitat.

Mitigation Measures

Mitigation measures have been considered for the Project. These include the timing of works (construction hours and time period undertaken), implementation of pre-clearing surveys and clearing protocols, the inspection of felled trees and investigating options for the relocation of habitat features to reduce impacts associated with the displacement of fauna. Other mitigation measures considered include the installation of temporary fencing and signage, as well as the modification of clearing equipment to reduce inadvertent impacts on adjacent habitat. The impact of the Project on adjacent habitat and threatened species is also considered to be reduced by the implementation of noise, dust, light, high threat weed and erosion guidelines, hygiene protocols and road amendments (reduced speed, signage and education).

Offset Requirements

AgDSA is committed to satisfying the biodiversity credit requirements using offset mechanisms allowed by the NSW Biodiversity Offsets Scheme (i.e. contribution to the Biodiversity Trust Fund administered by the NSW Biodiversity Conservation Trust, purchase of existing credits on the market, funding of a biodiversity conservation action, retirement of biodiversity credits and/or mine site ecological rehabilitation). Impacts that require an offset as per BAM Subsection 9.2.2.(2) (DPIE 2020a) are outlined in **Table 1**.

Table 1. Impacts that Require an Offset – Ecosystem Credits

Vegetation Zone	PCT	TEC	Impact Area (Ha)	Number of Ecosystem Credits
VZ1	101 Woodland (Good)	Poplar Box Grassy Woodland on Alluvial Plains (EPBC Act)	0.15	7
VZ2	101 Woodland (Moderate)	Poplar Box Grassy Woodland on Alluvial Plains (EPBC Act)	0.21	6
VZ5	101 Scattered Trees	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (BC Act)	14 trees	14
Total				27

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SHORTENED FORMS

APZ	Asset Protection Zone
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC ACT	<i>Biodiversity Conservation Act 2016 (Nsw)</i>
BC REGULATION	Biodiversity Conservation Regulation 2017 (Nsw)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets And Agreement Management System
BOS	Biodiversity Offsets Scheme
CEEC	Critically Endangered Ecological Community
DBH	Diameter At Breast Height Over Bark
EC	Ecological Community Listed Under The Epbc Act
EPBC ACT	<i>Environment Protection And Biodiversity Conservation Act 1999 (Cwlth)</i>
EP&A ACT	<i>Environmental Planning And Assessment Act 1979 (Nsw)</i>
EEC	Endangered Ecological Community
HTW	High Threat Weed
IBRA	Interim Biogeographic Regionalisation For Australia
LLS ACT	<i>Local Land Services Act 2013 (Nsw)</i>
MNES	Matters Of National Environmental Significance
NPW ACT	<i>National Parks And Wildlife Act 1974 (Nsw)</i>
NSW	New South Wales
PCT	Plant Community Type
SAII	Serious And Irreversible Impact
SEARS	Secretary's Environmental Assessment Requirements
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Community
VEC	Vulnerable Ecological Community
VEGETATION SEPP	<i>State Environmental Planning Policy (Vegetation In Non-Rural Areas) 2017 (NSW)</i>

DECLARATIONS

i. **Certification under clause 6.15 Biodiversity Conservation Act 2016**

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the *Biodiversity Conservation Act 2016* (BC Act).

Signature: 

Date: 27/2/24

BAM Assessor Accreditation no: BAAS21027

This BDAR has been prepared to meet the requirements of BAM 2020.

ii. Details and experience of author/s and contributors

Authors and contributors

Name	BAM Assessor Accreditation no. (if relevant)	Position/Role	Tasks performed	Relevant qualifications
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iii. Conflict of interest

I declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

This declaration has been made in the interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature

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Date: 27/2/24

BAM Assessor Accreditation no: BAAS21027

STAGE 1: BIODIVERSITY ASSESSMENT

1. INTRODUCTION

1.1 Proposed Development

1.1.1 DEVELOPMENT OVERVIEW

Premise Australia Pty Ltd (Premise) was engaged by Agriculture Development Services Australia Pty Ltd (AgDSA) in September 2022 to assess the potential environmental impact associated with the proposed expansion of an existing feedlot (current capacity: 1,000 head of cattle) and the construction of a new feedlot. The total capacity of the Angora Feedlot will be 9,500 head of cattle.

The Project is a considered both Designated and Integrated Development and will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and requires an approval under the *Protection of the Environment Operations Act 1997*. The Planning Secretary's Environmental Assessment Requirements (SEARs) 1696 has been issued.

The Environmental Impact Assessment (EIS) must comply with the assessment requirements and meet the minimum form and content requirements in sections 190 and 192 of the *Environmental Planning and Assessment Regulation 2021*. A Biodiversity Development Assessment Report (BDAR) must be prepared by an accredited assessor using the Biodiversity Assessment Method (BAM) (DPIE 2020a) to assess the impact of the proposals on biodiversity values. The BDAR is to accompany the EIS if the Project triggers the NSW Biodiversity Offset Scheme (BOS). Triggers to enter the BOS include:

- Identified on the Biodiversity Values Map
- Clearing exceeds minimum clearing threshold (related to minimum lot size)
- Significant impact on a threatened species or ecological community.

Premise has prepared this BDAR to assess the potential impact of the Project on biodiversity values, threatened species, threatened ecological communities and their habitats under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) in accordance with the BAM (DPIE 2020a). The BDAR must also document measures taken to avoid, minimise or mitigate potential impacts to threatened entities and calculate the number and class of any biodiversity credits that need to be offset to achieve a 'no net loss' of biodiversity using the BAM Credit Calculator (BAM-C) (DPIE 2020b).

1.1.2 LOCATION

The Project is proposed to be located at 'Annabrae', Rannock Burn Road, Rushes Creek NSW, within Tamworth Regional Council Local Government Area (LGA). The Subject Land includes Lot 19, 43, 44, 141 and 142 DP752169 and partial Lot 7300 DP1134279 and Lot 1 DP842391 (**Figure 1; Figure 2**).

Figure 1. Location Map

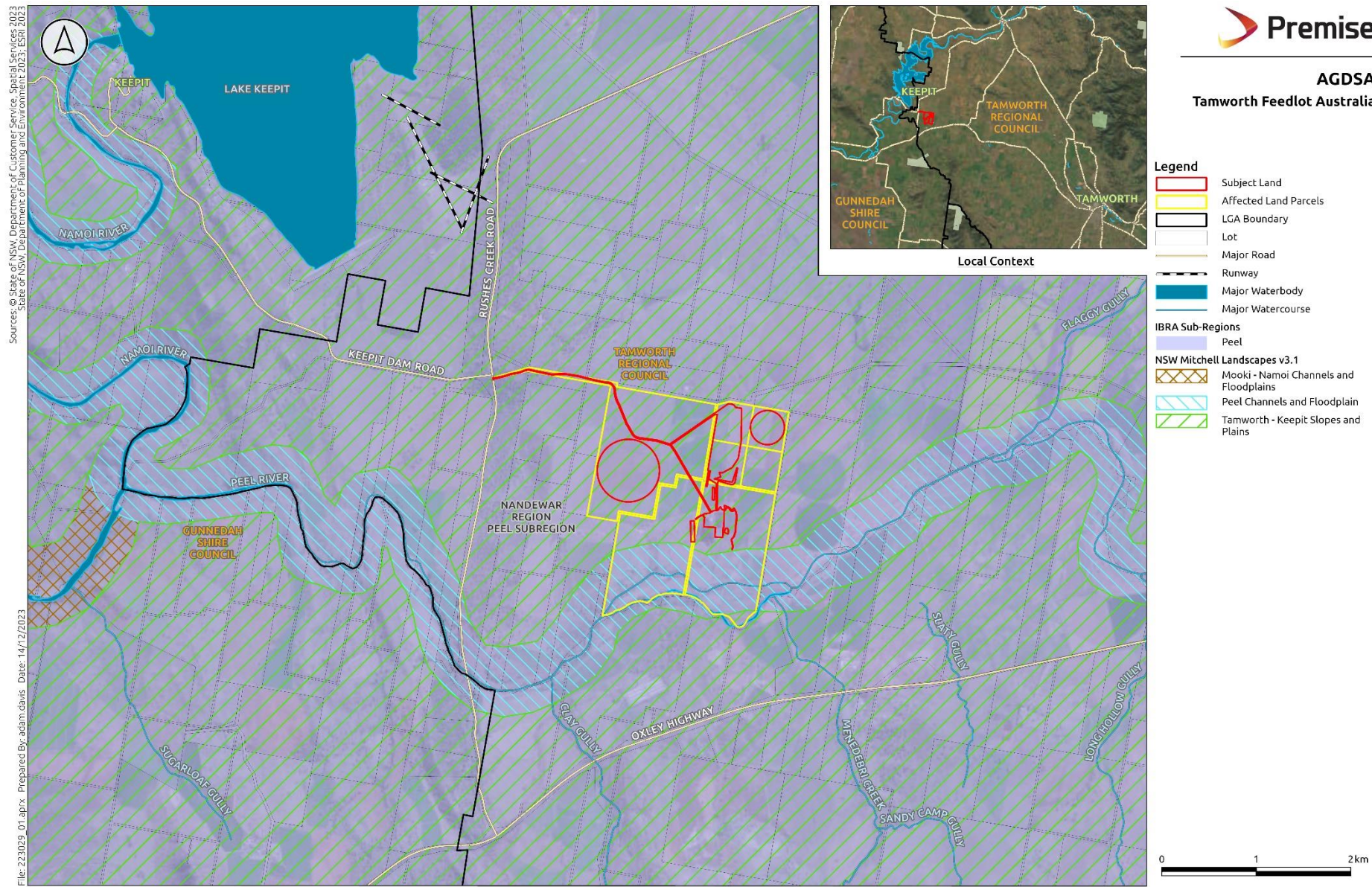
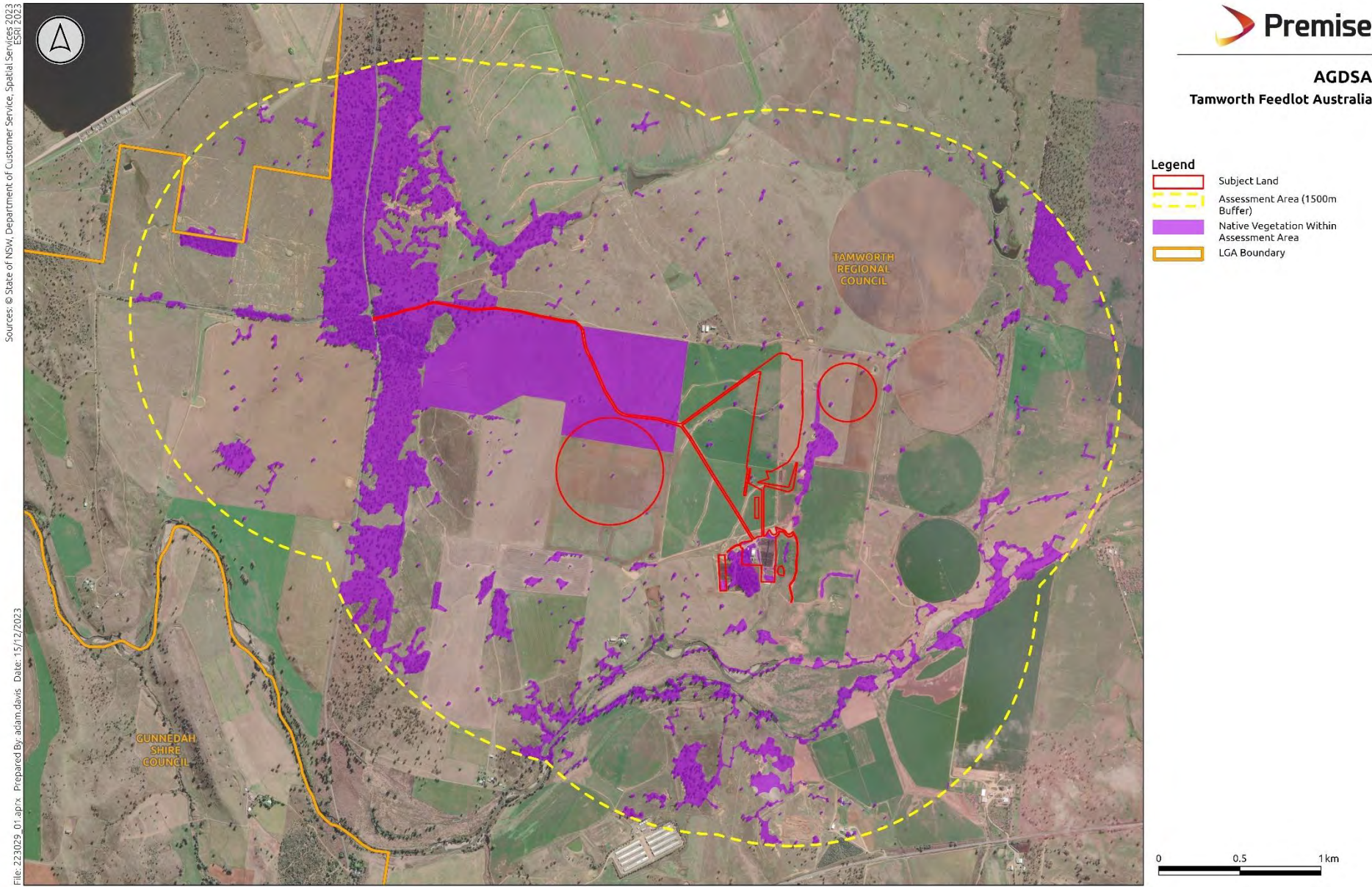


Figure 2. Site Map



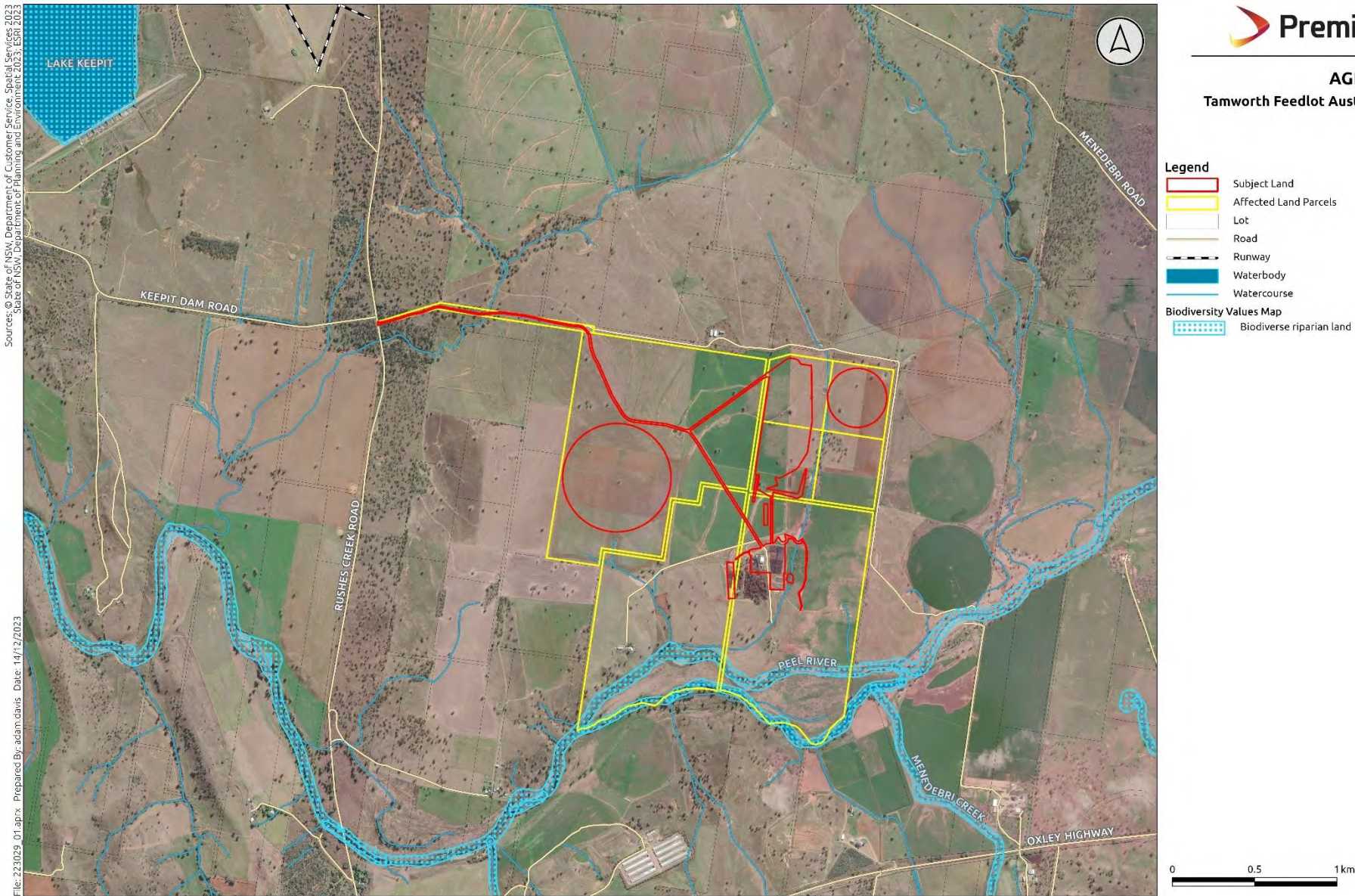
1.1.3 GENERAL DESCRIPTION OF THE SUBJECT LAND

The Subject Land (75.93 ha) is currently zoned as RU1 Primary Production in the Tamworth Regional Local Environmental Plan 2010. Elevation on the site ranges from 309 metres (m) above sea level (ASL) near the existing feedlots to 320 m ASL at the western effluent reuse area. The site contains infrastructure associated with the existing feedlot (i.e., internal tracks, sheds, stock yards, equipment and dams), as well as cropped paddocks and exotic paddocks which are sown with summer crops every 3-4 years. Native woody vegetation includes remnant woodland along the access road and near the existing feedlots (retained as shade trees for livestock), and scattered trees across the cropped area. Native grasslands, derived from the original vegetation that would have occurred in the area pre-European settlement also occurs in areas which have historically been cropped and are reverting back to native. There are no mapped Biodiversity Values on the Subject Land (NSW Government 2023f) (**Figure 3**).

The Subject Land lies within the Solodic Soils Greater Soil Group (DPE 2023e). During biodiversity surveys, it was determined that soils on the Subject Land included red-brown clay-based loams.

The topographic and hydrological setting of the Subject Land are assessed in Section 3.2.2.

Figure 3. Biodiversity Values Map



1.1.4 PROPOSED DEVELOPMENT AND THE SUBJECT LAND

AgDSA propose the expansion of an existing feedlot (current capacity: 1,000 head of cattle) and the construction of a new feedlot. The total capacity of the Angora Feedlot will be 9,500 head of cattle. The proposal is to occur at 'Annabrae', Rannock Burn Road, Rushes Creek NSW.

Proposed development associated with the new feedlot includes:

- Two effluent reuse areas (44.4 ha);
- Arrival, dispatch and handling facilities including feedlots, a manure pad (1.31 ha), retention of existing pens and handling yards for short term use;
- 2.5ML sedimentation basin (0.27 ha) and a 22ML effluent pond (1.56ha);
- Vegetation screens along Rannock Burn Road and the eastern perimeter of the site;
- Site access connecting the north-western corner of the site to Rannock Burn Road via an internal road; and
- Infrastructure associated with a feedlot including silage pits and a hay shed, upgraded feed mill and additional feed storage.

Proposed development associated with the existing feedlot includes:

- Upgraded feed mill infrastructure and additional silos with a limited footprint change.

There is to be no change to the Controlled Drainage Area of the existing facility. All proposed works will be managed in the proposed sedimentation basin and effluent holding ponds. The capacities of the required sedimentation basin and effluent holding ponds have been determined in accordance with the NSW Feedlot Guidelines.

The Project will require all vegetation (excluding the woodland patch in proximity to the existing feedlot [0.57 ha]) to be cleared for the construction of the additional feedlot and associated infrastructure. Woody vegetation to be cleared includes woodland along the access road and scattered trees across the Subject Land. Woodland in proximity to the existing feedlot (0.57 ha) is to be retained as shade trees. This small area has been excluded from the BAM-C but has been included in the BDAR for threatened species habitat and impact assessments. Non-woody vegetation to be cleared includes derived native grassland (DNG), exotic grasslands and cropped paddocks within the proposed feedlot layout.

The Subject Land is 75.93 hectares (ha), of which 0.94 ha is remnant woodland, 0.33 is remnant scattered trees, 8.56 ha is DNG, 14.95 ha is exotic grassland, 45.92 ha is cropped and 5.23 ha is infrastructure. The Project will require all vegetation to be cleared.

Proposed development on the Subject Land is shown in **Figure 4**.

Figure 4. Development Layout



1.1.5 OTHER DOCUMENTATION

The Secretary's Environmental Assessment Requirements (SEARs) for the Project state the following requirements for biodiversity:

- 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 in accordance with the current Environment and Heritage Group legislation and guidelines;
- details of weed management during construction and operation in accordance with existing State, regional or local weed management plans or strategies; and
- a detailed description of the measures to avoid, minimise, mitigate and/or offset biodiversity impacts.

1.2 Biodiversity Offsets Scheme Entry

The Project is a Part 4 activity under the EP&A Act. The proposed subdivision will result in the loss of 24.21 ha of native vegetation which exceeds the minimum clearing threshold of 1 ha for a property with a minimum lot size of 400 ha. The Biodiversity Offset Scheme (BOS) applies, and a BDAR is required to be prepared by an accredited assessor using the Biodiversity Assessment Method (BAM).

Premise have prepared this BDAR to assess the potential impact of the Project on biodiversity values, threatened species, threatened ecological communities and their habitats under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) in accordance with the Biodiversity Assessment Method (BAM) (DPIE 2020a). The BDAR must also document measures taken to avoid, minimise or mitigate potential impacts to threatened entities and calculate the number and class of any biodiversity credits that need to be offset to achieve a 'no net loss' of biodiversity using the BAM Credit Calculator (BAM-C) (DPIE 2020b).

This BDAR was prepared by an Accredited assessor using version 61 of the BAM-C.

1.3 Excluded Impacts

The *Local Land Services Act 2013* (LLS Act) applies to RU1 land and recognises three categories of land under the Land Management Framework:

- Category 1 (exempt land) – vegetation can be cleared without approval;
- Category 2 (regulated/vulnerable/sensitive) – vegetation is protected and needs a permit to clear; and
- Excluded land – urban areas, National Parks, State Forestry, Crown Reserves etc where the LLS Act does not apply.

Premise Ecologists identified 49.82 ha of vegetation on the Subject Land to be consistent with Category 1 – exempt land. Clause 6.8(3) of the BC Act specifies that the BAM is to exclude the assessment of the impacts of any clearing of native vegetation and loss of habitat on category 1-exempt land (as defined in Part 5A of the LLS Act), other than prescribed impacts (as defined in clause 6.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation)). A Land Category Report was prepared to be endorsed by the Biodiversity, Conservation and Science Directorate of the Department of Planning and Environment (DPE) in 2024 (**Appendix A**). A total of 49.82 ha of the Subject Land (i.e., cropping) is considered Category 1 land and

vegetation clearing on that area is not considered in this BDAR (**Figure 5**). Prescribed impacts are assessed on the whole Subject Land, including Category 1-exempt land.

Other areas not considered in this BDAR include existing infrastructure.

Figure 5. Excluded Impacts



1.4 Matters Of National Environmental Significance

This BDAR assesses impacts to Matters of National Environmental Significance listed under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

Thirty-seven (37) flora and fauna species recognised as MNES under the EPBC Act were identified during database searches as potentially occurring on the Subject Land and are outlined further in **Appendix C**. Only those species considered likely to utilise the Subject Land for foraging or breeding were considered further, including Regent Honeyeater, White-throated Needletail, Swift Parrot, Spot-tailed Quoll, Corben's Long-eared Bat and Grey-headed Flying-fox. Koalas were not assessed as a MNES due to the completion of SAT surveys (i.e., species not identified on Subject Land) and the presence of degraded potential foraging habitat (i.e., one tree along the access road and one scattered tree).

PCT 101 Woodland (Good) and PCT 101 Woodland (Moderate) along the access road, meet the minimum condition thresholds for classification as Poplar Box Grassy Woodland on Alluvial Plains Endangered Ecological Community under the EPBC Act.

An assessment of whether the proposed development will have a significant impact on these MNES is provided in **Appendix E**. The Project is considered unlikely to have a significant impact on the nine (9) MNES entities. Consequently, referral of the development to the Commonwealth is not considered necessary for any MNES entities.

1.5 Information Sources

Key information sources used in the BDAR, include but are not limited to:

Title	Web address
Biodiversity Assessment Method (BAM 2020) (DPIE 2020a)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-2020-200438.pdf
Biodiversity Assessment Method Operational Guide – Stage 1 (DPIE 2020c)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-2020-operational-manual-stage-1-200582.pdf
Biodiversity Assessment Method Operational Guide – Stage 2 (DPIE 2019)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/biodiversity-assessment-method-operational-manual-stage-2-190512.pdf
BAM Credit Calculator (BAM-C) (DPIE 2020b)	https://www.lmbc.nsw.gov.au/bamcalc
BAM-C User Guide (OEH 2017)	https://www.lmbc.nsw.gov.au/bamcalc/app/assets/BAMTools_UserGuide.pdf
Vegetation Classification System (DPE 2023a)	https://www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx
Threatened Biodiversity Data Collection (TBDC) (DPE 2023b)	https://www.environment.nsw.gov.au/AtlasApp/UI_Modules/TSM_/Default.aspx?a=1
NSW BioNet Atlas (DPE 2023c)	https://www.environment.nsw.gov.au/atlaspublicapp/UI_Modules/ATLAS_/AtlasSearch.aspx
Sharing and Enabling Environmental Data in NSW (SEED) (NSW Government 2022a)	https://geo.seed.nsw.gov.au/Public_View/index.html?viewer=Public_View&locale=en-AU
Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities – Working Draft (DEC 2004)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Threatened-species/draft-threatened-biodiversity-survey-guide.pdf

Title	Web address
Surveying threatened plants and their habitats NSW Survey Guide for the BAM (DPIE 2020d)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/surveying-threatened-plants-and-habitats-nsw-survey-guide-biodiversity-assessment-method-200146.pdf
PlantNET (RBG 2023)	https://plantnet.rbg Syd.nsw.gov.au/floraonline.htm
Directory of Important Wetlands in Australia (Department of Climate Change, Energy, the Environment and Water [DECCW] 2021)	https://www.dcceew.gov.au/water/wetlands/australian-wetlandsdatabase/directory-important-wetlands
BioNet NSW (Mitchell) Landscapes (NSW Government 2022b)	https://datasets.seed.nsw.gov.au/dataset/nsw-mitchell-landscapesversion-3-1
NSW Interim Biogeographic Regions of Australia (IBRA region and subregion) (NSW Government 2022c)	https://datasets.seed.nsw.gov.au/dataset/interim-biogeographicregionalisation-for-australia-ibra-version-7-regions
Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (Australian Government, 2013).	https://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf
Serious and Irreversible Impacts of Development on Biodiversity (DPE 2023f)	https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity-offsets-scheme/local-government-and-other-decision-makers/serious-and-irreversible-impacts-of-development

2. METHODS

2.1 Site Context Methods

2.1.1 LANDSCAPE FEATURES

Landscape features were identified according to Section 3.1 of the BAM (DPIE 2020a) using a combination of desktop review and field survey methods.

Desktop review included:

- International Biographic Regionalisation for Australia (IBRA) bioregions and subregions: SEED Map (Layer: Interim biogeographic regionalisation for Australia regions) (NSW Government 2023b).
- Habitat connectivity: NPWS Reserve, State Forest and Water Feature Corridor layers (NSW Government 2023c-e).
- Rivers, streams, estuaries and wetlands: SEED Map (Layers: Estuaries, NSW Wetlands, Ramsar Wetlands, Hydrography) (NSW Government 2023g-j).
- Karst, caves, crevices, cliffs, rocks and other geological features of significance: (NSW Government 2023a).
- Areas of outstanding biodiversity value (DPE 2023d).
- Areas of high biodiversity value: Biodiversity Values Map (NSW Government 2023f).
- NSW (Mitchell) landscape: SEED Map (Layer: NSW Mitchell Landscapes v3.1 Ecosystem Meso Grouping) (NSW Government 2023k).
- BioNet Vegetation Classification (DPE 2023a).
- NSW State Vegetation Type Map (NSW Government 2023l).

Biodiversity surveys were conducted between 10-13 January 2023 to map vegetation on site and identify and confirm landscape features. The survey included:

- Identifying vegetation types, dominant canopy, mid-storey and groundcover species
- Vegetation formation and class in accordance with Keith (2004)
- Landform and landscape type
- Weed species and high threat weeds or priority weeds
- Soil characteristics
- Evidence of previous disturbance
- Photographic evidence
- Opportunistic observations of fauna species and fauna habitat

2.1.2 NATIVE VEGETATION COVER

The percentage of native vegetation cover estimated to remain in the landscape was assessed according to Section 3.2 of the BAM (DPIE 2020a). A 1500 m buffer was applied to the edge of the Subject Land and all native vegetation within this larger 'Assessment Area' was digitised using Geographic Information Systems (GIS) editing tools.

Native vegetation extent on the Subject Land was mapped using the latest available aerial imagery and digitized using GIS. The initial vegetation maps were ground-truthed in the field in January and February 2023. Native vegetation within the broader 1500 m buffer Assessment Area was identified using Google Satellite imagery and State Vegetation Type Mapping (Central West Lachlan Region) (NSW Government 2023l). GIS was used to calculate the total area of native vegetation on the Subject Land and Assessment Area.

2.2 Native Vegetation, Threatened Ecological Communities and Vegetation Integrity Methods

2.2.1 EXISTING INFORMATION

Plant Community Types (PCTs) on the Subject Land were determined according to BAM Section 4.2 (DPIE 2020a). Prior to conducting fieldwork, desktop reviews of State Vegetation Type Mapping (Western Region) (NSW Government 2022l) and the BioNet Vegetation Classification system (DPE 2022a) were undertaken to identify potentially occurring PCTs within the Assessment Area. This preliminary mapping was reviewed after fieldwork in January 2023.

Filters such as IBRA region, IBRA sub-region, vegetation formation, vegetation class and dominant species were applied to the BioNet Vegetation Classification system. PCTs considered likely to occur on the Subject Land were then refined based on landscape position, geomorphology and vegetation structure.

Threatened Ecological Communities (TECs) associated with the PCTs on the Subject Land were identified and assessed in accordance with the relevant Final Determinations under the BC Act and EPBC Act. Relevant guidelines and publications include:

- BioNet Vegetation Classification System (DPE 2022a)
- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions – Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act, hereafter referred to as the Brigalow Final Determination (TSSC 2011a)

- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Penneplain, Nandewar and Brigalow Belt South Bioregions – Determination to make a minor amendment to Part 3 of Schedule 1 of the Threatened Species Conservation Act, hereafter referred to as Inland Grey Box Woodland Final Determination (TSSC 2011b)
- Conservation Advice (including listing advice) for the Poplar Box Grassy Woodland on Alluvial Plains (DEE 2019)
- Commonwealth Listing Advice on White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (TSSC 2006)

Detailed assessment of PCTs and TECs on the Subject Land are provided in Section 4.2 and Section 4.3.

2.2.2 MAPPING NATIVE VEGETATION EXTENT

Aerial photography, site walkover and Rapid Assessment Spot Samples (RASS) were used to confirm the extent of native vegetation on the Subject Land. Aerial photography was used to develop the initial map, and an iPad was used during field surveys to collect spatially referenced data to confirm vegetation zones and their boundaries, based RASS which involved recording the dominant species, composition and structure of each vegetation zone.

RASS were undertaken by recording all flora species within a 20 × 20 m area. Photographs were taken at each site and locations recorded using a GPS. Each species was given an abundance rating according to the following approximate scale;

- A Abundant (>50);
- C Common (11 to 50);
- O Occasional (6 to 10);
- U Uncommon (3 to 5); or
- R Rare (1 or 2).

Scattered Trees are defined in the BAM as remnant native trees that *'have a DBH of greater than or equal to 5 cm and are located more than 50 m away from any living tree that is greater than or equal to 5 cm DBH, and the land between the scattered trees is comprised of vegetation that are all ground cover species on the widely cultivated native species list, or exotic species or human-made surfaces or bare ground'* (DPIE 2020a).

Scattered trees on the Subject Land were assessed in the field and the GPS location, species name, Diameter at Breast Height (DBH) and habitat features such as the presence of hollows and mistletoe were recorded.

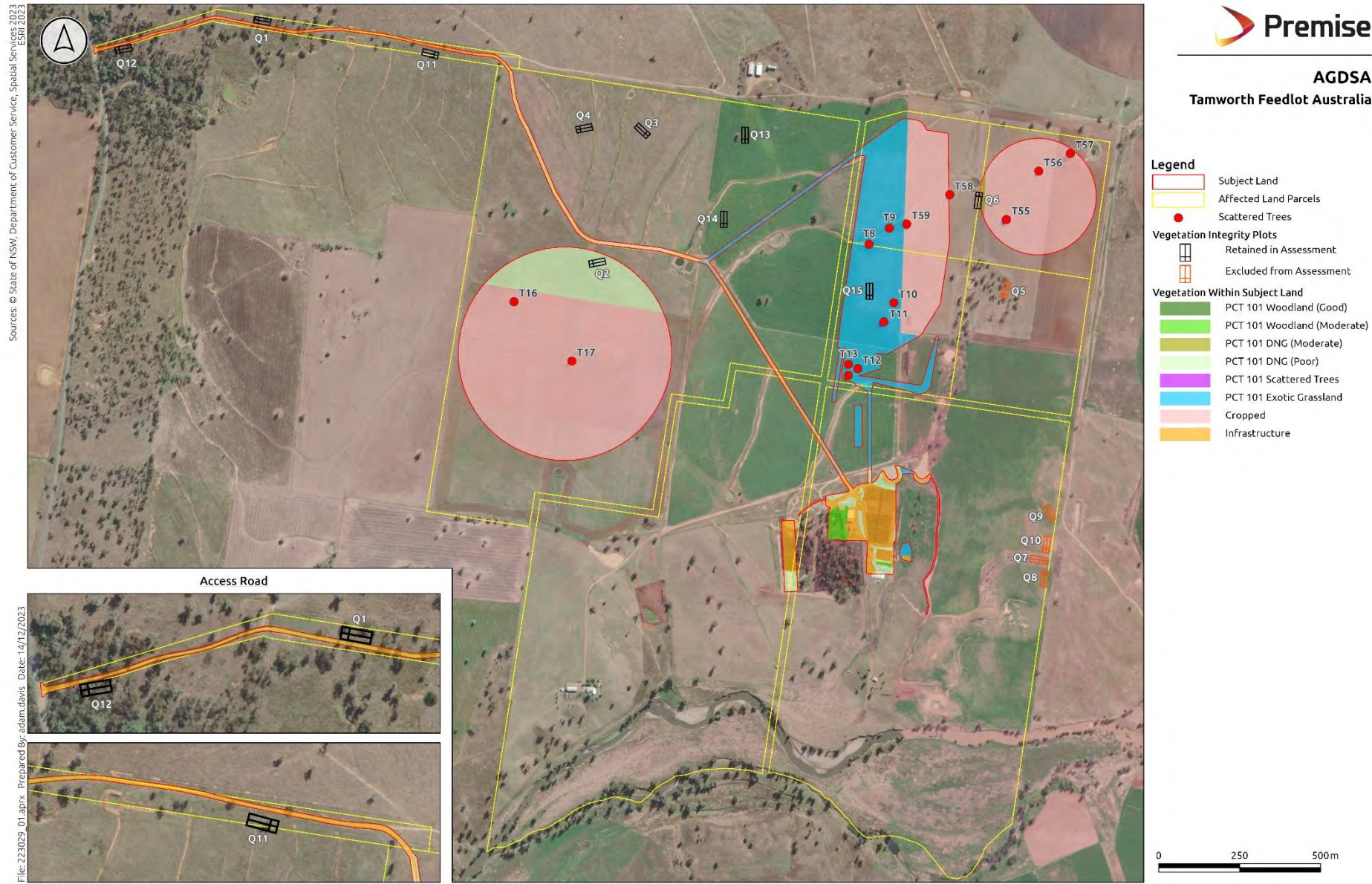
2.2.3 PLOT-BASED VEGETATION SURVEY

Vegetation Integrity Plots (VI) comprise a 20 x 20 m full floristic sub-plot at one end of a 50 x 20 m quadrat to gain data on vegetation structure and composition in native vegetation (**Figure 6**). A list of vascular plant species was made within each plot with estimates of abundance and groundcover for input into BAM-C. The flora species were categorised as trees, shrubs, grasses and grass-like, forbs, ferns and others. Leaf litter cover in five 1m² sub-plots and tree classes were assessed in the 50 x 20 m quadrat, along with presence or absence of hollows in trees. In linear areas where there was no room to fit a 20 x 50 m transect, 10 x 100 m VI Plots were used as 400 m² equivalent plots in accordance with Box 1 of BAM Subsection 4.2.1 (DPIE 2020a).

Fifteen (15) VI Plots were undertaken on the Subject Land in accordance with BAM Subsection 4.2.1. VI Plots were located in vegetation considered to be representative of each vegetation condition zone (VZ), targeted to assess any environmental variation within vegetation communities. VI Plots were located to avoid ecotones, edges or disturbed areas where possible. Ten (10) VI Plots were used in the BAM-C, including Q1, Q3, Q4, Q11, Q12, Q13 and Q14 which were located outside the Subject Land boundary. These VI Plots were

retained in the BAM-C because the species structure and composition are considered representative of the vegetation zones within the Subject Land.

Figure 6. Field Survey Locations



2.2.4 VEGETATION INTEGRITY SURVEY

The area of each Vegetation Zone (VZ) was calculated using GIS and the minimum number of VI plots required per VZ area was determined based on Table 3 of BAM Subsection 4.3.4 (DPIE 2020a). VI plot locations were assigned randomly via GIS to avoid field bias and ensure they captured representative attributes within each VZ. All VI Plots were 20 x 50 m.

2.3 Threatened Flora Survey Methods

2.3.1 REVIEW OF EXISTING INFORMATION

A comprehensive review of literature was undertaken to compile a list of species to be targeted during the threatened flora species surveys:

- NSW BioNet Atlas (DPE 2023c) search within a 10 km buffer. BioNet Atlas searches were undertaken throughout the duration of survey planning and implementation to ensure the candidate species list was as temporally accurate as possible, with the most recent search undertaken on 4 September 2023.
- Protected Matters Search Tool (PMST) (DCCEE 2023a) within the same 10 km buffer. PMST searches were undertaken throughout the duration of survey planning and implementation to ensure the candidate species list was as temporally accurate as possible, with the most recent search undertaken on 4 September 2023.
- NSW BioNet Threatened Biodiversity Data Collection (TBDC) (DPE 2023b).
- The Biodiversity Assessment Method Calculator (BAM-C) (DPIE 2023b).

Each flora species identified in the literature or database search was assessed in the context of the Subject Land to determine whether it could potentially occur. Species information on the TBDC (DPE 2023b) and BAM-C (DPIE 2023b) was used to identify habitat requirements, or habitat constraints for each species.

2.3.2 HABITAT CONSTRAINTS ASSESSMENT

The BAM Credit Calculator allows the assessor to include or exclude candidate threatened species if the species:

1. has habitat constraints listed in the TBDC and none of these constraints are present on the Subject Land;
2. is vagrant in the area (taken as the record being well outside the species range or natural distribution); or
3. is unable to use the habitat constraints listed in the TBDC or known microhabitats that the species requires to persist on or use because the habitat constraints are degraded to the point where the species will no longer be present.

The likelihood of occurrence of each candidate flora species was assessed based on distribution records in the NSW BioNet Atlas of Wildlife (DPE 2023c), and information in both the TBDC (DPE 2023b) and referenced scientific publications. Out of a total of fourteen (14) flora species identified by database and literature searches as potentially occurring on the Subject Land, four (4) threatened flora species were retained for targeted searches.

2.3.3 FIELD SURVEYS

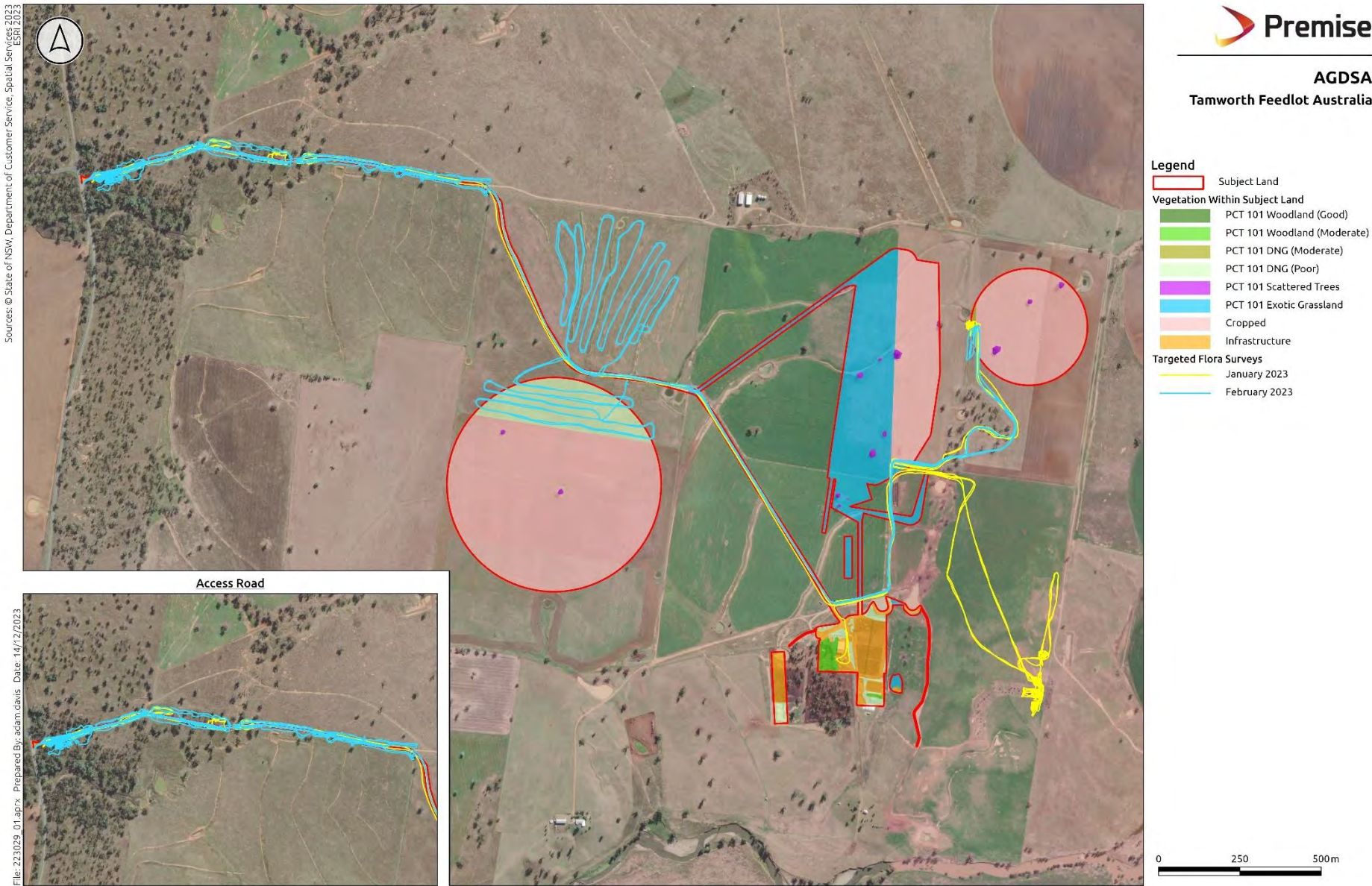
Vegetation surveys were conducted between 10-13 January and 15-16 February 2023 by Premise Ecologists. Threatened flora species surveys were undertaken in accordance with the BAM (DPIE 2020a) and the methods described in the *NSW Surveying Threatened Plants and Their Habitats: NSW Survey Guide for the*

Biodiversity Assessment Method (Threatened Flora Survey Guideline) (DPIE 2020d). Threatened flora surveys were conducted over the Subject Land within suitable habitat.

Incidental observations of non-targeted threatened flora were recorded simultaneously while undertaking targeted surveys.

Parallel field transects at 10 m intervals were undertaken in moderate to high quality native grassland and woodland areas on the Subject Land. All threatened flora species searches were conducted by Premise ecologists experienced in threatened plant detection and identification. Tracks were recorded using a GPS and survey effort is displayed on **Figure 7**.

Figure 7. Threatened Flora Species Surveys



2.4 Threatened Fauna Survey Methods

2.4.1 REVIEW OF EXISTING INFORMATION

Threatened fauna species were identified via literature review described in Section 2.3.1. Information sources included:

- PCTs on the Subject Land identified in this BDAR
- NSW BioNet Atlas (DPE 2023c)
- EPBC Act PMST (DCCEEW 2023a)
- TBDC (DPE 2023b)
- BAM-C (DPIE 2020b)

2.4.2 HABITAT CONSTRAINTS ASSESSMENT

Habitat assessments conducted by Premise in January and February 2023 involved detailed recording and analysis of fauna habitat features within the Subject Land including:

- Live and dead paddock trees;
- Winter flowering eucalypts;
- Koala feed tree species including White Box;
- Trees with hollows ranging from 5 cm to 30 cm in diameter;
- Watercourses and dams; and
- Areas dominated by native grasses including *Themeda triandra* (Kangaroo Grass).

2.4.3 FIELD SURVEYS

Field surveys for threatened fauna species were conducted within suitable habitat on 10-13 January and 15-16 February 2023 by Premise Ecologists. Threatened fauna species surveys were undertaken in accordance with the BAM (DPIE 2020a) and the methods described in the *Survey Guidelines for Australia's Threatened Birds: Guidelines for Detecting Birds Listed as Threatened Under the Environment Protection and Biodiversity Conservation Act 1999* (Threatened Bird Survey Guideline) (DEWHA 2017).

Survey methods are described below:

- **Koala Spot Assessment Technique (SAT) Surveys:** The presence of Koalas on the Subject Land was assessed via SAT surveys within remnant woodland along the access road.
- **Habitat Assessments:** Area searches for presence of nests, feed trees, tree scratches, roosting and perching habitats, scats and hollow-bearing trees.

All threatened fauna species searches were conducted by Premise ecologists experienced in threatened fauna habitat assessment and identification. Incidental observations of non-target threatened fauna species were also recorded simultaneously while undertaking targeted survey. Tracks were recorded using a GPS and survey effort is displayed on **Figure 8**.

Figure 8. Threatened Fauna Species Surveys



2.5 Limitations

No limitations were recognised for targeted threatened flora or fauna surveys. All threatened species surveys occurred within the recommended survey period according to the BioNet Atlas (DPE 2023c).

The Southern Whiteface and Grey Snake were listed as Vulnerable species under the BC Act and EPBC Act in March 2023. The information on the TBDC is incomplete and it wasn't able to be selected in BAM-C. The Southern Whiteface could potentially utilise the remnant woodland as part of its foraging habitat, however this has not been accounted for in this assessment. Similarly, the Grey Snake could utilise woodland or DNG with cracking clay soils, however this has also not been accounted for in this assessment.

Poplar Box Grassy Woodland EEC is not an option in BAM-C when selecting TEC associations with PCT 101. The drop down box includes Brigalow, Inland Grey Box and White Box TECs. Although the vegetation on the Subject Land was assessed to be PCT 101 and meets the criteria for Poplar Box EEC under the EPBC Act, it has been entered into BAM-C as PCT 101 and White Box TEC under the EPBC Act. The only other option was to select 'not a TEC' which was incorrect.

2.5.1 EXPERT ADVICE

Paragraphs in the following sections were formed with assistance from species experts David Milledge (Masked and Barking Owls) and Martin Schulz (Eastern Pygmy Possum).

2.5.1.1 Masked Owl

The Masked Owl is known to occur within the Peel sub-region of the Nandewar IBRA bioregion. Potentially suitable nesting habitat for the Masked Owl, and denning habitat for some of its major prey species, occurs on the Subject Land in the form of three (3) 86-119 cm diameter old-growth Poplar Box and White Box trees providing five (5) observed hollows with ≥ 20 cm diameter entrances (**Plate 1-3**). However, use of these trees for breeding by the Masked Owl is considered highly unlikely, based on consultation with expert David Milledge. The isolated nature of the hollow-bearing trees, with no surrounding vegetation in a highly-cleared landscape and with a consequent likely very low density of suitable prey species for the Masked Owl indicates that the site would be unsuitable for breeding. This species has also not been recorded within 10 km of the Subject Land. Targeted surveys were not conducted as site visits fell outside the recommended survey period of May-August (DPE 2023b).

2.5.1.2 Barking Owl

As for the Masked Owl, suitable habitat for the Barking Owl occurs on the Subject Land in the form of three (3) 86-119 cm diameter old-growth Poplar Box and White Box trees supporting five (5) observed hollows with ≥ 20 cm diameter entrances (**Plate 1-3**). The species is known to occur in the Peel sub-region of the Nandewar IBRA bioregion, but use of these trees site for breeding is considered highly unlikely, based on consultation with expert David Milledge. The isolated nature of the old-growth hollow-bearing trees, with no surrounding vegetation and within a highly-cleared landscape appears most unlikely to provide suitable breeding habitat for the Barking Owl. It also appears highly unlikely to provide the required density of arboreal and other prey species required to support breeding. The Barking Owl has also not been recorded within 10 km of the Subject Land. Targeted surveys were not conducted as site visits fell outside the recommended survey period of May-December (DPE 2023b).

Plate 1. Tree 8 with Two Suitable Hollows



Plate 2. Tree 13 with Two Suitable Hollows



Plate 3. Tree 17 with One Suitable Hollow



2.5.1.3 Eastern Pygmy Possum

The Eastern Pygmy-possum was identified as a species credit species in the BAM-C. Potential breeding habitat occurs on the Subject Land in the form of PCT 101 Woodland (good) and PCT 101 Woodland (moderate) along the access road. Consultation with species expert Martin Schulz, determined this habitat is unsuitable for breeding as Eastern Pygmy-possums would be unlikely to utilise the small sized tree habitat (i.e., one tree [T25] to be removed) as they are typically found in large tracts of forest/woodland. Further, the disturbed nature of the understorey, as a result of ongoing vehicle movement on the adjacent road, would also decrease the likelihood of this species occurring on the Subject Land.

3. SITE CONTEXT

3.1 Assessment Area

The Assessment Area for the Project includes the Subject Land and the land within a 1500 m buffer surrounding the Subject Land. The Assessment Area (2,167.61 ha) includes approximately:

- 267.14 ha native woody vegetation;
- 94.78 ha native grassland; and
- 1,805.69 ha cleared agricultural and industrial land.

The Assessment Area showing the extent of woody and non-woody vegetation is shown in **Figure 2**.

3.2 Landscape Features

Landscape features on the Subject Land and Assessment Area are described below in accordance with Section 3.1 of the BAM (DPIE 2020a) and shown on **Figure 1** and **Figure 2**.

3.2.1 IBRA BIOREGIONS AND IBRA SUBREGIONS

The Subject Land and Assessment Area are located within the Peel subregion of the Nandewar Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (Thackway and Cresswell 1995) (**Figure 2**).

3.2.2 RIVERS, STREAMS, ESTUARIES AND WETLANDS

The Assessment Area occurs on the floodplain of the Peel River. The Peel River is located approximately 330 m south of the Subject Land flowing in a westerly direction before it flows into the Namoi River west of the Assessment Area. Clay Gully and Menedebri Creek are tributaries of Peel River, flowing in a southern direction through the Assessment Area. Other waterbodies within the Assessment Area include numerous farm dams and unnamed tributaries of Peel River.

The Peel River and surrounding unnamed tributaries are mapped as Key Fish Habitat (DPI 2023).

No wetlands or estuaries occur on the Subject Land or Assessment Area (NSW Government 2023i).

3.2.3 HABITAT CONNECTIVITY

The Subject Land is located in an agricultural area west of Tamworth. The land around the site is predominantly cleared for cropping and livestock grazing. Native vegetation around the Subject Land includes derived native grasslands, isolated patches of remnant woodland, and planted native trees. Large areas of intact native vegetation in the region include Somerton National Park (NP), Melville Range, Dowe NP, Boonalla Aboriginal Area, Lake Keepit State Park, Vickery Nature Preserve and Dinawirindi Nature Preserve.

3.2.4 KARST, CAVES, CREVICES, CLIFFS, ROCKS OR OTHER GEOLOGICAL FEATURES OF SIGNIFICANCE

There are no karst, caves, crevices, cliffs, rocks or other geological features of significance on the Subject Land or within the Assessment Area.

3.2.5 AREAS OF OUTSTANDING BIODIVERSITY VALUE

There are no areas of outstanding biodiversity value, as declared by the Minister for Energy and Environment within the Subject Land and Assessment Area (DPE 2022d).

3.2.6 NSW (MITCHELL) LANDSCAPE

The Subject Land lies within the Tamworth – Keepit Slopes and Plains (64 % cleared) NSW Landscape, while the Assessment Area also contains the Tamworth – Keepit Slopes and Plains NSW Landscape, as well as the Peel Channels and Floodplain (84 % cleared) NSW Landscape (NSW Government 2023k).

3.2.7 ADDITIONAL LANDSCAPE FEATURES IDENTIFIED IN SEARS

There were no additional landscape features identified for consideration in the SEARs.

3.3 Native Vegetation Cover

Native vegetation cover in the Assessment Area is estimated to be 2,167.61 ha based on aerial photography, satellite imagery and State Vegetation Type Mapping as per BAM Subsection 2.1.2.

Table 2 and **Figure 2** summarise native vegetation cover within the Assessment Area.

Table 2. Native Vegetation Cover in the Assessment Area

Assessment area (ha)	Total area of native vegetation cover (ha)	Percentage of native vegetation cover (%)	Class (0-10, >10-30, >30-70 or >70%)
2,167.61	361.92	17	>10-30

4. NATIVE VEGETATION, THREATENED ECOLOGICAL COMMUNITIES AND VEGETATION INTEGRITY

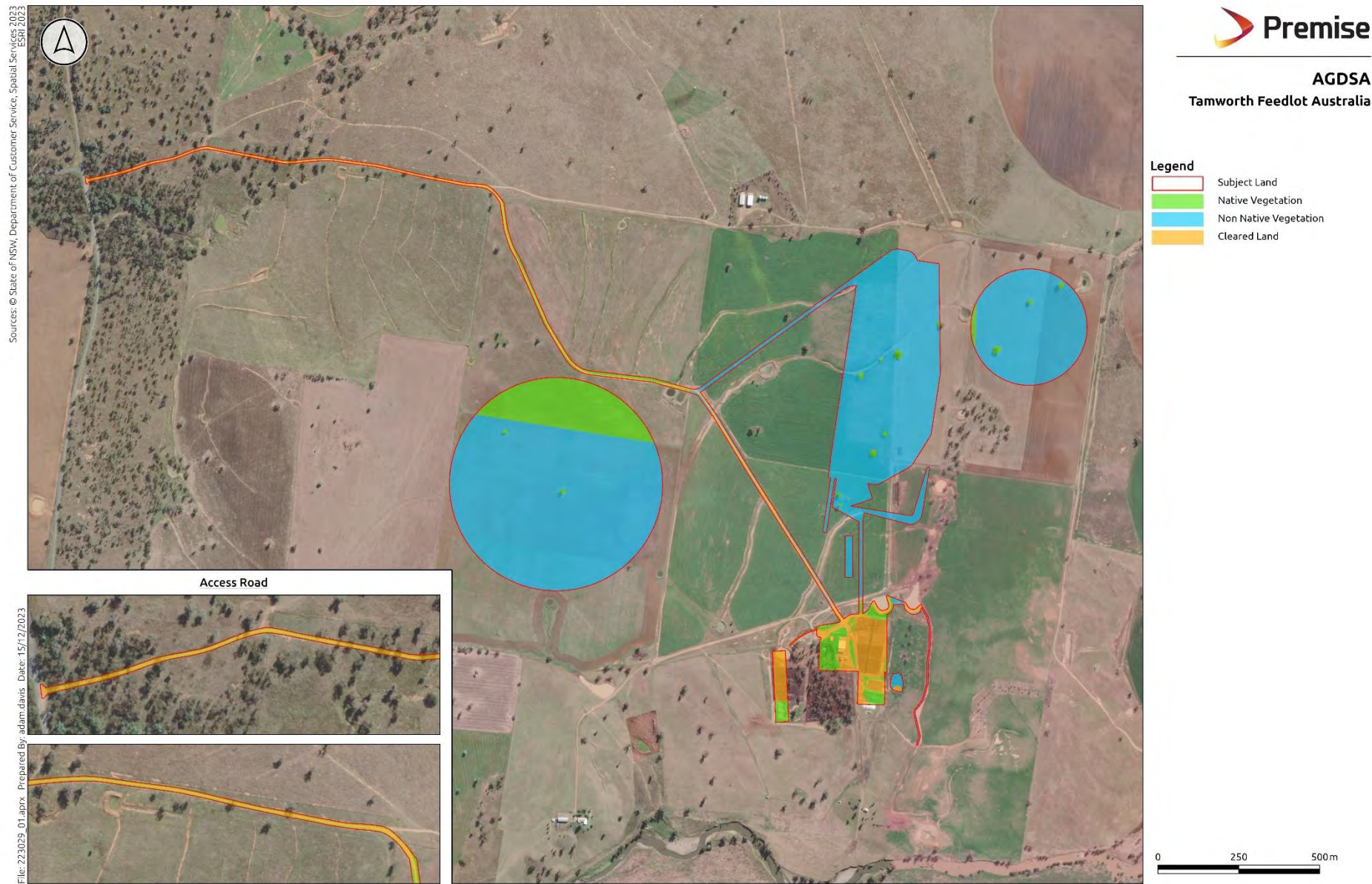
4.1 Native Vegetation Extent

The Subject Land is 75.93 ha and comprises the following:

- Native woodland (0.94 ha);
- DNG (8.56 ha); and
- Fourteen (14) scattered trees (0.33 ha).

The remaining 66.10 ha includes cropped land (45.92 ha), exotic grassland (14.95 ha) and infrastructure (5.23 ha) (**Figure 9**).

Figure 9. Native Vegetation Extent on the Subject Land



4.1.1 CHANGES TO THE MAPPED NATIVE VEGETATION EXTENT

State Vegetation Type Mapping identified the majority of the Subject Land and Assessment area to be non-native vegetation. Woodland areas within the Subject Land are mapped as PCT 101. Other PCTs in the Assessment Area include PCT 78, PCT 1 and PCT 433. Vegetation surveys conducted in January and February 2023 confirmed the presence of native vegetation in the form of remnant woodland, scattered trees and DNG on the Subject Land (**Figure 6**). Native vegetation was mapped and described as outlined in BDAR Section 2.2.

4.1.2 AREAS THAT ARE NOT NATIVE VEGETATION

Areas on the Subject Land that do not contain native vegetation include cropped paddocks (46.11 ha) and infrastructure (5.23 ha) (**Figure 6**).

Cropped paddocks on the Subject Land were cultivated with *Avena sativa* (Oats) (**Plate 4**). Cropped areas were identified and mapped using GPS and assessed via three (3) RASS (SS1-3). This vegetation has been described in the Land Category Report and prescribed impacts included in sections 6 and 8.3 of this BDAR.

Infrastructure on the Subject Land includes dams, roads, buildings and disturbed ground around the existing feedlot (**Plate 5**).

Plate 4. Oats crop on the Subject Land



Plate 5. Farm dam void of submergent and emergent vegetation



4.2 Plant Community Types

4.2.1 OVERVIEW

PCTs identified on the Subject Land are listed in **Table 3** and shown on **Figure 6**. Detailed descriptions and justifications of each PCT are provided in the following subsections.

Table 3. PCTs identified within the Subject Land

PCT ID	PCT name	Subject Land area (ha)
101	Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	24.78
Total area		24.78

4.2.2 PCT 101 - POPLAR BOX - YELLOW BOX - WESTERN GREY BOX GRASSY WOODLAND ON CRACKING CLAY SOILS MAINLY IN THE LIVERPOOL PLAINS, BRIGALOW BELT SOUTH BIOREGION

4.2.2.1 PCT Overview

PCT 101 occurs on the Subject Land as remnant woodland, scattered trees and DNG (**Table 4**). Remnant woodland occurs along the access road (**Plate 6-7**) and in proximity to the existing feedlot (**Plate 8**). This vegetation community is dominated by *Eucalyptus populnea subsp. Bimbil* (Poplar Box) with *Eucalyptus albens* (White Box) occurring as a minor component. The shrub layer is sparse and the groundcover is dominated by native grasses such as *Austrostipa verticillata* (Slender Bamboo Grass), *Aristida ramosa* (Purple Wiregrass), *Cynodon dactylon* (Common Couch) and *Austrostipa aristiglumis* (Plains Grass). Poplar Box woodland in proximity to the existing feedlot is used for shade for livestock and contained no groundcover vegetation at the time of assessment.

DNG contained a mixture of native and exotic species (**Plate 9-10**). Native grasses included *Austrostipa aristiglumis* (Plains Grass), *Sporobolus caroli* (Fairy Grass), *Austrostipa scabra* (Speargrass), *Chloris truncata* (Windmill Grass), *Paspalidium gracile* (Slender Panic) and *Cynodon dactylon* (Common Couch). Some DNG contained scattered native shrubs such as *Maireana microphylla* (Small-leaf Bluebush), while forbs were less common and included *Calotis lappulacea* (Yellow Burr-daisy), *Euchiton sphaericus* (Star Cudweed), *Calotis hispidula* (Bogan Flea), *Neptunia gracilis* (Sensitive Plant) and *Rumex brownii* (Swamp Dock). Exotic groundcover species were dominant in some areas including Oats, *Conyza bonariensis* (Flaxleaf Fleabane), *Urochloa panicoides* (Urochloa Grass), *Echium plantagineum* (Patteron's Curse) and *Lolium rigidum* (Wimmera Ryegrass). The condition of DNG varied depending on livestock grazing pressure.

Scattered trees in cropped and exotic grassland were predominantly Poplar Box with the occasional *Alectryon oleifolius* (Western Rosewood), White Box and *Eucalyptus dealbata* (Tumbledown Red Gum) (**Plate 11**).

Exotic grassland areas were dominated by Oats, *Eragrostis cilianensis* (Stinkgrass) and *Conyza bonariensis* (Flaxleaf Fleabane), and contained low covers of native grasses (i.e., *Sporobolus creber* [Slender Rat's Tail Grass] and Windmill Grass) (**Plate 12-13**).

Table 4. PCT 101 on the Subject Land

PCT ID	PCT name	Vegetation formation	Vegetation class	Per cent cleared value (%)	Extent within Subject Land (ha)
101	Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	Semi-arid Woodlands (Grassy sub-formation)	Brigalow Clay Plain Woodlands	75	24.21

4.2.2.2 Condition states

The species assemblages present at the time of survey is indicative of past disturbance. PCT 101 occurs in six (6) conditions including (**Plate 6-13**):

- PCT 101 Woodland (Good) (0.15 ha). Intact canopy and regenerating canopy species, shrubs and a diversity of grasses and forbs in the understory.
- PCT 101 Woodland (Moderate) (0.78 ha). Woodland with less diversity than "Good" condition.

- PCT 101 DNG (Moderate) (0.36 ha). Grassland area dominated by native grasses and forbs. Some shrubs present.
- PCT 101 DNG (Poor) (8.20 ha). Grassland area dominated by native grasses and forbs with less diversity than DNG Moderate.
- PCT 101 Scattered Trees (fourteen trees covering 0.33 ha). Isolated paddock trees.
- PCT 101 Exotic Grassland (14.95 ha). Grassland dominated by Oats with some native species present.

Plate 6. PCT 101 Woodland (Good) – Access Road



Plate 7. PCT 101 Woodland (Moderate) - Access Road



Plate 8. PCT 101 Woodland (Moderate) - Feedlot



Plate 9. PCT 101 DNG (Moderate)



Plate 10. PCT 101 DNG (Poor)



Plate 11. PCT 101 Scattered Trees



Plate 12. Exotic Grassland dominated by Oats



Plate 13. Exotic Grassland dominated by Oats and Flaxleaf Fleabane



4.2.2.3 Justification of PCT selection

The BioNet Vegetation Classification Database was used to identify the most likely PCT for this vegetation community using the following filters: dominant canopy species - Poplar Box, and Nandewar IBRA Bioregion (DPE 2023). PCT 101, PCT 244, PCT 397 and PCT 429 were identified as potential matches. State Vegetation Type Mapping for the Border Rivers Gwydir / Namoi identified woodland areas on the Subject Land as PCT 101.

PCT 101 was considered the best fit for the woodland, derived native grassland and scattered trees on the Subject Land. This PCT is dominated by Poplar Box and occurs as a semi-arid woodland (grassy sub-formation) on alluvial cracking clay soils on alluvial plains or gently undulating slopes. PCT 101 contains high grass diversity including *Aristida* spp., *Austrostipa* spp., *Rytidosperma* spp., Queensland Bluegrass and *Sporobolus* spp. which are all prominent on the Subject Land. The landscape position, soil and species assemblages present on the Subject Land align with that of PCT 101 which is known to occur in the Gunnedah area. The Subject Land contained White Box trees within woodland and as scattered trees. White Box is not a characteristic species of PCT 101. However, White Box and Grey Box have an overlapping distribution near Tamworth and it is likely that White Box has replaced Grey Box in this community on the Subject Land as Poplar Box and White Box trees were interspersed.

PCT 244 was discounted due to unsuitable vegetation structure, landscape position and vegetation formation. PCT 244 occurs as floodplain transition woodland on flats on alluvial plains and contains *Casuarina cristata* (Belah) and *Callitris glaucophylla* (White Cypress Pine) which are absent from the Subject Land and immediate surrounds. This PCT also contains groundcover species such as *Eleocharis* spp. and *Marsilea drummondii* (Common Nardoo) which are found in waterlogged areas and are absent from the Subject Land.

PCT 397 is classified as a Dry Sclerophyll Forest (shrub/grass sub-formation) which occurs on grey to brown sandy loams and clay loams on alluvial plains. Groundcover in this community is dominated by shrubs such as *Sclerolaena diacantha* (Grey Copperburr) and *Chenopodium desertorum*. The Subject Land contains red-brown clay loams rather than grey-brown sandy loams and groundcover shrubs are absent from the site. PCT 397 has been discounted due to unsuitable species composition, geomorphology and vegetation formation.

PCT 429 is also classified as a dry sclerophyll forest (shrub/grass sub-formation) and occurs on moist light brown to red-brown clay loam to sandy loam soils on low rises and plains. This PCT is dominated by White Cypress Pine with Poplar Box occurring as a less common canopy species. PCT 429 has been recorded in the Moree Plains, Narrabri and Gwydir LGAs but is unlikely to occur on the Subject Land due to unsuitable vegetation formation and dominant tree species.

4.2.2.4 Alignment with Threatened Ecological Communities (TECs)

PCT 101 is associated with the following TECs under the BC Act (DPE 2023a):

- *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC* (Brigalow EEC)
- *Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions EEC* (Inland Grey Box Woodland EEC)

4.2.2.5 Alignment with EPBC Act listed Ecological Communities (ECs)

PCT 101 is associated with the following TECs under the EPBC Act (DPE 2023a):

- *Poplar Box Grassy Woodland on Alluvial Plains EEC* (Poplar Box EEC)
- *White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Box-Gum Woodland CEEC)

4.3 Threatened Ecological Communities

TECs associated with PCT 101 were identified in the BioNet Vegetation Classification Database and are identified in Sections 4.2.2.4 and 4.2.2.5 (DPE 2023a). Conformance of the vegetation on the Subject Land with a TEC identified through BioNet was verified by reference to Final Determinations and Conservation Listing Advice of the NSW Scientific Committee.

Nine (9) potential TECs were identified by database searches of the BioNet Vegetation Classification Database (DPE 2023a) and PMST (DCCEEW 2023a):

Weeping Myall Woodlands Endangered Ecological Community (EEC)

Weeping Myall Woodlands EEC is solely or dominated by Weeping Myall (TSSC 2009b). As this species is absent from the Subject Land and immediate surrounds, this TEC is not considered to occur on the Subject Land.

Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions EEC (Coolibah – Black Box Woodland EEC)

The canopy of Coolibah – Black Box Woodland EEC is dominated by *Eucalyptus coolabah* subsp. *coolabah* (Coolabah) and/or *Eucalyptus largiflorens* (Black Box) (TSSC 2011a). These tree species are absent from the

Subject Land and adjacent remnant woodland areas and this TEC is not considered to occur on the Subject Land.

Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland Critically Endangered Ecological Community (CEEC) (Natural grasslands CEEC)

Natural Grasslands CEEC are dominated by tussock grasses including *Rytidosperma*, *Austrostipa*, *Bothriochloa*, *Chloris*, *Enteropogon* or *Themeda* spp (TSSC 2009a). All these species are present on the Subject Land in low abundances. However, grassland areas on the Subject Land are considered more likely to be derived from Poplar Box remnant woodland which is present along the access road and as scattered trees. Therefore, Natural Grasslands CEEC is considered absent from the Subject Land.

New England Peppermint (Eucalyptus nova-anglica) Grassy Woodlands CEEC (Peppermint Grassy Woodlands CEEC)

Peppermint Grassy Woodlands CEEC is dominated or co-dominated by *Eucalyptus nova-anglica* (New England Peppermint) (TSSC 2011b). As this species is absent from the Subject Land and immediate surrounds, this TEC is not considered to occur on the Subject Land.

Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (Inland Grey Box Woodland TEC).

According to the TSSC Final Determination, BC Act criteria for classification of the Inland Grey Box Woodland TEC is based on characteristic assemblage of species (DPE 2021). *Eucalyptus microcarpa* (Inland Grey Box) is the most characteristic species of areas considered to be this TEC. As Inland Grey Box is absent from the Subject Land and surrounds, this TEC is not present on the Subject Land.

Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia EEC (Grey Box Woodland EEC)

Due to the absence of Inland Grey Box from the Subject Land and immediate surrounds, PCT 101 is not considered to be Grey Box Woodland EEC listed on the EPBC Act (TSSC 2010).

Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions EEC (Brigalow EEC)

According to the TSSC Final Determination, Brigalow EEC TECs are characteristically dominated or co-dominated by *Acacia harpophylla* (Brigalow) (TSSC 2011c). As this species is absent from the Subject Land and immediate surrounds, this TEC is not considered to occur on the Subject Land.

White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC (Box-Gum Woodland CEEC)

The PMST search also identified Box-Gum Woodland CEEC as a TEC likely to occur on the Subject Land (DCCEEW 2023a). White Box trees occur on the Subject Land as minor components of remnant woodland areas and one scattered tree. Therefore, it is considered unlikely White Box previously dominated or co-dominated the site. Due to this, Box-Gum Woodland CEEC is considered absent from the Subject Land based on EPBC Act criteria (DCCEEW 2023e).

Poplar Box Grassy Woodland on Alluvial Plains EEC (Poplar Box Woodland EEC)

Woodland areas on the Subject Land were assessed for conformance against the Final Determination for Poplar Box Woodland EEC. The Commonwealth Listing Advice refers to key diagnostic characteristics and condition thresholds to identify patches of the TEC listed protected under the EPBC Act and distinguish between patches of different quality (DEE 2019).

Key Diagnostic Characteristics:

To classify as Poplar Box Woodland TEC protected under the EPBC Act, areas of vegetation must meet the key diagnostic characteristics outlined in **Table 5**.

Table 5. EPBC Act Criteria – Key Diagnostic Characteristics

Key Diagnostic Characteristics	Alignment with PCT 101 on the Subject Land					Justification
	Woodland (access road)	Woodland (feedlot) ¹	Scattered Trees	DNG	Exotic Grassland	
Occurs in the Brigalow Belt North, Brigalow Belt South, Southeast Queensland, Cobar Penepains, Darling Riverine Plains, NSW South Western Slopes, Riverina and Murray Darling Depression IBRA bioregions.	Yes	Yes	Yes	Yes	Yes	The Subject Land occurs at the western extent of the Nandewar IBRA bioregion. Therefore, the Subject Land cannot be discounted from this characteristic due to its location in proximity to the Brigalow Belt South IBRA bioregion.
Occurs on alluvial plains with clay, clay-loam, loam and sandy loam, typically duplex soils or sodosols	Yes	Yes	Yes	Yes	Yes	The Subject Land occurs on alluvial plains with clay loams
A grassy woodland to grassy open woodland with a tree crown cover of 10% or more at patch scale	Yes	Yes	Yes	No	No	PCT 101 Woodland and Scattered Trees contain a tree crown cover of ≥10%. PCT 101 DNG and PCT 101 Exotic Grassland areas are void of tree species. According to the Commonwealth Listing Advice, ' <i>Patches lacking the canopy cover and tree regrowth are not considered part of this ecological community, except where these represent a gap in, or on the edge of a larger patch, or where the tree layer is sparse between two patches across a short distance</i> '. Therefore, PCT 101 DNG and PCT 101 Exotic Grassland do not meet the criteria of Poplar Box Woodland EEC protected under the EPBC Act.
Canopy tree species are capable of reaching ≥ 10 m in height	Yes	Yes	Yes	N/A	N/A	PCT 101 Woodland and Scattered Trees contain Poplar Box, White Box, Tumbledown Red Gum and Western Rosewood. All trees (excluding Western Rosewood) grow to ≥ 10 m in height

¹ PCT 101 Woodland (Moderate) in proximity to the feedlot does not conform to the Poplar Box Woodland EEC under the EPBC Act. This area has been assessed separately to be clear.

Key Diagnostic Characteristics	Alignment with PCT 101 on the Subject Land					Justification
	Woodland (access road)	Woodland (feedlot) ¹	Scattered Trees	DNG	Exotic Grassland	
Poplar Box must be present in the canopy and is the dominant tree species	Yes	Yes	Yes	N/A	N/A	The overstorey of PCT 101 Woodland and Scattered Trees are dominated by Poplar Box.
Mid layer (1-10 m) crown cover of shrubs to small trees is low, about 30% or less	Yes	Yes	Yes	N/A	N/A	The mid layer crown cover is less than 30% for PCT 101 Woodland and Scattered Trees
The ground layer (<1 m) mostly dominated across a patch by native grasses, other herbs and occasionally chenopods, ranging from sparse to thick	Yes	No	No	N/A	N/A	<p>The groundcover of PCT 101 Woodland along the access road is dominated by native grasses such as Slender Bamboo Grass, Purple Wiregrass, Common Couch and Plains Grass. In comparison, PCT 101 Woodland in proximity to the existing feedlots is void of all vegetation due to livestock trampling.</p> <p>The ground layer of PCT 101 Scattered Trees is dominated by exotic species such as Oats in cropped areas and Oats and Flaxleaf Fleabane in exotic grassland areas.</p>
Alignment with diagnostic native plant species provided in Appendix A of the Commonwealth Listing Advice	Yes	N/A	N/A	N/A	N/A	PCT 101 Woodland contains thirty-one (31) diagnostic native plant species including Poplar Box, Purple Wiregrass, Slender Bamboo Grass, Yellow Burr-daisy, <i>Lomandra filiformis</i> (Wattle Mat-rush) and Slender Rat's Tail Grass.

Condition Thresholds:

According to the Commonwealth listing advice, condition thresholds are designed to identify the relatively good quality patches for protection under the EPBC Act. To be protected under the EPBC Act, vegetation patches must meet the key diagnostic characteristics outlined above and at least the minimum condition threshold (Moderate and High condition categories A, B or C) set out in Table 3 of the Commonwealth listing advice (DEE 2019). An assessment of PCT 101 Woodland patches as characterised by Q1 and Q5 are provided in **Table 6**.

Table 6. EPBC Act Criteria – Condition Thresholds

Vegetation	PCT 101 Woodland (Moderate) Q1	PCT 101 Woodland (Good) Q12
Category A1: Highest Quality		
The crown cover of canopy trees in the patch is $\geq 10\%$ AND	Yes	Yes
$\geq 90\%$ of perennial vegetation cover in the ground layer is native AND	Yes (98%)	Yes (94%)
≥ 30 native plant species per patch in the ground layer	Yes (32)	Yes (39)
Protected under the EPBC Act	Yes	Yes

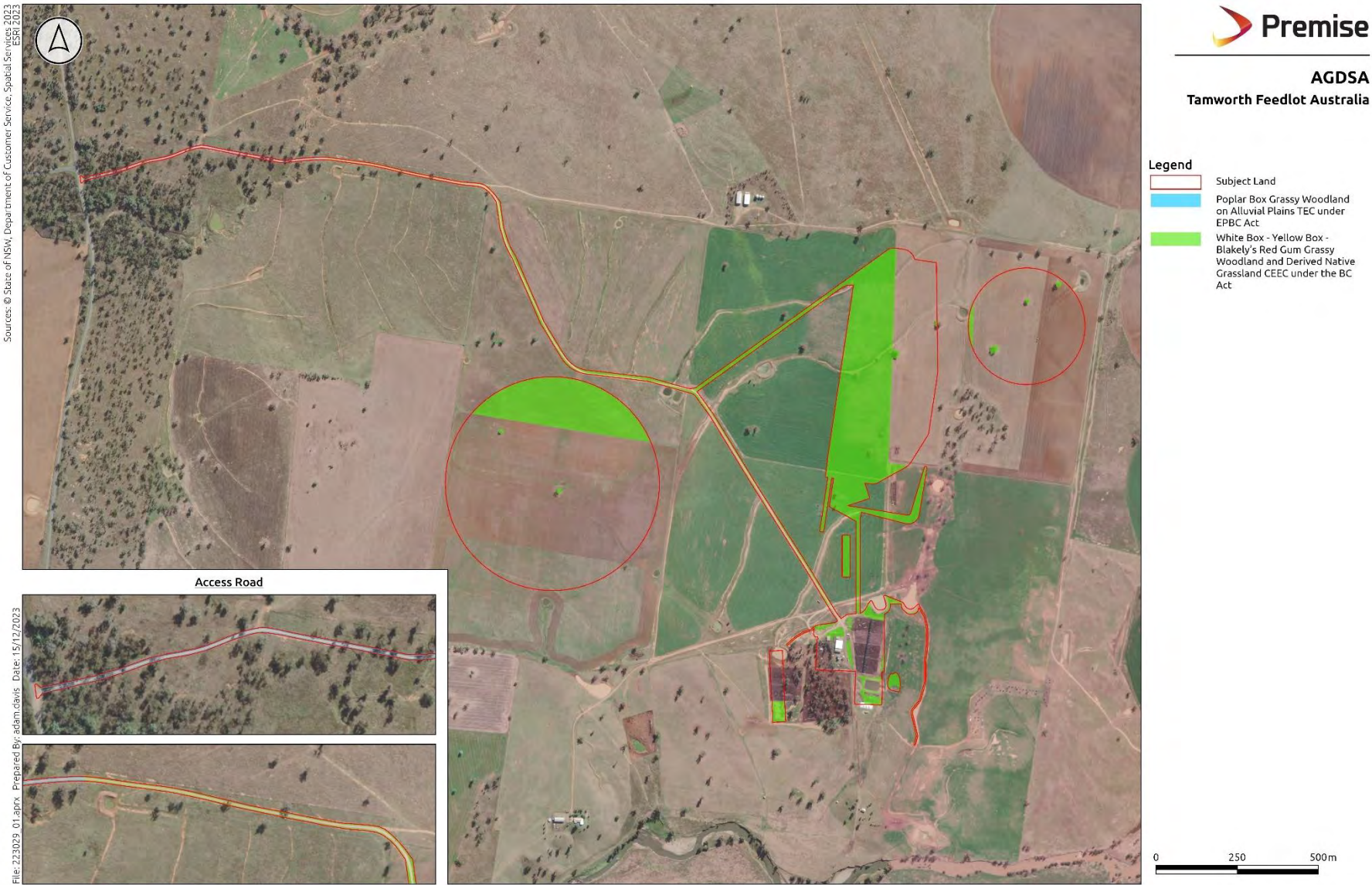
PCT 101 Woodland (Good) and PCT 101 Woodland (Moderate) along the access road (as classified by Q1 and Q12) meet the key diagnostic characteristics and the minimum condition thresholds for protection under the EPBC Act. The PCT Woodland (Moderate) near the feedlot does not meet the minimum condition threshold for protection under the EPBC Act. There is a total of 0.31 ha of Poplar Box Woodland EEC to be removed for the Project which is unlikely to have a significant impact and referral to the Australian Government is not considered necessary.

TECs identified within the Subject Land are listed in **Table 7** and their extent is shown on **Figure 10**.

Table 7. TECs within the Subject Land

TEC name	Profile ID (from TBDC)	BC Act status	EPBC Act status	Associated vegetation zones within the Subject Land	Area within Subject Land (ha)
Poplar Box Grassy Woodland on Alluvial Plains	20373	N/A	EEC	PCT 101 Woodland (Good) and PCT 101 Woodland (Moderate)	0.31

Figure 10. Threatened Ecological Communities and Ecological Communities



4.4 Vegetation Zones

Vegetation was classified into six (6) zones within the Subject Land, as per Subsection 4.3.2 of the BAM (DPIE 2020a) (**Figure 11**). Vegetation zones are based on PCT, condition and the presence or absence of canopy species in the vegetation community.

Patch size classes are identified in accordance with BAM Subsection 4.3.2 which states '*A patch is an area of native vegetation that occurs on the Subject Land and includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤ 30 m for non-woody ecosystems)*'. A patch may extend into adjoining land. Patch sizes were assigned to one of the following classes <5 ha, 5-<25 ha, 25-100 ha and ≥ 100 ha (

Table 8).

Figure 11. Vegetation Zones



Table 8. Vegetation Zones and Patch Sizes

Vegetation zone ID	PCT ID number and name	Condition / other defining feature	Area (ha)	Patch size class (select multiple if areas of native vegetation are discontinuous)	No. vegetation integrity plots required	No. vegetation integrity plots completed	No. vegetation integrity plots used in assessment	Plot IDs of vegetation integrity plots used in assessment
VZ1	101 Woodland	Good	0.15	<input checked="" type="checkbox"/> >100 ha	1	1	1	Q12
VZ2	101 Woodland	Moderate	0.78	<input checked="" type="checkbox"/> >100 ha	1	1	1	Q1
VZ3	101 DNG	Moderate	0.36	<input checked="" type="checkbox"/> 25- <100 ha	1	2	2	Q6 and Q11
VZ4	101 DNG	Poor	8.20	<input checked="" type="checkbox"/> 25- <100 ha	3	3	3	Q2, Q3 and Q4
VZ5	101 Scattered Trees	Fourteen (14) trees	0.33	<input checked="" type="checkbox"/> <5 ha	N/A	N/A	N/A	N/A
VZ6	101 Exotic Grassland	Poor	14.95	<input checked="" type="checkbox"/> >100 ha	3	3	3	Q13, Q14 and Q15

4.5 Vegetation Integrity (Vegetation Condition)

4.5.1 VEGETATION INTEGRITY SURVEY PLOTS

The minimum number of VI Plots required for each vegetation zone area was sampled in accordance with the BAM (DPIE 2020a). VI Plots conducted in native vegetation that will not be disturbed by the Subject Land have been excluded from the assessment. These Plots are not considered relevant as this vegetation will not be impacted by the Project. VI Plots for the relevant VZs have been used in the assessment.

4.5.2 SCORES

Vegetation integrity scores for each vegetation zone are identified in **Table 9**.

Table 9. Vegetation Integrity Scores

Vegetation zone ID	Composition condition score	Structure condition score	Function condition score (where relevant)	Vegetation integrity score	Hollow bearing trees present?
PCT 101 Woodland (Good)	93	92.6	59.2	79.9	Yes
PCT 101 Woodland (Moderate)	73.7	33.7	47.2	48.9	Yes
PCT 101 DNG (Moderate)	60.7	21.1	2.5	14.8	Yes
PCT 101 DNG (Poor)	48.8	18.1	1.4	10.7	No
PCT 101 Exotic Grassland	11	2	0.5	2.3	No

4.5.3 USE OF BENCHMARK DATA

Benchmark data was sourced from the NSW BioNet Vegetation Classification system for PCT 101 in the Nandewar IBRA Bioregion (DPE 2023a).

5. HABITAT SUITABILITY FOR THREATENED SPECIES

5.1 Identification of Threatened Species for Assessment

5.1.1 ECOSYSTEM CREDIT SPECIES

As detailed in Sections 2.3 and 2.4 a comprehensive desktop review was conducted to identify threatened flora and fauna species and ecological communities which have, or may have, suitable habitat on the Subject Land.

A total of thirty-seven (37) predicted ecosystem or dual credit species were identified by BAM-C, PMST and database searches as requiring consideration (**Table 10**). This includes twenty-five (25) species identified by the BAM-C and eight (8) additional species identified by the PMST and BioNet database searches (DCCEEW 2022; DPE 2022c). Premise also undertook database searches as detailed in Section 2.3.1 and Section 2.4.1 to ensure all required threatened species were considered and no additional species requiring consideration were identified.

Details regarding the listing status, associated PCTs, sensitivity to gain and statement regarding the need for further assessment are provided in **Table 10**.

Each of the EPBC Act listed ecosystem credit or dual credit species are addressed in detail in Section 8.

Table 10. Predicted Ecosystem Credit Species

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act								
Birds											
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	No	Partial	Retained in vegetation zones containing <i>Eucalyptus</i> spp.	VZ1 and VZ2	High
Southern Whiteface	<i>Aphelocephala leucopsis</i>	-	V	Unknown	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	Species was listed as Vulnerable in March 2023. Species is absent from BioNet Atlas and BAM-C as credits are yet to be assigned.	N/A	Unknown
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing dry, open woodland	VZ1 and VZ2	Moderate
Australasian Bittern	<i>Botaurus poiciloptilus</i>	E	E	No	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	Habitat constraint: Brackish or freshwater wetlands are absent from the Subject Land	N/A	Moderate
Curlew Sandpiper	<i>Calidris ferruginea</i>	E	CE	Yes	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	Yes	No	Microhabitat: littoral and estuarine habitats with mudflats are absent from the Subject Land No suitable habitat: species is not associated with PCT 101 and does not occur in the Peel IBRA sub-region	N/A	High
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	V	V	Yes	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC	No	No	No	Habitat constraint: Allocasuarina and Casuarina species are absent from the Subject Land	N/A	High

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act								
					<input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST						
Speckled Warbler	<i>Chthonicola sagittata</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing <i>Eucalyptus</i> spp.	VZ1 and VZ2	High
Spotted Harrier	<i>Circus assimilis</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Yes	N/A	All VZ	Moderate
Brown Treecreeper	<i>Climacteris picumnus victoriae</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing rough-barked <i>Eucalyptus</i> spp. and open grassy understorey	VZ1 and VZ2	High
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing rough-barked Eucalypt woodland	VZ1 and VZ2	Moderate
Grey Falcon	<i>Falco hypoleucos</i>	V	V	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	No suitable habitat: species does not occur in the Peel IBRA sub-region	N/A	Moderate
Black Falcon	<i>Falco subniger</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Yes	N/A	All VZ	Moderate

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act								
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing <i>Eucalyptus</i> spp. woodland	VZ1, VZ2 and VZ5	High
Painted Honeyeater	<i>Grantiella picta</i>	V	V	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	Habitat constraint: Mistletoe is absent from the Subject Land	N/A	Moderate
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Yes	Retained in VZ within 1km of the unnamed creeks	VZ1, VZ2, VZ3 and VZ4	High
Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Yes	N/A	All VZ	Moderate
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Yes	N/A	All VZ	Moderate
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	-	V	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	Yes	Yes	N/A	All VZ	High

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act								
Swift Parrot	<i>Lathamus discolor</i>	E	CE	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	Yes	Partial	Retained in vegetation zones containing winter flowering <i>Eucalyptus</i> spp.	VZ1, VZ2 and VZ5	Moderate
Square-tailed Kite	<i>Lophoictinia isura</i>	V	-	Dual	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Yes	N/A	All VZ	Moderate
Hooded Robin	<i>Melanodryas cucullata cucullata</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing open eucalyptus woodland with structural diversity including mature eucalypts, saplings and a ground layer of moderately tall native grasses.	VZ1 and VZ2	Moderate
Black-chinned Honeyeater	<i>Melithreptus gularis gularis</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing rough-barked Eucalypt woodland	VZ1 and VZ2	Moderate
Blue-winged Parrot	<i>Neophema chrysostoma</i>	V	V	Unknown	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	Microhabitat: Grasslands and grassy woodlands in proximity to wetlands are absent from the Subject Land	N/A	Unknown
Turquoise Parrot	<i>Neophema pulchella</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones with eucalypt woodland	VZ1, VZ2 and VZ5	High

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act								
Barking Owl	<i>Ninox connivens</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Yes	N/A	All VZ	High
Superb Parrot	<i>Polytelis swainsonii</i>	V	V	Yes	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	No suitable habitat: species does not occur in the Peel IBRA sub-region	N/A	Moderate
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing <i>Eucalyptus</i> spp. woodland	VZ1 and VZ2	Moderate
Australian Painted Snipe	<i>Rostratula australis</i>	E	E	No	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	No suitable habitat: species is not associated with PCT 101 and does not occur in the Peel IBRA sub-region	N/A	Moderate
Diamond Firetail	<i>Stagonopleura guttata</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	Yes	Retained in vegetation zones containing <i>Eucalyptus</i> spp. woodland	VZ1 and VZ2	Moderate
Masked Owl	<i>Tyto novahollandiae</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Yes	N/A	All VZ	High
Mammals											

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act								
Little Pied Bat	<i>Chalinolobus pictatus</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing <i>Eucalyptus</i> spp. woodland	VZ1 and VZ2	High
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E	No	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	No suitable habitat: species is not associated with PCT 101	N/A	High
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	Yes	No	Partial	Retained in vegetation zones containing <i>Eucalyptus</i> spp. woodland	VZ1 and VZ2	High
Corben's Long-eared Bat	<i>Nyctophilus corbeni</i>	V	V	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing <i>Eucalyptus</i> spp. woodland	VZ1 and VZ2	High
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	Partial	Retained in vegetation zones containing <i>Eucalyptus</i> spp. woodland	VZ1 and VZ2	High
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Yes	N/A	All VZ	High
Reptiles											
Five-clawed Worm-skink	<i>Anomalopus mackayi</i>	E	V	No	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC	No	No	No	No suitable habitat: species does not occur in the Peel IBRA sub-	N/A	High

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID	Sensitivity to gain class
		BC Act	EPBC Act								
					<input checked="" type="checkbox"/> BioNet <input type="checkbox"/> PMST				region		
Grey Snake	<i>Hemiaspis damelii</i>	E	E	No	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	No	Species not identified by BAM-C. Credit class is yet to be assigned. Degraded microhabitat: clay soils impacted by stock grazing.	N/A	Unknown

5.1.2 SPECIES CREDIT SPECIES

A total of fifteen (15) flora species credit species and twenty-one (21) fauna species credit species were returned by the BAM-C or through PMST search as requiring consideration (**Table 11** and **Table 12**). This includes seventeen (17) species identified by the BAM-C and fifteen (15) additional species identified by the PMST and BioNet database searches (DCCEEW 2023a; DPE 2023c). Premise also undertook database searches as detailed in Section 2.3.1 and Section 2.4.1 to ensure all required threatened species were considered and no additional species requiring consideration were identified.

Details regarding the listing status, associated PCTs, sensitivity to gain and statement regarding the need for further assessment are provided in **Table 11** and **Table 12**. Four (4) flora species and one (1) fauna species were retained for targeted survey. Exclusions were made based on habitat constraints, vagrant status, geographic limitations or microhabitat requirements.

Table 11. Predicted Flora Species Credit Species

Common name	Scientific name	Listing status		Sources	SAII	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Ooline	<i>Cadellia pentastylis</i>	V	V	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No suitable habitat: species is not associated with PCT 101	N/A
-	<i>Callistemon pungens</i>	-	V	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No suitable habitat: species is not associated with PCT 101	N/A
-	<i>Commersonia procumbens</i>	V	V	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	Habitat constraint: species only occurs on Piliga sandstone which is absent from the Subject Land	N/A
Bluegrass	<i>Dichanthium setosum</i>	V	V	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	Partial	Retained in good to moderate condition woodland and grassland areas.	VZ1, VZ2, VZ3 and VZ4
Finger Panic Grass	<i>Digitaria porrecta</i>	E	-	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	Partial	Retained in good to moderate condition woodland and grassland areas.	VZ1, VZ2, VZ3 and VZ4
Narrow-leaved Black Peppermint	<i>Eucalyptus nicholii</i>	V	V	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No suitable habitat: species is not associated with PCT 101	N/A

Common name	Scientific name	Listing status		Sources	SAII	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
-	<i>Euphrasia arguta</i>	CE	CE	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	No	No suitable habitat: species is not associated with PCT 101	N/A
Lake Keepit Hakea	<i>Hakea pulvinifera</i>	E	E	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	No	No suitable habitat: species is not associated with PCT 101	N/A
Belson's Panic	<i>Homopholis belsonii</i>	E	V	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	Microhabitat: Dry woodland containing <i>Casuarina cristata</i> (Belah) and alluvial clay soils are absent from the Subject Land	N/A
Spiny Peppercress	<i>Lepidium aschersonii</i>	V	V	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No suitable habitat: species is not associated with PCT 101 and does not occur in the Peel IBRA sub-region	N/A
Winged Peppercress	<i>Lepidium monolocoides</i>	E	E	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No suitable habitat: species is not associated with PCT 101 and does not occur in the Peel IBRA sub-region	N/A
-	<i>Prasophyllum sp. Wybong</i>	-	CE	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	No	No suitable habitat: species is not associated with PCT 101	N/A

Common name	Scientific name	Listing status		Sources	SAII	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act					
Slender Darling Pea	<i>Swainsona murrayana</i>	V	V	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No suitable habitat: species does not occur in the Peel IBRA sub-region	N/A
Austral Toadflax	<i>Thesium australe</i>	V	V	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	Partial	Retained in vegetation zones with Kangaroo Grass	VZ1
-	<i>Tylophora linearis</i>	V	E	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No suitable habitat: species is not associated with PCT 101	N/A

Table 12. Predicted Fauna Species Credit Species

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act							
Birds										
Regent Honeyeater	<i>Anthochaera phrygia</i>	CE	CE	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	No	No	Habitat constraints: Subject Land is not on the Important Areas map for this species (DPE 2022a)	N/A

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act							
Bush Stone-curlew	<i>Burhinus grallarius</i>	E	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	No	Degraded microhabitat: Potential habitat (i.e., logs) is present in VZ1 and VZ2. However, all logs are absent from areas to be cleared.	N/A
Curlew Sandpiper	<i>Calidris ferruginea</i>	E	CE	Yes	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	Yes	No	No suitable habitat: species is not associated with PCT 101 and does not occur in the Peel IBRA sub-region	N/A
South-eastern Glossy Black-Cockatoo	<i>Calyptrorhynchus lathami</i>	V	V	Yes	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	No suitable habitat: species is not associated with PCT 101	N/A
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	No	Habitat constraint: suitable nest trees <1 km from rivers, lakes, large dams or creeks, wetlands and coastlines are absent from the subject land	N/A
Black-breasted Buzzard	<i>Hamirostra melanosternon</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	No	Habitat constraints: Subject Land is not within 40 m of riparian woodland on inland watercourses/waterholes containing dead or dying eucalypts	N/A

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act							
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input checked="" type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	No	Habitat constraints: Suitable nest trees are absent from the Subject Land which contains one occupied Magpie nest	N/A
Swift Parrot	<i>Lathamus discolor</i>	E	CE	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	Yes	No	Habitat constraints: Subject Land is not on the Important Areas map for this species (DPE 2022a)	N/A
Square-tailed Kite	<i>Lophoictinia isura</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	No	Habitat constraint: Nest trees are absent from the Subject Land	N/A
Barking Owl	<i>Ninox connivens</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	No	Degraded microhabitat: Three suitable hollow bearing trees occur on the Subject Land as scattered trees. The isolated nature of the hollow-bearing trees in a highly-cleared landscape and consequent likely low density of suitable prey (particularly arboreal species) indicates that the site would be unsuitable for breeding.	N/A
Superb Parrot	<i>Polytelis swainsonii</i>	V	V	Yes	<input type="checkbox"/> BAM-C	Yes	No	No	Habitat constraints: Living or dead Blakely's Red Gum, Yellow	N/A

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act							
					<input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST				Box, White Box, <i>Eucalyptus camaldulensis</i> (River Red Gum), <i>Eucalyptus microcarpa</i> (Inland Grey Box), <i>Eucalyptus polyanthemos</i> (Red Box), <i>Eucalyptus mannifera</i> (Brittle Gum) and <i>Eucalyptus intertexta</i> (Gum Coolibah) with hollows > 5 cm diameter, > 4 m above ground or trees with a DBH > 30 cm are absent from the Subject Land.	
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	Dual	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	No	Degraded microhabitat: Four suitable hollow bearing trees occur on the Subject Land as scattered trees. The isolated nature of the hollow-bearing trees in a highly-cleared landscape and consequent likely low density of suitable prey (particularly arboreal species) indicates that the site would be unsuitable for breeding.	N/A
Mammals										
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	No	No	No	Degraded microhabitat: Based on expert advice, VZ1 and VZ2 are considered too small and disturbed to provide suitable habitat for this species. See Section 5.4.	N/A

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act							
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V	V	No	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	Yes	No	No	Habitat constraints: Subject Land is not within 2km of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels. No suitable habitat: species is not associated with PCT 101	N/A
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	Yes	No	No	Habitat constraints: Roosting habitat including caves, tunnels, mines and culverts are absent from the Subject Land	N/A
Koala	<i>Phascolarctos cinereus</i>	E	E	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	Partial	Retained in VZ occurring within large remnant woodland patches containing Koala feed trees (i.e., White Box)	VZ1 and VZ2
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V	Yes	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	Habitat constraints: breeding camps are absent from the Subject Land	N/A

Common name	Scientific name	Listing status		Dual credit species	Sources	SAII	Migratory Species	Species retained for further assessment?	Reason for exclusion from further assessment	Vegetation zone ID species retained within, including PCT ID
		BC Act	EPBC Act							
Eastern Cave Bat	<i>Vespadeulus trougtoni</i>	V	-	No	<input checked="" type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input type="checkbox"/> PMST	Yes	No	No	Degraded habitat constraint: Potential breeding habitat (i.e., sheds) is considered too disturbed for this species. All existing sheds will be retained.	N/A
Reptiles										
Pink-tailed Legless Lizard	<i>Aprasia parapulchella</i>	V	V	No	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	Habitat constraints: rocky areas and areas within 50 m of rocky areas are absent from the Subject Land. No suitable habitat: species is not associated with PCT 101	N/A
Grey Snake	<i>Hemiaspis damelii</i>	-	E	No	<input type="checkbox"/> BAM-C <input type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	Species not identified by BAM-C. Credit class is yet to be assigned. Degraded microhabitat: clay soils impacted by stock grazing	N/A
Border Thick-tailed Gecko	<i>Uvidicolus sphyrurus</i>	V	V	No	<input type="checkbox"/> BAM-C <input checked="" type="checkbox"/> TBDC <input type="checkbox"/> BioNet <input checked="" type="checkbox"/> PMST	No	No	No	No suitable habitat: species is not associated with PCT 101	N/A

5.2 Presence Of Candidate Species Credit Species

From the remaining list of candidate species credit species, no flora (**Table 13**) or fauna species (**Table 14**) were determined to be present within the Subject Land based on targeted threatened species surveys in accordance with BAM Subsection 5.2.4 (DPIE 2020a).

Table 13. Determining the presence of candidate flora species credit species on the Subject Land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Bluegrass	<i>Dichanthium setosum</i>	V	V	Targeted threatened species survey	No	No
Finger Panic Grass	<i>Digitaria porrecta</i>	E	-	Targeted threatened species survey	No	No
Austral Toadflax	<i>Thesium australe</i>	V	V	Targeted threatened species survey	No	No

Table 14. Determining the presence of candidate fauna species credit species on the Subject Land

Common name	Scientific name	Listing status		Method used to determine presence	Present?	Further assessment required? (BAM Subsections 5.2.5 and 5.2.6)
		BC Act	EPBC Act			
Koala	<i>Phascolarctos cinereus</i>	E	E	Targeted threatened species survey	No	No

5.3 Threatened Species Surveys

5.3.1 THREATENED FLORA SURVEYS

Targeted threatened species surveys were conducted in January and February 2024, during which no threatened flora species were found to be present within the Subject Land (**Table 15**). Targeted searches were undertaken in accordance with Threatened Flora Survey Guideline (DPIE 2020d). Targeted search tracks are shown on **Figure 7**.

Table 15. Threatened species surveys for candidate flora species credit species on the Subject Land

Common name	Scientific name	Threatened flora species surveys			Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (transects or grids)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
Bluegrass	<i>Dichanthium setosum</i>	Transects	<input checked="" type="checkbox"/> Yes 10.1.23-13.1.23 15.2.23-16.2.23	Two people, six days	No	No
Finger Panic Grass	<i>Digitaria porrecta</i>	Transects	<input checked="" type="checkbox"/> Yes 10.1.23-13.1.23 15.2.23-16.2.23	Two people, six days	No	No

Common name	Scientific name	Threatened flora species surveys			Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (transects or grids)	Timing of survey – within recommended period? (BAM-C / TBDC)	Effort (hours & no. people)		
Austral Toadflax	<i>Thesium australe</i>	Transects	<input checked="" type="checkbox"/> Yes 10.1.23-13.1.23 15.2.23-16.2.23	Two people, six days	No	No

5.3.1.1 Justification for Survey Methods

Additional details on the survey requirements for each species are provided below:

Dichanthium setosum:

Dichanthium setosum is a species of Bluegrass which is found in moderately disturbed areas on heavy soils and red-brown loams with clay subsoil (DPE 2023b). The recommended survey period is November to May while the flowering period is usually November to May, 3-4 weeks after effective rainfall (DPE 2023b). Targeted searches were conducted in February 2023 during a below average rainfall period. PCT 101 Woodland (Good), PCT 101 Woodland (Moderate), PCT 101 DNG (Moderate) and PCT 101 DNG (Poor) were comprehensively traversed, and the survey effort is considered sufficient to have detected the species if it were present.

Premise Ecologists are familiar with both *Dichanthium setosum* and *Dichanthium sericeum* and have previously visited the Botanical Identification Service Technical Officers at the National Herbarium of NSW to determine the difference between these two species. *Dichanthium sp.* was observed during the targeted searches and samples were collected using Scientific License 102430 for analysis under the microscope. All specimens were confirmed to be *Dichanthium sericeum*.

Dichanthium setosum was absent from the Subject Land.

Digitaria porrecta:

Within NSW, *Digitaria porrecta* is found on the North West Slopes and Plains between Moree, Tambar Spring, Tamworth and Coonabarabran in native grassland and grassy woodland on rich soils (DPE 2023b). This species has also been recorded on sites exposed to grazing and physical disturbance by road and farm machinery. The recommended survey period is January and February. Flowering occurs between mid-January to late-February with seeds maturing and falling from the plants which die back to a tussock base (DPE 2023b). Targeted searches were conducted in January and February 2023 within PCT 101 Woodland (Good), PCT 101 Woodland (Moderate), PCT 101 DNG (Moderate) and PCT 101 DNG (Poor). The survey effort is considered sufficient to have detected the species if it were present.

Premise Ecologists are familiar with *Digitaria porrecta* and similar *Digitaria spp.* and have previously visited the Botanical Identification Service Technical Officers at the National Herbarium of NSW to determine the distinguishing features of *Digitaria porrecta*. *Digitaria divaricatissima* was observed on the Subject Land.

Digitaria porrecta was absent from the Subject Land.

Thesium australe:

Thesium australe occurs as scattered populations throughout eastern NSW on the coast, and Northern and Southern Tablelands (DPE 2023b). This species inhabits native and heterogeneous native/exotic grassland, as well as grassy woodland containing the host flora (Kangaroo Grass) for parasitism. *Thesium australe* can be easily overlooked with the groundcover height exceeds 30cm as this species may be perennial below ground and ephemeral above ground. The recommended survey period is from November to February. Targeted

searches were conducted in January and February 2023 within the access road reserve (PCT 81 Woodland (Good)) as this was the only area containing Kangaroo Grass.

Thesium australe was absent from the Subject Land.

5.3.2 THREATENED FAUNA SURVEYS

Targeted threatened fauna species surveys were conducted on 10-13 January and 15-16 February 2023, during which no threatened fauna were found to be present within the Subject Land (**Table 16**).

Table 16. Threatened species surveys for candidate fauna species credit species on the Subject Land

Common name	Scientific name	Threatened fauna species surveys				Present	Further assessment required (BAM Subsections 5.2.5 and 5.2.6)
		Survey method (e.g. harp trap, Elliott trap, bioacoustics, etc.)	Timing of survey – within recommended period? (BAM-C / TBDC)		Effort (hours & no. people)		
Koala	<i>Phascolarctos cinereus</i>	SAT survey, scat/scratching search, habitat assessment and feed tree identification	<input checked="" type="checkbox"/> Yes 10.1.23-13.1.23 15.2.23-16.2.23	<input type="checkbox"/> No	2 people (6 hours)	No	No

5.3.2.1 Justification for Survey Methods

Within NSW, Koalas are found on the central and north coasts, southern highlands, tablelands, Blue Mountains and southern coastal forests (DPE 2023b). This species is well known in the Gunnedah-Tamworth area. There is no recommended survey period for this species which can be surveyed year-round. Targeted searches were conducted in January and February 2023 in areas with koala feed trees (i.e., White Box): PCT 81 Woodland (Good), PCT 101 Woodland (Moderate) and PCT 101 Scattered Trees. Koala feed trees occur in the form of one (1) scattered tree and one remnant woodland tree within the access road reserve. The survey effort is considered sufficient to have detected the species if it were present due to the degraded condition of feed trees.

5.4 Expert Reports

No expert reports have been used in place of threatened species surveys. Reference to previous correspondence with expert David Milledge and Martin Schulz has been included in Section 2.

5.5 More Appropriate Local Data (Where Relevant)

No local data has been used to assess habitat suitability.

5.6 Area Or Count, And Location Of Suitable Habitat For A Species Credit Species (A Species Polygon)

No threatened flora or fauna species credits will be generated by the Project.

5.7 Matters of National Environmental Significance

A PMST search (DCCEEW 2023a) was conducted on 5 December 2023 (10 km buffer of the Subject Land) to identify Matters of National Environmental Significance (MNES) that have the potential to occur within the Subject Land including:

- Wetlands of International Importance.
- Threatened Ecological Communities.
- Threatened Species.
- Migratory Species.

The potential for these MNES to occur at the site are outlined below and discussed in **Appendix E**.

5.7.1 WETLANDS OF INTERNATIONAL SIGNIFICANCE

There were three Ramsar Wetlands returned from the PMST report (DCCEEW 2023a). These include Riverland (900-1000 km downstream), Banrock Station Wetland Complex (1000-1100 km downstream) and The Coorong, and Lakes Alexandria and Albert Wetland (1100-1200 km downstream). The Project is unlikely to impact any wetland of international significance.

5.7.2 THREATENED ECOLOGICAL COMMUNITIES

Nine (9) TECs were identified by the PMST report as potentially occurring on the Subject Land. PCT 101 Woodland (Good) meets all key diagnostic characteristics and threshold conditions for classification as Poplar Box Grassy Woodland on Alluvial Plains under the EPBC Act.

No other TECs are considered to occur due to the lack of diagnostic species present.

5.7.3 THREATENED SPECIES

Thirty-seven (37) flora and fauna species recognised as MNES under the EPBC Act were identified during database searches as potentially occurring on the Subject land and are outlined further in **Appendix C**. Only those species considered likely to utilise the Subject Land for foraging were considered further, including Regent Honeyeater, White-throated Needletail, Swift Parrot, Spot-tailed Quoll, Corben's Long-eared Bat and Grey-headed Flying-fox. Koalas were not assessed as a MNES due to the completion of SAT surveys (i.e., species not identified on Subject Land) and the presence of degraded potential foraging habitat (i.e., one tree along the access road and one scattered tree). An assessment of whether the proposed development will have a significant impact on these MNES is assessed in **Appendix E**.

5.7.4 MIGRATORY SPECIES

Ten (10) listed migratory species were returned from the PMST. Based on habitat assessment (**Appendix B, Appendix D, Table 10, Table 11** and **Table 12**), none of these species are considered likely to utilise the Subject Land.

6. IDENTIFYING PRESCRIBED IMPACTS

Prescribed additional biodiversity impacts (prescribed impacts) are additional impacts on threatened species credit species besides vegetation clearing and habitat loss. Prescribed impacts must be assessed as part of the BOS as per clause 6.1 of the Biodiversity Conservation Regulation (NSW) 2017. Each prescribed impact and its relevance to the Subject Land is assessed below (**Figure 1** to **Figure 4**, and **Table 17**).

Table 17. Prescribed impacts identified

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
Karst, caves, crevices, cliffs, rocks or other geological features of significance	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Caves/adits, rocky outcrops and other geological features of significance are absent from the Subject Land and do not occur within 2 km of the site.	N/A
Human-made structures	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Human-made structures includes infrastructure associated with the existing feedlot (i.e., sheds, stock yards, equipment and internal tracks). These are concentrated across the southern extent of the Subject Land.	Threatened bat species (i.e., Little Pied Bat, Large Bent-winged Bat and Yellow-bellied Sheath-tail-Bat) utilise human-made structures for breeding habitat (DPE 2023b). Although potential breeding habitat (i.e., human-made structures) was identified on the Subject Land, these are considered unsuitable for breeding due to disturbance in the form of security lights, motion-detecting sensor lights and noise pollution from animals in the stock yards. Therefore, there are no prescribed impacts associated with the removal of human-made structures.
Non-native vegetation	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Non-native vegetation includes cropped paddocks. These areas are widespread throughout the site.	Threatened entities that use habitat connectivity for dispersal throughout their home range include raptors (i.e., Black Falcon, Little Eagle, Black-breasted Buzzard, Spotted Harrier, Square-tailed Kite and White-throated Needle-tail), owls (i.e., Barking Owl and Masked Owl) and bats (i.e., Little Pied Bat, Large Bent-winged Bat, Corben's Long-eared Bat, Grey-headed Flying-fox and Yellow-bellied Sheath-tail-Bat) (DPE 2023b). None of the afore mentioned species were considered likely to utilise the Subject Land for breeding. The loss of 45.92 ha of non-native vegetation is considered unlikely to impair movements critical to any of the listed species' life cycles due to the highly mobile nature of these species and the presence of more suitable habitat in the surrounding area. Therefore, there are no prescribed impacts associated with the removal of non-native vegetation which dominates the surrounding area.
Habitat connectivity	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Native vegetation on the Subject Land is predominantly isolated and disconnected from remnant native vegetation in the Assessment Area due to intensive agricultural land uses and vegetation clearing. Connectivity occurs along the access road remnant woodland corridor.	Threatened entities that use habitat connectivity for dispersal throughout their home range include plants (i.e., <i>Dichanthium setosum</i> , <i>Digitaria porrecta</i> and <i>Thesium australe</i>), raptors (i.e., Spotted Harrier, Black Falcon, Black-breasted Buzzard, Little Eagle, Square-tailed Kite and White-throated Needle-tail), owls (i.e., Barking Owl and Masked Owl), woodland birds (i.e., Regent Honeyeater, Varied Sittella, Black-chinned Honeyeater, Dusky Woodswallow,

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
			Speckled Warbler, Brown Treecreeper, Little Lorikeet, Swift Parrot, Hooded Robin, Grey-crowned Babbler, Turquoise Parrot and Diamond Firetail), bats (i.e., Little Pied Bat, Large Bent-winged Bat, Little Eagle, Corben's Long-eared Bat Grey-headed Flying-fox and Yellow-bellied Sheath-tail-Bat) and mammals (i.e., Spot-tailed Quoll and Koala) (DPE 2023b). Of the afore mentioned species, only one was considered to potentially utilise the Subject Land for breeding: Koala but was not identified during targeted surveys. The loss of 0.31 ha of connected native vegetation (i.e., woodland along access road) is considered unlikely to impair movements critical to any of the listed species' life cycles due to the highly mobile nature of these species and the presence of more suitable habitat in the surrounding area. As only one tree will be cleared in this area, the dispersal distance for threatened fauna will not significantly increase. Similarly, no threatened flora species were recorded within the roadside corridor.
Waterbodies, water quality and hydrological processes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	No underground courses of water or aquifers feeding streams or wetlands occur on the Subject Land. Above ground waterbodies on the Subject Land include five farm dams on the southern of the site and an unnamed creek. All dams will be retained for stormwater drainage basins (three dams), an effluent holding pond and stock watering dam within the existing feedlot. The unnamed creek will not be slightly modified to allow road widening.	Mobile threatened species (i.e., bats and birds) identified in Appendix E as likely to occur on the Subject Land rely on freshwater sources. The White-bellied Sea-eagle is also found in suitable vegetation within 1 km of waterways. There are no prescribed impacts associated with waterbodies on the Subject Land as all dams and the unnamed creek are to be retained and the water quality and hydrological processes are not considered likely to significantly change given the current land use. Mitigation measures are described in Section 8.4.
Vehicle strikes	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Numerous internal tracks occur throughout the Subject Land, as well as one main access road. There is potential for vehicle strikes along the access road due to the presence of remnant woodland either side of the road.	The Project will increase the cattle carrying capacity of the Subject Land from 1,000 to 9,500 head of cattle. Additional vehicle movements during construction and operation of the expanded feedlot is considered likely to increase the risk of vehicle strikes on threatened birds, bats and mammals. Species at risk of vehicle strikes include: Regent Honeyeater, Southern Whiteface, Dusky Woodswallow, Speckled Warbler, Spotted Harrier, Brown Treecreeper, Varied Sittella, Little Lorikeet, Swift Parrot, Hooded Robin, Black-chinned Honeyeater, Grey-crowned Babbler, Turquoise Parrot, Diamond Firetail, Little Pied Bat, Large Bent-winged Bat, Corben's Long-eared Bat, Grey-headed Flying-fox and Yellow-

Feature	Present	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature. Where relevant, threatened species or fauna that are part of a TEC or EC, that are at risk of vehicle strike
			<p>bellied Sheathtail-bat.</p> <p>The potential prescribed impacts of the Project will be discussed further in Section 8.3.</p>

STAGE 2: IMPACT ASSESSMENT (BIODIVERSITY VALUES AND PRESCRIBED IMPACTS)

7. AVOID AND MINIMISE IMPACTS

7.1 Avoid And Minimise Direct and Indirect Impacts

This section outlines strategies and actions that have been taken to avoid or minimise impacts on biodiversity values during the proposal planning process.

7.1.1 PROJECT LOCATION

The Project is proposed on land zoned as RU1 Primary Production in an agriculture dominated area between Gunnedah and Tamworth. This area has predominantly been cleared for cropping and grazing. The Project's location is considered opportunistic given the current land use as an existing feedlot with the capacity to expand by 8,500 head of cattle.

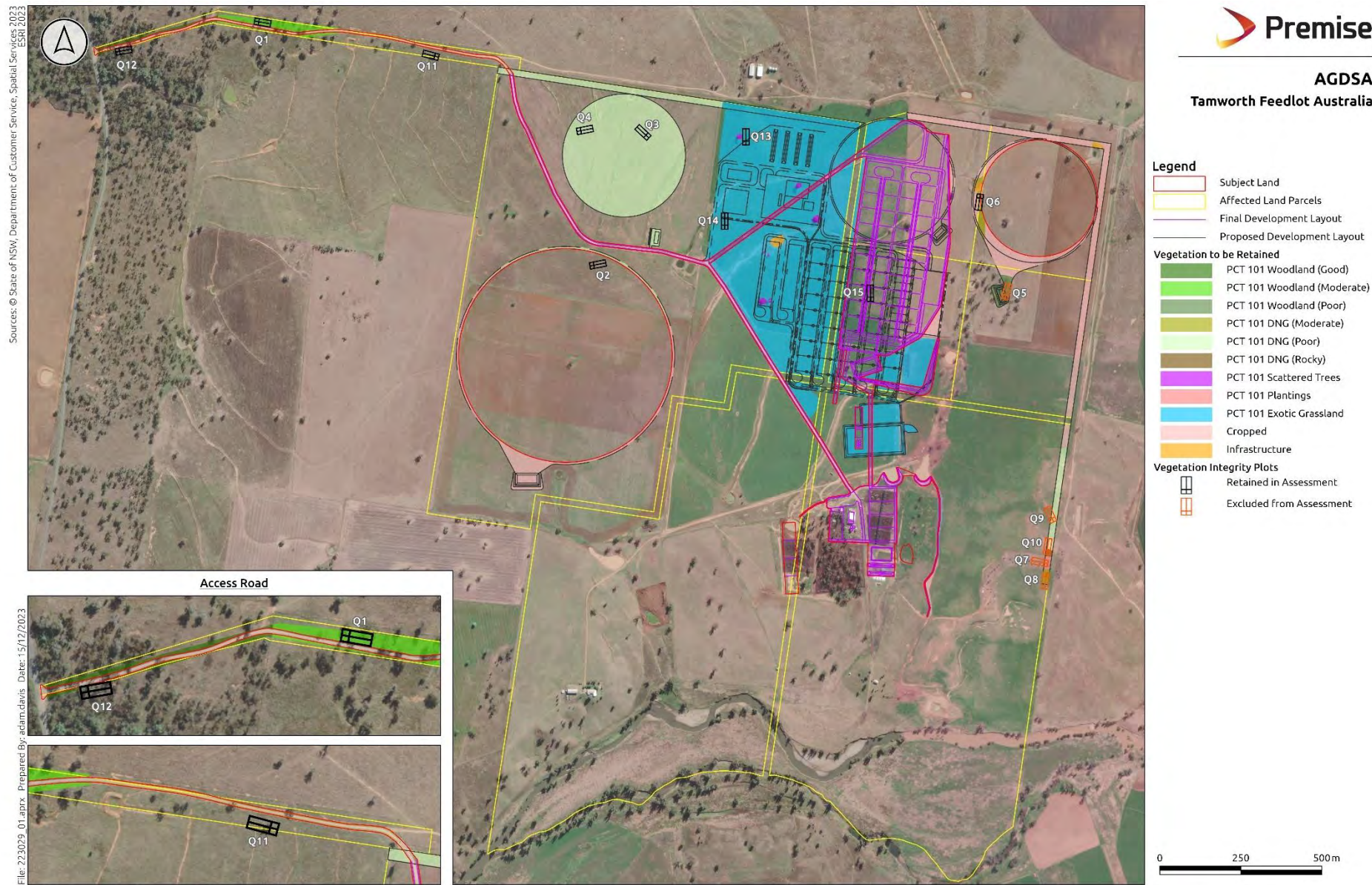
The Subject Land is connected to an existing road network which is to be widened to accommodate for the increased cattle carrying capacity of the site. All internal tracks are to be retained and existing infrastructure will be modified.

The Project is proposed in an area generally lacking biodiversity values due to the site's long history of agricultural use. Suitable threatened species habitat is predominantly restricted to remnant woodland areas along the access road which will be retained, with the exception of one tree that needs to be removed for safety. Indirect impacts can be avoided through site management during construction (i.e., machinery operation during daylight hours, relocate any displaced fauna). Mitigation measures are outlined in **Table 23**.

7.1.2 PROJECT DESIGN

The Project layout was redesigned to avoid additional areas of DNG, woodland, native plantings, nine scattered trees and threatened species habitat (**Figure 12**). This included reducing the area of impact along the access road from a 10-20 m buffer to a 4-5 m buffer, reducing the extent of threatened species habitat and Poplar Box Woodland EEC to be cleared.

Figure 12. Alternative Footprints, and Avoidance and Minimisation Measures



7.2 Avoid And Minimise Prescribed Impacts

This section outlines strategies and actions that have been taken to avoid or minimise prescribed impacts on biodiversity values during the proposal planning process. The only prescribed impact identified in Section 6 for the Project is vehicle strikes.

7.2.1 PROJECT LOCATION AND DESIGN

The Subject Land is connected to surrounding remnant vegetation through the access road corridor. This area was redesigned so that only groundcover and one tree (T25) are to be cleared for the Project, reducing the Project's overall impact by retaining areas PCT 101 Woodland and Poplar Box Woodland EEC, and associated threatened species habitat.

The Project will increase vehicle movement along the access road, which may increase the likelihood of vehicle strikes for threatened birds, bats and mammals utilising the area as part of their wider foraging range. The location of the access road cannot be moved due to the presence of existing infrastructure. However, the extent to which the road is to be widened has been reduced through Project design. Areas to be cleared along the access road are now considered degraded and severely impacted by current vehicle movements. Mitigation measures are outlined in **Table 23**.

8. IMPACT ASSESSMENT

Stage 2 of the BAM (DPIE 2020a) provides the requirements for the impact assessment of the BDAR. The impact assessment assesses the potential direct, indirect and prescribed impacts of the Project in line with Chapter 8 of the BAM (DPIE 2020a). Direct impacts of the Project on native vegetation, TECs, and threatened species and their habitat have been assessed according to Section 8.1 of the BAM and are identified on **Figure 13** and documented in **Table 18**. (DPIE 2020a).

Figure 13. Final Impacts Likely to Occur on the Subject Land



8.1 Direct Impacts

8.1.1 RESIDUAL DIRECT IMPACTS

Residual direct impacts are those impacts remaining following the implementation of measures to avoid and minimise impacts discussed in **Section 7** and mitigation measures discussed in **Section 8.4**. Final impacts likely to occur on the Subject Land are shown in **Figure 13** and documented in **Table 18**.

Table 18. Summary of residual direct impacts

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAII entity	Biodiversity Credit Class	Project phase/timing of impact (e.g. construction, operation, rehabilitation)	Extent (ha, number of individuals)	NSW % Cleared for PCT (DPE 2023a)
PCT Vegetation Clearance							
PCT 101 Woodland (Good)	N/A				Construction	0.15	75
PCT 101 Woodland (Moderate)						0.78	
PCT 101 DNG (Moderate)						0.36	
PCT 101 DNG (Poor)						8.20	
PCT 101 Scattered Trees						0.33 (14 trees)	
PCT 101 Exotic Grassland						14.95	
TEC Vegetation Clearance							
Poplar Box Grassy Woodland on Alluvial Plains	-	E	No	N/A	Construction	0.31	N/A
Threatened Fauna Species Habitat Clearance							
Birds							
Black Falcon	V	-	No	Ec	Construction	24.78	N/A
Black-breasted Buzzard	V	-	No	Ec		24.78	
Spotted Harrier	V	-	No	Ec		24.78	
Varied Sittella	V	-	No	Ec		0.94	

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAII entity	Biodiversity Credit Class	Project phase/timing of impact (e.g. construction, operation, rehabilitation)	Extent (ha, number of individuals)	NSW % Cleared for PCT (DPE 2023a)
Black-chinned Honeyeater	V	-	No	Ec		0.94	
Barking Owl	V	-	No	Ec		24.78	
Masked Owl	V	-	No	Ec		24.78	
Regent Honeyeater	CE	CE	Yes	Ec		1.26	
Dusky Woodswallow	V	-	No	Ec		0.94	
Speckled Warbler	V	-	No	Ec		1.26	
Brown Treecreeper	V	-	No	Ec		1.26	
Little Lorikeet	V	-	No	Ec		0.94	
Hooded Robin	V	-	No	Ec		0.94	
Little Eagle	V	-	No	Ec		24.78	
White-throated Needletail	-	V	No	Ec		24.78	
Swift Parrot	E	CE	Yes	Ec		1.26	
Grey-crowned Babbler	V	-	No	Ec		0.94	
Diamond Firetail	V	-	No	Ec		0.94	
Southern Whiteface	-	V	No	Ec		0.94	
White-bellied Sea-eagle	V	-	No	Ec		9.50	
Square-tailed Kite	V	-	No	Ec		24.78	
Turquoise Parrot	V	-	No	Ec		1.26	
Mammals							
Little Pied Bat	V	-	No	Ec	Construction	0.94	N/A
Grey-headed Flying-fox	V	V	No	Ec		0.94	
Large Bent-winged Bat	V	-	Yes	Ec		0.94	
Corben’s Large-eared Bat	V	V	No	Ec		0.94	

Direct impact (Describe the impact on PCT/TEC/EC or threatened species and their habitat)	BC Act status	EPBC Act status	SAII entity	Biodiversity Credit Class	Project phase/timing of impact (e.g. construction, operation, rehabilitation)	Extent (ha, number of individuals)	NSW % Cleared for PCT (DPE 2023a)
Yellow-bellied Sheath-tail-Bat	V	-	No	Ec		24.78	

8.1.2 CHANGE IN VEGETATION INTEGRITY SCORE

Residual impacts on vegetation condition after avoidance and minimisation measures have been carried out are documented in **Table 19**. PCT 101 DNG (Moderate), PCT 101 DNG (Poor) and PCT 101 Exotic Grassland have a VI score of <15 which is the benchmark VI score for PCTs representative of an EEC or a CEEC. Therefore, these vegetation zones do not generate any credits.

Table 19. Impacts to vegetation integrity

Vegetation zone	PCT ID	Area (ha)	Before development				After development				Change
			Composition	Structure	Function	VI score	Composition	Structure	Function	VI score	Change in VI score
VZ1	PCT 101 Woodland (Good)	0.15	93	92.6	59.2	79.9	0	0	0	0	-79.9
VZ2	PCT 101 Woodland (Moderate)	0.21 ²²	73.7	33.7	47.2	48.9	0	0	0	0	-48.9
VZ3	PCT DNG (Moderate)	0.36	60.7	21.1	2.5	14.8	0	0	0	0	-14.8
VZ4	PCT 101 DNG (Poor)	8.20	18.8	18.1	1.4	10.7	0	0	0	0	-10.7
VZ6	PCT 101 Exotic Grassland	14.95	11	2	0.5	2.3	0	0	0	0	-2.3

²² 0.21 ha of PCT 101 Woodland (Moderate) excludes the remnant woodland polygon (0.57 ha) to be retained

8.1.3 SCATTERED TREE MODULE

Fourteen (14) remnant scattered native trees will be cleared from the Subject Land. The data as entered into the BAM-C case number 00044705/BAAS21027/23/00044925 / Revision 0. is summarised in **Table 20**.

Table 20. Scattered trees to be impacted by the Project

PCT code	Species	DBHOB category	Hollows	No. of trees	Class
VZ5 (PCT 101 Scattered Trees)	<i>Eucalyptus populnea subsp. Bimbil</i>	≥30 cm	Yes	11	3
	<i>Eucalyptus dealbata</i>	≥30 cm	Yes	1	3
	<i>Eucalyptus albens</i>	≥30 cm	Yes	1	3
	<i>Alectryon oleifolius</i>	≥30 cm	No	1	3

8.2 Indirect Impacts

Indirect impacts of the Project on native vegetation, threatened entities and their habitat have been assessed according to Section 8.28.2 of the BAM (DPIE 2020a) and include the nature, extent, frequency, duration and timing of the indirect impacts during construction and operation of the facility in the long term (**Table 21**).

Table 21. Summary of residual indirect impacts

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Inadvertent impacts on adjacent habitat or vegetation	PCT 101 <u>TEC:</u> Poplar Box Grassy Woodland on Alluvial Plains	Subject Land boundary	Infrequent	Short-term	Construction	<u>Low Likelihood:</u> Indirect clearing would be mitigated through a vegetation clearance protocol and it is recommended that the Subject Land boundary is clearly marked to prevent accidental damage to adjacent remnant woodland. <u>Consequences:</u> Localised changes to soil stability, damage to tree limbs or root structures and increased edge effects.

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration	Project phase/timing of impact	Likelihood and consequences
Reduced viability of adjacent habitat due to edge effects	<p>PCT 101</p> <p><u>TEC:</u> Poplar Box Grassy Woodland on Alluvial Plains</p> <p><u>Threatened Species:</u> Regent Honeyeater, Southern Whiteface, Dusky Woodswallow, Speckled Warbler, Spotted Harrier, Brown Treecreeper, Blue-winged Parrot, Turquoise Parrot, Square-tailed Kite, Varied Sittella, Black Falcon, Little Lorikeet, Black-breasted Buzzard, Little Eagle, White-throated Needletail, Swift Parrot, Hooded Robin, Black-chinned Honeyeater, Barking Owl, Grey-crowned Babbler, Diamond Firetail, Masked Owl, Little Pied Bat, Large Bent-winged Bat, Corben's Long-eared Bat, Grey-headed Flying-fox and Yellow-bellied Sheath-tail-bat</p>	Subject Land boundary	Infrequent	Short- term and Long-term	Construction and operation	<p><u>Low Likelihood:</u> Clearing would be mitigated through a vegetation clearance protocol and it is recommended that the Subject Land boundary is clearly marked to prevent accidental damage to adjacent vegetation.</p> <p><u>Consequences:</u> Weed invasion, encroachment and predation by pest species and increased species competition.</p>
Reduced viability of adjacent habitat due to dust, noise or light spill	<p>PCT 101</p> <p><u>TEC:</u> Poplar Box Grassy Woodland on Alluvial Plains</p> <p><u>Threatened Species:</u> Regent Honeyeater, Southern Whiteface, Dusky Woodswallow, Speckled Warbler, Spotted</p>	Subject Land boundary	Infrequent (dust/noise) and frequent (noise/light spill)	Short-term (dust and noise) and long-term (light)	Construction and operation	<p><u>Low Likelihood:</u> Dust suppression measures will be undertaken during construction. The impacts of noise and light spill will be reduced by completing construction during day light hours. Long-term noise and light spill impacts are not considered to be exacerbated by the Project due to its location in an agricultural area.</p> <p><u>Consequence:</u> Increased noise, dust and light spill may</p>

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration	Project phase/timing of impact	Likelihood and consequences
	Harrier, Brown Treecreeper, Blue-winged Parrot, Turquoise Parrot, Square-tailed Kite, Varied Sittella, Black Falcon, Little Lorikeet, Black-breasted Buzzard, Little Eagle, White-throated Needletail, Swift Parrot, Hooded Robin, Black-chinned Honeyeater, Barking Owl, Grey-crowned Babbler, Diamond Firetail, Masked Owl, Little Pied Bat, Large Bent-winged Bat, Corben's Long-eared Bat, Grey-headed Flying-fox and Yellow-bellied Sheath-tail-bat					impact the foraging behaviour of threatened species. However, these impacts are not anticipated to influence breeding behaviour due to the absence of suitable habitat from the Subject Land and immediate surrounds.
Transport of weeds and pathogens from the site to adjacent vegetation	PCT 101 <u>TEC:</u> Poplar Box Grassy Woodland on Alluvial Plains	Subject Land boundary	Frequent	Short-term	Construction	<u>Low Likelihood:</u> Vegetation adjacent to the Subject Land is already highly disturbed in some areas and weeds present on the Subject Land are already likely already present in surrounding vegetation. The risk of this is heightened during the construction phase when vegetation clearing is occurring. However, this risk can be reduced by regularly washing vehicles and machinery and applying weed control measures. <u>Consequence:</u> Spread of weeds and pathogens into adjacent habitat at a higher frequency than currently present.
Increased risk of starvation or exposure, and loss of shade or shelter	<u>Threatened Species:</u> Regent Honeyeater, Southern Whiteface, Dusky Woodswallow, Speckled Warbler, Spotted Harrier, Brown Treecreeper, Blue-winged Parrot, Turquoise Parrot, Square-tailed Kite, Varied	24.78 ha (VZ1-6)	Infrequent	Short-term	Construction	<u>Low Likelihood:</u> The Subject Land occurs in a predominantly cleared landscape (9% native vegetation within 1500m buffer). The temporary disturbance of species may occur during vegetation removal. However, habitat clearance is to occur progressively, and pre-

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration	Project phase/timing of impact	Likelihood and consequences
	Sittella, Black Falcon, Little Lorikeet, Black-breasted Buzzard, Little Eagle, White-throated Needletail, Swift Parrot, Hooded Robin, Black-chinned Honeyeater, Barking Owl, Grey-crowned Babbler, Diamond Firetail, Masked Owl, Little Pied Bat, Large Bent-winged Bat, Corben's Long-eared Bat, Grey-headed Flying-fox and Yellow-bellied Sheath-tail-bat					clearing surveys are to be undertaken to identify and relocate any resident fauna. <u>Consequence:</u> Displacement of resident fauna, leading to an increased risk of starvation and exposure.
Loss of breeding habitat	N/A					<u>Nil Likelihood:</u> Suitable breeding habitat for threatened species is absent from the Subject Land.
Trampling of threatened flora species	N/A					<u>Nil Likelihood:</u> Targeted flora surveys were completed in January and February 2023 and no threatened flora species were identified.
Rubbish dumping	PCT 101 <u>TEC:</u> Poplar Box Grassy Woodland on Alluvial Plains	Subject Land (75.93 ha)	Infrequent	Short-term	Construction and Operation	<u>Low Likelihood:</u> Access to the Project will be restricted to parties involved in planning and construction, as well as future residents. Waste would be controlled according to Tamworth Regional Council waste management procedures. <u>Consequences:</u> Increased presence of rubbish in adjacent vegetation
Wood collection	PCT 101 <u>TEC:</u> Poplar Box Grassy Woodland on Alluvial Plains	Subject Land (75.93 ha)	Infrequent	Short-term	Construction and Operation	<u>Low Likelihood:</u> Access to the Project will be restricted to parties involved in planning and construction. Where possible, wood from felled trees is to be relocated to adjacent remnant woodland for habitat

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration	Project phase/timing of impact	Likelihood and consequences
						enhancement. <u>Consequences:</u> Loss of potential habitat enhancement features for adjacent woodland areas.
Removal and disturbance of rocks	PCT 101 <u>TEC:</u> Poplar Box Grassy Woodland on Alluvial Plains	Subject Land (75.93 ha)	Infrequent	Short-term	Construction	<u>Low Likelihood:</u> Where possible, any bush rocks identified on the Subject land are to be scattered throughout adjacent remnant woodland for habitat enhancement. <u>Consequences:</u> Loss of potential habitat enhancement features for adjacent woodland areas.
Increase in predators and pest animal populations	<u>Threatened Species:</u> Regent Honeyeater, Southern Whiteface, Dusky Woodswallow, Speckled Warbler, Spotted Harrier, Brown Treecreeper, Blue-winged Parrot, Turquoise Parrot, Square-tailed Kite, Varied Sittella, Black Falcon, Little Lorikeet, Black-breasted Buzzard, Little Eagle, White-throated Needletail, Swift Parrot, Hooded Robin, Black-chinned Honeyeater, Barking Owl, Grey-crowned Babbler, Diamond Firetail, Masked Owl, Little Pied Bat, Large Bent-winged Bat, Corben's Long-eared Bat, Grey-headed Flying-fox and Yellow-bellied Sheath-tail-bat	Subject Land boundary	Infrequent	Short-term	Construction and Operation	<u>Low Likelihood:</u> The Subject Land occurs within a degraded, agriculturally dominated landscape. Feral animals present on the Subject Land are already likely to utilise adjacent habitat within their wider foraging range. <u>Consequences:</u> Increased abundance of invasive exotic (foxes, cats and rabbits) and native (Indian Miner or Noisy Miner) species in the surrounding area which may lead to vegetation trampling and overgrazing, increased competition for resources and the spread of diseases.
Changed fire regimes	N/A					<u>Nil Likelihood:</u> The Project is unlikely to change fire regimes

Indirect impact	Impacted entities	Extent (ha or zone reference)	Frequency	Duration	Project phase/ timing of impact	Likelihood and consequences
Disturbance to specialist foraging habitat	<u>Threatened Species:</u> Regent Honeyeater, Southern Whiteface, Dusky Woodswallow, Speckled Warbler, Spotted Harrier, Brown Treecreeper, Blue-winged Parrot, Turquoise Parrot, Square-tailed Kite, Varied Sittella, Black Falcon, Little Lorikeet, Black-breasted Buzzard, Little Eagle, White-throated Needletail, Swift Parrot, Hooded Robin, Black-chinned Honeyeater, Barking Owl, Grey-crowned Babbler, Diamond Firetail, Masked Owl, Little Pied Bat, Large Bent-winged Bat, Corben's Long-eared Bat, Grey-headed Flying-fox and Yellow-bellied Sheath-tail-bat	Subject Land (75.93 ha)	Infrequent	Short-term	Construction and Operation	<u>Low Likelihood:</u> The Project will result in the loss of up to 75.93 ha of potential foraging habitat for threatened species. This is considered unlikely to have a significant effect on threatened species due to the presence of similar and more suitable foraging habitat in the surrounding area. <u>Consequences:</u> Any threatened species utilising the Subject Land for foraging prior to construction will disperse into adjacent habitat. This may lead to an increased competition for resources and disease transmission.

8.3 Prescribed Impacts

Measures to avoid and minimise prescribed impacts have been identified in Section 6 and discussed in Section 7.2. In accordance with the BAM (DPIE 2020a). Prescribed impacts for the Project have been identified as vehicle strikes, which are assessed in the Sections 8.3.1 and 8.3.2, respectively.

8.3.1 VEHICLE STRIKES

The Project will increase the cattle carrying capacity of the Subject Land from 1,000 to 9,500 head of cattle. The addition of 8,500 head of cattle will increase road activity during the Project's construction and operation. Species at risk of potential vehicle strike impacts are outlined in **Table 22**. These species are likely to utilise the PCT 101 Woodland remnant corridor as part of their wider foraging range and, if present, are likely to disperse over the access road.

Table 22. Residual prescribed impacts – vehicle strikes

Threatened fauna or protected fauna that are part of a TEC that are at risk of vehicle strike (identified in Section 6)	SAII entity	Likelihood	Estimated vehicle strike rates	Consequences
Regent Honeyeater	Yes	Low	Higher than current levels	Injury or mortality of individuals. Unlikely to lead to a decline in the local population
Southern Whiteface	No			
Dusky Woodswallow	No			
Speckled Warbler	No			
Spotted Harrier	No			
Brown Treecreeper	No			
Turquoise Parrot	No			
Varied Sittella	No			
Little Lorikeet	No			
Swift Parrot	Yes			
Hooded Robin	No			
Black-chinned Honeyeater	No			
Grey-crowned Babbler	No			
Diamond Firetail	No			
Little Pied Bat	No			
Large Bent-winged Bat	Yes			
Corben's Long-eared Bat	No			
Grey-headed Flying-fox	No			
Yellow-bellied Sheath-tail-bat	No			

8.4 Mitigating Residual Impacts – Management Measures and Implementation

Section 8.4 of the BAM (DPIE 2020a) requires a BDAR to describe measures to mitigate and manage residual impacts following impact avoidance and minimisation measures. Proposed mitigation and measurement measures for residual direct, indirect and prescribed impacts are presented in **Table 23**.

Table 23. Summary of proposed mitigation measures for residual impacts (direct and indirect)

Impact	Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	Risk of Failure	Consequence of Failed Measure
Residual Direct Impacts								
Displacement of resident fauna.	Timing of works	Planning the timing of vegetation removal to avoid the breeding seasons of threatened, migratory and resident species.	Planning and Construction	Regular	Project management and Environmental specialists	High	Low	Fauna dispersal distress, injury or death
	Pre-clearing surveys	Undertake pre-clearing surveys to determine the presence of resident fauna in vegetation, particularly hollow-bearing trees.	Pre-construction	Regular	Environmental specialists and licensed wildlife handler	High	Low	Fauna dispersal distress, injury or death
	Clearing protocols	Implementation of best practice clearing protocols.	Construction	Ongoing	Project management, Site manager and Contractors	High	Low	Inadvertent damage or distress to adjacent habitat and threatened species
	Inspection of felled trees	Licensed wildlife handler is to inspect all felled trees for the presence of fauna. Injured fauna are to be cared for in conjunction with WIRES. Displaced fauna are to be relocated to adjacent remnant woodland by a qualified wildlife handler.	Construction	Infrequent	Licensed wildlife handler	High	Low	Fauna dispersal distress, injury or death
	Investigating ways to relocate habitat features	Relocate habitat features (surface rocks and felled trees) as habitat enhancement (where these opportunities are available).	Construction	Infrequent	Project management	High	Low	Loss of habitat features and increased competition among resident fauna for resources
Residual Indirect Impacts								
Inadvertent	Pre-clearing protocols	Prior to commencing vegetation	Construction	Regular	Project	High	Low	Adjacent vegetation or habitat

Impact	Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	Risk of Failure	Consequence of Failed Measure
impacts on adjacent habitat or vegetation		clearing, daily site briefings are to occur to identify the Subject Land boundary, the presence of any adjacent remnant vegetation to be retained and methods to relocate habitat features into adjacent habitat. Trees along the access road to be retained to be clearly marked or temporary fencing installed.			management and Contractors			inadvertently damaged
	Temporary fencing and signage	Clearly demark the adjacent habitat to be retained.	Construction	Ongoing	Project management and site manager	High	Low	Adjacent vegetation or habitat inadvertently damaged
Reduced viability of adjacent habitat due to noise, dust and light spill	Adjust construction hours	Construction activities are to occur generally during daylight hours minimising light spill and noise disturbance.	Construction	Regular	Project management and site manager	High	Low	Allow fauna species the opportunity to disperse.
Transport of weeds and pathogens from the site to adjacent vegetation	Hygiene protocols	Implementation of hygiene protocols (regularly washing vehicles and equipment). High threat weeds (HTW) recorded on the Subject Land are outlined in Appendix B .	Construction and Operation	Ongoing	Project management and contractors	High	Low	Spread of pathogens or weeds, including HTW, between Subject Land and adjacent habitat
	Reduce chemical drift	Application of herbicides to HTW is to occur as per the NSW Department of Primary Industries guidelines (DPI n.d.). Spraying is to occur during suitable weather conditions.	Construction and Operation	Ongoing	Project management and contractors	High	Low	Spread of herbicides to non-targeted flora species in adjacent habitat
Increased erosion	Sediment barriers and erosion control measures	Implementation of best practice erosion management and monitoring	Construction and Operation	Ongoing	Project management and contractors	High	Low	Increased sedimentation in adjacent habitat and western dam to be retained
Inadvertent impacts on the unnamed creek	Sediment barriers, sediment ponds or coffer dams	Implementation of best practice water management and monitoring to control the quality of water released from the site into the receiving environment.	Construction	Infrequent	Project management	High	Low	Decreased water quality in unnamed creek.
Inadvertent contribution of pollutants to	Fertiliser, herbicides, insecticides and other pollutants protocols	Industry best practice and standards	Construction and Operation	Ongoing	Landholder	High	Low	Increased pollutants in adjacent habitat

Impact	Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy	Risk of Failure	Consequence of Failed Measure
adjacent habitat								
Residual Prescribed Impacts								
Vehicle strikes	Vehicle speeds	Impose speed limits on internal roads.	Construction and Operation	Ongoing	Project management and site manager	High	Low	Inadvertent wildlife injury or death

Further details on the implementation of measures outlined in **Table 23** are provided in **Table 24** in accordance with Section 8.4 of the BAM (DPIE 2020a).

Table 24. Mitigation measures implementation

Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Timing	Frequency
Timing of works	<p>The timing of works is considered prior to action undertaking to prioritise favourable conditions and to minimise the potential impacts.</p> <p>Particular areas to consider timing of works include:</p> <ul style="list-style-type: none"> Seasonal timing: coinciding construction to avoid inadvertent impacts to threatened species Duration and intensity: coordinating high intensity works with short duration. Pollution: consideration of timing of works relevant to noise, light and dust pollution 	Prior to clearing	As required
Pre-clearing surveys	<p>A pre-clearance survey is developed and undertaken where practical to reduce impacts on threatened species. The purpose of pre-clearance inspections are:</p> <ul style="list-style-type: none"> to identify and clearly mark all habitat structures and recommend management actions to minimise impact on the hollow dependent species during clearing; identify salvageable topsoil and clay resources; and identify management strategies to minimise the impact of clearing activities on resident fauna. 	Prior to clearing	As required
Clearing protocols	<p>A vegetation clearance protocol is developed to minimise the impact of vegetation clearance on flora and fauna. Key components of the protocol may include:</p> <ul style="list-style-type: none"> identification of areas requiring clearing; identification of areas to be retained (i.e., trees within PCT 101 Woodland (access road)); pre-clearance surveys; and fauna management strategies (i.e., relocation) <p>Prior to clearing, the veterinary practice will be alerted to the clearing event a week from operation and must be willing to accept wildlife. Any animals injured will be assessed by a suitably licenced and experienced supervising ecologist.</p>	Prior to clearing	As required

Measure/action	Monitoring and evaluation strategy (Data, frequency, timing and reporting)	Timing	Frequency
Inspection of felled trees	Inspection of trees felled for the presence of fauna. Injured fauna to be captured using recommended techniques prescribed by WIRES and WIRES contacted for first aid and temporary care of the animal. Uninjured fauna to be relocated into surrounding native woodland at a suitable time.	Prior to clearing	As required
Investigating ways to relocate features	Relocating habitat features (i.e., hollows, felled trees and surface rocks) can be considered as a fauna management strategy to provide habitat to fauna in areas lacking habitat features. Additionally, it provides an opportunity for important structures and species to be relocated from the Subject Land to adjacent remnant woodland. The process and purpose of relocating habitat features is as follows: <ul style="list-style-type: none"> Habitat structures suitable for relocation are identified and marked during pre-clearance surveys. Features and relocation area are decided by the known threatened species in the locality and their nesting, roosting, shelter and feeding regime and requirement. 	Prior to clearing	As required
Temporary fencing and signage	Temporary fencing and signage may be erected to: <ul style="list-style-type: none"> identify the potential presence of threatened species; alert motorists to potential increases in fauna movement and relocation as a result of clearing; and to control vertebrate pests. 	Prior to clearing	As required
Sediment barriers and erosion control measures	The following broad measures would be implemented to prevent, reduce and manage soil erosion at the Project: <ul style="list-style-type: none"> minimise disturbance during all phases of the Project and restrict access to undisturbed areas; sequence construction activities such that sediment control works are completed early in the construction phase; divert clean water around disturbance areas; minimise compaction during soil excavation and movement; use erosion control features (e.g. silt fences and temporary sediment traps, diversion banks) to minimise sediment migration, divert surface water around disturbed areas and control runoff velocity; and construct collection drains, diversion drains and culverts to control surface runoff from the Subject Land. 	During operations	As required
Road signage	Road signage will be implemented to minimise vehicular impacts on resident fauna, such as: <ul style="list-style-type: none"> signage erected during clearing periods to warn motorists of potential increases in fauna relocation movement. 	During operations	As required

8.5 Adaptive Management Strategy for Uncertain Impacts

An adaptive management strategy is not required for the Project as mitigation measures have been considered for all indirect and prescribed impacts in Section 8.4 of the BDAR. The size and nature of impacts have been considered and associated risk of failure and consequences in **Table 23**.

9. SERIOUS AND IRREVERSIBLE IMPACTS

9.1 Assessment For Serious And Irreversible Impacts On Biodiversity Values

The determination of a SAI on biodiversity values is to be made by the decision-maker in accordance with the four principles set out in the BC Regulation. This section identifies biodiversity values at risk of an SAI by the Project and evaluates the extent and severity of the impact in accordance with the BAR criteria (Section 9). Biodiversity values considered at risk of an SAI relevant to the proposed development are outlined in **Table 25** and assessed in **Appendix F. Figure 14** outlines those biodiversity entities considered to be directly impacted by the Proposal.

Table 25. Entities at risk of an SAI

Common name	Scientific name	Reason for inclusion in assessment
Swift Parrot	<i>Lathamus discolor</i>	Included in current list of entities at risk of an SAI and is likely to be impacted by the proposal (Ecosystem Credit)
Regent Honeyeater	<i>Anthochaera phrygia</i>	Included in current list of entities at risk of an SAI and is likely to be impacted by the proposal (Ecosystem Credit)
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	Included in current list of entities at risk of an SAI and is likely to be impacted by the proposal (Ecosystem Credit)

Figure 14. Serious and Irreversible Impact



10. IMPACT SUMMARY

10.1 Determine an offset requirement for impacts

10.1.1 IMPACTS ON NATIVE VEGETATION AND TECS OR ECS (ECOSYSTEM CREDITS)

PCT 101 DNG (Moderate), PCT 101 DNG (Poor) and PCT 101 Exotic Grassland have a VI score of <15 and do not generate any credits, as per BAM Subsection 9.2.1(3.) (**Table 26** and **Figure 15**).

Table 26. Impacts that do not require offsetting – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	Entity at risk of an SAI?	Current VI score
VZ3	PCT 101 DNG (Moderate)	No	0.36	No	14.8
VZ4	PCT 101 DNG (Poor)	No	8.20	No	10.7
VZ6	PCT 101 Exotic Grassland	No	14.95	No	2.3

Table 27 and **Table 28** identify impacts that require an offset, as per BAM Subsection 9.2.1(1) (DPIE 202a) (**Figure 15**).

Table 27. Impacts that require an offset – ecosystem credits

Vegetation zone	PCT name	TEC	Impact area (ha)	Current VI score	Future VI score	Change in VI score	Biodiversity risk weighting	Number of ecosystem credits required
VZ1	PCT 101 Woodland (Good)	Poplar Box Grassy Woodland on Alluvial Plains (EPBC Act)	0.15	79.9	0	-79.9	2.5	7
VZ2	PCT 101 Woodland (Moderate)	Poplar Box Grassy Woodland on Alluvial Plains (EPBC Act)	0.21 ³	48.9	0	-48.9	2.5	6
Total credits								13

Table 28. Impacts that require an offset – Scattered Trees (Ecosystem Credits)

PCT	Number of Trees	Ecosystem Credits Required
101	14	14

³ 0.21 ha of PCT 101 Woodland (Moderate) excludes the remnant woodland polygon (0.57 ha) to be retained

10.1.2 IMPACTS ON THREATENED SPECIES AND THEIR HABITAT (SPECIES CREDITS)

No threatened flora or fauna species credits require an offset as per BAM Subsection 9.2.2(2).

Figure 15. Thresholds for Assessing and Offsetting Impacts



10.1.3 INDIRECT AND PRESCRIBED IMPACTS

There are no remaining indirect or prescribed impacts after measure to avoid, minimise and mitigate have been applied. Therefore, offsetting using additional biodiversity credits (above the credit requirement generated by the BAM-C for direct impacts) and/or other conservation measures are not required.

10.2 Impacts that do not need further assessment

Areas which will be impacted by the Project but which do not need further assessment for ecosystem credits (as per BAM Section 9.3(1–2.)) are identified in **Table 29** and **Figure 15**.

Table 29. Impacts that do not need further assessment for ecosystem credits

Impact	Location within Subject Land	Justification why no further assessment is required
Clearing of non-native vegetation	Cropped (46.11 ha)	Areas are void of native vegetation. Assessment for threatened species habitat was conducted.
	Infrastructure (5.23 ha)	Areas are void of vegetation. Assessment for threatened species habitat was conducted.

11. BIODIVERSITY CREDIT REPORT

The BAM-C credit report must identify the numbers and classes of biodiversity credits required to be retired in accordance with the like-for-like requirements of the offset rules and those that could be retired in accordance with the variation rules. Credit reports for ecosystem credits are provided in are provided in **Appendix G** and are summarised in **Table 30**.

11.1 Ecosystem credits

Table 30. Ecosystem credit class and matching credit profile

Ecosystem credit	Attributes shared with matching credits						
	PCT name	PCT vegetation class	PCT vegetation formation	Associated TEC or EC	Offset trading group (BAM Section 10.2, Tables 4 & 5)	Hollow bearing trees present?	IBRA subregion (in which proposal is located)
PCT 101 Woodland (Good)	Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	Semi-arid Woodlands (Grassy sub-formation)	Brigalow Clay Plain Woodlands	Poplar Box Grassy Woodland on Alluvial Plains (EPBC Act)	Poplar Box Grassy Woodland on Alluvial Plains	Yes	Peel
PCT 101 Woodland (Moderate)				Poplar Box Grassy Woodland on Alluvial Plains (EPBC Act)	Poplar Box Grassy Woodland on Alluvial Plains	Yes	
PCT 101 Scattered Trees				N/A	N/A	Yes	

12. REFERENCES

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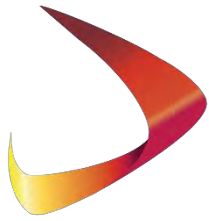
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APPENDIX A

DETERMINATION OF EXCLUDED IMPACTS

Land Category Report



Premise

AGRICULTURAL DEVELOPMENT SERVICES AUSTRALIA PTY LTD

Angora Feedlot

LAND CATEGORY REPORT


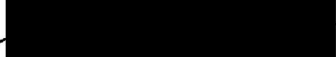

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15 December 2023

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INTRODUCTION

Agriculture Development Services Australia Pty Ltd (AgDSA) propose the expansion of an existing feedlot (current capacity: 1,000 head of cattle) and the construction of a new feedlot. The total capacity of the Angora Feedlot will be 9,500 head of cattle. Premise Australia Pty Ltd (Premise) was engaged to prepare a Biodiversity Assessment Report (BDAR) to assess the potential impacts of the Project on biodiversity values, threatened species, threatened ecological communities and their habitats.

The Proposed Development is to be assessed under Part 4 of the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act). The Subject Land has a minimum lot size of 400 ha with a minimum clearing threshold of 1 ha. As the Proposed Development will result in the permanent loss of 24.21 ha of native vegetation, the Biodiversity Offset Scheme (BOS) will be triggered. Therefore, a BDAR must be prepared by an accredited assessor using the Biodiversity Assessment Method (BAM) to assess the impact of the proposal on biodiversity values.

Premise have undertaken desktop and on-site investigations and identified areas of the Subject Land to be consistent with Category 1 – exempt land under section 60H of the *Local Land Services Act 2013* (LLS Act). This report provides justification for the Category 1 land for review and endorsement by the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment (DPE). Clearing vegetation on Category 1 land does not require assessment under the NSW Biodiversity Conservation Act 1999 (BC Act) as the land can lawfully be cleared under the LLS Act. Any part of the Subject Land that is not classified as Category 1 land will be assessed further in the BDAR. Native vegetation considered to be Category 2 land include PCT 101 Woodland (good and moderate conditions) and PCT 101 DNG (moderate and poor conditions). These vegetation zones have been excluded from this Land Category Report.

1. PROJECT DETAILS

1.1 Project Overview

Proposed development associated with the new feedlot includes:

- Two effluent reuse areas (44.4ha);
- Arrival, dispatch and handling facilities including feedlots, a manure pad (1.31 ha), retention of existing pens and handling yards for short term use;
- 2.5ML sedimentation basin (0.27 ha) and a 22ML effluent pond (1.56ha);
- Vegetation screens along Rannock Burn Road and the eastern perimeter of the site;
- Site access connecting the north-western corner of the site to Rannock Burn Road via an internal road; and
- Infrastructure associated with a feedlot including silage pits and a hay shed, upgraded feed mill and additional feed storage.

Proposed development associated with the existing feedlot includes:

- Upgraded feed mill infrastructure and additional silos with a limited footprint change.

1.2 Administration

The proponent for the proposed feedlot is AgDSA, located at Unit 14/12 Prescott St, Toowoomba City, Queensland. The contact name is Matthew Norton [REDACTED]

The Project Identification for Premise Pty Ltd is 223029.

Premise Ecologists Isobel Colson and Michelle Lindsay undertook the site inspection and prepared the land category assessment, under the supervision of Sally Kirby.

1.3 Site Details

The Project is proposed to be located at 'Annabrae', Rannock Burn Road, Rushes Creek NSW, within Tamworth Regional Council Local Government Area (LGA). The Subject Land includes Lot 19, 43, 44, 141 and 142 DP752169 and partial Lot 7300 DP1134279 and Lot 1 DP842391 (**Figure 1; Figure 2**).

The Subject Land (75.93 ha) for this Land Category Report includes Lot 19, 43, 44, 141 and 142 DP752169, and Lot 1 DP842391, and is zoned as RU1: Primary Production as per the *Tamworth Regional Local Environmental Plan 2011*. Therefore, the LLS Act applies. The site occurs in the Tamworth Regional Council Local Government Area (LGA), within the Peel subregion of the Nandewar Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (Thackway and Cresswell 1995) (**Figure 1**). It also lies within the Tamworth – Keepit Slopes and Plains Mitchell Landscape (NSW Government 2022).

The site is surrounded by agricultural land uses and is bounded by Rannock Burn Road to the north and east, the Peel River to the south and Rushes Creek Road to the west. The Subject Land is generally flat, ranging from 300 m Above Sea Level (ASL) at the existing feedlot along the southern boundary of the site to 330 m ASL in the north-west. The site contains numerous farm dams, tracks and infrastructure associated with the existing feedlot. The property has a long history of agricultural production, including grazing and cropping. At the time of survey, some areas were sown to oats and cattle were grazing. Summer crops are also undertaken in exotic grassland areas within the pivot paddocks every 3-4 years. Native vegetation on the Subject Land occurs in the form of remnant woodland, native grasslands and scattered trees. An assessment of this native vegetation (excluding scattered trees) is provided in the BDAR and is excluded from the Land Category Report.

The land around the site is predominantly cleared for cropping and livestock grazing. Native vegetation around the Subject Land includes derived native grasslands, isolated patches of remnant woodland, and planted native trees. Large areas of intact native vegetation in the region include Somerton National Park (NP), Melville Range, Dowe NP, Boonalla Aboriginal Area, Lake Keepit State Park, Vickery Nature Preserve and Dinawirindi Nature Preserve.

Figure 1. Location Map

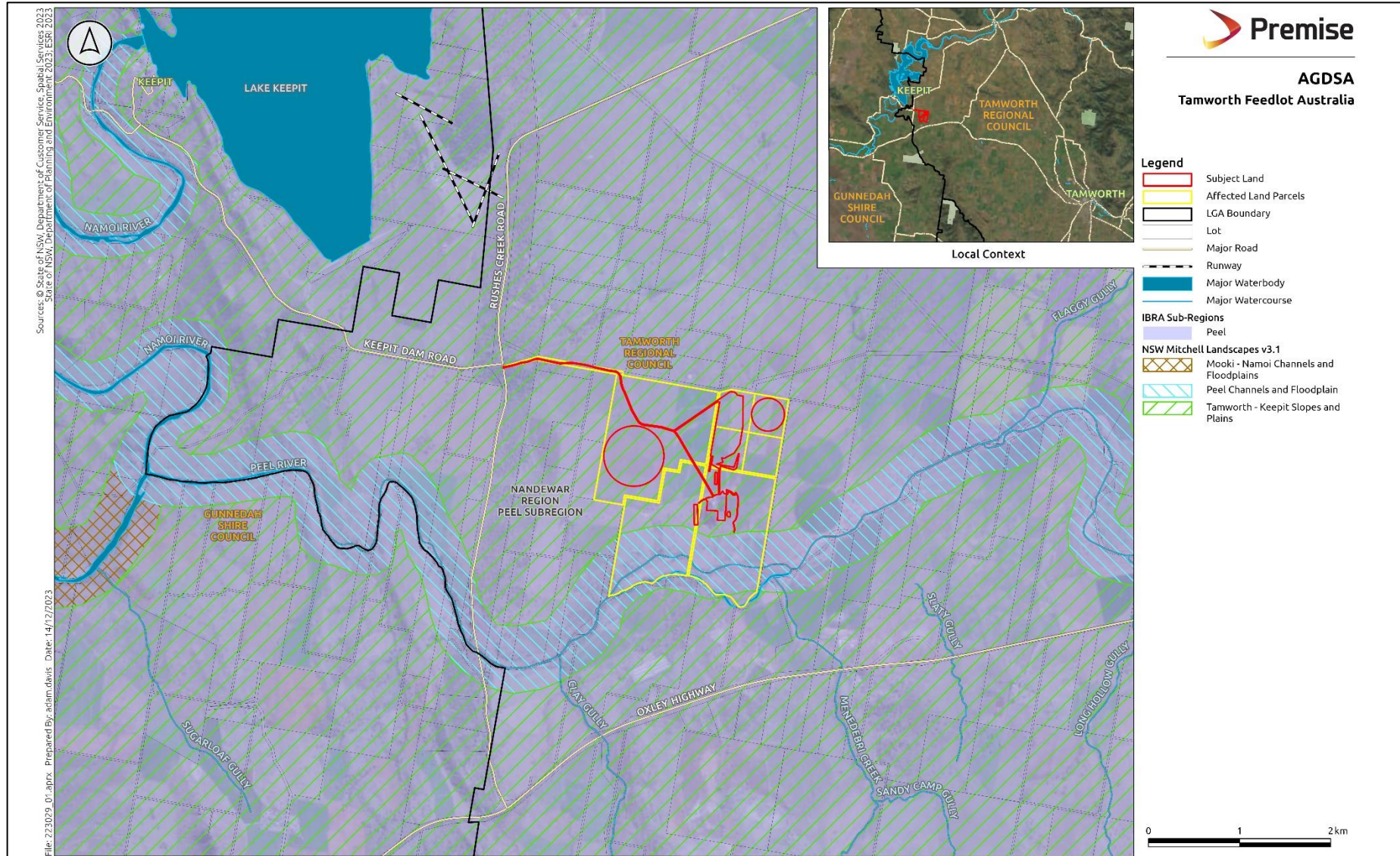


Figure 2. Development Layout



2. LAND CATEGORIES ON THE SUBJECT LAND

Native vegetation on rural land in NSW is managed under the Land Management Framework according to categories determined by Section 60H of the LLS Act. Where the LLS Act applies, land can be classified as:

- Category 1 – exempt land, land that is devoid of native vegetation, or is native vegetation that has regenerated on land that was lawfully cleared prior to 1990;
- Category 2 – regulated land, native vegetation that may be cleared with authorisation from Local Land Services;
- Category 2 – vulnerable regulated land, applies to steep or erodible land, riparian areas or special category land; and
- Category 2 – sensitive regulated land, for environmentally sensitive areas.

The decision matrix shown in **Table 1** outlines the data sources and steps taken in assessing the Subject Land to determine whether it meets the Category 1 exempt land criteria within the meaning of the LLS Act. This decision matrix was developed in consultation with BCS in 2021. Vegetation clearing on Category 1 land is not required to be assessed under the BC Act. However, other impacts (i.e., the loss of fauna habitat features such as rocks, human-made structures, or non-native vegetation) listed in the Biodiversity Conservation Regulation 2017 (cl. 6.1) as prescribed impacts, are considered in the BDAR.

Table 1. Land Categorization Decision Matrix

Data Source	Land Use Category	Priority Given	Land Category	Justification
Transitional Native Vegetation Regulatory Map	Category 2 - vulnerable regulated or Category 2 - sensitive regulated land.	1	2	CI 108(4) <i>Local Land Services Regulation 2014</i> (LLS Reg): An area of the State to which Part 5A of the Act applies is, during the period from the commencement of that Part until the area has been designated on a native vegetation regulatory map, taken to be Category 2 - sensitive regulated land if the land is so designated on a transitional native vegetation regulatory map published by the Environment Agency Head.
Local Land Services, Client, Biodiversity Conservation Trust, DPE, Local Council	Land part of a Travelling Stock Reserve (TSR), consent or conservation agreement, biodiversity certification, an offset under a Property Vegetation Plan (PVP), a 'set-aside', subject to a remedial action or publicly funded.	1	2	S60I(2) LLS Act: Land is to be designated as Category 2 - regulated land if the Environment Agency Head reasonably believes that the land contains native vegetation that was grown or preserved with the assistance of public funds (other than funds for forestry purposes), is subject to a private land conservation agreement, a set aside or offset under the Native Vegetation Act or biodiversity certified under the BC Act.
				CI113(1) LLS Reg: (1) Land is also to be designated as Category 2 - regulated land if the Environment Agency Head reasonably believes that the land is (or was previously) subject to a private native forestry plan, property vegetation plan or an incentive property vegetation plan (being land that was required to be conserved or in respect of which public funding was provided to improve biodiversity), Nature Conservation Trust Act 2001, or proposed plantation under the Plantations and Reafforestation Act 1999, to be set aside for nature conservation, for re-vegetation of native vegetation or as a native vegetation offset, or the land is a travelling stock reserve (unless the land is located in the Western Division of the State).
Koala Plan of Management	Land is identified as core koala habitat under a Plan of Management approved under State Environmental Planning	1	2	S601(2)(j) LLS Act and CI111 LLS Reg: Land that in the opinion of the Environment Agency Head is core koala habitat . (Koala Habitat Protection SEPP 2020 which applies to RU1 Primary Production, RU2

Data Source	Land Use Category	Priority Given	Land Category	Justification
	Policy (Koala Habitat Protection) 2020.			Rural Landscape or RU3 Forestry zones) is to be designated as Category 2 - regulated land.
Existing approvals for lawful clearing e.g. development consents, consent authority approved operational plans etc	Existing approval for clearing of native vegetation can be unambiguously demonstrated AND is NOT overridden by any of the other specific agreements noted below (where there is no definitive evidence, a precautionary approach must be applied (i.e. Category 2 assumed)).	2	1	Existing clearing which was previously authorised under other legislation as set out in S60O LLS Act is to be designated as Category 1 – exempt land.
				S60H(1) LLS Act: Land is to be designated as Category 1 – exempt land if the Environment Agency head reasonably believes that (a) the land was cleared of native vegetation at 1 January 1990 or (b) lawfully cleared between that date and the commencement of Part 5A of the LLS Act (25 August 2017).
Best available aerial photography (including Six Viewer and Google Earth Pro)	Woody vegetation (native) present at or before 1 January 1990.	3	2	S60I(1) LLS Act: Land is to be designated as Category 2 – regulated land if the Environment Agency Head reasonably believes that the land was (a) not cleared of native vegetation at 1 January 1990 OR (b) the land was unlawfully cleared of native vegetation after 1 January 1990.
				CI113(1)(g) LLS Reg: land is to be designated as Category 2 – regulated land if the Environment Agency Head reasonably believes that the land contains low conservation grasslands beneath the canopy or dripline of woody vegetation (being woody vegetation that satisfied the criteria for classification of the land as category 2) (Scattered Trees).
Premise ground-truthed vegetation mapping	Native vegetation, remnant woodlands, grasslands.	3	2	S60I(1)(a) LLS Act: Land is to be designated as Category 2 – regulated land if the Environment Agency Head reasonably believes that the land was not cleared of native vegetation at 1 January 1990 and is not 'low conservation value' grasslands or groundcover.
Floristic data (Interim Grasslands and other Groundcover Assessment Method [IGGAM] Transects)	The land is classed as low conservation value (i.e., exotic perennial cover is greater than native cover).	4	1	S60H(2)(a) LLS Act: Land is to be designated as Category 1 – exempt land if the Environment Agency Head reasonably believes that the land contains low conservation value grasslands in accordance with the relevant requirements of the LLS Act and Regulations. See also CI 109 LLS Reg (low conservation value ground cover) and S60F(3) LLS Act.

Data Source	Land Use Category	Priority Given	Land Category	Justification
				The IGGAM is a DPE endorsed method for determining low conservation value grasslands/groundcover. IGGAM transects require an appropriate number of plots, qualified survey personnel, appropriate seasonal or species-specific survey timing for maximum native species representation.
Floristic data (IGGAM Transects)	Land contains grasslands that are not low conservation value (i.e., greater than (>) 50 per cent (%) native species, or are associated with a Threatened Ecological Community (TEC), or known to contain threatened species habitat).	4	2	S60I(2)(e) LLS Act requires land to be designated as Category 2 regulated land if the Environment Agency Head reasonably believes that the land contains grasslands that are not low conservation value grasslands). Under the 'Native Species Criteria', grasslands or groundcover cannot be designated as low conservation value under the native species assessment where threatened species have been mapped by the Office of Environment and Heritage as having been present on the land, or are known to be present by the assessor.
Best available aerial photography (including Six Viewer and Google Earth Pro, landholder records)	Spatial imagery indicates vegetation has been 'significantly disturbed' or 'modified' within the meaning of the LLS Act and in accordance with the LLS Regulations.	5	1	S60J(2) LLS Act allows native vegetation that comprises grasslands or other non-woody vegetation to be taken to have been cleared if the native vegetation was significantly disturbed or modified (see cl. 114(1) and(2) LLS Reg).
Best available aerial photography (including Six Viewer and Google Earth Pro, landholder records)	Pre-1990 non-vegetated areas such as public roads, farm tracks and roads and other infrastructure.	5	1	S60H(1)(a) LLS Act: Land is to be designated as Category 1 - exempt land if the Environment Agency Head reasonably believes that the land was cleared of native vegetation at 1 January 1990.

Data Source	Land Use Category	Priority Given	Land Category	Justification
NSW Land Use 2017 v1.2	1. Conservation and Natural Environments	5	2	As per Figure 7 of the Native Vegetation Regulation (NVR) map method statement - Australian Land Use Mapping (ALUM) classification assigned to the NVR map Category 2.
	1.2.0 Managed resource protection			
	1.2.1 Biodiversity			
	1.2.2 Surface water supply			
	1.2.3 Groundwater			
	1.2.4 Landscape			
	1.2.5 Traditional Indigenous use			
	1.3.0 Other minimal use			
	1.3.1 Defence land – natural areas			
	1.3.2 Stock route			
	1.3.3 Residual native cover			
	1.3.4 Rehabilitation			
	2. Production from Relatively Natural Environments			
	2.1.0 Grazing native vegetation			
	5. Intensive Uses			
	5.4.3 Rural residential without agriculture			
	5.5.2 Public services – cemeteries			
	5.7.0 Transport and communication			
	5.7.1 Airport/aerodrome			
	5.7.2 Roads			
	5.7.3 Railways			
	5.7.4 Ports and water transport			
	5.7.5 Navigation and communication			
	6. Water			

Data Source	Land Use Category	Priority Given	Land Category	Justification
	6.1.1 Lake – conservation			
	6.1.4 Lake – saline			
	6.3.0 River			
	6.3.1 River – conservation			
	6.5.0 Marsh/wetland			
	6.5.1 Marsh/wetland – conservation			
	6.5.4 Marsh/wetland – saline			
	6.6.0 Estuary/coastal waters			
	6.6.1 Estuary/Coastal water – conservation			
	NVR Map Special			
	8.8.0 No defined land use			
	8.8.8 Cemeteries			
NSW Land Use 2017 v1.2	All other Land Use Categories (other than those specifically listed above).	6	1	As per Figure 7 of the NVR map method statement - ALUM classification assigned to the NVR map Category 1.

2.1 Datasets and Resources

The following datasets and resources were used to inform the process of identifying, mapping and justifying Category 1 on the Subject Land:

- Satellite Imagery Google Earth Pro 2018 (**Figure 1**);
- Native Vegetation Regulatory (NVR) Map Viewer (NSW Government, 2021a) (<https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap>) Category 2 Regulated Land on the publicly available Transitional NVR Map (**Figure 3**);
- NSW Native Vegetation Extent v1p4 (Office of Environment and Heritage [OEH], 2023) <https://datasets.seed.nsw.gov.au/dataset/nsw-native-vegetation-extent-5m-raster-v1-0>. Woody extent mapping showing woody and non woody areas (**Figure 4**);
- NSW Land Use Mapping 2017 v1.2 (Department of Planning and Environment [DPE], 2019) https://geo.seed.nsw.gov.au/Public_View/index.html?viewer=Public_View&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED_Catalog.281 NSW Land Use Mapping to identify land classes consistent with Category 1 and Category 2 Land (**Figure 5**);
- Premise Vegetation Survey Results. Field Surveys conducted by qualified and experienced ecologists on the Subject Land in January 2023 (**Figure 6**); and
- NSW Historical Aerial Imagery from the NSW Spatial Portal (NSW Government, 2023). Historical aerial imagery from 1956 to 2001. <https://portal.spatial.nsw.gov.au/portal/apps/webappviewer/index.html?id=f7c215b873864d44bccdda8075238cb> (**Figure 7, Figure 8, Figure 9** and **Figure 10**).

Figure 3. Transitional Native Vegetation Regulatory Map

Legend
Subject Land
Native Vegetation Regulatory Map
Vulnerable Regulated Land

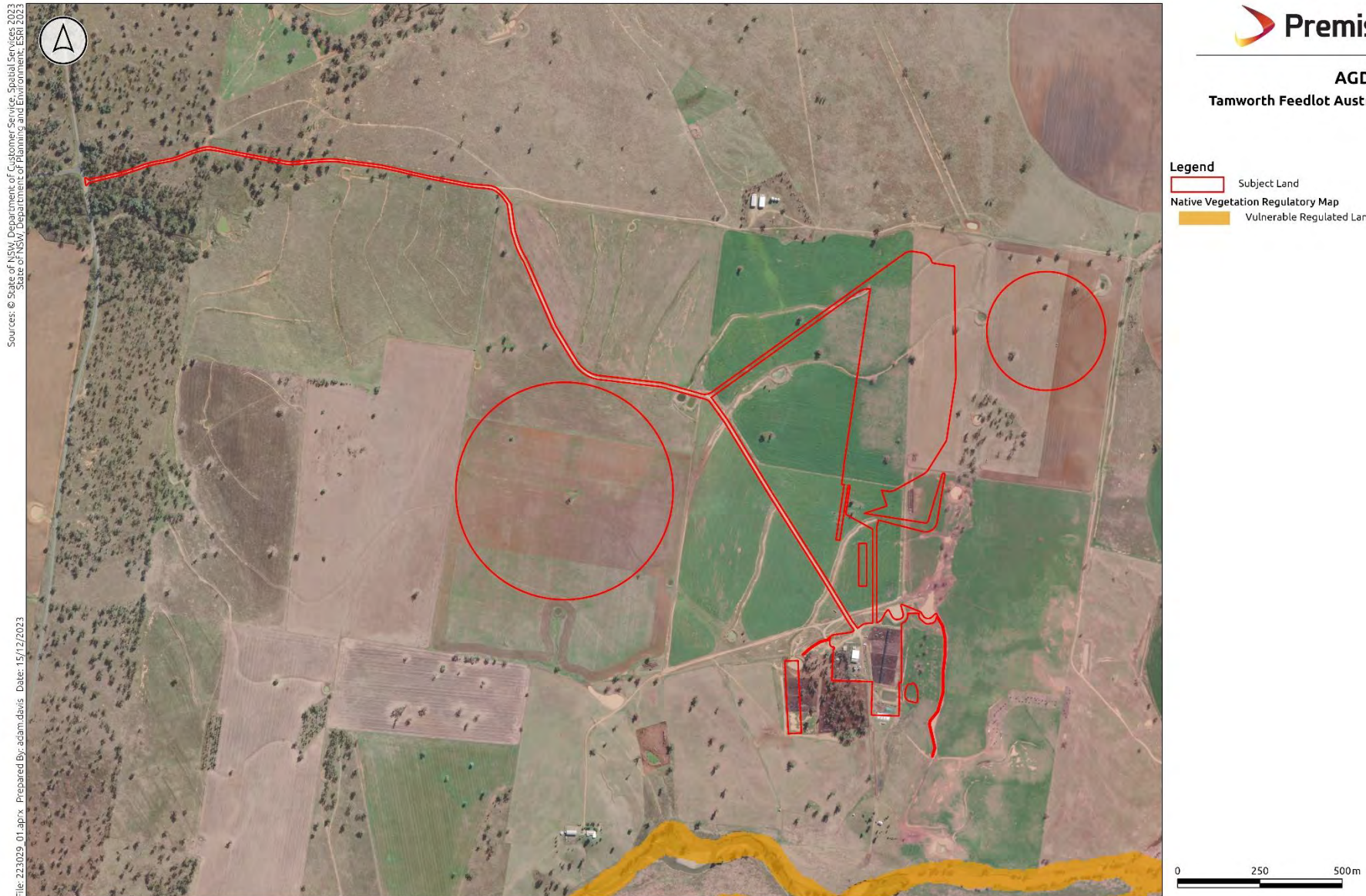


Figure 4. Native Vegetation Extent Mapping

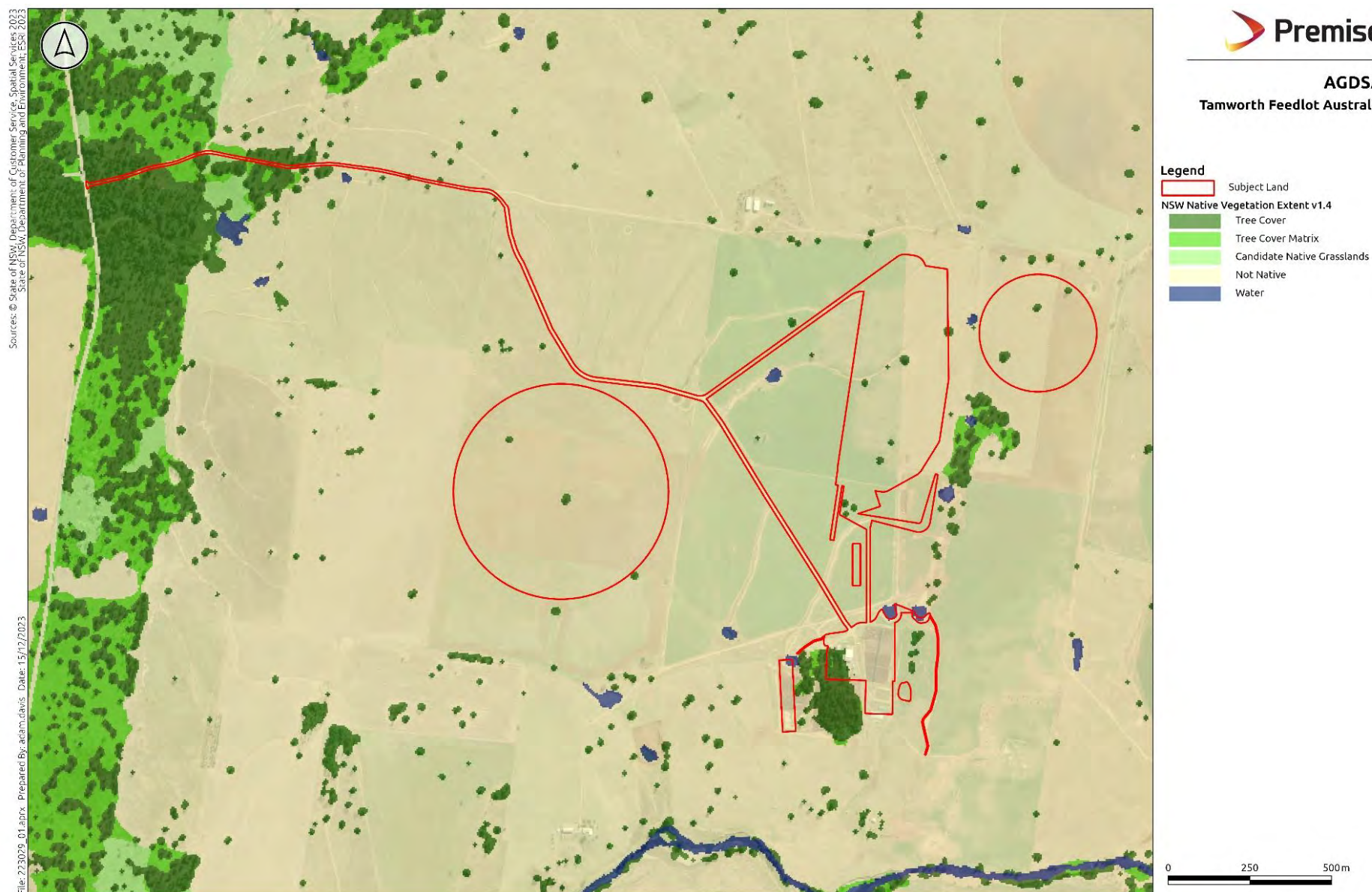


Figure 5. NSW Land Use Mapping



Figure 6. Premise Vegetation Survey Results

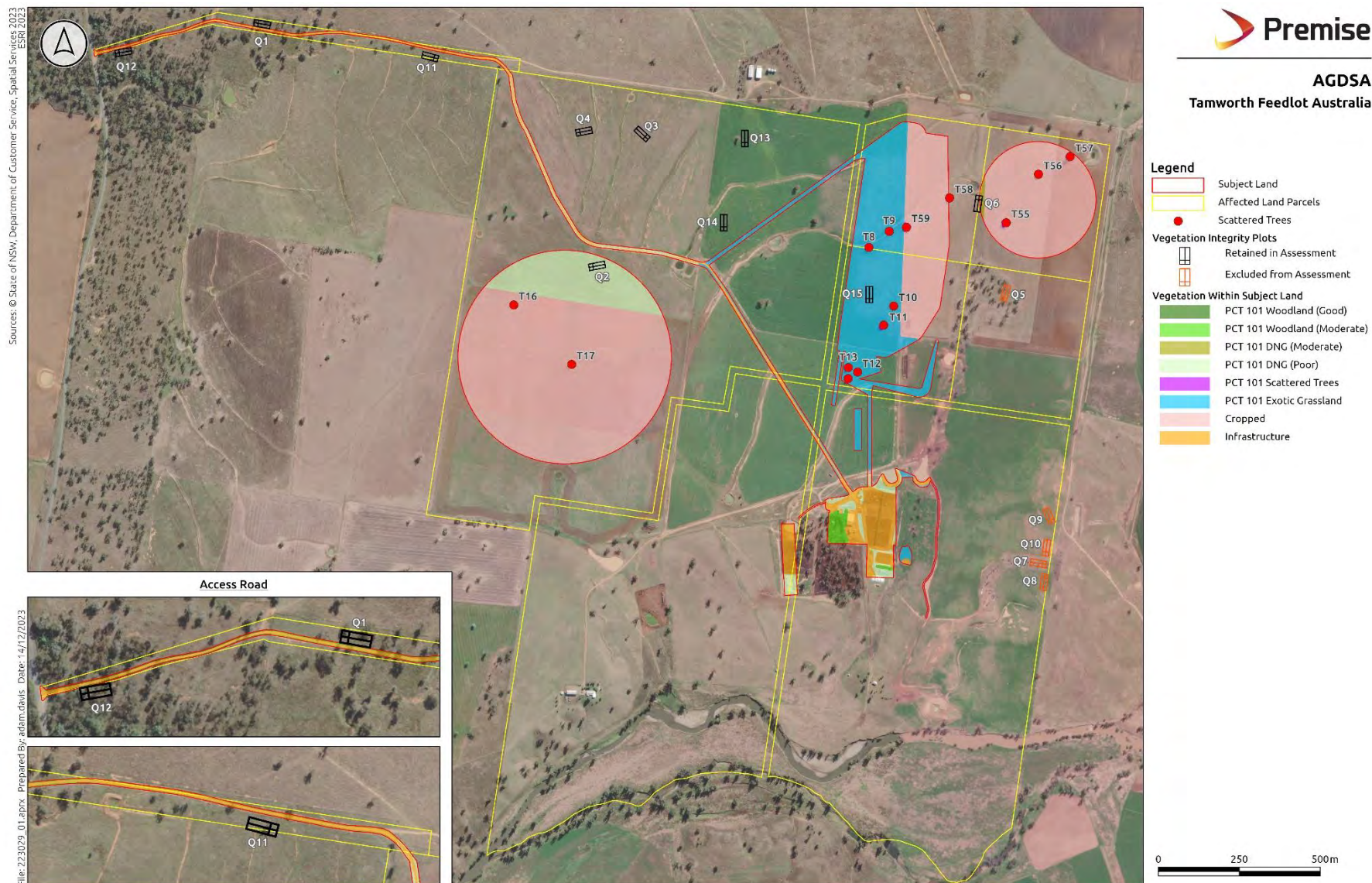


Figure 7. Historical Imagery Overview



Figure 8. Vegetation Mapping based on Aerial Photography and Premise Vegetation Surveys (1 of 3)

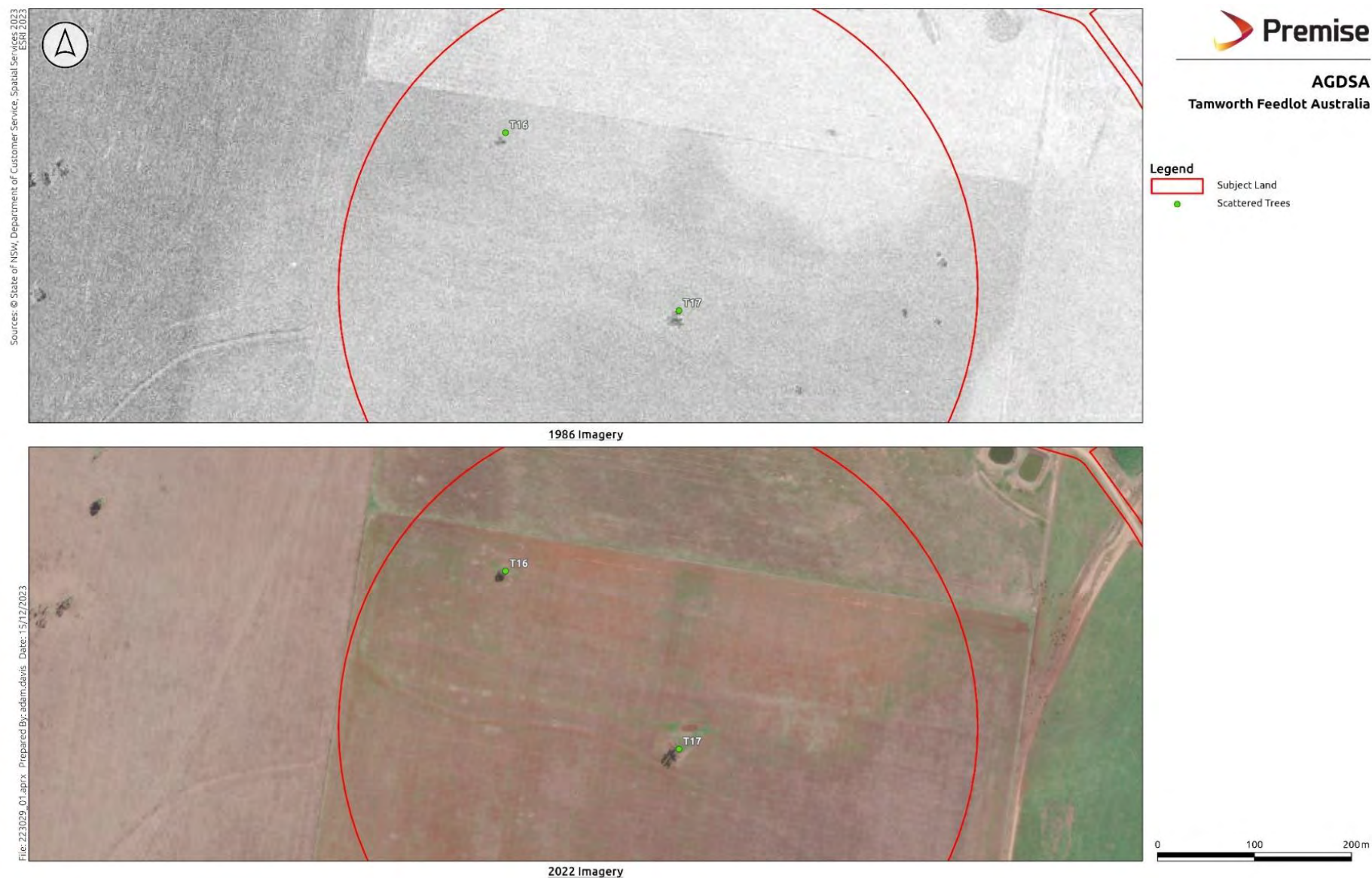
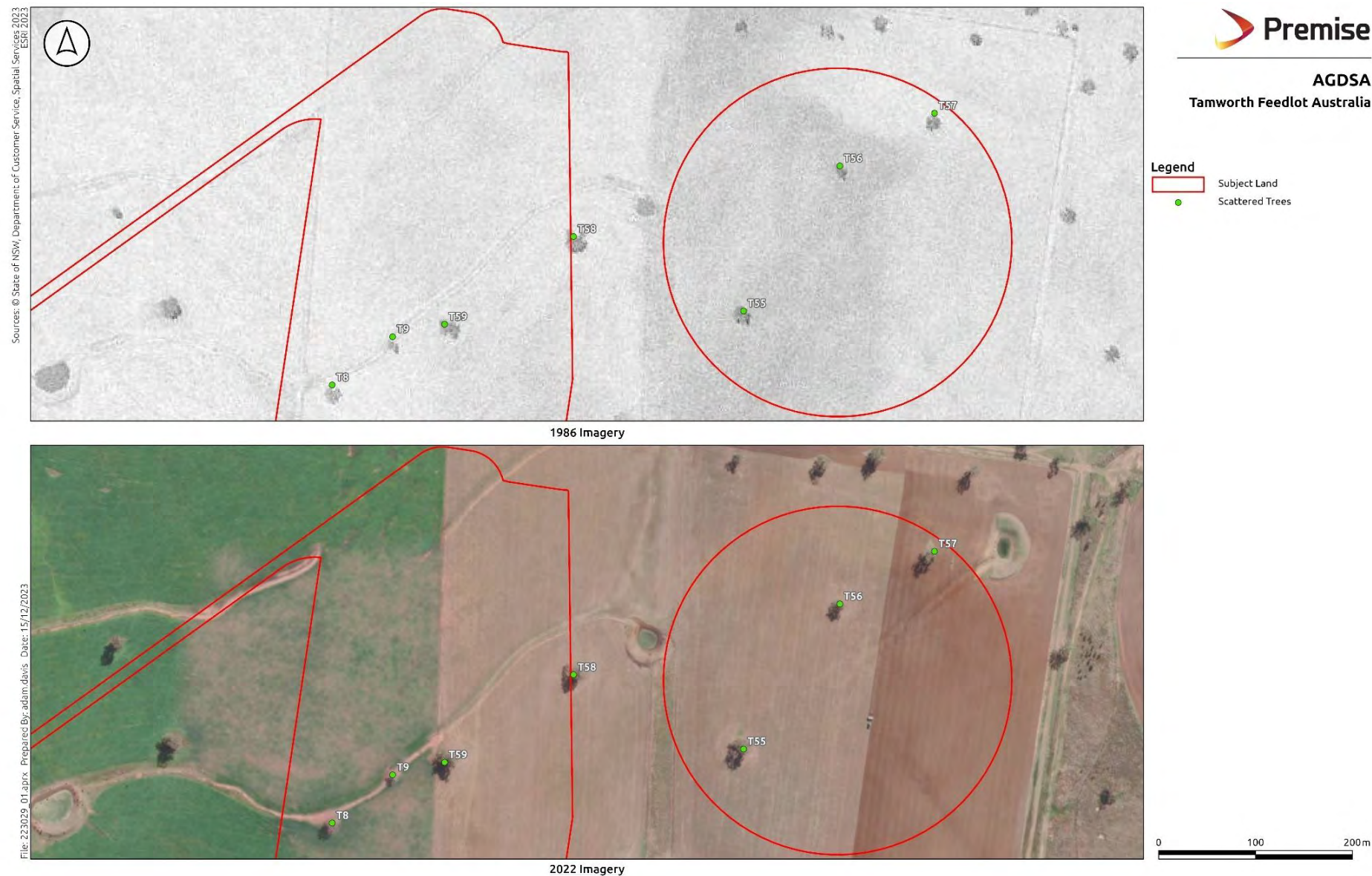


Figure 9. Vegetation Mapping based on Aerial Photography and Premise Vegetation Surveys (2 of 3)





AGDSA
Tamworth Feedlot Australia

Figure 10. Vegetation Mapping based on Aerial Photography and Premise Vegetation Surveys (3 of 3)



2.2 Methods and Results

The best available aerial photography, including Google Earth Pro was used to map the Subject Land into five broad vegetation condition zones: Woodland, DNG, Scattered Trees, Exotic Grassland and Cropped. These broad zones were further refined following ground truthing and vegetation surveys undertaken between 10th-13th January 2023. Native vegetation (including remnant woodland [good and moderate conditions] and DNG [moderate and poor conditions]) were assigned to Plant Community Types (PCTs) and condition based on Biodiversity Assessment Method (BAM) (DPIE 2020) Vegetation Integrity (VI) Plots. No Interim Grasslands and Groundcover Assessment Method (IGGAM) transects were used to assess the conservation value of exotic grassland or cropped zones. Vegetation zones were mapped as polygons using Geographic Information Systems (GIS) and provide the framework for the land categorization process.

Broad zones on the Subject Land were assigned to Category 1 or Category 2 land according to a decision matrix developed in consultation with BCS (**Table 1**).

The decision matrix was applied as follows:

- All polygons identified on the Transitional NVR Map **Figure 3** were assigned to Category 2.
- Threatened Ecological Communities (TECs) were assigned to Category 2. Threatened species assessments were undertaken when preparing the BDAR for the Project. No threatened species were detected and therefore threatened species habitat was not used to assign Category 2 to any polygons.
- The NSW Native Vegetation Extent v1p4 was acquired from the DPE BOS Data Broker in October 2023 to identify areas mapped as native vegetation. Scattered trees were identified on the Subject Land in accordance with the BAM (2020) as *"three or fewer trees that have a DBH of greater than or equal to 5 cm and are within a distance of 50 m of each other, that in turn, are greater than 50 m away from the nearest living tree that is greater than or equal to 5 cm DBH, and the land between the scattered trees is comprised of vegetation that are all ground cover species on the widely cultivated native species list, or exotic species or humanmade surfaces or bare ground"*. Scattered trees on the Subject Land are included for assessment in the BDAR. The Native Vegetation Extent and Scattered Trees are shown in **Figure 4**.
- Scattered trees on the Subject Land were recorded and evaluated in the office using historical aerial photography.
- Native vegetation identified on the Subject Land through aerial imagery interpretation and on ground vegetation surveys were attributed to Category 2 (**Figure 8**).
- Premise undertook vegetation surveys to ground truth the vegetation mapping (**Figure 6**). All areas of native vegetation were assigned to Category 2 and areas that were identified as exotic dominated grassland were assessed to determine whether they were Category 1 or Category 2.
- Exotic vegetation where the ALUM classification was assigned to NVR Map Category 2 were assigned to Category 2 to be conservative (for example 2.1.0 grazing native vegetation).
- Exotic vegetation where the ALUM classification assigned to the NVR Map Category 1 (for example 3.2.0 Grazing modified pastures) was assigned to Category 1 except where field survey indicated that the vegetation was native. Native vegetation within these areas was sampled using VI plots and assigned to Category 2.

The Subject Land for this Land Category Report is 75.93 ha and zoned as RU1: Primary Production. It has a long history of cropping and cattle grazing, and at the time of survey (10th-13th January and 15th-16th February 2023) some areas were in an oats crop with cattle grazing.

2.2.1 VEGETATION SURVEY

Ten (10) VI Plots were undertaken within the Subject Land between 10th-13th January and 15th-16th February 2023. VI Plots consisted of a 20 x 20 m full floristic plot to gain data on vegetation structure and composition. A list of all vascular plant species was made with estimates of abundance and ground cover for each species. Surveys were undertaken by qualified and experienced ecologists, during early summer, which is considered optimal timing to detect perennial native species on the Subject Land. Seasonal conditions were also favourable, with above average rainfall in preceding months.

Scattered trees 'have a DBH of greater than or equal to 5 cm and are located more than 50 m away from any living tree that is greater than or equal to 5 cm DBH, and the land between the scattered trees is comprised of vegetation that are all ground cover species on the widely cultivated native species list, or exotic species or human made surfaces or bare ground' (DPIE 2020). Scattered trees were identified using aerial photography and assessed during vegetation surveys. Each tree was recorded using a Global Positioning System (GPS) and features recorded including location, Diameter at Breast Height (DBH), species and habitat characteristics such as presence or absence of hollows and mistletoe. The full list of scattered trees is provided in Appendix B of the BDAR.

Survey locations were strategically located in areas where Premise Ecologists identified high covers of native grasses in areas with land uses consistent with Category 1 land (

Figure 5). Survey locations are shown in **Figure 8**. VI Plot data was interpreted to determine the percent cover of native species compared to the percent cover of perennial exotic species (**Table 2**). A full list of plant species per survey location are provided in Appendix B of the BDAR.

2.2.2 LAND CATEGORISATION

2.2.2.1 Exotic Grassland

The NSW Land Use Layer identified most of the vegetation zone Exotic Grassland (14.81 ha) as 3.2.0 Grazing Modified Pastures and 3.3.0 Cropping. A small area as 3.3.0 Cropping, categories consistent with Category 1 land. A small area (0.15 ha) was mapped on the NSW Land Use Layer as 2.1.0 Grazing Native Vegetation, which is consistent with Category 2 land. At the time of survey, the Exotic Grassland was dominated by the exotic annuals, *Eragrostis cilianensis* (Stink Grass), *Avena sativa* (Oats) and *Conyza bonariensis* (Flaxleaf Fleabane), and contained low covers of native grasses (i.e., *Sporobolus creber* [Slender Rat's Tail Grass] and *Chloris truncata* [Windmill Grass]) (**Plate 1** and **Plate 2**). Exotic Grassland contains woody vegetation in the form of fifteen (15) scattered trees which are to be assessed in Section 3.2.2.3. No IGGAM transects or VI Plots were conducted in Exotic Grassland areas. Therefore, the proportion of perennial native vegetation cover could not be determined. A conservative approach was taken and all Exotic Grassland areas were mapped as Category 2 land for inclusion in the BDAR. No ecosystem credit costs are associated with Exotic Grassland which retained a VI score <15.

Plate 1. Exotic Grassland dominated by Oats



Plate 2. Exotic Grassland dominated by Oats and Flaxleaf Fleabane



2.2.2.2 Cropping

Following the decision matrix in **Table 1**, the NSW Land Use Layer identifies Cropping as 3.2.0 Grazing Modified Pastures (0.01 ha) and 3.3.0 Cropping (45.91 ha). These land uses are consistent with classification as Category 1 – exempt land as per the NVR Map Method Statement (OEH 2017). A small area of cropping (<0.01 ha) was identified on the NSW Land Use Layer as 2.1.0 Grazing Native Vegetation (<0.01 ha). This is a category consistent with Category 2 land. However, at the time of survey, all cropped areas were sown with an Oats crop (**Plate 3** and **Plate 4**). Aerial photography shows the area contains woody vegetation in the form of seven (7) scattered trees which are to be assessed in Section 3.2.2.3. The 45.92 ha of Cropping is considered Category 1 land based on NSW Land Use and Premise ground-truthed vegetation mapping.

Plate 3. Cropped Land with Scattered Trees



Plate 4. Cropped Land



2.2.2.3 Scattered Trees

All 14 scattered trees were assessed using the NSW Woody Extent layer (**Figure 4**) and historical aerial imagery using the Spatial Portal. All 14 scattered trees are present in the NSW Native Vegetation Extent dataset (**Figure 4**). Trees identified during field survey as scattered trees were matched to images from 1983 and 1990. All scattered trees on the site were able to be identified in their current

location in imagery from 1983 or 1990, indicating that they were present prior to 1990 and must be considered Category 2. Scattered trees are therefore not considered further in this report, and will be addressed in the BDAR (**Plate 5**).

Plate 5. PCT 101 Scattered Trees



2.2.2.4 Native Vegetation

Areas that were mapped as consistent with Category 1 land on the NSW Land Use map, but which contained a >50% proportion of perennial native vegetation cover, were mapped as Category 2 land.

2.2.2.5 Infrastructure

All areas cleared of vegetation associated with farm infrastructure including roads, tracks and buildings have been mapped as Category 1 and Category 2 land. These areas are mapped on the NSW Land Use Map as 3.2.0 Grazing Modified Pastures, and 3.3.0 Cropping which are consistent with Category 1 land, and 2.1.0 Grazing Native Vegetation, which is consistent with Category 2 land.

3. CONCLUSION

A total area of 75.93 ha on the Subject Land shown in **Figure 11** is considered Category 1 exempt land. A total area of 26.11 ha on the Subject Land, including 14 scattered trees, is considered Category 2 - regulated land and will be assessed using the Biodiversity Assessment Method (BAM) 2020 via a separate BDAR. Prescribed impacts will also be assessed and included in the BDAR for land assigned as Category 1.

Figure 11. Category 1 and Category 2 Land on the Subject Land



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APPENDIX B

VEGETATION SURVEY DATA

Table 31. Vegetation survey data and locations

Q15	Q14	Q13	Q12	Q11	Q6	Q4	Q3	Q2	Q1	Plot
101	101	101	101	101	101	101	101	101	101	PCT
14.95	14.95	14.95	0.78	0.38	0.38	8.05	8.05	8.05	0.16	Area (ha)
101	101	101	101	46	46	48	48	48	101	Patch Size
Exotic	Exotic	Exotic	Woodland_Go	DNG_Moderat	DNG_Moderat	DNG_Poor	DNG_Poor	DNG_Poor	Woodland_M	Condition Class
55	55	55	55	55	55	55	55	55	55	Zone
840036	839598	839677	837748	838743	266954	265707	265930	265748	264712	Easting
6574025	6574272	6574528	6574920	6574850	6577228	6577422	6577402	6577706	6577763	Northing
0	0	0	80	285	188	79	313	79	100	Bearing
0	0	0	3	1	0	0	0	0	1	Comptree
1	1	0	3	1	0	1	1	1	2	Compshrub
2	3	2	19	7	10	5	8	8	19	Compgrass
3	4	4	14	7	11	5	8	7	9	Compforbs
0	0	0	1	0	0	0	0	0	0	Compferns
0	0	0	3	0	0	0	0	0	2	Compothor
0.0	0.0	0.0	40.1	10.0	0.0	0.0	0.0	0.0	10.0	Structree
1.0	0.2	0.0	6.0	1.0	0.0	1.0	0.1	0.5	0.2	Strucshrub
0.3	5.6	0.3	78.1	55.5	78.6	31.1	19.3	11.6	68.3	Strucgrass
0.3	2.5	0.4	6.1	0.7	3.0	1.4	0.8	2.0	8.2	Strucforbs
0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	Strucferns
0.0	0.0	0.0	15.6	0.0	0.0	0.0	0.0	0.0	0.3	Strucother
0	0	0	2	1	0	0	0	0	2	Funlargetrees
0	0	0	2	1	0	0	0	0	2	Funhollowtrees
5.0	3.0	10.0	21.0	6.6	11.0	6.8	11.0	8.8	6.6	Funlittercover
0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	17.5	Funlenfallenlogs
0	0	0	1	0	0	0	0	0	0	Funtreestem5to9
0	0	0	1	0	0	0	0	0	0	Funtreestem10to19
0	0	0	1	0	0	0	0	0	0	Funtreestem20to29
0	0	0	1	0	0	0	0	0	0	Funtreestem30to49
0	0	0	1	0	0	0	0	0	1	Funtreestem50to79
0	0	0	1	0	0	0	0	0	1	Funtreeregen
0.0	0.0	0.5	0.2	0.2	0.2	0.0	0.2	0.1	0.2	Funhighthreatexotic
Q15	Q14	Q13	Q12	Q11	Q6	Q4	Q3	Q2	Q1	Plot-based vegetation survey?
101	101	101	101	101	101	101	101	101	101	Vegetation integrity survey?

Table 32. VI Plot Species List

Scientific Name	Common Name	Status	Growth Form	Q1		Q2		Q3		Q4		Q6		Q11		Q12		Q13		Q14		Q15	
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Alectryon oleifolius</i>	Western Rosewood	N	Tree (TG)													0.1	1						
<i>Alternanthera denticulata</i>	Lesser Joyweed	N	Forb (FG)					0.1	1			0.1	5										
<i>Alternanthera pungens</i>	Khaki Weed	HTW												0.1	20								
<i>Anthosachne scabra</i>	Wheatgrass, Common Wheatgrass	N	Grass & grasslike (GG)	0.1	20											0.1	2						
<i>Aristida ramosa</i>	Purple Wiregrass	N	Grass & grasslike (GG)	10	200			2	50					12	50	0.5	30			0.5	5	0.1	2
<i>Auistrostipa aristiglumis</i>	Plains Grass	N	Grass & grasslike (GG)									60	500										
<i>Auistrostipa scabra</i>	Speargrass	N	Grass & grasslike (GG)	0.3	50	0.5	30	3	200	0.5	50					25	500			5	50	0.2	10
<i>Auistrostipa verticillata</i>	Slender Bamboo Grass	N	Grass & grasslike (GG)	50	300									15	50	10	100						
<i>Avena sativa</i>	Oats	E				25	10000	30	10000	50	10000							40	500	15	150	25	300
<i>Boerhavia dominii</i>	Tarvine	N	Forb (FG)	0.1	100	0.1	50	0.1	10	0.1	5			0.1	2	0.5	200						
<i>Bothriochloa decipiens</i>	Pitted Bluegrass	N	Grass & grasslike (GG)	0.1	30	0.1	2	0.1	1	0.1	2	0.1	5	0.1	1								
<i>Bromus catharticus</i>	Praire Grass	E		0.5	30									5	500								
<i>Brunonia australis</i>	Blue Pincushion	N	Forb (FG)													0.1	20						
<i>Callitris glaucophylla</i>	White Cypress Pine	N	Tree (TG)													10	4						
<i>Calotis hispidula</i>	Bogan Flea	N	Forb (FG)									1	200										

Scientific Name	Common Name	Status	Growth Form	Q1		Q2		Q3		Q4		Q6		Q11		Q12		Q13		Q14		Q15	
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Calotis lappulacea</i>	Yellow Burr-daisy	N	Forb (FG)	5	1000	0.5	100			1	50	0.2	10	0.1	2	3	200			2	50	0.1	5
<i>Carex inversa</i>	Knob Sedge	N	Grass & grasslike (GG)	0.1	5							0.1	5	0.1	1								
<i>Carex spp.</i>		N	Grass & grasslike (GG)									0.1	1										
<i>Carthamus lanatus</i>	Saffron Thistle	HTW				0.1	5	0.1	1			0.1	1	0.1	1								
<i>Centaurea solstitialis</i>	St Barnabys Thistle	E		0.1	2							0.1	3	0.1	1								
<i>Centaureum erythraea</i>	Common Centaury	E		0.1	1	0.1	50	0.1	50	0.1	10	0.1	20					0.1	5	0.1	5		
<i>Cheilanthes distans</i>	Bristly Cloak Fern	N	Fern (EG)													0.1	10						
<i>Chenopodium album</i>	Fat Hen	E																0.5	5				
<i>Chloris truncata</i>	Windmill Grass	N	Grass & grasslike (GG)			0.1	5	10	500	10	500	0.1	1	3	100			0.1	10	0.1	2		
<i>Chloris ventricosa</i>	Tall Chloris	N	Grass & grasslike (GG)	0.1	20											20	400						
<i>Chondrilla juncea</i>	Skeleton Weed	E				0.1	5							0.1	50								
<i>Convolvulus graminetinus</i>		N	Other (OG)													0.1	1						
<i>Conyza bonariensis</i>	Flaxleaf Fleabane	E		5	10000	3	5000	10	5000	2	500	0.5	200	0.2	200	0.1	100	10	100	15	200	15	200
<i>Cyclospermum leptophyllum</i>	Slender Celery	E		0.1	10							0.1	30										
<i>Cyclospermum leptophyllum</i>	Slender Celery	E												0.1	3								
<i>Cymbopogon refractus</i>	Barbed Wire Grass	N	Grass & grasslike (GG)													0.5	20						
<i>Cynodon dactylon</i>	Common Couch	N	Grass & grasslike (GG)			10	200	2	100	20	500			25	1000								

Scientific Name	Common Name	Status	Growth Form	Q1		Q2		Q3		Q4		Q6		Q11		Q12		Q13		Q14		Q15	
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Cyperus gracilis</i>	Slender Flat-sedge	N	Grass & grasslike (GG)	2	500											0.2	100						
<i>Dianella caerulea</i>	Blue Flax-lily	N	Forb (FG)													0.2	5						
<i>Dichelachne micrantha</i>	Shorthair Plumegrass	N	Grass & grasslike (GG)													0.1	2						
<i>Dichondra repens</i>	Kidney Weed	N	Forb (FG)									0.1	1	0.1	30								
<i>Dichondra sp. Inglewood</i>		N	Forb (FG)													0.1	5						
<i>Digitaria brownii</i>	Cotton Panic Grass	N	Grass & grasslike (GG)	0.1	50											0.2	30						
<i>Digitaria spp.</i>		N	Grass & grasslike (GG)													0.1	2						
<i>Dysphania pumilio</i>	Small Crumbweed	N	Forb (FG)															0.1	2				
<i>Echium plantagineum</i>	Patterson's Curse	E		0.2	100	1	400	0.1	50	2	300	0.5	300	0.1	5	0.1	5	0.1	2	0.1	5	5	50
<i>Einadia hastata</i>	Berry Saltbush	N	Forb (FG)	0.5	50																		
<i>Einadia nutans</i>	Climbing Saltbush	N	Forb (FG)	1	200	0.1	2							0.1	10	0.5	50						
<i>Einadia trigonos</i>	Fishweed	N	Forb (FG)													0.1	10						
<i>Enneapogon nigricans</i>	Nine-awn Grass	N	Grass & grasslike (GG)													0.1	1						
<i>Enteropogon acicularis</i>	Curly Windmill Grass	N	Grass & grasslike (GG)	2	300	0.5	50									0.2	20						
<i>Eragrostis ciliaris</i>	Stinkgrass	E				1	200											15	300			0.1	2
<i>Eragrostis curvula</i>	African Lovegrass	HTW		0.1	10																		

Scientific Name	Common Name	Status	Growth Form	Q1		Q2		Q3		Q4		Q6		Q11		Q12		Q13		Q14		Q15	
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Eragrostis leptostachya</i>	Paddock Lovegrass	N	Grass & grasslike (GG)	0.5	50	0.1	5	0.1	1							0.1	5						
<i>Eremophila debilis</i>	Amulla	N	Shrub (SG)													5	500						
<i>Eriochloa crebra</i>	Cup Grass, Tall Cupgrass	N	Grass & grasslike (GG)									0.1	10										
<i>Eucalyptus albens</i>	White Box	N	Tree (TG)											10	1								
<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Bimble Box	N	Tree (TG)	10	2											30	10						
<i>Euchiton sphaericus</i>	Star Cudweed	N	Forb (FG)	0.2	500	1	500	0.1	20	0.1	5	0.1	10	0.1	10					0.2	10	0.1	2
<i>Euphorbia drummondii</i>	Caustic Weed	N	Forb (FG)					0.1	10							0.1	1	0.1	2				
<i>Gamochaeta calviceps</i>	Cudweed	E		0.1	20															0.1	5		
<i>Geijera parviflora</i>	Wilga	N	Shrub (SG)													0.5	2						
<i>Glycine clandestina</i>	Twining glycine	N	Other (OG)	0.1	2											0.5	300						
<i>Glycine tabacina</i>	Variable Glycine	N	Other (OG)	0.2	200																		
<i>Grona varians</i>	Slender Tick-trefoil	N	Other (OG)													15	5000						
<i>Heliotropium amplexicaule</i>	Blue Heliotrope	HTW						0.1	1														
<i>Hibiscus krichauffianus</i>	Velvet-leaf Hibiscus	N	Forb (FG)													0.1	5						
<i>Hibiscus sturtii</i>	Hill Hibiscus	N	Forb (FG)	0.1	10																		
<i>Hirschfeldia incana</i>	Buchan Weed	E		0.1	1									1	100								

Scientific Name	Common Name	Status	Growth Form	Q1		Q2		Q3		Q4		Q6		Q11		Q12		Q13		Q14		Q15	
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Hordeum leporinum</i>	Barley Grass	E		0.1	20	1	100					0.1	10					0.1	10				
<i>Hyparrhenia hirta</i>	Coolatai Grass	HTW														0.1	10						
<i>Hypochaeris glabra</i>	Smooth Catsear	E				0.1	1																
<i>Juncus flavidus</i>	Yellow Rush	N	Grass & grasslike (GG)									5	100										
<i>Lactuca serriola</i>	Prickly Lettuce	E				0.1	1									0.1	5	0.1	2				
<i>Lepidium africanum</i>	Common Peppergrass	E		0.1	50	0.1	20	0.1	10	0.1	20	0.1	1	0.2	100	0.1	10						
<i>Lepidium bonariense</i>	Argentine Peppergrass	E		0.2	100													0.1	5	0.1	5	0.1	10
<i>Leptochloa decipiens</i>	Slender Canegrass	N	Grass & grasslike (GG)	0.1	1																		
<i>Lolium rigidum</i>	Wimmera Ryegrass	E		0.1	1			0.1	5	5	500			0.1	100								
<i>Lomandra confertifolia</i>	Matrush	N	Grass & grasslike (GG)													0.1	1						
<i>Lomandra filiformis</i>	Wattle Mat-rush	N	Grass & grasslike (GG)	0.1	3																		
<i>Lomandra multiflora</i>	Many-flowered Mat-rush	N	Grass & grasslike (GG)													0.3	10						
<i>Maireana microphylla</i>	Small-leaf Bluebush	N	Shrub (SG)	0.1	1	0.5	4	0.1	2	1	10			1	6	0.5	3			0.2	5	1	10
<i>Malva parviflora</i>	Small-flowered Mallow	E																0.1	2	0.1	2		
<i>Malvastrum americanum</i>	Spiked Malvastrum	E		0.1	30															0.1	5		

Scientific Name	Common Name	Status	Growth Form	Q1		Q2		Q3		Q4		Q6		Q11		Q12		Q13		Q14		Q15	
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Medicago polymorpha</i>	Burr Medic	E		0.1	100	0.1	100	0.1	100	0.1	100			0.1	100					2	50		
<i>Medicago sativa</i>	Lucerne	E								0.1	1												
<i>Mentha satereioides</i>	Native Pennyroyal	N	Forb (FG)									0.2	10										
<i>Microlaena stipoides</i>	Weeping Grass	N	Grass & grasslike (GG)	1	200																		
<i>Neptunia gracilis</i>	Sensitive Plant	N	Forb (FG)									0.5	20										
<i>Opuntia aurantiaca</i>	Tiger Pear	HTW														0.1	1						
<i>Opuntia stricta</i>	Common Prickly Pear	E														0.2	2						
<i>Oxalis perennans</i>	Grassland Wood-sorrel	N	Forb (FG)	0.1	1							0.1	10	0.1	2								
<i>Panicum effusum</i>	Hairy Panic	N	Grass & grasslike (GG)	1	100																		
<i>Panicum queenslandicum</i>	Yadbila Grass	N	Grass & grasslike (GG)													0.5	100						
<i>Paspalidium gracile</i>	Slender Panic	N	Grass & grasslike (GG)	0.1	2							3	200										
<i>Persicaria spp.</i>	Knotweed	N	Forb (FG)													1	20						
<i>Petrorhagia dubia</i>		E		0.1	10											0.1	20						
<i>Polygonum aviculare</i>	Wireweed	E		1	200	0.1	100					0.1	50	0.1	5			2	50				
<i>Portulaca oleracea</i>	Pigweed	N	Forb (FG)															0.1	2				
<i>Rapistrum rugosum</i>	Turnip Weed	E										0.1	1										
<i>Rumex brownii</i>	Swamp Dock	N	Forb (FG)									0.5	100	0.1	1								
<i>Rumex crispus</i>	Curled Dock	E										0.2	30										

Scientific Name	Common Name	Status	Growth Form	Q1		Q2		Q3		Q4		Q6		Q11		Q12		Q13		Q14		Q15	
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Rytidosperma bipartitum</i>	Wallaby Grass	N	Grass & grasslike (GG)	0.1	5							0.1	10										
<i>Rytidosperma fulvum</i>	Wallaby Grass	N	Grass & grasslike (GG)													10	200						
<i>Rytidosperma longifolium</i>	Long-leaved Wallaby Grass	N	Grass & grasslike (GG)													0.1	10						
<i>Rytidosperma setaceum</i>	Small-flowered Wallaby-grass	N	Grass & grasslike (GG)	0.1	2	0.1	1	0.1	3														
<i>Schkuhria pinnata</i>	Dwarf Marigold	E				0.1	5	0.1	10	0.1	2							0.1	2			0.1	2
<i>Sclerolaena birchii</i>	Galvanized Burr	N	Shrub (SG)	0.1	5																		
<i>Senna barclayana</i>	Smooth Senna	N	Forb (FG)					0.1	2			0.1	2										
<i>Sida corrugata</i>	Corrugated Sida	N	Forb (FG)					0.1	10	0.1	1					0.1	5			0.1	5		
<i>Sida spinosa</i>		E		0.2	50	0.1	10	0.1	10	0.1	5	0.1	2	0.1	50	0.1	5						
<i>Sida trichopoda</i>	High Sida	N	Forb (FG)	0.2	50																		
<i>Sigesbeckia australiensis</i>		N	Forb (FG)													0.1	3						
<i>Silybum marianum</i>	Variegated Thistle	E		0.1	10																		
<i>Sisymbrium orientale</i>	Indian Hedge Mustard	E		0.1	5																		
<i>Sisymbrium spp.</i>		E								0.1	1												
<i>Solanum elaeagnifolium</i>	Silver-leaved Nightshade	HTW										0.1	2										
<i>Solanum esuriale</i>	Quena	N	Forb (FG)									0.1	20										

Scientific Name	Common Name	Status	Growth Form	Q1		Q2		Q3		Q4		Q6		Q11		Q12		Q13		Q14		Q15	
				Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance	Cover	Abundance
<i>Sonchus oleraceus</i>	Common Sowthistle	E		0.1	100	0.1	5	0.1	5											0.1	5		
<i>Sporobolus caroli</i>	Fairy Grass	N	Grass & grasslike (GG)									10	200										
<i>Sporobolus creber</i>	Slender Rat's Tail Grass	N	Grass & grasslike (GG)	0.5	100	0.2	10	2	20	0.5	50			0.3	10	10	50	0.2	2				
<i>Tribulus micrococcus</i>	Spineless Caltrop	N	Forb (FG)															0.11	2				
<i>Trifolium angustifolium</i>	Narrow-leaved Clover	E						0.1	5	0.1	3												
<i>Trifolium arvense</i>	Haresfoot Clover	E				0.1	5	0.1	5							0.2	50	0.1	5	0.1	10		
<i>Trifolium glomeratum</i>	Clustered Clover	E		0.1	100	0.1	100	0.1	50	0.1	100	0.1	100	0.1	50								
<i>Urochloa panicoides</i>	Urochloa Grass	E				5	1000					0.1	10	0.1	20			5	50				
<i>Verbascum virgatum</i>	Twiggy Mullein	E		0.1	2											0.1	8						
<i>Verbena quadrangularis</i>		E		0.1	5	0.3	20					0.5	100	1	5								
<i>Vittadinia cuneata</i>		N	Forb (FG)			0.1	2	0.1	2							0.1	1						
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell	N	Forb (FG)			0.1	300	0.1	30	0.1	20					0.1	200			0.2	50	0.1	5
<i>Xanthium spinosum</i>	Bathurst Burr	HTW		0.1	2													0.5	10				
<i>Xerochrysium bracteatum</i>	Golden Everlasting	N	Forb (FG)	1	300	0.1	1																

Table 33. Habitat Tree Assessment

Identity	Scientific Name	Common Name	Eastings	Northings	DBH	HB	Hollow Sizes	Scattered Tree
T8	<i>Eucalyptus albens</i>	White Box	266613	6577068	86	YES	8 cm (7 m up), 3x 10 cm (8 m up), 2x 25 cm (8 m up)	YES
T9	<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	266675	6577118	73	YES	5 cm (2 m up), 5 cm (5 m up), 5 cm (3 m up)	YES
T10	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	266690	6576887	106	YES	30 cm (2 m up)	YES
T11	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	266659	6576828	78	YES	5 cm (4 m up), 10 cm (7 m up)	YES
T12	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	266578	6576683	105	YES	15 cm (8 m up)	YES
T13	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	266549	6576696	119	YES	20 cm (7 m up), 30 cm (6 m up), 10 cm (6 m up), 15 cm (6 m up)	YES
T14	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	266549	6576663	103	YES	15 cm (4 m up), 7 cm (3 m up)	YES
T16	<i>Alectryon oleifolius</i>	Western Rosewood	265515	657689	61	NO		YES
T17	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	265694	6576707	95	YES	30 cm (4 m up), 10 cm (6 m up), 10 cm (7 m up)	YES
T25	<i>Eucalyptus albens</i>	White Box	264412	6577717	130	YES	10 cm (7 m up), 10 cm (4 m up), 10 cm (5 m up), 15 cm (9 m up)	NO
T55	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	267038	6577144	103	YES	5 cm (2 m up), 5 cm (3 m up), 5 cm (4 m up)	YES
T56	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	267137	6577294	70	YES	10 cm (6 m up), 10 cm (7 m up), 7 cm (2 m up)	YES
T57	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	267235	6577349	105	YES	10 cm (6 m up), 10 cm (5 m up), 10 cm (7 m up)	YES
T58	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	266862	6577221	129	YES	10 cm (4 m up), 10 cm (5 m up), 15 cm (4 m up), 10 cm (8 m up), 15 cm (6 m up)	YES
T59	<i>Eucalyptus populnea</i> subsp. <i>Bimbil</i>	Poplar Box	266735	6577131	134	YES	3 cm (2 m up), 10 cm (7 m up), 5 cm (7 m up), 5 cm (4 m up), 10 cm (6 m up), 3x 5 cm (8 m up), 5 cm (5 m up)	YES



APPENDIX C

THREATENED SPECIES ASSESSMENT

Table 34. Threatened Species Assessment

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraints ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
PLANTS															
<i>Cadellia pentastylis</i>	Ooline	V	V	-	✓	Sp	-	-	Species occurs along the western edge of the North West Slopes from Gunnedah to Tenterfield No geographic limitations in the Peel IBRA sub-region.	Sp: N/A	This tree forms a closed or open canopy with eucalypts and cypress pines, and occurs on sandy loam soils	No	Sp: Nil	No	Not identified by BAMC: No suitable habitat (species is not associated with PCT 101)
<i>Callistemon pungens</i>	-	-	V	-	✓	Sp	-	-	Species occurs from near Inverell to the eastern escarpment in New England National Park. Associated IBRA sub-region unknown.	Sp: N/A	This species grows in woodland, rocky shrubland or riparian forests dominated by <i>Casuarina cunninghamiana subsp. cunninghamiana</i> (River Oak). Species grows along waterways with sandy granite substrate.	No	Sp: Nil	No	Not identified by BAMC: No suitable habitat (species is not associated with PCT 101)
<i>Commersonia procumbens</i>	-	V	V	-	✓	Sp	-	-	Species is known from the Dubbo-Mendooran-Gilgandra region. No geographic limitations in the Peel IBRA sub-region.	Sp: Pilliga sandstone	Grows in sandy sites, often along roadsides. This species has been recorded in <i>Eucalyptus dealbata</i> (Tumbledown Red Gum), <i>Eucalyptus sideroxylon</i> (Mugga Ironbark) and <i>Callitris spp.</i> communities.	No	Sp: Nil	No	Not identified by BAMC: Habitat Constraint (Sp)
<i>Dichanthium setosum</i>	Bluegrass	V	V	-	✓	Sp	Sp	-	Bluegrass occurs on the New England Tablelands, North West Slopes and	Sp: N/A	This species is associated with heavy basaltic black soils and	No	Sp: Low	Yes (January/February)	Retained as Sp

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraints ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									Plains and the Central Western Slopes of NSW, extending to northern Queensland. Species predominantly occurs north of Tamworth. No geographic limitations in the Peel IBRA sub-region.		red-brown loams with clay subsoil and is often found in moderately disturbed woodland and grassland. Species is associated with PCT 101.				
<i>Digitaria porrecta</i>	Finger Panic Grass	E	-	-	-	Sp	Sp	-	Within NSW, this species is found on the North West slopes and plains, from near Moree south to Tambar Springs and from Tamworth to Coonabarabran. No geographic limitations in the Peel IBRA sub-region.	Sp: N/A	This species occurs in native grassland, grassy woodlands or open forest on rich soils and is often associated with <i>Eucalyptus albens</i> (White Box) and <i>Acacia pendula</i> (Weeping Myall). Species is known to tolerate some disturbance. Species is associated with PCT 101.	No	Sp: Low	Yes (January/February)	Retained as Sp
<i>Eucalyptus nicholii</i>	Narrow-leaved Peppermint	V	V	-	✓	Sp	-	✓	Species is sparsely distributed on the New England Tablelands from Nundle to north of Tenterfield, primarily on private property and roadsides. No geographic limitations in the Peel IBRA sub-region.	Sp: N/A	Narrow-leaved Peppermint grows in dry grassy woodland, on shallow soils on slopes and ridges.	No	Sp: Nil	No	Excluded as Sp: No suitable habitat (species is not associated with PCT 101)
<i>Euphrasia arguta</i>	-	CE	CE	-	✓	Sp	-	✓	<i>Euphrasia arguta</i> is only known from the Nundle	Sp: N/A	This species grows in open forests, in	No	Sp: Nil	No	Not identified by BAMC: No suitable

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraints ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									area of the NSW North Western Slopes and Tablelands. No geographic limitations in the Peel IBRA sub-region.		eucalypts forests with a mixed grass and shrub understorey.				habitat (species is not associated with PCT 101)
<i>Hakea pulvinifera</i>	Lake Keepit Hakea	E	E	✓	✓	Sp	-	✓	This species is known from a single population near Lake Keepit. Species has been recorded ~3.5 km north-west of the Subject Land near Keepit. Lake Keepit Hakea is geographically limited to within 20 km of the Lake Keepit Dam wall.	Sp: N/A	Lake Keepit Hakea is associated with <i>Alstonia constricta</i> (Bitter Bark) and <i>Acacia decora</i> (Western Silver Wattle) and only grows on hard rocky hillsides near Lake Keepit.	No	Sp: Nil	No	Not identified by BAMC: No suitable habitat (species is not associated with PCT 101)
<i>Homopholis belsonii</i>	Belson's Panic	E	V	-	-	Sp	Sp	-	Belson's Panic occurs on the northwest slopes and plains of NSW between Wee Waa, Goodiwindi and Glen Innes. No geographic limitations in the Peel IBRA sub-region.	Sp: N/A	This species grows in dry woodland dominated by <i>Casuarina cristata</i> (Belah), on poor soils or alluvial clay soils. Species is associated with PCT 101.	No	Sp: Nil	No	Excluded as Sp: Microhabitat
<i>Lepidium aschersonii</i>	Spiny Peppercress	V	V	-	✓	Sp	-	-	This species occurs in the marginal central-western slopes and north-western plains regions of NSW. Most recorded sightings occur near Narrabri and West Wylong. Species is absent from	Sp: N/A	This species occurs on ridges of gilgai clays in open to dense woodland with a sparse grassy understorey. Associated species include <i>Acacia harpophylla</i> (Brigalow), Belah, Bulloak and Inland Grey Box. This	No	Sp: Nil	No	Not identified by BAMC: No suitable habitat (species is not associated with PCT 101 and does not occur in the Peel IBRA sub-region)

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraint ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									the Peel IBRA sub-region.		species is disturbance tolerant.				
<i>Lepidium monolocoides</i>	Winged Peppergrass	E	E	-	✓	Sp	-	-	Winged Peppergrass is widespread in the semi-arid western plains of NSW. Species is absent from the Peel IBRA sub-region.	Sp: N/A	Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, usually in open woodland dominated by Bullock, <i>Eucalyptus largiflorens</i> (Black Box) and <i>Eucalyptus populnea</i> (Poplar Box).	No	Sp: Nil	No	Not identified by BAMC: No suitable habitat (species is not associated with PCT 101 and does not occur in the Peel IBRA sub-region)
<i>Prasophyllum sp. Wybong</i>	-	-	CE	-	✓	Sp	-	✓	<i>Prasophyllum sp. Wybong</i> is known predominantly from near Wybong with scattered records occurring near Ilford, Premer, Muswellbrook, Yeoval, Inverell, Tenterfield, Currabubula and the Pilliga areas. No geographic limitations in the Peel IBRA sub-region.	Sp: N/A	This species grows in open eucalypt woodland and grassland.	No	Sp: Nil	No	Not identified by BAMC: No suitable habitat (species is not associated with PCT 101)
<i>Swainsona murrayana</i>	Slender Darling-pea	V	V	✓	✓	Sp	-	-	The Slender Darling-pea is found throughout NSW, predominantly near Hay and Deniliquin. Species has been recorded ~3.5 km north-west of the Subject Land near Keepit. Species is absent from the Peel IBRA sub-region.	Sp: N/A	Suitable habitat includes native grassland or grassy woodlands on grey, brown or red cracking clays. Species also grows in bladder saltbush, Black Box and grassland communities on plains, floodplains and depressions. Species tolerates moderate	No	Sp: Nil	No	Not identified by BAMC: No suitable habitat (species does not occur in the Peel IBRA sub-region)

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraint ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
											grazing disturbance. Species is associated with PCT 101.				
<i>Thesium australe</i>	Austral Toadflax	V	V	-	✓	Sp	-	-	Austral Toadflax occurs as scattered populations throughout NSW with most records occurring north of Tamworth near Inverell. No geographic limitations in the Peel IBRA sub-region.	Sp: N/A	This species is a root parasite on Kangaroo Grass and often occurs in grassland or grassy woodland in inland areas. Species is associated with PCT 101.	No	Sp: Low	Yes (January/February)	Retained as Sp
<i>Tylophora linearis</i>	-	V	E	-	✓	Sp	-	-	Within NSW, this species is known from Goonoo, Pilliga, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie Nature Reserve, Goobang National Park and Beni and Goonoo State Conservation Areas. No geographic limitations in the Peel IBRA sub-region.	Sp: N/A	Suitable habitat includes dry scrub and open forest containing <i>Eucalyptus fibrosa</i> (Red Ironbark), Muga Ironbark, White Box, Bulloak and <i>Callitris</i> spp.	No	Sp: Nil	No	Not identified by BAMC: No suitable habitat (species is not associated with PCT 101)
BIRDS															
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	CE	-	✓	Dual	Dual	✓	Regent Honeyeaters have a patchy distribution in NSW, occurring near Capertee and the Bundarra-Barraba region in NSW. This species is well known in the	Ec: N/A Sp: Important Habitat Map	This species inhabits temperate woodlands and open forests that support a high bird species richness and abundance. This species relies on Eucalyptus spp.	No	Ec: Low Sp: Nil	No	Retained as Ec Excluded as Sp: Habitat Constraint

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraint ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									Tamworth region. No geographic limitations in the Peel IBRA sub-region.		for foraging. Species is associated with PCT 101.				
<i>Aphelocephala leucopsis</i>	Southern Whiteface	-	V	✓	✓	N/A	-	-	The Southern Whiteface occurs across most of mainland Australia (DCCEEW 2023c). This species has been recorded ~3 km south of the Subject Lahn near Carroll Gap. Geographic limitations are unknown.	Unknown	Species occurs on ranges, foothills, lowlands and plains within open woodlands and shrublands with an understorey of grasses and shrubs (DCCEEW 2023c). PCT association is unknown for this species.	No	N/A	No	Species was listed as Vulnerable in March 2023. Species is absent from BioNet Atlas and BAM-C as credits are yet to be assigned.
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	-	-	-	Ec	Ec	-	This species has a scattered distribution throughout NSW, predominantly occurring on the western slopes of the Great Dividing Range. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Dusky Woodswallows occur in dry, open eucalypt forests and woodlands with an open or sparse understorey of eucalypt samplings, shrubs and woody debris. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec
<i>Botaurus poeciloptilus</i>	Australasian Bittern	E	E	-	✓	Ec	-	-	This species has a widespread but sparse distribution throughout NSW. No geographic limitations in the Peel IBRA sub-region.	Ec: Brackish or freshwater wetlands	Australasian Bitterns occur in permanent freshwater wetlands with tall, dense vegetation.	No	Ec: Nil	No	Not identified by BAMC: Habitat Constraint (Ec) and no suitable habitat (species is not associated with PCT 101)

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraint ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
<i>Burhinus grallarius</i>	Bush Stone-curlew	E	-	-	-	Sp	Sp	-	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. This species has not been recorded within a 10 km radius of the Subject Land. No geographic limitations in the Peel IBRA sub-region.	Sp: Fallen/standing dead timber including logs	This species inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Species is associated with PCT 101.	No	Sp: Nil	No	Excluded as Sp: Degraded microhabitat
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	-	✓	Dual	-	✓	Species is predominantly distributed along the coast of NSW, occasionally occurring inland in the Murray-Darling Basin. Species is absent from the Peel IBRA sub-region	Ec: N/A Sp: Important Habitat Map	Curlew Sandpipers inhabit littoral and estuarine habitat with mudflats.	No	Ec: Nil Sp: Nil	No	Not identified by BAMC: Microhabitat (Ec), Habitat Constraint (Sp) and no suitable habitat (species is not associated with PCT 101 and does not occur in the Peel IBRA sub-region)
<i>Calyptorhynchus lathami lathami</i>	South-eastern Glossy Black-Cockatoo	V	V	-	✓	Dual	-	-	Within NSW, this species occurs on the southern tablelands, central western plains and in the Riverina. No geographic limitations in the Peel IBRA sub-region.	Ec: Presence of Allocasuarina and Casuarina species Sp: HBTs with hollows >15cm diameter, >8m above ground	Open forest and woodland containing <i>Allocasuarina spp.</i> which is relied on for foraging.	No	Ec: Nil Sp: Nil	No	Not identified by BAMC: Habitat Constraint (Ec), and no suitable habitat (species is not associated with PCT 101) (Sp)
<i>Chthonicola sagittata</i>	Speckled Warbler	V	-	✓	-	Ec	Ec	-	The Speckled Warbler has a patchy distribution across the hills and	Ec: N/A	Occurs in Eucalyptus dominated communities with a grassy	No	Ec: Low	No	Retained as Ec

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraints ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									tablelands of the Great Dividing Range. Species has been recorded ~2.5 km north of the Subject Lean near Lake Keepit. No geographic limitations in the Peel IBRA sub-region.		understorey, on rocky ridges or in gullies. Species is associated with PCT 101.				
<i>Circus assimilis</i>	Spotted Harrier	V	-	-	-	Ec	Ec	No	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Spotted Harriers inhabit open woodland, grassland and agricultural land, foraging on terrestrial mammals, birds and reptiles. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	-	-	✓	Ec	Ec	-	This species occurs on the inland slopes and plains of the Great Dividing Range. The western boundary of this subspecies is Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Brown Treecreepers inhabit eucalypt woodland and dry open forests dominated by rough-barked eucalyptus, with an open grassy understorey and occasional shrub. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	-	-	Ec	Ec	-	This sedentary species inhabits most of Australia except the treeless deserts and open	Ec: N/A	Species inhabits rough-barked eucalypt forests and woodlands, feeding	No	Ec: Low	No	Retained as Ec

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraints ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									grasslands. No geographic limitations in the Peel IBRA sub-region.		on arthropods. Species is associated with PCT 101.				
<i>Falco hypoleucos</i>	Grey Falcon	V	V	-	✓	Ec	-	-	Species is sparsely distributed throughout NSW, primarily in the Murray-Darling Basin. Species has not been recorded near the Subject Land. Species is absent from the Peel IBRA sub-region	Ec: N/A	Species is restricted to shrubland, grassland and wooded watercourses in arid and semi-arid regions. Species is associated with PCT 101.	No	Ec: Nil	No	Not identified by BAMC: No suitable habitat (species does not occur in the Peel IBRA sub-region)
<i>Falco subniger</i>	Black Falcon	V	-	-	-	Ec	Ec	-	Species has a wide but sparse distribution in NSW, mostly occurring in inland regions. Species has not been recorded near the Subject Land. Geographic limitations are unknown.	Ec: N/A	Black Falcons occur in tree-lined watercourses and isolated woodlands (Birdlife Australia n.d.). Associated PCTs are unknown	No	Ec: Low	No	Retained as Ec
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	-	-	Ec	Ec	-	The Little Lorikeet has a wide distribution across the coast and Great Dividing Range. Species has not been recorded near the Subject Land. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	This nomadic species occurs in open eucalypt forest and woodland, favouring riparian habitat. Species is also known to utilise trees in open country and urban trees. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
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<i>Grantiella picta</i>	Painted Honeyeater	V	V	-	✓	Ec	Ec	-	Within NSW, this species is found on the inland slopes of the Great Dividing Range. Species has not been recorded near the Subject Land. No geographic limitations in the Peel IBRA sub-region.	Ec: Mistletoe present at a density >5 mistletoes per hectare	Painted Honeyeaters inhabit Weeping Myall, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. Species is associated with PCT 101.	No	Ec: Nil	No	Not identified by BAMC: Habitat Constraint (Ec)
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	-	-	-	Dual	Dual	-	White-bellied Sea-Eagles are widespread in NSW along the coast and all major inland rivers and waterways. Species has not been recorded near the Subject Land. Geographic limitations are unknown.	Ec: Within 1 km of rivers, lakes, large dams, creeks, wetlands or coastlines Sp: living or dead mature trees within suitable vegetation within 1km of a waterbody	This species occurs in a variety of habitats in proximity to large areas of open water. Breeding occurs in mature tall open forests or woodlands, while hunting occurs over open areas. Species is associated with PCT 101.	No	Ec: Low Sp: Nil	No	Retained as Ec Excluded as Sp: Habitat Constraint
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V	-	-	-	Dual	Dual	-	Within NSW, Black-breasted Buzzards are sparsely distributed across the state. Species has not been recorded near the Subject Land. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A Sp: Land within 40 m of riparian woodland on inland watercourses or waterholes containing dead or dying eucalypts	This species inhabits timbered watercourses, foraging over grasslands and sparsely timbered woodlands. Species is associated with PCT 101.	No	Ec: Low Sp: Nil	No	Retained as Ec Excluded as Sp: Habitat Constraint
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	✓	-	Dual	Dual	-	Little Eagles are found throughout mainland Australia, except for in densely forested parts of	Ec: N/A Sp: Nest trees (live or	Species inhabits open forest, woodland and riparian woodland. Nesting occurs in tall	No	Ec: Low Sp: Nil	No	Retained as Ec Excluded as Sp: Habitat Constraint

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		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraints ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									the Great Dividing Range. Species has been recorded ~2.5 km north of the Subject Lean near Lake Keepit. No geographic limitations in the Peel IBRA sub-region.	dead large old trees within vegetation)	living trees within a remnant patch. Species is associated with PCT 101.				
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	V	-	✓	Ec	Ec	-	Migratory visitor to eastern Australia and are predominantly found on the coast. Species has not been recorded near the Subject Land. Geographic limitations are unknown.	Ec: N/A	This species is mostly aerial but have been recorded foraging over wooded areas and in clearings (TSSC 2019). Associated PCTs are unknown.	No	Ec: Low	No	Retained as Ec
<i>Lathamus discolor</i>	Swift Parrot	E	CE	-	✓	Dual	Dual	✓	Migratory visitor to mainland eastern Australia during winter. Within NSW this species mostly occurs on the coast and south west slopes. Scattered recorded sightings occur in Tamworth and Gunnedah. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A Sp: Important Habitat Map	Occurs in areas where winter eucalypts (i.e., White Box) are flowering profusely or where there are abundant lerps (i.e., Grey Box). Species is associated with PCT 101.	No	Ec: Low Sp: Nil	No	Retained as Ec Excluded as Sp: Habitat Constraint
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-	-	-	Dual	Dual	-	In NSW, this species is known from the north, north-east and along the major west-flowing river systems. This species has	Ec: N/A Sp: Nest trees	This species occurs in dry woodland and open forests, preferring timbered watercourses. Square-tailed Kites	No	Ec: Low Sp: Nil	No	Retained as Ec Excluded as Sp: Habitat Constraint

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		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraints ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									not been recorded within a 10 km radius of the Subject Land. No geographic limitations in the Peel IBRA sub-region.		forage in the tree canopy and over open chenopod shrubland and grasslands. Species is associated with PCT 101.				
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V	-	-	✓	Ec	Ec	-	Hooded Robins are widespread throughout Australia, mainly in inland areas. Subspecies <i>cucullata</i> occurs between Brisbane and Adelaide and through most of inland NSW. Species has not been recorded near the Subject Land. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Hooded Robins prefer structurally diverse lightly wooded country in or near clearings with mature and juvenile eucalypts, small shrubs, tall native grasses, timber and low-hanging branches. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	-	-	-	Ec	Ec	No	The eastern subspecies is widespread in NSW from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Occupied dry open woodland dominated by box-gum eucalypts, or smooth-barked gums. This species occupies the largest woodland patches in the landscape with home ranges <5 ha. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec
<i>Neophema chrysostoma</i>	Blue-winged Parrot	V	V	-	✓	N/A	-	-	Within NSW, this species occurs across western and south-eastern NSW (DCCCEW 2023d). Most	N/A	Blue-winged Parrots favour grasslands and grassy woodlands in proximity to wetlands	No	Ec: Nil	No	Not identified by BAMC: Microhabitat (Ec)

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									records occur west of Griffith with one record occurring near Coonabarabran. Geographic limitations are unknown.		(DCCEEW 2023d). Associated PCTs are unknown.				
<i>Neophema pulchella</i>	Turquoise Parrot	V	-	-	-	Ec	Ec	-	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. This species has not been recorded within a 10 km radius of the Subject Land. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	This species inhabits the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Foraging for seeds, grasses and herbs occurs under the shade of a tree. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec
<i>Ninox connivens</i>	Barking Owl	V	-	-	-	Dual	Dual	No	The Barking Owl is found throughout continental Australia except for the central arid regions. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A Sp: Living or dead trees with hollows >20 cm diameter and >4m above the ground.	Species inhabits woodland, open forest and partly cleared farmland. Hunting occurs in treed and treeless areas, while nesting requires dense tree canopies. Species is associated with PCT 101.	No	Ec: Low Sp: Nil	No	Retained as Ec Not identified by BAMC: Degraded microhabitat (Sp)
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	-	✓	Dual	-	-	Species occurs throughout eastern inland NSW, with a core	Ec: N/A	Inhabits Box-Gum, Box-Cypress-pine and Boree woodlands and River	No	Ec: Nil	No	Not identified by BAMC: No suitable habitat (species

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									breeding area occurring on the south-western slopes. Species has not been recorded near the Subject Land.	Sp: HBT with hollows >5cm diameter, >4m above ground in DBH >30cm	Red Gum forests. Species is associated with PCT 101.		Sp: Nil		does not occur in the Peel IBRA sub-region) (Ec) and Habitat Constraint (Sp)
<i>Pomatostomus temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	-	-	-	Ec	Ec	-	In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. Species has not been recorded near the Subject Land. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	-	✓	Ec	-	-	Within NSW, this species occurs in the Murray-Darling Basin. Species has not been recorded near the Subject Land. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Suitable habitat includes swamps, dams and marshy areas with grasses, lignum, reeds, low scrub and open timber.	No	Ec: Nil	No	Not identified by BAMC: No suitable habitat (species is not associated with PCT 101 and does not occur in the Peel IBRA sub-region)
<i>Stagonopleura guttata</i>	Diamond Firetail	V	-	-	✓	Ec	Ec	-	Species has a wide distribution in NSW with most records occurring west of Dubbo. Species has not been recorded near the Subject Land.	Ec: N/A	Diamond Firetails occur in grassy eucalypt woodlands, open forest, mallee and native grasslands, and are often found in riparian	No	Ec: Low	No	Retained as Ec

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									No geographic limitations in the Peel IBRA sub-region.		areas. Species is associated with PCT 101.				
<i>Tyto novahollandiae</i>	Masked Owl	V	-	-	-	Dual	Dual	-	Species' range extends from the coast where it is most abundant to the western plains. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A Sp: Living or dead trees with hollows >20cm diameter.	Species inhabits dry eucalypt forests and woodlands. Foraging occurs in woodland or along roadsides at the edge of forests, feeding on arboreal and ground mammals. Species is associated with PCT 101.	No	Ec: Low Sp: Nil	No	Retained as Ec Not identified by BAMC: Degraded microhabitat (Sp)
MAMMALS															
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V	-	-	-	Sp	Sp	-	In NSW this species' range extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Eastern Pygmy-possums have not been recorded in the Gunnedah-Tamworth region. No geographic limitations in the Peel IBRA sub-region.	Sp: N/A	This species inhabits rainforest, woodland, forest and heath, preferring large tracts of woodland. Species is associated with PCT 101.	No	Sp: Nil	No	Excluded as Sp: Degraded microhabitat
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	-	✓	Sp	-	✓	Species is found in areas with extensive cliffs and caves from Rockhampton in QLD to Bungonia in NSW. Species has not	Sp: withing 2km of rocky areas containing caves, overhangs, escarpments, outcrops, crevices, old mines or tunnels.	Roosting occurs in caves, cliffs, old mines and disused Fairy Martin nests in dry open forest and woodland.	No	Sp: Nil	No	Not identified by BAMC: Habitat Constraint (Sp) and no suitable habitat (species is not

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		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraint ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									been recorded near the Subject Land. No geographic limitations in the Peel IBRA sub-region.						associated with PCT 101)
<i>Chalinolobus picatus</i>	Little Pied Bat	V	-	-	-	Ec	Ec	-	The Little-Pied Bat is found in inland Queensland and NSW (including Western Plains and slopes) extending slightly into South Australia and Victoria. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Species occurs in a variety of habitats including open forest and woodland. Suitable roosting habitat includes caves, rocky outcrops, tunnels, tree hollows and buildings. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec
<i>Dasyurus maculatus maculatus</i>	Spot-tailed Quoll	V	E	-	✓	Ec	-	-	Within NSW, this species predominantly occurs east of the Great Dividing Range. Species is well known in the Tamworth/Gunnedah area. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Species inhabits a range of habitats including rainforest, open forest, woodland and riparian forest. Spot-tailed Quolls rely on hollow-bearing trees, fallen logs, caves and rocky outcrops.	No	Ec: Nil	No	Not identified by BAMC: No suitable habitat (species is not associated with PCT 101)
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	-	-	-	Dual	Dual	✓	Species occurs along the east and north-western coasts of Australia. Species has not been recorded near the Subject Land. No geographic limitations in the Peel	Ec: N/A Sp: Cave, tunnel, mine, culvert or other structures	Large Bent-winged Bats primarily roost in caves but have been recorded in derelict mines, tunnels, buildings and other man-made structures. Species is associated	No	Ec: Low Sp: Nil	No	Retained as Ec. Excluded as Sp: Habitat Constraint

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraint ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
									IBRA sub-region.		with PCT 101.				
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V	-	✓	Ec	Ec	-	This species occurs within the Murray-Darling Basin, with a stronghold in the Pilliga Scrub. Scattered recorded sightings occur in the Gunnedah-Tamworth area. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Suitable habitat includes Mallee, Bulloke and box eucalypt dominated communities. Roosting occurs in hollows, crevices and under bark. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec.
<i>Phascolarctos cinereus</i>	Koala	E	E	-	✓	Sp	Sp	-	Within NSW, Koalas are found on the central and north coasts, southern highlands, tablelands, Blue Mountains and southern coastal forests. Species is well known in the Gunnedah-Tamworth area. No geographic limitations in the Peel IBRA sub-region.	Sp: presence of koala use trees	Inhabits eucalypt woodland and forests. Species is associated with PCT 101.	No	Sp: Low	Yes (January/February)	Retained as Sp
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	-	✓	Dual	Dual	-	Grey-headed Flying-fox are generally found within 200km of the eastern coast. There is a known breeding camp in Tamworth. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A Sp: Breeding camps	Species inhabits subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Species is associated with PCT 101.	No	Ec: Low Sp: Nil	No	Retained as Ec Excluded as Sp: Habitat constraint

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraints ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	V	-	✓	-	Ec	Ec	-	Within NSW, this species occurs in south-west with scattered records on the New England Tablelands and North West Slopes. Species has been recorded three times near Lake Keepit, including within 2.5 km of the Subject Lean. No geographic limitations in the Peel IBRA sub-region.	Ec: N/A	Roosting occurs in hollows, buildings and mammal burrows, while foraging occurs in treed and treeless habitats. Species is associated with PCT 101.	No	Ec: Low	No	Retained as Ec
<i>Vespadelus troungtoni</i>	Eastern Cave Bat	V	-	-	-	Sp	Sp	-	The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey. This species has not been recorded within a 10 km radius of the Subject Land. No geographic limitations in the Peel IBRA sub-region.	Sp: <2 km of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or <2 km of old mines, tunnels, old buildings or sheds.	This cave-roosting species is usually found in dry open forest and woodland, near cliffs or rocky overhangs and has been recorded in disused mine workings. Species is associated with PCT 101.	No	Sp: Nil	No	Excluded as Sp: Degraded habitat constraints
FISH															
<i>Bidyanus bidyanus</i>	Silver Perch	-	CE	-	✓	-	-	-	Murray-Darling Basin system	N/A	Large, permanent, flowing waterways	Unknown	Nil	No	Not identified by BAMC: No suitable habitat (waterways are absent from the Subject Land)
<i>Maccullochella peelii</i>	Murray Cod	-	V	-	✓	-	-	-		N/A		Unknown			
REPTILE															

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraint ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
<i>Anomalopus mackayi</i>	Five-clawed Worm-skink	E	V	-	✓	Ec	-	-	Species has a patchy distribution on the North West Slopes and Plains. No recorded sightings occur south of Narrabri. Species is absent from the Peel IBRA sub-region.	Ec: presence of cracking clay soils	Species occurs on lower slopes and slight rises in grassy White Box woodland or grassland on moist black soils. Species is associated with PCT 101.	No	Ec: Nil	No	Not identified by BAMC: No suitable habitat (species does not occur in the Peel IBRA sub-region)
<i>Aprasia parapulchella</i>	Pink-tailed Legless-lizard	V	V	-	✓	Sp	-	-	Species occurs on the central and southern tablelands and south western slopes. This species has been recorded once in Gunnedah and once in Tamworth. No geographic limitations in the Peel IBRA sub-region.	Sp: within 50m of rocky areas	Sloping, open woodland with a native grassy groundcover dominated by Kangaroo Grass. Sites contain rocky outcrops or scattered, partially buried rocks.	No	Sp: Nil	No	Not identified by BAMC: Habitat Constraint (Sp) and no suitable habitat (species is not associated with PCT 101)
<i>Hemiaspis damelii</i>	Grey Snake	E	E	-	✓	N/A	-	-	In NSW, this species occupies five geographically discrete subpopulations in the Gwydir, Namoi, Castlereagh, Macquarie, Lachlan, and Murrumbidgee River systems. The closest recorded sightings are near Narrabri. Geographic limitations are unknown.	N/A	Floodplains and ephemeral wetlands with heavy clay soils. Associated PCTs are unknown.	No	N/A	No	Species was listed as Vulnerable in March 2023. Species is absent from BioNet Atlas and BAM-C as credits are yet to be assigned.
<i>Uvidicolus</i>	Border Thick-	V	V	-	✓	Sp	-	-	This species is restricted to the slopes and	Sp: N/A	The Border Thick-tailed Gecko occurs on steep	No	Sp: Nil	No	Not identified by BAMC: No suitable

Scientific Name	Common Name	Threatened Status		Database Source		Credit Class		SAII	Species Assessment				Occurrence Likelihood	Survey Required	Retained / Excluded in BAM-C
		BC Act	EPBC Act	BioNet ₁	PMST ₂	TBDC ₃	BAMC ₄		Geographic Range _{1,3}	Habitat Constraint ₃	Microhabitat ₃	Vagrancy (sub-region) ₅			
<i>sphyrurus</i>	tailed Gecko								tablelands of northern NSW and southern QLD. Species has not been recorded near the Subject Land but is known in the Tamworth region. No geographic limitations in the Peel IBRA sub-region.		rocky slopes, favouring forest and woodland areas with boulders, rock slabs, fallen timber and deep leaf litter.				habitat (species is not associated with PCT 101) (Sp)

1: BioNet Atlas (DPE 2023c), 2: Protected Matters Search Tool (DCCEEW 2023a), 3: BioNet Threatened Biodiversity Data Collection (DPE 2023b), 4: Biodiversity Assessment Method Calculator (DPIE 2020b), 5: Threatened Biodiversity Profile Search (OEH 2023a).



APPENDIX D

MIGRATORY SPECIES ASSESSMENT

Table 35. Migratory Species Assessment

Scientific Name	Common Name	Threatened Status		Source		SAII	Species Assessment	Occurrence Likelihood
		BC Act	EPBC Act	BioNet	PMST			
<i>Actitis hypoleucos</i>	Common Sandpiper	-	-	-	✓	-	Within NSW, the Common Sandpiper occurs within coastal and inland wetlands (DCCEEW 2023b). Wetland habitat is absent from the Subject Land.	Nil
<i>Apus pacificus</i>	Fork-tailed Swift	-	-	-	✓	-	The Fork-tailed Swift is a non-breeding visitor to Australia which occurs predominantly east of the Great Dividing Range in NSW (DCCEEW 2023b). This species is almost exclusively aerial but can inhabit riparian woodland, swamps or saltmarshes. Suitable habitat is absent from the Subject Land.	Nil
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	-	-	✓	-	This species is a non-breeding visitor to south-eastern Australia, occurring in freshwater and saline habitats along the coast and inland (DCCEEW 2023b). Suitable freshwater habitat (i.e., lakes, swamps) is absent from the Subject Land.	Nil
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	-	✓	✓	Assessed in Table 34	
<i>Calidris melanotos</i>	Pectoral Sandpiper	-	-	-	✓	-	The Pectoral Sandpiper is widespread throughout NSW in shallow fresh to saline wetlands (DCCEEW 2023b). Freshwater wetlands are absent from the Subject Land.	Nil
<i>Gallinago hardwickii</i>	Latham's Snipe	-	-	-	✓	-	Latham's Snipe is a non-breeding visitor to south-eastern Australia, inhabiting permanent and ephemeral wetlands (DCCEEW 2023b). Wetland habitat is absent from the Subject Land.	Nil
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	V	-	✓	-	Assessed in Table 34	
<i>Motacilla flava</i>	Yellow Wagtail	-	-	-	✓	-	Yellow Wagtails inhabit damp habitats with low vegetation including bogs, meadows, marshes, waterside pasture and tundra (Birdlife International 2023). Suitable habitat is absent from the Subject Land.	Nil
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	-	-	✓	-	Satin Flycatchers are widespread east of the Great Dividing Range (DCCEEW 2023b). Species occurs within heavily vegetation gullies which are absent from the Subject Land.	Nil
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	-	-	✓	-	Rufous Fantails are found in gullies east of the Great Dividing Range containing wet sclerophyll forests dominated by <i>Eucalyptus microcorys</i> (Tallow-wood), <i>Eucalyptus cypellocarpa</i> (Mountain Grey Gum), <i>Eucalyptus radiata</i> (Narrow-leaved Peppermint), <i>Eucalyptus regnans</i> (Mountain As), <i>Eucalyptus delegatensis</i> (Alpine Ash), <i>Eucalyptus pilularis</i> (Blackbutt) or <i>Eucalyptus resinifera</i> (Red Mahogany) (DCCEEW 2023b). Suitable habitat and associated species are absent from the Subject Land.	Nil



APPENDIX E

MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

White-throated Needletail

Table 36. MNES – White-throated Needletail

White-throated Needletail (<i>Hirundapus caudacutus</i>)	Vulnerable Species	Likelihood
<p>Distribution: The White-throated Needletail is a large migratory bird that is widespread along the east of Australia, from Queensland through to Tasmania, extending inland to the western slopes of the Great Dividing Range (TSSC 2019). This species generally occurs in large flocks, occasionally with other insect-eating birds like Fork-tailed Swifts and Fairy Martins. The White-throated Needletail breeds in Asia and spends its non-breeding season in Australia. Scattered recorded sightings occur in the Tamworth-Gunnedah area, with most recorded sightings occurring in the Pilliga and along the Great Dividing Range (DPE 2023c).</p> <p>Habitat: This species is predominantly aerial when in Australia and has been recorded over a variety of habitats and landscapes, including forests, pasture and plantations, although most often over wooded areas (TSSC 2019). White-throated Needletails have also been recorded in coastal areas, often observed flying over sand dunes and cliffs.</p> <p>Potential impacts associated with the Project: The closest recorded sighting is ~20 km north-east of the Subject Land near Manilla. This species is considered likely to utilise the Subject Land for foraging within its wider foraging range. The Project will remove 24.78 ha of potential foraging habitat. However, as White-throated Needletails are predominantly aerial, the Project is considered highly unlikely to impact the survival of this species. Any impacts are considered to be indirect impacts associated with the loss of small abundances of invertebrate prey species during vegetation clearing.</p> <p>Avoidance and mitigation measures: The Project layout was redesigned to avoid some areas of DNG, woodland, native plantings and nine scattered trees. The extend of the woodland clearing along the access road was reduced from a 10-20 m buffer to a 4-5 m buffer, resulting in the loss of only one tree in this area. Mitigation will involve avoidance of clearing prior to storms when the species is most likely to be located close to the ground. Felled trees (i.e., potential invertebrate habitat) are also to be relocated to adjacent areas for habitat enhancement. Further mitigation measures have been outlined in Section 8.4.</p>		
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it would:		
1. lead to a long-term decrease in the size of an important population of a species		
<p>Under the EPBC Act MNES Guidelines (DCCEEW 2013) an 'important population' include populations necessary for the species survival through:</p> <ul style="list-style-type: none"> - <i>key source populations either for breeding or dispersal</i> - <i>populations that are necessary for maintaining genetic diversity, and/or</i> - <i>populations that are near the limit of the species range.</i> <p>Scattered recorded sightings occur near Gunnedah and Tamworth (DPE 2023c) and the species may utilise the Subject Land for foraging. However, it is highly unlikely these populations would be considered an important population of this species according to the above criteria. This species is migratory, does not breed in Australia, and therefore does not have a geographically restricted population. Due to this, the Project would not affect populations necessary for maintaining genetic diversity.</p>		Unlikely
2. reduce the area of occupancy of an important population the species;		
<p>The area of occupancy (AOO) for this species is estimated at 18,000km² and is widely distributed across Australia. The Subject Land is not considered an important population of the species. Therefore, the loss of 24.78 ha of potential foraging habitat (0.004 % loss of AOO) is unlikely to significantly reduce the AOO of such a population.</p>		Unlikely
3. fragment an existing important population into two or more populations;		
<p>The White-throated Needletail's population has not been estimated in Australia, but it is widespread with no geographic boundaries within the population in NSW. The Subject Land is located within the centre of the mapped known range for the species in NSW, and as such, it is unlikely that clearing within the Subject Land will lead to fragmentation of the population.</p>		Unlikely
4. adversely affect habitat critical to the survival of a species;		
<p>The White-throated Needletail has been adversely affected by vegetation clearing which is associated with the loss of breeding habitat (in the Northern Hemisphere), roosting sites and invertebrate prey (TSSC 2019). The Subject Land has not been flagged as habitat critical for the survival of this species. Additionally, the species has been observed over a wide range of landscapes (TSSC 2019). In this context, it is unlikely impacts from the Project will adversely affect habitat critical to the survival of this species. Mitigation measures including retention of any felled timber to provide habitat for invertebrates in adjacent remnant woodland, where possible, to reduce the impact of vegetation clearing prey species.</p>		Unlikely
5. disrupt the breeding cycle of a population		
<p>The White-throated Needletail breeds throughout northern Asia (DPE 2023b). This species spends its non-breeding season in Australia. Therefore, the Project will not have an impact on the breeding cycle of this population.</p>		Unlikely

White-throated Needletail (<i>Hirundapus caudacutus</i>)	Vulnerable Species	Likelihood
6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;		
The White-throated Needletail roosts in trees on the edge of forested areas (DPE 2023b). Suitable roosting habitat is absent from the Subject Land. However, 24.78 ha of potential foraging habitat will be removed by the Project. Due to the aerial lifestyle of this species and the presence of more suitable foraging habitat in the surrounding area, it is unlikely the Project will significantly decrease the availability or quality of habitat to the extent that the species is likely to decline.		Unlikely
7. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;		
No direct threats from invasive species are listed for the White-throated Needletail (TSSC 2019). Indirect impacts from invasive species becoming more established in surrounding habitat may affect the White-throated Needletail through reduction in quality roosting habitat and invertebrate prey numbers. There is a low likelihood of this occurring as a result of vegetation clearing on the Subject Land.		Unlikely
8. introduce disease that may cause the species to decline, or		
There are no known diseases that may cause this species to decline (TSSC 2019) and the introduction of disease as an impact of the Project is highly unlikely.		Unlikely
9. Interfere substantially with the recovery of the species.		
The main threats to the White-throated Needletail in Australia are loss of suitable habitat and prey availability (DPE 2023b). Impacts from the Project are restricted to loss of potential foraging habitat. There are no threat abatement or recovery actions proposed by either the NSW DPE or DAWE and therefore this item is not relevant.		Unlikely
Conclusion: The Project is considered unlikely to result in a significant impact to the White-throated Needletail. Referral to the Commonwealth is not required.		

Grey-headed Flying-fox

Table 37. MNES – Grey-headed Flying-fox

Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	Vulnerable Species	Likelihood
<p>Distribution and occurrence: The Grey-headed Flying-fox occurs from Bundaberg, QLD to Geelong, Victoria in coastal lowlands, tablelands and slopes (DAWE 2021). Grey-headed Flying-fox breeding camps have been identified in Tamworth and Manilla, with numerous recorded sightings occurring in the region (DPE 2023b; DCCEEW 2023e)</p> <p>Habitat: This species occurs in a range of habitats including subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps (DPE 2023b). Potential foraging habitat occurs on the Subject Land in the form of remnant woodland (0.94 ha).</p> <p>Potential impacts associated with the Project: The Subject Land contains 0.94 ha of potential foraging habitat. Breeding habitat and roosting camps are absent from the Subject Land.</p> <p>Avoidance and mitigation: The Project layout was redesigned to avoid some areas of DNG, woodland, native plantings and nine scattered trees. The extend of the woodland clearing along the access road was reduced from a 10-20 m buffer to a 4-5 m buffer, resulting in the loss of only one tree in this area. Further mitigation measures have been outlined in Section 8.4.</p>		
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it would:		
1. lead to a long-term decrease in the size of an important population of a species		
The Subject Land occurs >20 km from nationally important camps in Tamworth and Manilla (DCCEEW 2023e) and the closest Priority Management Area is at Tamworth (DPE 2023f). Marginal potential foraging habitat occurs on the Subject Land (0.94 ha) within remnant roadside woodland. The loss of 0.94 ha is unlikely to lead to a long-term decrease in the size of the Tamworth or Manilla important populations as the site is >20 km away and more suitable foraging habitat is present in the surrounding area.		Unlikely
2. reduce the area of occupancy of an important population of the species;		
The official area of occupancy (AOO) is unavailable for this species. The closest important populations occur in Tamworth and Manilla (DCCEEW 2023e). As the Subject Land is not occupied by an important population, nor is breeding habitat present on the site, the Project is unlikely to reduce the area of occupancy for any populations occasionally frequenting the site within their wider foraging range.		Unlikely
3. fragment an existing important population into two or more populations;		
The Subject Land has not been recognised as an important population, nor is suitable breeding habitat present on the site. Given the small size of foraging habitat to be lost and distance of the Subject Land from important populations (>20 km), it is unlikely impacts would fragment any populations into two or more populations.		Unlikely
4. adversely affect habitat critical to the survival of a species;		
The National Recovery Plan described habitat critical to the survival of the Grey-headed Flying-fox as vegetation communities which (DAWE 2021):		Low

Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>)	Vulnerable Species	Likelihood
<ul style="list-style-type: none"> - contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May) - contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer (DCCEEW 2023e), or - contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp1 as identified on the Department's interactive flying-fox web viewer (DCCEEW 2023e). <p>The 0.94 ha is considered habitat critical to the survival of the species due to the presence of native species that are known to be productive as foraging habitat (i.e., White Box). The Subject Land occurs >20 km from nationally important camps in Tamworth and Manilla and does not contain any breeding camps. The Subject Land will clear 0.94 ha of critical habitat. Due to the small area to be cleared, the Project is not considered likely to significantly impact the survival of the species.</p>		
5. disrupt the breeding cycle of an important population		
Breeding camps are absent from the Subject Land which occurs >20 km from the closest important populations. Therefore, the Project would not disrupt the breeding cycle of local populations.		Unlikely
6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;		
0.94 ha of potential foraging habitat would be removed by the Project. Due to the abundance of mapped suitable habitat in the Gunnedah-Tamworth area, and the small scale of vegetation clearing required, the loss of 0.94 ha of potential foraging habitat is unlikely to significantly reduce the availability or quality of habitat to the extent that the species is likely to decline.		Unlikely
7. result in invasive species that are harmful to a critically endangered or endangered species becoming established in the vulnerable species' habitat;		
There are no listed invasive species considered a threat to this species (TSSC 2001)		Unlikely
8. introduce disease that may cause the species to decline, or		
There are no listed diseases that are harmful to this species (TSSC 2001)		Unlikely
9. Interfere substantially with the recovery of the species.		
The Project would directly impact on 0.94 ha of potential foraging habitat for the Grey-headed Flying Fox, all of which falls outside the mapped Priority Management Areas and >20km from the nearest nationally important camp. The Project is likely to impact adjoining potential foraging habitat through indirect means such as increased noise during construction, and the generation of dust. The Project has the potential to impact foraging habitat of the species through 'habitat loss and alteration'. However, the Project is unlikely to interfere with the recovery of this species due to the highly disturbed nature of potential foraging habitat, and the abundance of foraging habitat in the surrounding area.		Unlikely
Conclusion: The Project is considered unlikely to result in a significant impact on Grey-headed Flying-fox. Referral to the Commonwealth is not required.		

Corben's Long-eared Pied Bat

Table 38. MNES – Corben's Long-eared Pied Bat

Corben's Long-eared Pied Bat (<i>Nyctophilus corbeni</i>)	Vulnerable Species	Likelihood
<p>Distribution and occurrence: Corben's Long-eared Bat is found throughout south-eastern Australia with a stronghold in the Murray Darling Basin and the Pilliga scrub (DPE 2023b). Most recorded sightings occur in the Pilliga and north of Boggabri with scattered records between Gunnedah and Tamworth (DPE 2023c).</p> <p>Habitat: This species occurs in a range of habitats including box eucalypt dominated communities with foraging occurring within the understorey and on the ground for insects (TSSC 2015). Corben's Long-eared Pied Bat roosts in tree hollows, crevices, and under loose bark. (DPE 2023b).</p> <p>Potential impacts associated with the Project: The Subject Land contains 0.94 ha of potential foraging habitat in the form of remnant woodland along the access road (one tree [T25] is to be removed). This area was identified as potential roosting habitat due to the presence of hollows and/or loose bark.</p> <p>Avoidance and mitigation: The Project layout was redesigned to avoid some areas of DNG, woodland, native plantings and nine scattered trees. The extend of the woodland clearing along the access road was reduced from a 10-20 m buffer to a 4-5 m buffer, resulting in the loss of only one tree in this area. Further mitigation measures have been outlined in Section 8.4.</p>		
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it would:		
1. lead to a long-term decrease in the size of an important population of a species		
Extensive areas of Priority Management Areas occur in the Gunnedah-Tamworth surrounds, including ~3 km west of the site near Keepit (DPE 2023g). This species is mostly known from the Pilliga area, but scattered recorded sightings occur near Gunnedah and Tamworth (DPE 2023c). This species is known from one population. The loss of potential roosting habitat and 0.94 ha of potential foraging habitat is unlikely to lead to the long-term decrease in the size of this population as the Subject Land is not a Priority Management Area and more suitable habitat occurs in the surrounds.		Unlikely
2. reduce the area of occupancy of an important population of the species;		
The official area of occupancy (AOO) is unavailable for this species. This species has a patchy distribution throughout its range largely due to availability of suitable nesting habitat. Most recorded sightings occur in forested areas surrounding within the Pilliga (DPE 2023c). Due to the availability of suitable habitat surrounding the Subject Land, impacts from the Project are unlikely to reduce the area of occupancy for any populations which is unknown for this population.		Unlikely
3. fragment an existing important population into two or more populations;		
The Subject Land lies between numerous mapped Priority Management Areas for the species, while most records occur in forested areas in the Pilliga region (DPE 2023c). Given the size of potential roosting and foraging habitat to be lost for the Project, the highly mobile lifestyle of this species and the ongoing presence of this species in the region, the Project is unlikely to fragment the single population into two or more populations.		Unlikely
4. adversely affect habitat critical to the survival of a species;		
The Subject Land is not mapped as a Management Area for this species (DPE 2023g), and there is an abundance of mapped suitable habitat in the surrounding region. In this context, the loss of		Unlikely

Corben's Long-eared Pied Bat (<i>Nyctophilus corbeni</i>)	Vulnerable Species	Likelihood
0.94 ha of potential foraging habitat and some potential roosting habitat is unlikely to adversely affect habitat critical to the survival of the species.		
5. disrupt the breeding cycle of an important population		
0.94 ha of remnant woodland along the access road (including one tree [T25] to be removed) was identified as potential roosting habitat due to the presence of hollows and/or loose bark. Any individuals present on the Subject Land are likely to disperse to more suitable breeding habitat within the numerous Priority Management Areas surrounding the site. Potential impacts of the Project on breeding habitat will also be managed by timing work to avoid breeding periods for this species. Therefore, the Project is considered unlikely to disrupt the breeding cycle of any populations.		Low
6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;		
0.94 ha of potential foraging habitat and some potential roosting habitat (T25) would be removed by the Project. Due to the abundance of mapped suitable habitat in the surrounding area, and the small scale of vegetation clearing required, the loss of potential foraging and roosting habitat is unlikely to significantly reduce the availability or quality of habitat to the extent that the species is likely to decline.		Unlikely
7. result in invasive species that are harmful to a critically endangered or endangered species becoming established in the vulnerable species' habitat;		
No direct threats from invasive species are listed for Corben's Long-eared Bat (DPE 2023b) and the Project is unlikely to result in the spread of invasive species into the species' wider foraging range.		Possible
8. introduce disease that may cause the species to decline, or		
The Project is unlikely to introduce disease that may cause the species to decline.		Possible
9. Interfere substantially with the recovery of the species.		
The Project would not interfere substantially with the recovery of Corben's Long-eared Pied Bat as the Subject Land does not lie within a Priority Management Area and more suitable foraging and breeding habitat occurs in the surrounding area.		Unlikely
Conclusion: The Project is considered unlikely to result in a significant impact on Corben's Long-eared Pied Bat. Referral to the Commonwealth is not required.		

Swift Parrot

Table 39. MNES – Swift Parrot

Swift Parrot (<i>Lathamus discolor</i>)	Critically Endangered Species	Likelihood
<p>Distribution and occurrence: Swift Parrots breed in Tasmania during spring and summer, migrating in autumn and winter to south-eastern Australia (between Victoria and south-east Queensland). In NSW the species mostly occurs on the coast and southwest slopes (DPE 2023b). Very few records occur in the Gunnedah-Tamworth area and the Subject Land is not within mapped Important Habitat for the species. However, suitable foraging habitat occurs on the Subject Land in the form of winter-flowering eucalypts (i.e., White Box).</p> <p>Habitat: Swift Parrots migrate to mainland Australia between March and September, occurring in areas where eucalypts are flowering profusely or where there are abundant lerp infestations (DPE 2023b). Favoured feed trees include winter flowering species include White Box, while commonly used lerp infested trees include <i>Eucalyptus microcarpa</i> (Inland Grey Box) (DPE 2023b). The Subject Land is also not mapped as a Priority Management Area Map (OEH 2023b).</p> <p>Potential impacts associated with the Project: 1.26 ha of potentially suitable foraging habitat would be cleared for the Project in the form of one White Box tree within remnant woodland along the access road and one scattered tree.</p> <p>Avoidance and mitigation: The Project layout was redesigned to avoid some areas of DNG, woodland, native plantings and nine scattered trees. The extend of the woodland clearing along the access road was reduced from a 10-20 m buffer to a 4-5 m buffer, resulting in the loss of only one tree in this area. Further mitigation measures have been outlined in Section 8.4.</p>		
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it would:		
1. lead to a long-term decrease in the size of a population;		
The Swift Parrot comprises a single, migratory population (Saunders & Tzaros 2011). The Subject Land contains potential, marginal foraging habitat occurs in the form of winter flowering eucalypts. Given the highly mobile nature of this species, and the presence of more suitable habitat in the surrounding landscape, it is unlikely that the Project would lead to a long-term decrease in the size of a population.		Unlikely
2. reduce the area of occupancy of the species;		
The current estimated AOO for this species is 1400 km². However, this range fluctuates between 12 km² and 1,700 km² (Garnett & Baker 2021). The area of the species’ geographic range to be impacted by the Project would be 1.26 ha. This would account for <0.0001 % of the overall EOO and between 0.1 % and 0.0007 % of the overall AOO for the species. Therefore, the Project would not significantly reduce the area of occupancy of this species.		Unlikely
3. fragment an existing important population into two or more populations;		
The Swift Parrot comprises a single, migratory population (Saunders & Tzaros 2011). Given the highly mobile nature of the species, and the fact that no breeding habitat or Priority Management Area would be impacted, the Project is considered highly unlikely to fragment an existing important population into two or more populations.		Unlikely
4. adversely affect habitat critical to the survival of a species;		
The National Recovery Plan for the Swift Parrot (Saunders & Tzaros 2011) describes habitat critical for the species survival as:		Unlikely
<ul style="list-style-type: none">Areas of priority habitat for which for which the Swift Parrot has a level of site fidelity or possess phenological characteristics likely to be of importance to the Swift Parrot		

Swift Parrot (<i>Lathamus discolor</i>)	Critically Endangered Species	Likelihood
<ul style="list-style-type: none"> Areas otherwise identified by the recovery team. <p>No areas of habitat identified as Priority Management Areas or breeding habitat occur within the Subject Land. Due to this, it is unlikely that the Subject Land contains habitat critical to the survival of this species.</p>		
5. disrupt the breeding cycle of a population		
The Swift Parrot is a non-breeding visitor to mainland Australia. Therefore, the Project would not impact the breeding cycle of this species.		Unlikely
6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;		
Potential foraging habitat (1.26 ha remnant woodland and one scattered tree would be removed by the Project. Given the highly mobile nature of this species and the absence of breeding habitat on the Subject Land, it is unlikely the Project would result in a significant decrease in the availability or quality of habitat to the extent that the species is likely to decline.		Unlikely
7. result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;		
Invasive species harmful to the Swift Parrot are feral honeybees, Large Earth Bumblebees and the aggressive native Noisy Miner (<i>Manorina melanocephala</i>) (Saunders & Tzaros 2011). Any native or exotic invasive species present on the Subject Land are likely to be occasional visitors within their wider range. Therefore, the impact of invasive species in adjacent habitats is unlikely to be exacerbated by the Project.		Unlikely
8. introduce disease that may cause the species to decline, or		
Swift Parrots are vulnerable to Psittacine circoviral disease (PCD), commonly known as 'beak and feather'. This disease naturally occurs in the environment among psittacine species. The Project is unlikely to introduce disease that may cause the Swift Parrot to decline as PCD may already be present in the surrounding area.		Unlikely
9. Interfere with the recovery of the species.		
The Project would directly impact 1.26 ha of potential foraging habitat for the Swift Parrot. Given the highly mobile nature of this species and the fact that no breeding habitat or mapped important areas would be impacted, the Project would not interfere with the recovery of the species.		Unlikely

Regent Honeyeater

Table 40. MNES – Regent Honeyeater

<i>Regent Honeyeater (Anthochaera Phrygia)</i>	Critically Endangered Species	Likelihood
<p>Distribution and occurrence: Regent Honeyeaters have a patchy distribution in NSW, occurring near Capertee and the Bundarra-Barraba region in NSW (DPE 2023b). This species is well known in the Tamworth region with the closest Priority Management Site occurring north of Manilla (DPE n.d.).</p> <p>Habitat: This species inhabits temperate woodlands and open forests that support a high bird species richness and abundance. This species relies on <i>Eucalyptus</i> spp. for foraging. The Subject Land contains suitable foraging habitat in the form of 1.26 ha of remnant woodland [one tree to be removed] and 13 scattered <i>Eucalyptus</i> spp. trees. The Subject Land is not mapped within the Important Area Habitat Map for the Regent Honeyeater (OEH 2023b).</p> <p>Potential impacts associated with the Project: Potentially suitable foraging habitat (1.26 ha of remnant woodland [one tree to be removed] and 13 scattered <i>Eucalyptus</i> spp. trees) would be cleared for the Project.</p> <p>Avoidance and mitigation: The Project layout was redesigned to avoid some areas of DNG, woodland, native plantings and nine scattered trees. The extend of the woodland clearing along the access road was reduced from a 10-20 m buffer to a 4-5 m buffer, resulting in the loss of only one tree in this area. Further mitigation measures have been outlined in Section 8.4.</p> <p>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it would:</p>		
1. lead to a long-term decrease in the size of an important population of a species		
The Subject Land is not mapped within the Important Area Habitat Map for the Regent Honeyeater (DPIE 2020b). The loss of potential foraging habitat (1.26 ha of remnant woodland [one tree to be removed] and 13 scattered <i>Eucalyptus</i> spp. trees) is unlikely to lead to a long-term decrease in the size of any local populations due to the abundance of suitable habitat in the surrounding area.		Unlikely
2. reduce the area of occupancy of an important population of the species;		
The current estimated AOO for this species is 300 km ² which is considered to be declining (DE 2015). The area of the species' geographic range to be impacted by the Project would be 1.26 ha. This would account for 0.004 % of the overall AOO for the species.		Unlikely
3. fragment an existing important population into two or more populations;		
The Subject Land is not mapped within the Important Area Habitat Map for the Regent Honeyeater (DPIE 2020b). Any Regent Honeyeater individuals present on the Subject Land are likely to be infrequent visitors within their wider foraging range. Therefore, given the area of potential foraging habitat to be cleared and the distance from the mapped important habitat areas, it is unlikely impacts would fragment any populations into two or more populations.		Unlikely
4. adversely affect habitat critical to the survival of a species;		
<p>The National Recovery Plan for the Regent Honeyeater defines habitat critical to the survival of the species as (DE 2016):</p> <ul style="list-style-type: none"> - any breeding or foraging areas where the species is likely to occur 		Low

Regent Honeyeater (<i>Anthochaera Phrygia</i>)	Critically Endangered Species	Likelihood
<p>- any newly discovered breeding or foraging locations</p> <p>The Subject Land is not mapped within the Important Area Habitat Map (DPIE 2020b). However, due to the presence of potential foraging habitat, the Subject Land is considered habitat critical to the survival of the species. The Project will result in the loss of critical habitat (1.26 ha of remnant woodland [one tree to be removed] and 13 scattered <i>Eucalyptus spp.</i> trees). Due to the small area to be cleared and the location of the scattered trees in a degraded area, the Project is not considered likely to significantly impact the survival of the species.</p>		
5. disrupt the breeding cycle of an important population		
The Subject Land is not mapped within the Important Area Habitat Map for the Regent Honeyeater (OEH 2023b). Breeding habitat is absent from the Subject Land.		Unlikely
6. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;		
Potential foraging habitat (1.26 ha of remnant woodland [one tree to be removed] and 13 scattered <i>Eucalyptus spp.</i> trees) would be removed by the Project. Given the small area to be cleared and the degree of disturbance on the site, the loss of potential foraging habitat is unlikely to significantly reduce the availability or quality of habitat to the extent that the species is likely to decline.		Unlikely
7. result in invasive species that are harmful to a critically endangered or endangered species becoming established in the vulnerable species' habitat;		
No direct threats from exotic invasive species are listed for the Regent Honeyeater. However, this species is sensitive to competition from the native aggressive Noisy Miner (<i>Manorina melanocephala</i>). Any native or exotic invasive species present on the Subject Land are likely to be occasional visitors within their wider range. Therefore, the impact of invasive species in adjacent habitats is unlikely to be exacerbated by the Project.		Low
8. introduce disease that may cause the species to decline, or		
The Project is unlikely to introduce disease that may cause the species to decline.		Unlikely
9. Interfere substantially with the recovery of the species.		
The Project would not interfere substantially with the recovery of the Regent Honeyeater as the site is not mapped within the Important Area Habitat Map for the Regent Honeyeater (DPIE 2020b) and more suitable foraging habitat occurs in the surrounding area.		Unlikely
Conclusion: The Project is considered unlikely to result in a significant impact on the Regent Honeyeater Referral to the Commonwealth is not required.		

Poplar Box Grassy Woodland on Alluvial Plains

Table 41. MNES – Poplar Box Grassy Woodland on Alluvial Plains

Poplar Box Grassy Woodland on Alluvial Plains	Endangered Ecological Community	Likelihood
<p>Distribution: The Poplar Box EEC occurs in a broad band west of the Great Dividing Range at altitudes <300 m ASL (DPE 2023b). Within NSW, this community extends cross the western slopes and plains from Leeton in the south, west to Bourke, Goondiwindi in the north and Tamworth in the east.</p> <p>Habitat: The Poplar Box EEC is typically a grassy woodland or occasionally open grassy forest, with a canopy dominated by Poplar Box and an understorey mostly of grasses and other forbs (DPE 2023b). This community mostly occurs in gently undulating to flat landscapes or gentle slopes on a wide range of soils of alluvial and depositional origin (DEE 2019).</p> <p>Potential impacts associated with the Project: PCT 101 Woodland (good) and PCT 101 Woodland (moderate), along the access road, are considered to be Poplar Box EEC under the EPBC Act (Section 4.3). The Project will result in the loss of 0.31 ha of Poplar Box EEC. This includes groundcover vegetation and one tree (T25).</p> <p>Avoidance and mitigation measures: The Project layout was redesigned to avoid some areas of DNG, woodland, native plantings and nine scattered trees. The extend of the woodland clearing along the access road was reduced from a 10-20 m buffer to a 4-5 m buffer, resulting in the loss of only one tree in this area. Project mitigation measures have been outlined in Section 8.4.</p> <p>An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:</p>		
1. reduce the extent of an ecological community		
Pre-1750 extent estimates, current distribution and decline are incomplete for some areas of the Poplar Box EEC (DEE 2019). The pre-1750 extent in PCT 101 within NSW was estimated to be 20,000 ha, whereas the current extent is estimated to be 5,000 ha (75% decline). The loss of 0.31 ha will further reduce the extent of the EEC by <0.01%. Due to the small area to be cleared (groundcover and one tree), this is unlikely to significantly reduce the extent of Poplar Box EEC.		Unlikely
2. fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines		
The Project will result in the loss of 0.31 ha of remnant woodland along the Project access road. The loss of one tree (T25) in this area will increase the distance between adjacent trees from <15 m to ~30 m. As patches are defined as >3 trees <50m apart, this will not fragment the patch into two more patches. Similarly, fragmentation currently occurs within the patch due to the existing road. Therefore, widening the road for the Project is not anticipated to significantly increase the dispersal distance of groundcover species.		Unlikely
3. adversely affect habitat critical to the survival of an ecological community		
Habitat critical to the survival of the EEC is recognised as Class A (Category A1: highest condition) patches (DEE 2019). The 0.31 ha of remnant woodland along the access road is classified as Class A as this is based on the whether the entire patch meets the condition thresholds. The vegetation to be removed (PCT 101 Woodland and one tree) is unrepresentative of the overall patch as this area has been heavily disturbed by vehicle movement (and associated dust). Due to this, the 0.31 ha is not considered habitat critical to the survival of the EEC as it is a small, degraded area within the larger good condition patch.		Low
4. modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns		
The Project may have indirect, temporary effects on abiotic factors. Soil associated with clearing 0.31 ha of EEC will be stockpiled in designed areas, at the contractor's discretion. No sources of groundwater have been identified along the access road. However, an unnamed creek and associated road crossing intersect the access road. Mitigation measures to reduce residual indirect impacts on surface water have been outlined in Section 8.4.		Unlikely
5. cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting		
The Project is unlikely to substantially change the species composition of the EEC because exotic species present adjacent to the road are already present within the wider patch. Clearing associated with widening the access road may increase the abundance of some exotic species in the surrounding area. However, measures to reduce and minimise the spread of weeds are outlined in Section 8.2. The Project is unlikely to cause a decline or loss of functionality of important species.		Unlikely

Poplar Box Grassy Woodland on Alluvial Plains		Endangered Ecological Community	Likelihood
6. cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:			
a) assisting invasive species, that are harmful to the listed ecological community, to become established, or			Unlikely
Clearing associated with widening the access road may increase the abundance of some exotic species in the surrounding area. However, measures to reduce and minimise the spread of weeds are outlined in Section 8.2. Therefore, the Project is unlikely to assist invasive species to become established as they are already present in the wider woodland patch.			
b) causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or			
The Project is proposed on land currently used as a feedlot. The application of fertilisers, herbicides and other chemicals are not likely to increase as the area of grazing land will be reduced by the Project. Pollutants are also highly unlikely to be mobilised in proximity to the Poplar Box EEC due to the absence of suitable adjacent grazing land.			
7. interfere with the recovery of an ecological community.			
The loss of 0.31 ha of Poplar Box EEC (groundcover and one tree) is unlikely to interfere with the recovery of this EEC. This is because the area to be cleared is un-representative and degraded compared to the overall patch. The Project will not fragment the patch into two or more patches and is unlikely to alter the species structure and composition to the point of the EEC becoming downgraded from a Class A patch.			Unlikely
Conclusion: The Project is considered unlikely to result in a significant impact to the Poplar Box EEC. Referral to the Commonwealth is not required.			



APPENDIX F

SERIOUS AND IRREVERSIBLE IMPACTS

Swift Parrot

The Swift Parrot has been listed as a possible SAI due to: Principle 1 - Rapid Rate of Decline.

Principle 1 applies to the Swift Parrot as per Section 9.1.2 (2.a) of the BAM (DPIE 2020a) as this species is "*unlikely to respond to management because:*

- *decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or*
- *decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors, or parasites."*

Principle 2 (species with a very small population size) does not apply to the Swift Parrot as the total NSW population, estimated rate of decline in three years or one generation, number and percentage of mature individuals in each subpopulation, and whether the species is likely to undergo extreme fluctuations is unknown for this species (TSSC 2016).

Principle 3 (species with very limited geographic distribution) is not applicable to the Swift Parrot as the species' EOO and AOO are not geographically limited. Principle 3 also does not apply to the Swift Parrot as the threat-defined locations have not been identified and the likelihood of the species' population undergoing extreme fluctuations is unknown (TSSC 2016).

Principle 4 (species that is unlikely to respond to management and is therefore irreplaceable) is also not applicable to the Swift Parrot as: known reproductive characteristics do not severely limit the ability to increase the existing population on a biodiversity stewardship site; the species is not reliant on abiotic habitat which cannot be restored or replaced on a biodiversity stewardship site; and life history traits and/or ecology is known and threatened processes can be controlled on a biodiversity stewardship site (TSSC 2016).

1. Actions to avoid and minimise direct and indirect impacts

Actions to avoid and minimise direct and indirect impacts are detailed in Sections 7 and 8. The Subject Land is not included in the important habitat areas map for the Swift Parrot (DPIE 2020b). However, this species has been retained as an ecosystem credit species, due to the presence of potential foraging habitat (winter flowering eucalypts) on the site. The 1.26 ha of potential foraging habitat includes one White Box tree within remnant woodland along the access road and one scattered tree. Surveys were not required for this species as it is considered an ecosystems credit due to the lack of suitable breeding habitat on the Subject Land. However, it is recommended that tree clearing activities are undertaken in spring or summer (October to February) to ensure impacts to any potential individuals are avoided, as any Swift Parrots frequenting the Subject Land will be in Tasmania during this time.

2. Current status E

Detailed assessment of the Swift Parrot's current status as per Section 9.1.2 of the BAM is outlined in **Table 42**. The Swift Parrot breeds in Tasmania, before migrating to south-eastern mainland Australia between February and October. In NSW, the Swift Parrot occurs predominantly in woodlands and forests where it feeds on insects, pollen and nectar, favouring winter flowering trees such as *Eucalyptus robusta* (Swamp Mahogany), *Corymbia maculata* (Spotted Gum), *Corymbia gummifera* (Red Bloodwood), *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus sideroxylon* (Mugga Ironbark) and *Eucalyptus albens* (White Box) (DPE 2023b). According to the Saving Our Species program (OEH 2023b), there are three Priority Management Sites for the Swift Parrot: Central Coast, Riverina and Tarcutta Hills.

Item 2(a,i) of Section 9.1.2 of the BAM (decline in population of the species in NSW in the past 10 years or three generations [whichever is longer]) is applicable to the Swift Parrot which has experienced a population decline of $\geq 80\%$ in 10 years or three generations (DPE 2023b). The Subject Land is not mapped within the Important Area Habitat Map for the Swift Parrot (DPIE 2020b). Potential foraging habitat occurs in the form of one White Box tree within remnant woodland along the access road and one scattered tree. This species has been retained as an ecosystem credit species.

Table 42. Current Status – Swift Parrot

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
2a. evidence of rapid decline (Principle 1) presented by an estimate of the:			
<i>i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer)</i>	The Swift Parrot experienced significant population decline in NSW and is projected to continue declining at a rate of 87% over three generations (TSSC 2016).	Threatened Species Scientific Committee (TSSC) Conservation Advice	TSSC listing advice states current population numbers are unknown and declining rates may be higher.
<i>i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors or parasites</i>	<ul style="list-style-type: none"> - Swift Parrots experience reduction in geographic distribution through ongoing land clearing and agricultural expansion in NSW and production forestry in Tasmania. In NSW, over 70% of important habitat has been cleared since European settlement. Additionally, habitat quality is reduced by wildfires through destruction of nesting trees (TSSC 2016). - The Swift Parrot is a valued species by international bird collectors and has been targeted by illegal trade, however the extent of this impact is unknown. - The Swift Parrot has been critically impacted by predation from Sugar Gliders, which target not only the eggs but also the breeding female. The species is also impacted by competition for resources from large, more aggressive birds like honey eaters. - The species has been impacted by the Psittacine Beak and Feather Disease (PBFD) disease 	Threatened Species Scientific Committee (TSSC) Conservation Advice	The extent of illegal trade impacts is unknown.

3. Deficient or unknown data in the TBDC

Not applicable.

4. Impact Assessment

The impact assessment for the Swift Parrot according to Principle 1 of the BAM (DPIE 2020a) is outlined in **Table 43** below.

Table 43. SAII Impact Assessment – Swift Parrot

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
4a. The impact on the species' population (Principles 1 and 2) presented by:			
i. <i>An estimate of the number of individuals (mature and immature) present in the subpopulation on the Development Footprint (the site may intersect or encompass the subpopulation) and as a percentage of the total NSW population</i>	<p>The Swift Parrot may utilise the Project site for foraging due to the presence of winter flowering eucalypts, and scattered records exist in Tamworth to the east and Gunnedah to the west of the Subject Land (DPE 2023c). However, this species has not been recorded on site.</p> <p>The number of individuals in NSW is not accurately known. The 2020 Action Plan for Australian Birds estimate 1000 mature individuals occur in the wild, with the current estimated population likely being 750 individuals (Garnett and Baker 2021).</p>	<p>The Action Plan for Australia Birds 2020 (Garnett & Baker, 2021)</p> <p>NSW BioNet Atlas (DPE 2023c)</p>	Details of the total NSW population is unknown due to data deficiency. Therefore, the estimate of the number of individuals present on the site as a percentage of the total NSW population cannot be calculated.
ii. <i>An estimate of the number of individuals (mature and immature) to be impacted by the proposal and as a percentage of the total NSW population, or</i>	Not applicable as the unit of measure is area. Targeted surveys were not completed as suitable breeding habitat is absent from the Subject Land. Any individuals present on the site are likely to occur infrequently within their wider foraging range.	N/A	N/A
iii. <i>If the species' unit of measure is area, provide data on the number of individuals on the site, and the estimated number that would be impacted, along with the area of habitat to be impacted by the proposal</i>	This species is considered an ecosystem credit species for this Project and 1.26 ha of potential foraging habitat would be impacted by the proposal, including one remnant woodland tree and one scattered tree.	N/A	N/A
4b. Impact on geographic range (Principles 1 and 3) presented by:			
i. <i>The area of the species' geographic range to be impacted by the proposal in hectares, and a percentage of the total AOO, or EOO within NSW</i>	<p>The current estimated EOO for this species is 71,000 km² (Garnett & Baker 2021). The estimated AOO is 1,400 km², however this range fluctuates between 12 km² and 1,700 km² (Garnett & Baker 2021). The TSSC considers this restrictive taking into account these fluctuations (TSSC 2016).</p> <p>The area of the species' geographic range to be impacted by the Project would be 1.26 ha. This would account for <0.0001 % of the overall EOO and between 0.1 % and 0.0007 % of the overall AOO for the species.</p>	<p>TSSC Conservation Advice <i>Lathamus discolor</i>: Swift Parrot (TSSC 2016)</p> <p>The Action Plan for Australia Birds 2020 (Garnett & Baker 2021)</p>	

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
ii. <i>The impact on the subpopulation as either: all individuals would be impacted (subpopulation eliminated); OR impact will affect some individuals and habitat; OR impact will affect some habitat, but no individuals of the species would be directly impacted</i>	<p>The Project will affect some potential foraging habitat (1.26 ha of woodland [one tree to be removed] and one scattered tree), but no individuals of the species will likely be directly impacted.</p> <p>It is recommended pre-clearing surveys are conducted to ensure impacts to any potential individuals be avoided and that vegetation clearing is limited to between October and February when the species is wintering in Tasmania.</p>	BioNet Atlas (DPE 2022c)	
iii. <i>To determine if the persisting subpopulation that is fragmented will remain viable, estimate (based on published and unpublished sources such as scientific publications, technical reports, databases or documented field observations) the habitat area required to support the remaining population, and habitat available within dispersal distance, and distance over which genetic exchange can occur (e.g. seed dispersal) and pollination distance for the species</i>	<p>Potential foraging habitat (1.26 ha remnant woodland [one tree] and one scattered tree would be removed by the Project. Given the highly mobile nature of this species and the absence of breeding habitat on the Subject Land, it is unlikely the Project would result in fragmentation within the population. Any individuals frequenting the Subject Land are likely to do so sporadically within their wider foraging range.</p>		
iv. <i>to determine changes in threats affecting remaining subpopulations and habitat if the proposed impact proceeds, estimate changes in environmental factors including changes to fire regimes (frequency, severity); hydrology, pollutants; species interactions (increased competition and effects on pollinators or dispersal); fragmentation, increased edge effects, likelihood of disturbance; and disease, pathogens and parasites. Where these factors have been considered elsewhere in</i>	<p><i>Changes to fire regimes (frequency, severity)</i></p> <p>The landscape in which the Project would occur is not prone to fire due to the patchy nature of remnant woodland, and conversion of woodland and native grassland to cropping and intensive grazing. The Project would not lead to a reduction or an increase in bushfire risk, nor would it significantly affect fire regimes in the surrounds. Section 8.2</p> <p><i>Hydrology</i> Section 6</p> <p><i>Pollutants:</i> Section 8.2</p>		

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
<p><i>relation to the target species, the assessor may refer to the relevant sections of the BDAR or BCAR.</i></p>	<p><i>Species interactions (increased competition and effects on dispersal):</i> Section 8.2</p> <p><i>Fragmentation:</i> The Project may increase habitat fragmentation for the Swift Parrot as the Project occurs within a highly fragmented landscape with poor connectivity between adjacent woodland patches, and vegetation clearing for the Project may increase the distance between habitat areas.</p> <p><i>Increased edge effects:</i> Section 8.2</p> <p><i>Likelihood of disturbance:</i> It is recommended that pre-clearance surveys are conducted within areas of suitable habitat to avoid any potential impact to individuals of this species. Any individuals identified on the Subject Land are to be re-located to suitable adjacent habitat by a qualified fauna handler in conjunction with WIRES. The likelihood of any Swift Parrots occurring on the Subject Land will be significantly reduced by undertaking clearing in October to February.</p> <p><i>Disease, pathogens and parasites:</i> Section 8.2</p>		

Conclusion

The Swift Parrot is not considered to be at risk of a SAI due to the Project. The Project will result in the loss of 1.26 ha (woodland and scattered trees) of potential foraging habitat. Actions to minimise and mitigate potential impacts to foraging habitat have been outlined in Sections 7 and 8.

Regent Honeyeater

The Regent Honeyeater has been listed as a possible SAI due to: Principle 1 - Rapid Rate of Decline and Principle 2 - Species or ecological community with a very small population size

Principle 1 applies to the Regent Honeyeater as per Section 9.1.2 (2.a) of the BAM (DPIE 2020a) as this species is "*unlikely to respond to management because:*

- *decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or*
- *decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors, or parasites".*

Principle 2 applies to the Regent Honeyeater as per Section 9.1.2 (2.b) of the BAM (DPIE 2020a) as this species is "*unlikely to respond to management because:*

- *an estimate of the species' current population size in NSW, and*
- *an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and*
- *where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations."*

Principle 3 (species with very limited geographic distribution) is not applicable to the Regent Honeyeater as the species' EOO and AOO are not geographically limited. Principle 3 also does not apply to the Regent Honeyeater as the threat-defined locations have not been identified and the likelihood of the species' population undergoing extreme fluctuations is unknown (TSSC 2016).

Principle 4 (species that is unlikely to respond to management and is therefore irreplaceable) is also not applicable to the Regent Honeyeater as: known reproductive characteristics do not severely limit the ability to increase the existing population on a biodiversity stewardship site; the species is not reliant on abiotic habitat which cannot be restored or replaced on a biodiversity stewardship site; and life history traits and/or ecology is known and threatened processes can be controlled on a biodiversity stewardship site (TSSC 2016).

1. Actions to avoid and minimise direct and indirect impacts

Actions to avoid and minimise direct and indirect impacts are detailed in Sections 7 and 8. The Subject Land is not included in the important habitat areas map for the Regent Honeyeater with the important areas occurring north of Manilla (DPIE 2020b). However, this species has been retained as an ecosystem credit species, due to the presence of potential foraging habitat (including White Box which is considered key foraging species) on the site (DPE 2023B). Potential foraging habitat in the form of 1.26 ha of remnant woodland [one tree to be removed] and 13 scattered *Eucalyptus* spp. trees will be removed by the Project. Surveys were not required for this species due to the lack of suitable breeding habitat on the Subject Land.

Current status

Detailed assessment of the Regent Honeyeaters current status as per Section 9.1.2 of the BAM is outlined in **Table 44**.

The Regent Honeyeater breeds between July and January in three known breeding areas (DE 2015). Two key breeding areas occur in NSW, Capertee Valley and the Bundarra-Barraba regions. The Regent Honeyeater species inhabits temperate woodlands and open forests that support a high bird species richness and abundance (DPE 2023b). This species relies on *Eucalyptus* spp. for foraging feeding mainly on nectar. Key feed species include *Eucalyptus sideroxylon* (Mugga Ironbark), *Eucalyptus melliodora* (Yellow Box), White Box and *Eucalyptus robusta* (Swamp Mahogany) (DPE 2023b). This species also forages on mistletoe and insects.

Item 2(a,i) of Section 9.1.2 of the BAM (decline in population of the species in NSW in the past 10 years or three generations [whichever is longer]) is applicable to the Regent Honeyeater which has experienced a population decline of $\geq 80\%$ in 10 years or three generations (DPE 2023b).

The Subject Land is not mapped within the Important Area Habitat Map for the Regent Honeyeater (OEH 2023b). However, 1.26 ha of vegetation (one remnant woodland tree and 13 scattered *Eucalyptus* spp. trees) to be cleared is considered potential foraging habitat, retaining the species as an ecosystem credit species.

Table 44. Current Status – Regent Honeyeater

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
2a. evidence of rapid decline (Principle 1) presented by an estimate of the:			
<i>i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or</i>	The Regent Honeyeater has experienced significant population decline of 80% over three generations, this species is continuing to decline (DE, 2015).	Department of the Environment, Conservation advice, <i>Anthochaera phrygia</i>	Current population numbers are difficult to estimate and therefore decline rates are difficult to assess and may be higher (DE, 2015).
<i>ii. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors, or parasites.</i>	<ul style="list-style-type: none"> - Regent Honeyeaters experience reduction in geographic distribution and habitat quality through clearing and the removal of large feed and habitat trees. This leads to habitat fragmentation and degradation. Changes to fire regimes also has affected habitat (DE 2015). - Predation and competition from other species are also a key threat to the Regent Honeyeater. The Regent Honeyeater competes with aggressive native species (Noisy Miner and Noisy Friarbird [<i>Philemon corniculatus</i>]) for resources which may be a contributing factor to its decline (DE 2015). This species also experiences predation of its nest by species such as the Pied Currawongs (<i>Strepera graculina</i>) (DE 2015). - Due to the dramatic decline in the population loss of genetic variability is also a threat to the Regent Honeyeater (DE 2015). 	Department of the Environment, Conservation advice, <i>Anthochaera phrygia</i>	N/A
2b. Species or ecological community with a very small population size			
<i>i. an estimate of the species' current population size in NSW, and</i>	The current population of Regent Honeyeaters in the wild is estimated to be between 250 and 350 individuals (DPE 2015).	NSW Department of Planning and Environment, Saving the Regent Honeyeater.	Due to the mobile and unpredictable nature of the species the population size is difficult to assess (DE, 2015).
<i>ii. an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and</i>	The Regent Honeyeater has experienced significant population decline of 80% over three generations, this species is continuing to decline (DE 2015).	Department of the Environment, Conservation advice, <i>Anthochaera phrygia</i>	Current population numbers are difficult to estimate and therefore decline rates are difficult to assess and may be higher (DE, 2015).

Criteria	Data/ information	Data sources	Details of data deficiency, assumptions, reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
iii. <i>where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations.</i>	In the Bundarra- Barraba region it is estimated that there are approximately 20- 30 mature individuals (DPE 2022). The number of mature individuals in declining. However, no extreme fluctuations in the population, extent of occurrence or area of occupancy have been recorded. (DE 2015).	Department of the Environment, Conservation advice, <i>Anthochaera phrygia</i>	

3. Deficient or unknown data in the TBDC

Not applicable.

4. Impact Assessment

The impact assessment for the Regent Honeyeater according to Principle 1 and 2 of the BAM (DPIE 2020a) is outlined in **Table 45** below.

Table 45. SAII Impact assessment – Regent Honeyeater

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
4a. The impact on the species' population (Principles 1 and 2) presented by:			
iv. <i>An estimate of the number of individuals (mature and immature) present in the subpopulation on the Development Footprint (the site may intersect or encompass the subpopulation) and as a percentage of the total NSW population</i>	The Regent Honeyeater may utilise the Project site for foraging due to the presence of <i>Eucalyptus</i> spp. (including White Box which is considered key foraging species). The Subject Land is not mapped within the Important Area Habitat Map for the Regent Honeyeater (DPE 2022) and the species has not been recorded on the site. The number of individuals in NSW is not accurately known. However, the current population of Regent Honeyeaters in the wild is estimated to be between 250 and 350 individuals (DPE 2022).	NSW Department of Planning and Environment, Saving the Regent Honeyeater (DPE, 2022).	Details of the total NSW population is unknown due to data deficiency. Therefore, the estimate of the likely number of individuals frequenting the site within their broader foraging range as a percentage of the total NSW population cannot be calculated.

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
v. <i>An estimate of the number of individuals (mature and immature) to be impacted by the proposal and as a percentage of the total NSW population, or</i>	Not applicable as the unit of measure is area. Targeted surveys were not completed as suitable breeding habitat is absent from the Subject Land. Any individuals present on the site are likely to occur infrequently within their wider foraging range.	N/A	N/A
vi. <i>If the species' unit of measure is area, provide data on the number of individuals on the site, and the estimated number that would be impacted, along with the area of habitat to be impacted by the proposal</i>	This species is considered an ecosystem credit species for this Project and 1.26 ha of potential foraging habitat would be impacted by the proposal, including one remnant woodland tree and thirteen scattered trees.	N/A	N/A
4b. Impact on geographic range (Principles 1 and 3) presented by:			
i. <i>The area of the species' geographic range to be impacted by the proposal in hectares, and a percentage of the total AOO, or EOO within NSW</i>	The current estimated EOO for this species is 600,000 km ² and the estimated AOO is 300 km ² (DE 2015). Both the EOO and AOO are considered to be declining (DE 2015). The area of the species' geographic range to be impacted by the Project would be 1.26 ha. This would account for <0.0001 % of the overall EOO and 0.004 % of the overall AOO for the species.	Department of the Environment, Conservation advice, <i>Anthochaera phrygia</i> (DE, 2015).	
iii. <i>The impact on the subpopulation as either: all individuals would be impacted (subpopulation eliminated); OR impact will affect some individuals and habitat; OR impact will affect some habitat, but no individuals of the species would be directly impacted</i>	The Project will affect some potential foraging habitat (1.26 ha of woodland [one tree to be removed] and thirteen scattered trees), but no individuals of the species will likely be directly impacted. Any individuals present on the Subject Land are likely to be occasionally visitors frequenting the site as a minor component of their wider foraging range. It is recommended pre-clearing surveys are conducted to ensure impacts to any potential foraging individuals are avoided.		
v. <i>To determine if the persisting subpopulation that is fragmented will remain viable, estimate (based on published and unpublished sources such</i>	Potential foraging habitat (1.26 ha remnant woodland [one tree] and thirteen scattered tree would be removed by the Project. Given the highly mobile nature of this species and the absence of breeding habitat on the Subject Land, it is unlikely the Project would result in fragmentation within the population. Any individuals frequenting the Subject Land are likely to do so sporadically within their wider		

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
<i>as scientific publications, technical reports, databases or documented field observations) the habitat area required to support the remaining population, and habitat available within dispersal distance, and distance over which genetic exchange can occur (e.g. seed dispersal) and pollination distance for the species</i>	foraging range.		
vi. <i>to determine changes in threats affecting remaining subpopulations and habitat if the proposed impact proceeds, estimate changes in environmental factors including changes to fire regimes (frequency, severity); hydrology, pollutants; species interactions (increased competition and effects on pollinators or dispersal); fragmentation, increased edge effects, likelihood of disturbance; and disease, pathogens and parasites. Where these factors have been considered elsewhere in relation to the target species, the assessor may refer to the relevant sections of the BDAR or BCAR.</i>	<p><i>Changes to fire regimes (frequency, severity)</i></p> <p>The landscape in which the Project would occur is not prone to fire due to the patchy nature of remnant woodland, and conversion of woodland and native grassland to cropping and intensive grazing. The Project would not lead to a reduction or an increase in bushfire risk, nor would it significantly affect fire regimes in the surrounds.</p> <p>Section 8.2</p> <p><i>Hydrology</i></p> <p>Section 6</p> <p><i>Pollutants:</i></p> <p>Section 8.2</p> <p><i>Species interactions (increased competition and effects on dispersal):</i></p> <p>Section 8.2</p> <p><i>Fragmentation:</i></p> <p>The Project may increase habitat fragmentation for the Regent Honeyeater as the Project occurs within a highly fragmented landscape with poor connectivity between adjacent woodland patches, and vegetation clearing for the Project may increase the distance between habitat areas.</p>		

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
	<p><i>Increased edge effects:</i> Section 8.2</p> <p><i>Likelihood of disturbance:</i> It is recommended that pre-clearance surveys are conducted within areas of suitable habitat to avoid any potential impact to individuals of this species. Any individuals identified on the Subject Land are to be re-located to suitable adjacent habitat by a qualified fauna handler in conjunction with WIRES.</p> <p><i>Disease, pathogens and parasites:</i> Section 8.2</p>		

Conclusion

The Regent Honeyeater is not considered to be at risk of a SAII due to the Project. The Project will result in the loss of some potential foraging habitat (1.26 ha remnant woodland [one tree] and thirteen scattered trees). Actions to minimise and mitigate potential impacts to foraging habitat have been outlined in Sections 7 and 8.

Large Bent-winged Bat

The Large Bent-winged Bat has been listed in the TBDC as a possible SAI due to: Principle 4 - species or ecological community that is unlikely to respond to management and is therefore irreplaceable.

Principle 4 applies to the Large Bent-wing Bat as per Section 9.1.2 (2.d) of the BAM (DPIE 2020a), which states the species is "*unlikely to respond to management because:*

- *Known reproductive characteristics severely limit the ability to increase the existing population on, or occupy new habitat (e.g. species is clonal) on, a biodiversity stewardship site*
- *The species is reliant on abiotic habitats which cannot be restored or replaced (e.g. karst systems) on a biodiversity stewardship site, or*
- *Life history traits and/or ecology is known but the ability to control key threatening processes at a biodiversity stewardship site is currently negligible (e.g. frogs severely impacted by chytrid fungus)".*

Principle 1 (species currently in a rapid rate of decline) and Principle 2 (species has a small population size) do not apply to the Large Bent-wing Bat because the species has large distribution area and it is not possible to determine total population size (DPE 2023b).

Principle 3 (species has a limited geographic location) does not apply to the species as it occurs across much of eastern Australia (DPE 2023b).

1. Actions to avoid and minimise direct and indirect impacts

Actions to avoid and minimise direct and indirect impacts are detailed in Sections 7 and 8.

Species occurs along the east and north-western coasts of Australia and has not been recorded within 10 km of the Subject Land (DPE 2023c). The Large Bent-winged Bat utilise human-made structures for breeding habitat (DPE 2023b). Although potential breeding habitat (i.e., human-made structures) was identified on the Subject Land, these are considered unsuitable for breeding due to disturbance in the form of security lights, motion-detecting sensor lights and noise pollution from animals in the stock yards. Therefore, there are no prescribed impacts associated with the removal of human-made structures. Large Bent-winged Bats forage above the canopy in forested areas for insects. This species has been retained as an ecosystem credit species for the Project due to the presence of 0.94 ha of potential foraging habitat (woodland areas) which would be removed by the Project.

2. Current status

Detailed assessment of the Large Bent-winged Bat's current status as per Section 9.1.2 of the BAM (DPIE 2020a) is outlined in **Table 46** below. This species has highly specific reproductive habitat requirements and a low birth rate that lowers its rate of survival and responding to management actions. Furthermore, this species is impacted by exotic pathogens, in particular white nose fungus, further lowering rate of survival.

Table 46. Current Status – Large Bent-winged Bat

Impact	Data / information	Data sources	Details of data deficiency, assumptions or reasons for low confidence in information (e.g. TBDC indicates data is unknown or deficient)
2d. evidence that the species is unlikely to respond to management (Principle 4) because:			
i. <i>known reproductive characteristics severely limit the ability to increase the existing population on, or occupy new habitat (e.g. species is clonal) on, a biodiversity stewardship site</i>	The Large Bent-winged Bat's breeding habitat is highly specific and females often miscarry if breeding habitat is unsuitable (DPE 2023b). Due to this any impacts are considered potentially serious and irreversible.	BioNet Threatened Biodiversity Data Collection (DPE 2023b)	
ii. <i>the species is reliant on abiotic habitats which cannot be restored or replaced (e.g. karst systems) on a biodiversity stewardship site, or</i>	Large Bent-winged Bats utilise caves and man-made structures such as buildings and stormwater tunnels for habitat. However, maternity habitats have highly specific temperature and humidity regimes that may be difficult to replicate (DPE 2023b).	BioNet Threatened Biodiversity Data Collection (DPE 2023b)	
iii. <i>life history traits and/or ecology is known but the ability to control key threatening processes at a biodiversity stewardship site is currently negligible (e.g. frogs severely impacted by chytrid fungus).</i>	The species is vulnerable to a number of threats, particularly exotic pathogens such as white-nose fungus (DPE 2023b). Further threats include: <ul style="list-style-type: none"> - Cave disturbance by the public - Loss of high productivity foraging habitat - Cave entrances blocked by human intervention or overgrown vegetation - Inappropriate fire regimes disrupting feeding/breeding activities - Feral cat predation 	BioNet Threatened Biodiversity Data Collection (DPE 2023b)	

3. Deficient or unknown data in the TBDC

Not applicable.

4. Impact Assessment

Under the BC Act an allocation of Principle 4 does not trigger any further impact assessment as any impacts are considered serious and irreversible and the species is unlikely to respond to management measures to mitigate impacts. Additionally, the TBDC hasn't specified any further criteria according to SAI principle 4 for the Large Bent-winged Bat.

Conclusion

The Large Bent-winged Bat is not considered to be at risk of a SAI due to the Project. The Project will result in the loss of 0.94 ha of potential foraging habitat. No breeding habitat will be disturbed by the Project due to the species' specific breeding requirements which are absent from the site. Actions to minimise and mitigate potential impacts to foraging habitat have been outlined in Sections 7 and 8.



APPENDIX G

CREDIT REPORTS

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044705/BAAS21027/23/00044706	223029 Tamworth Feedlot	22/06/2023
Assessor Name	Report Created	BAM Data version *
Sally Kirby	28/02/2024	61
Assessor Number	BAM Case Status	Date Finalised
BAAS21027	Finalised	28/02/2024
Assessment Revision	Assessment Type	BOS entry trigger
0	Part 4 Developments (General)	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAI	Ecosystem credits
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Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion												
1	101_Woodland_Good	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	79.9	79.9	0.15	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		7
2	101_Woodland_Moderate	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	48.9	48.9	0.21	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		6
3	101_DNG_Moderate	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	14.8	14.8	0.36	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		0
4	101_DNG_Poor	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	10.7	10.7	8.2	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		0

BAM Credit Summary Report

5	101_Exotic	White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland	2.3	2.3	15	Environment Protection and Conservation Act listing status	High Sensitivity to Gain	Not Listed	Critically Endangered	2.50		0
											Subtotal	13
											Total	13

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAIL	Species credits
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BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044705/BAAS21027/23/00044706	223029 Tamworth Feedlot	22/06/2023
Assessor Name	Assessor Number	BAM Data version *
Sally Kirby	BAAS21027	61
Proponent Names	Report Created	BAM Case Status
	28/02/2024	Finalised
Assessment Revision	Assessment Type	Date Finalised
0	Part 4 Developments (General)	28/02/2024
BOS entry trigger	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BOS Threshold: Area clearing threshold		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval

Assessment Id	Proposal Name	Page 1 of 9
00044705/BAAS21027/23/00044706	223029 Tamworth Feedlot	

BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT

No Changes

Predicted Threatened Species Not On Site

Name

Grantiella picta / Painted Honeyeater

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	23.9	13	0	13

BAM Biodiversity Credit Report (Like for like)

101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland This includes PCT's: 74, 75, 83, 101, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 516, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1324, 1329, 1330, 1332, 1383, 1606,	-	101_Woodland_Good	Yes	7	Peel, Eastern Nandewars, Hunter, Inverell Basalts, Kaputar, Liverpool Plains, Liverpool Range, Northern Basalts, Tomalla and Walcha Plateau. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

	1608, 1611, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland This includes PCT's: 74, 75, 83, 101, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 516, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797,	-	101_Woodland _Moderate	Yes	6	Peel, Eastern Nandewars, Hunter, Inverell Basalts, Kaputar, Liverpool Plains, Liverpool Range, Northern Basalts, Tomalla and Walcha Plateau. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

	799, 847, 851, 921, 1099, 1303, 1304, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland This includes PCT's: 74, 75, 83, 101, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 516, 528, 538, 544, 563, 567, 571, 589, 590,	-	101_DNG_Mod erate	Yes	0	Peel, Eastern Nandewars, Hunter, Inverell Basalts, Kaputar, Liverpool Plains, Liverpool Range, Northern Basalts, Tomalla and Walcha Plateau. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland This includes PCT's: 74, 75, 83, 101, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488,	-	101_DNG_Poor	No	0	Peel, Eastern Nandewars, Hunter, Inverell Basalts, Kaputar, Liverpool Plains, Liverpool Range, Northern Basalts, Tomalla and Walcha Plateau. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

492, 496, 508, 509, 510, 511, 516, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland This includes PCT's: 74, 75, 83, 101, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367,	-	101_Exotic	No	0	Peel, Eastern Nandewars, Hunter, Inverell Basalts, Kaputar, Liverpool Plains, Liverpool Range, Northern Basalts, Tomalla and Walcha Plateau. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

	381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 516, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 847, 851, 921, 1099, 1303, 1304, 1324, 1329, 1330, 1332, 1383, 1606, 1608, 1611, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533, 4147, 4149, 4150					

Species Credit Summary

No Species Credit Data



BAM Biodiversity Credit Report (Like for like)

Credit Retirement Options

Like-for-like credit retirement options

BAM Candidate Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044705/BAAS21027/23/00044706	223029 Tamworth Feedlot	22/06/2023
Assessor Name	Report Created	BAM Data version *
Sally Kirby	28/02/2024	61
Assessor Number	Assessment Type	BAM Case Status
BAAS21027	Part 4 Developments (General)	Finalised
Assessment Revision	Date Finalised	BOS entry trigger
0	28/02/2024	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
<i>Dichanthium setosum</i> Bluegrass	No (surveyed)	<div> <input type="checkbox"/> Jan <input checked="" type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr </div> <div> <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug </div> <div> <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </div> <div> <input type="checkbox"/> Survey month outside the specified months? </div>
<i>Digitaria porrecta</i> Finger Panic Grass	No (surveyed)	<div> <input type="checkbox"/> Jan <input checked="" type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr </div> <div> <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug </div> <div> <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </div> <div> <input type="checkbox"/> Survey month outside the specified months? </div>
<i>Phascolarctos cinereus</i> Koala	No (surveyed)	<div> <input type="checkbox"/> Jan <input checked="" type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr </div> <div> <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug </div> <div> <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </div> <div> <input type="checkbox"/> Survey month outside the specified months? </div>

BAM Candidate Species Report

<i>Thesium australe</i> Austral Toadflax	No (surveyed)	<input type="checkbox"/> Jan <input checked="" type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec
		<input type="checkbox"/> Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Barking Owl	Ninox connivens	Habitat degraded
Belson's Panic	Homopholis belsonii	Refer to BAR
Black-breasted Buzzard	Hamirostra melanosternon	Habitat constraints
Bush Stone-curlew	Burhinus grallarius	Habitat degraded
Eastern Cave Bat	Vespadelus troughtoni	Habitat degraded
Eastern Pygmy-possum	Cercartetus nanus	Habitat degraded
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Little Eagle	Hieraaetus morphnoides	Habitat constraints
Masked Owl	Tyto novaehollandiae	Habitat degraded
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
Square-tailed Kite	Lophoictinia isura	Habitat constraints
Swift Parrot	Lathamus discolor	Habitat constraints
White-bellied Sea-Eagle	Haliaeetus leucogaster	Habitat constraints

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044705/BAAS21027/23/00044706	223029 Tamworth Feedlot	22/06/2023
Assessor Name	Report Created	BAM Data version *
Sally Kirby	28/02/2024	61
Assessor Number	Assessment Type	BAM Case Status
BAAS21027	Part 4 Developments (General)	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
0	BOS Threshold: Area clearing threshold	28/02/2024

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Barking Owl	Ninox connivens	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Black Falcon	Falco subniger	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Black-breasted Buzzard	Hamirostra melanosternon	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Diamond Firetail	Stagonopleura guttata	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion

BAM Predicted Species Report

Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	<i>Melanodryas cucullata cucullata</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Little Eagle	<i>Hieraaetus morphnoides</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Little Lorikeet	<i>Glossopsitta pusilla</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Little Pied Bat	<i>Chalinolobus picatus</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Masked Owl	<i>Tyto novaehollandiae</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Regent Honeyeater	<i>Anthochaera phrygia</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Speckled Warbler	<i>Chthonicola sagittata</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Spotted Harrier	<i>Circus assimilis</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Square-tailed Kite	<i>Lophoictinia isura</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion

BAM Predicted Species Report

Swift Parrot	<i>Lathamus discolor</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Turquoise Parrot	<i>Neophema pulchella</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Varied Sittella	<i>Daphoenositta chrysoptera</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
White-throated Needletail	<i>Hirundapus caudacutus</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Painted Honeyeater	<i>Grantiella picta</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Painted Honeyeater	<i>Grantiella picta</i>	Habitat constraints

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044705/BAAS21027/23/00044925	223029 Tamworth Feedlot Scattered Trees	22/06/2023
Assessor Name	Report Created	BAM Data version *
Sally Kirby	28/02/2024	61
Assessor Number	BAM Case Status	Date Finalised
BAAS21027	Finalised	28/02/2024
Assessment Revision	Assessment Type	BOS entry trigger
0	Scattered Trees	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Scattered Trees Credit Requirement

Class	Contains hollows	Number of trees	Ecosystem credits
101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion			
3	True	11.0	11
3	True	1.0	1
3	True	1.0	1
3	False	1.0	1
			14
			14

Species credits for threatened species

The scattered tree module is not applicable. This species must be assessed using chapter 5 of the BAM and BAM-C development module

Lathamus discolor
Swift Parrot

Anthochaera phrygia
Regent Honeyeater



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044705/BAAS21027/23/00044925	223029 Tamworth Feedlot Scattered Trees	22/06/2023
Assessor Name	Assessor Number	BAM Data version *
Sally Kirby	BAAS21027	61
Proponent Names	Report Created	Date Finalised
	28/02/2024	28/02/2024
Assessment Revision	Assessment Type	BAM Case Status
0	Scattered Trees	Finalised
BOS entry trigger	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BOS Threshold: Area clearing threshold		

Potential Serious and Irreversible Impacts

Nil

Additional Information for Approval

PCTs With Customized Benchmarks
No Changes

Ecosystem Credit Summary

Assessment Id	Proposal Name
00044705/BAAS21027/23/00044925	223029 Tamworth Feedlot Scattered Trees

BAM Biodiversity Credit Report (Like for like)

PCT	TEC	HBT Cr	No HBT Cr	Credits
101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	13	1	14

Credit classes for 101	Like-for-like options				
	TEC	Trading group	HBT	Credits	IBRA region
	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	-	Yes	13	Peel, Eastern Nandewars, Hunter, Inverell Basalts, Kaputar, Liverpool Plains, Liverpool Range, Northern Basalts, Tomalla and Walcha Plateau. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	-	No	1	Peel, Eastern Nandewars, Hunter, Inverell Basalts, Kaputar, Liverpool Plains, Liverpool Range, Northern Basalts, Tomalla and Walcha Plateau. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.



Scattered Tree Report

Proposal Details

Assessment Id	Assessment name	BAM data last updated *
00044705/BAAS21027/23/00044925	223029 Tamworth Feedlot Scattered Trees	22/06/2023
Assessor Name	Report Created	BAM Data version *
Sally Kirby	28/02/2024	61
Assessor Number	BAM Case Status	Date Finalised
BAAS21027	Finalised	28/02/2024
Assessment Revision	Assessment Type	BOS entry trigger
0	Scattered Trees	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Scattered Trees

PCT code	PCT name	No. of trees	Species	DBHOB Category	Contain hollows	Class	Assessment required
101	Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	11	Eucalyptus populnea subsp. bimbil	>= 30cm	True	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species

Scattered Tree Report

101	Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	1	Eucalyptus dealbata	>= 30cm	True	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species
101	Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	1	Eucalyptus albens	>= 30cm	True	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species
101	Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion	1	Alectryon oleifolius	>= 30cm	False	3	Visual assessment for hollows, presence of important habitat features and habitat suitability for threatened species

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00044705/BAAS21027/23/00044925	223029 Tamworth Feedlot Scattered Trees	22/06/2023
Assessor Name	Report Created	BAM Data version *
Sally Kirby	28/02/2024	61
Assessor Number	BAM Case Status	Date Finalised
BAAS21027	Finalised	28/02/2024
Assessment Revision	Assessment Type	BOS entry trigger
0	Scattered Trees	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name
Barking Owl	Ninox connivens
Black Falcon	Falco subniger
Black-breasted Buzzard	Hamirostra melanosternon
Little Eagle	Hieraaetus morphnoides
Little Lorikeet	Glossopsitta pusilla
Masked Owl	Tyto novaehollandiae
Spotted Harrier	Circus assimilis
Square-tailed Kite	Lophoictinia isura
Swift Parrot	Lathamus discolor
Turquoise Parrot	Neophema pulchella
White-throated Needletail	Hirundapus caudacutus
Yellow-bellied Sheath-tail-bat	Saccolaimus flaviventris

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion

BAM Predicted Species Report

Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	<i>Melanodryas cucullata cucullata</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Little Pied Bat	<i>Chalinolobus picatus</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Painted Honeyeater	<i>Grantiella picta</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Regent Honeyeater	<i>Anthochaera phrygia</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Speckled Warbler	<i>Chthonicola sagittata</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
Varied Sittella	<i>Daphoenositta chrysoptera</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	101-Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis gularis</i>	Refer to BAR
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	Refer to BAR
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	Refer to BAR
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	Refer to BAR

BAM Predicted Species Report

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	Refer to BAR
Little Pied Bat	Chalinolobus picatus	Refer to BAR
Painted Honeyeater	Grantiella picta	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Refer to BAR
Speckled Warbler	Chthonicola sagittata	Refer to BAR
Varied Sittella	Daphoenositta chrysoptera	Refer to BAR
White-bellied Sea-Eagle	Haliaeetus leucogaster	Habitat constraints



Premise

premise.com.au

APPENDIX M – GROUNDWATER WORKS SUMMARIES

WaterNSW

Work Summary

GW011144

Licence: 90WA815046	Licence Status: CURRENT
Authorised Purpose(s): STOCK Intended Purpose(s): STOCK	
Work Type: Bore open thru rock	
Work Status:	
Construct.Method: Cable Tool	
Owner Type: Private	
Commenced Date:	Final Depth: 27.40 m
Completion Date: 01/04/1955	Drilled Depth: 27.40 m
Contractor Name: (None)	
Driller:	
Assistant Driller:	
Property: N/A NSW	Standing Water Level (m):
GWMA: 005 - PEEL VALLEY	Salinity Description:
GW Zone: 002 - PEEL CATCHMENT	Yield (L/s):
MISCELLANEOUS FRACTURED ROCK	

Site Details

Site Chosen By:		
County	Parish	Cadastre
Form A: DARLING	KEEPIT	54
Licensed: DARLING	KEEPIT	Whole Lot //
Region: 90 - Barwon	CMA Map: 9036-3S	
River Basin: 419 - NAMOI RIVER	Grid Zone:	Scale:
Area/District:		
Elevation: 0.00 m (A.H.D.)	Northing: 6575666.000	Latitude: 30°55'44.3"S
Elevation Source: (Unknown)	Easting: 264576.000	Longitude: 150°32'10.1"E
GS Map: -	MGA Zone: 56	Coordinate Source: GD.,ACC.MAP

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Threaded Steel	-0.60	4.90	152			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
11.30	11.90	0.60	Fractured	8.50		0.13			
22.90	24.40	1.50	Fractured			0.35			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.61	0.61	Gravel	Gravel	
0.61	1.52	0.91	Clay	Clay	
1.52	11.28	9.76	Shale	Shale	
11.28	27.43	16.15	Slate Water Supply	Slate	

***** End of GW011144 *****

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW015382

Licence:	Licence Status:
	Authorised Purpose(s): Intended Purpose(s): IRRIGATION
Work Type: Well	
Work Status:	
Construct.Method:	
Owner Type: Private	
Commenced Date:	Final Depth: 4.60 m
Completion Date: 01/02/1957	Drilled Depth: 4.60 m
Contractor Name: (None)	
Driller:	
Assistant Driller:	
Property:	Standing Water Level (m):
GWMA:	Salinity Good
GW Zone:	Description:
	Yield (L/s):

Site Details

Site Chosen By:			
	County	Parish	Cadastre
Form A: Licensed:	DARLING	BALDWIN	12
Region: 90 - Barwon	CMA Map: 9036-3S		
River Basin: 419 - NAMOI RIVER	Grid Zone:	Scale:	
Area/District:			

Elevation: 0.00 m (A.H.D.)
Elevation (Unknown)
Source:

Northing: 6575734.000
Easting: 266274.000

Latitude: 30°55'43.3"S
Longitude: 150°33'14.1"E

GS Map: -

MGA Zone: 56

Coordinate GD.,ACC.MAP
Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1	1	Casing	Concrete Cylinder	-0.90	-0.90	1118			

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
2.10	4.50	2.40	Unconsolidated	2.10		37.89			

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.13	2.13	Soil Black	Soil	
2.13	4.57	2.44	Gravel River Water Supply	Gravel	

*** End of GW015382 ***

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APPENDIX N – ABORIGINAL DUE DILIGENCE ASSESSMENT



Premise

BOTTLEJAC TRADING COMPANY (VIA AGDSA PTY LTD)

Rushes Creek Proposed Feedlot

ABORIGINAL HERITAGE DUE DILIGENCE ASESSMENT

Report No: 223029_ARC




Rev: 001D

11 September 2023

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1. INTRODUCTION

1.1 Background

Premise Australia Pty Ltd (Premise) has been engaged by Agriculture Development Services Australia Pty Ltd (AgDSA) on behalf of Bottlejac Trading Company to prepare an Environmental Impact Statement (EIS) for a modification to an existing feedlot and construction of a new feedlot at Rushes Creek north west of Tamworth in NSW. The modification will involve expansion of the existing feedlot from 1,000 head of cattle to 1,400 head of cattle, as well as the construction of a new feedlot with a capacity of 9,900 head of cattle.

The proposed development is a considered both Designated and Integrated Development and will be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and requires an approval under the *Protection of the Environment Operations Act 1997*. The Planning Secretary's Environmental Assessment Requirements (SEARs) 1696 has been issued.

The EIS must comply with the assessment requirements and meet the minimum form and content requirements in sections 190 and 192 of the *Environmental Planning and Assessment Regulation 2021* and must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS, an Aboriginal cultural heritage due diligence assessment has been prepared.

This assessment has been undertaken in accordance with the guidelines prepared in 2010 by the Department of Climate Change and Water (DECCW, 2010) [formerly Office of Environment and Heritage (OEH) now Heritage NSW] *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. The aim of the guidelines is to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects. This assessment includes recommendations regarding Aboriginal heritage constraints for the proposed works.

1.2 Study Area

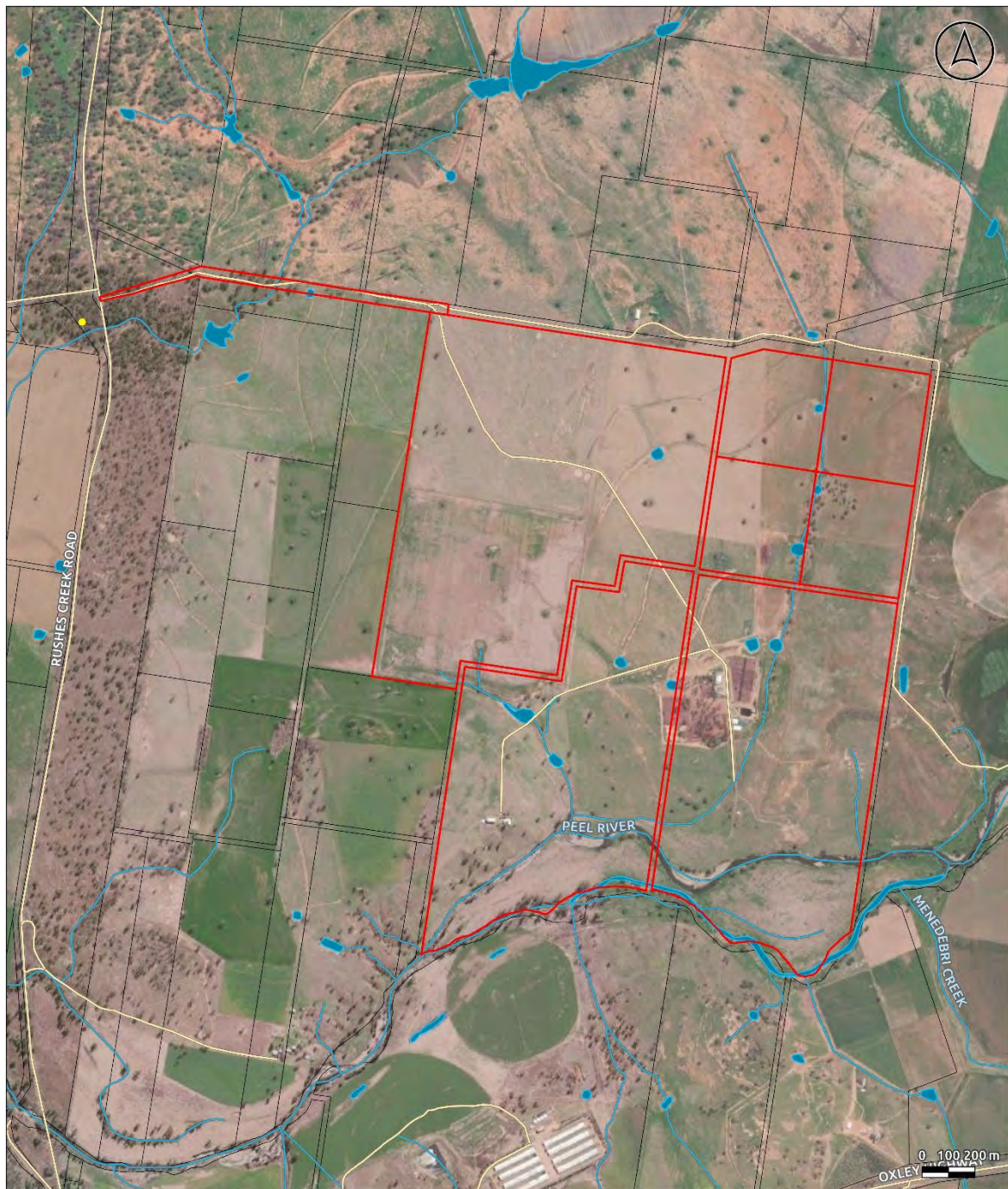
The study area is located across several land holdings currently used for an existing feedlot and agricultural land. The study area is located at 'Angora', Rannock Burn Road, Rushes Creek NSW and includes Lot 19, 43, 44, 141 and 142 DP752169 and partial Lot 7300 DP1134279 and Lot 1 DP842391, covering an approximate area of 134.42 hectares (ha). The study area also includes an access route along Rannock Burn Road extending from Rushes Creek Road to the 'Angora' property.

The study area is located in the Tamworth Local Government Area (LGA), bordering on the Parishes of Baldwin and Keepit and County of Darling. The land is currently zoned RU1 Primary Production pursuant to the *Tamworth Regional Local Environmental Plan 2011* (LEP). The study area is associated with the existing feedlot and the immediate surrounds are predominately used for agricultural farming practices such as cropping and grazing.

The study area falls within the boundary of the Tamworth Local Aboriginal Land Council (LALC). The study area is also within close proximity to the Red Chief LALC boundary, which is located to the west.

The study area is shown in **Figure 1**.

Figure 1 – Study Area



- Legend**
- Study Area
 - Cadastre
 - Roads
 - Watercourse
 - Waterbody
 - AHIMS Site

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1.3 Authorship and acknowledgments

This report was written by Latisha Ryall (Archaeologist, Premise). Management review was provided by Daniel Drum (Environmental Manager, Premise). A site inspection was undertaken by Latisha Ryall (Archaeologist, Premise) in consultation with Michael Fermor of Tamworth LALC between 22-24 February 2023. Copies of this report have been provided for review and comment to Tamworth LALC, prior to finalisation.

1.4 Report limitations

This report presents the results of an Aboriginal heritage due diligence assessment only.

1.5 Proposed works

AgDSA are proposing to expand an existing feedlot at Tamworth from 1,000 head of cattle to 1,400 head of cattle, as well as the construction of a new feedlot between Gunnedah and Tamworth with a capacity of 9,900 head of cattle. The proposal is to occur at 'Angora', Rannock Burn Road, Rushes Creek NSW.

Proposed development associated with the new feedlot includes:

- Two effluent reuse areas (44.4ha);
- Arrival, dispatch and handling facilities including feedlots, a manure pad (1.31 ha), retention of existing pens and handling yards for short term use;
- 2.5ML sedimentation basin (0.27 ha) and a 22ML effluent pond (1.56ha);
- Vegetation screens along Rannock Burn Road and the eastern perimeter of the site;
- Site access connecting the north-western corner of the site to Rannock Burn Road via an internal road; and
- Infrastructure associated with a feedlot including silage pits and a hay shed, upgraded feed mill and additional feed storage.

Proposed development associated with the existing feedlot includes:

- Upgraded feed mill infrastructure and additional silos with a limited footprint change.

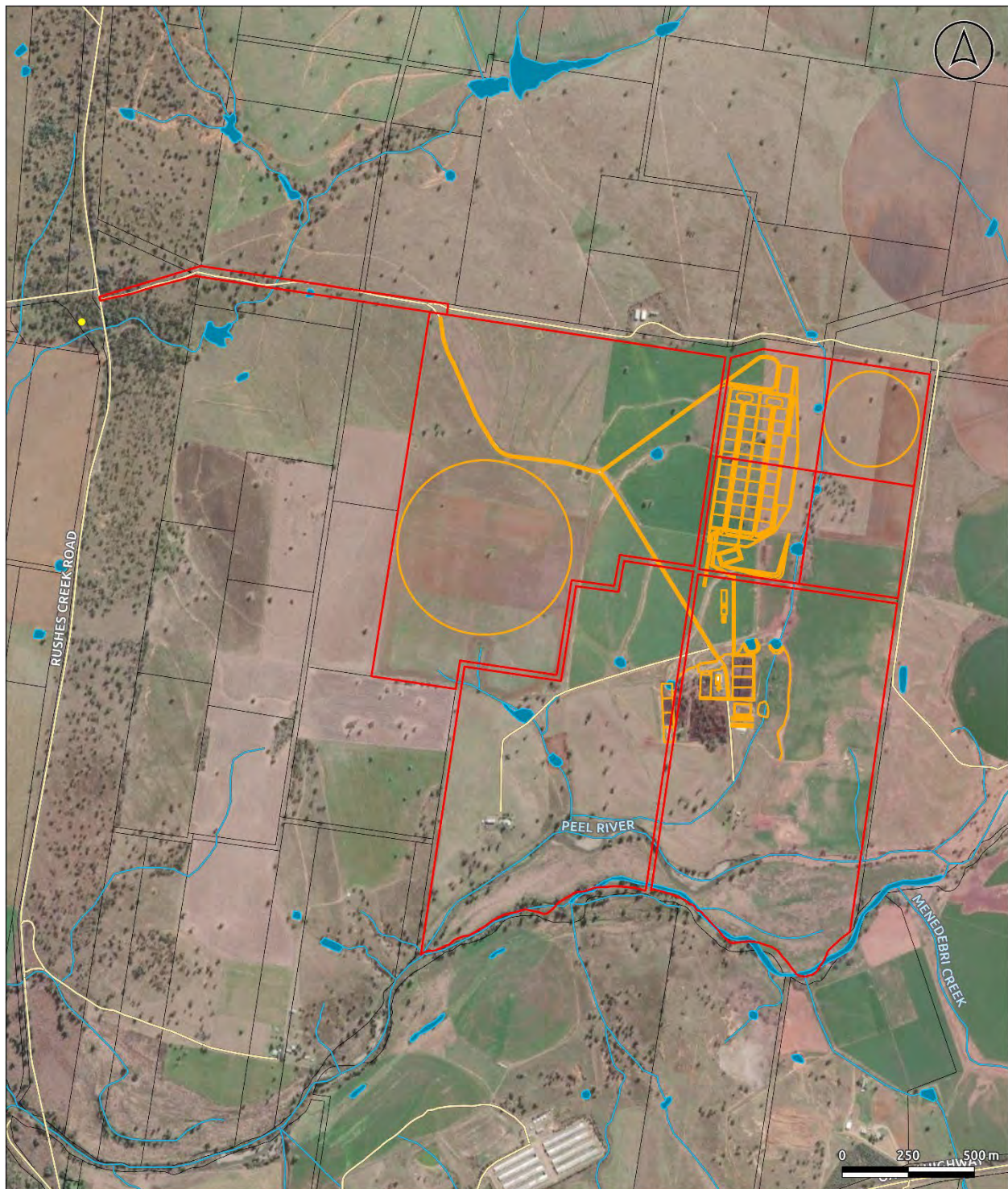
The proposed development will require vegetation to be cleared for the construction of the additional feedlot and associated infrastructure. It is anticipated that all vegetation within the impact area will be permanently cleared and will include woodland extant along the access road and scattered trees throughout the site as well as exotic grasslands and cropped paddocks within the new feedlot site. An ecological assessment undertaken by Premise (2023) indicates that all woody and non-woody vegetation within the proposed vegetation screen areas will be retained.

There is to be no change to the Controlled Drainage Area of the existing facility. All proposed works will be managed in the proposed sedimentation basin and effluent holding ponds. The capacities of the required sedimentation basin and effluent holding ponds have been determined in accordance with the NSW Feedlot Guidelines.

The proposed study area (134.42 ha) for this due diligence assessment includes the impacts associated with the expansion and new feedlot infrastructure.

The extent of the proposed works is shown in **Figure 2**.

Figure 2 – Proposed Works



- Legend**
- Study Area
 - Cadastre
 - Roads
 - Watercourse
 - Waterbody
 - AHIMS Site
 - Proposed Layout

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2. LEGISLATIVE CONTEXT

2.1 National Parks & Wildlife Act 1974

The National Parks & Wildlife Act 1974 (NP&W Act) provides statutory protection for all Aboriginal 'objects' (consisting of any material evidence of the Aboriginal occupation of NSW) and for 'Aboriginal Places' (areas of cultural significance to the Aboriginal community).

Under Section 86 of the NP&W Act, Aboriginal objects are afforded automatic statutory protection in NSW whereby it is an offence to:

'destroy, deface or damage the object or place, or.... Move the object from the land on which it had been situated...'

The NP&W Act defines an Aboriginal 'object' as:

'any deposit, object or material evidence (not being a handicraft for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction and includes Aboriginal remains.'

A due diligence assessment should take reasonable and practicable steps to ascertain whether there is a likelihood that Aboriginal sites will be disturbed or impacted during the proposed development. If it is assessed that if Aboriginal sites exist or have a likelihood of existing within the development area and may be impacted by the proposed development further archaeological investigations may be required along with an Aboriginal Heritage Impact Permit (AHIP). If it is found to be unlikely that Aboriginal sites exist within the study area and the Due Diligence Assessment has been conducted in accordance with the *Due Diligence Code of Practice* (DECCW 2010), proposed work may proceed without an AHIP.

The Due Diligence Code which set out the steps to identify whether or not Aboriginal objects are, or are likely to be, present in an area, were introduced in October 2010 by the Department of Environment, Climate Change and Water (DECCW 2010), formerly OEH now Heritage NSW. The aim of the guidelines is to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects.

This due diligence assessment seeks to comply with the guidelines and regulations associated with the NP&W Act, by assisting the proponent in meeting their obligations under the NP&W Act.

2.2 Environmental Planning & Assessment Act (1979)

The *Environmental Planning & Assessment Act 1979* (EP&A Act) sets out the framework for the development application process. The EP&A Act has three main parts of direct relevance to Aboriginal cultural heritage. Namely, Part 3 which governs the preparation of planning instruments, Part 4 which relates to development assessment and consent process for local government (consent) authorities and Part 5 which relates to infrastructure and environmental impact assessment activity approvals by governing (determining) authorities.

2.3 Native Title Act 1994

The *Native Title Act 1994* was introduced to work in conjunction with the *Commonwealth Native Title Act 1993*. Native Title claims, registers and Indigenous Land Use Agreements are administered under the Act. One active Native Title claim has been identified in the study area at the time this report was prepared:

Application Reference: Federal Court number: NSD37/2019

NNTT number: NC2011/006

Application Name: Gomeroi People v Attorney General of New South Wales (Gomeroi People)

Registration History: Registered from 20/01/2012

The Native Title Claim area is extensive and is shown in **Figure 3**.

Figure 3 – Native Title NTT number: NC2011/006 Area



2.4 Aboriginal Lands Right Act 1983

The *Aboriginal Land Rights Act 1983* (ALR Act) established Aboriginal Land Councils (at State and Local levels). These bodies have a statutory obligation under the ALR Act to:

- (a) take action to protect the culture and heritage of Aboriginal persons in the council's area, subject to any other law, and
- (b) promote awareness in the community of the culture and heritage of Aboriginal persons in the council's area.

The study area falls within the Tamworth LALC boundary.

3. BACKGROUND

The purpose of this section is to assist in the prediction of Aboriginal use of the landscape for resources and settlement, as well as the likely distribution of the material traces of Aboriginal groups.

3.1 Environmental Context

The study area is located at the western extent of the Nandewar Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion and the Peel IBRA Subregion within the Tamworth Local Government Area, Rushes Creek NSW (Thackway and Cresswell, 1995).

This bioregion is bound by the North Coast, New England Tablelands and Brigalow Belt South bioregions in the south, east and west respectively. The bioregion includes the areas of Inverell and Tamworth and the smaller towns of Quirindi, Bingara, Barraba, Manilla and Bendemeer.

Part of the MacIntyre, Gwydir and Namoi catchments are located in the bioregion and the Peel, Macdonald, McIntyre, Namoi, Severn and Gwydir Rivers traverse the bioregion. The climate is generally dry; however, temperatures and rainfalls vary in relation to elevation and topography. In areas with higher elevation such as the Nandewar Range and the northern slopes of the Liverpool Range, temperatures are generally cooler and are subject to summer rainfalls or are subject to frequent rains of high intensity and high run-offs caused by steep slopes and shallow soils that feature prominently in the bioregion (Morgan and Terrey 1992). At least two-thirds of the original cover of woody vegetation in the bioregion has been cleared.

The Peel River bounds the larger host lot on the southern boundary and at its closest proximity to development impacts being 330m.

3.1.1 GEOLOGY

The geological unit of the Nandewar Bioregion is formed on Palaeozoic sedimentary rocks on the western edge of the New England Tablelands and includes the Tertiary basalts of Inverell and Kaputar. The hilly landscapes are generally dry and warmer than the tablelands. The bioregion includes The New England Ford Belt which is the youngest geological structural feature in NSW. This geological sequence consists of Devonian sedimentary and volcanic rocks, formed in an island arc environment with Triassic sandstones and shales deposited by rivers on the edge of the Gunnedah Basin, about 250 million years ago, at a time when New England was being lifted by intrusions of granite (NSW NPWS 1991).

Major volcanic eruptions occurred in the Nandewar Ranges between 21-17 million years ago, resulting in large basalt lava flows to occur across the landscape, representing a diverse topography of the area.

The Peel subregion consists of fine grained Silurian to Devonian sedimentary rocks with strong folds and faults marked in a northwest alignment. Areas of sub-horizontal Carboniferous shales and sandstones are observed in the north. Limited areas of basalt cap from the Nandewar and Liverpool Ranges are included, with scattered bodies of limestone and linear outcrops of serpentinite. Plugs, dykes and karst landscapes formations occur with a distinct soil composition rock and vegetation combination.

The characteristic landforms in this subregion include north westerly aligned low peaked hills, basalt caps, moderate slopes and flat river valleys.

3.1.2 TOPOGRAPHY AND SOILS

The characteristic landforms of the Peel subregion include north westerly aligned low peaked hills, basalt caps, moderate slopes and flat river valleys. Shallow stony soils are found on ridges, with textured contrast soils found on most slopes transitioning in colour from red brown to yellow between the upper and lower slopes, whilst black earths are found on basalts and dark, alkaline, pedal clays are found on limestone.

Serpentinities have shallow stony profiles with a toxicity to many plants, whilst high fertility occurs in alluvial loams and clay profiles.

The study area is located within the Solodic Soils Greater Soil Group (Northcote PPF), characterised by sodosols with chromosol compositions located on the south eastern portion of the study area closer to the Peel River. This landscape is indicative of alluvial plains with clay loams.

The Northcote soil profile shows increased salinity, with bulk density and clay dispersion. Topsoil is favourable for irrigation and is hard almost cemented between 130-150cm depths with medium clay dispersions. Sandy clays are noted close to the Peel River overlain light clays transitioning to medium to light clays. This soil profile is characterised by local reliefs, with solum substrate over rock outcrop Biophysical Strategic Agricultural Land Soil BSAL and substrate strength. some scalds occurring across cropped paddocks typified by medium brown soils (10YR).

The study area is located within the Tamworth – Keepit Slopes and Plains (64 % cleared) NSW Landscape, as well as the Peel Channels and Floodplain (84 % cleared) NSW Landscape (NSW Government 2022a).

Land use in the area is predominantly used for dryland cropping and grazing in areas with native vegetation and grazing modified pasture with irrigated cropping (Land Use 2017).

3.1.3 VEGETATION AND HABITAT

Within the Peel subregion, vegetation is characterised by White box grassy woodlands, with yellowbox and Blakely's red gum community types on lower slopes. Rough-barked apple and yellow box occur on flats. River oak and some river red gum are observed along major streams. Patches of red stringybark and red ironbark are found on steeper slopes in the east, Silver-leaved ironbark on basalt caps, white cypress pine and kurrajong on stony areas in the west and north. Very large grass trees are located on serpentinite profiles (Thackway and Cresswell 1995).

The land around the site is predominantly used for agricultural purposes and cleared for cropping and livestock grazing. Native vegetation surrounding the site includes derived native grasslands, isolated patches of remnant woodland, and planted native trees. Large areas of intact native vegetation in the region include Somerton National Park (NP), Melville Range, Dowe NP, Boonalla Aboriginal Area, Lake Keepit State Park, Vickery Nature Preserve and Dinawirindi Nature Preserve.

Habitat assessments conducted by Premise in January 2023 recorded the following fauna habitat features in the study area:

- Live and dead paddock trees;
- Winter flowering eucalypts;
- Koala feed tree species including White Box;
- Trees with hollows ranging from 5 cm – 30 cm in diameter;
- Watercourses and dams; and
- Areas dominated by native grasses including *Themeda triandra* (Kangaroo Grass).

3.1.4 HYDROLOGY

The study area is located on the floodplain of the Peel River. The Peel River is located approximately 330 m south of the development area, flowing in a westerly direction before it flows into the Namoi River.

First and second order tributaries of the river flow through the site. Clay Gully and Menedebri Creek are tributaries of Peel River and flow in a southern direction across the assessment area.

The Peel River forms part of the Namoi Catchment within the larger Murray Darling Basin. Other waterbodies within the Assessment Area include numerous farm dams and unnamed tributaries of Peel River. No wetlands or estuaries occur in the study area.

The study area is generally flat, ranging from 300 m Above Sea Level (ASL) at the existing feedlot along the southern boundary of the site to 330 m ASL in the north-west.

The Peel River and surrounding unnamed tributaries are mapped as Key Fish Habitat (DPI 2022). The proximity of these waterways would likely have provided important subsistence resources for Aboriginal people and land use strategies in the area (NSW Government 2022b).

3.2 Aboriginal histories of the locality

For thousands of years Aboriginal groups occupied the region and formed part of the traditional lands of the Gamilaroi/Kamilaroi language group spoken from the Liverpool Plains to Gwydir; Walgett, Bingara, and Quirindi (NPWS 2003:148). Gamilaroi country extends from the Upper Hunter Valley through to the Warrumbungle Mountains in the west and up through the present-day centres of Coonabarabran, Quirindi, Tamworth, Narrabri, Walgett, Moree, and Mungindi in NSW, and to Nindigully in south-west Queensland (NSW State Library).

This language group comprised people who spoke the sub-dialects Yuwaalaraay, Yuwaaliyaay (Euahlayi), Gamilaraay, Gawambaraay, Wirayaraay (Wiriwiri) and Walaraay (Austin et al., 1980; O'Rourke, 1995, 1997).

Climate dictated the transient movements of Aboriginal groups, with evidence of transient campsites observed amongst the casuarinas and acacias (Mitchell), suggesting a seasonal approach to hunting and gathering activities (NPWS 2003:148). Aboriginal people used the landscape as both a natural and cultural resource and developed a detailed knowledge of the available resources and their associated seasonal activity in the area, as well as accessing water through a network of perennial streams and springs.

Stone tools were developed with local and traded stone, including "greywackes" and quartz, whilst mammals such as kangaroo and possum were used for food, clothing, decoration. Hunting tools included stone and wooden jagged spears, boomerangs and waddies. Fish including eels, freshwater crayfish, yabbies, tortoises and freshwater mussels were caught in the rivers, creeks and wetlands in the region (Mitchell, 1839; Parker, 1905; O'Rourke, 1997). They were trapped taken from Gwydir using stone weirs and nets made from plant fibres (NPWS 2003:148). Watercraft were manufactured from large slabs of bark cut from river red gum trees were used to make canoes. On land, kangaroos, wallabies, koalas, possums, emus, echidnas, lizards, snakes and frogs were hunted, whilst plants, grass seeds, wild orange, apples, melons, yams and roots were collected (Mitchell, 1839; Fison and Howitt, 1867; Gott, 1983; Parker, 1905; O'Rourke, 1997). (Mitchell, 1839; Parker, 1905; O'Rourke, 1997).

Ceremony and dreaming formed a major part of the Gamilaroi Aboriginal culture, with carved trees, ceremonial bora grounds and art sites located across Country, indicating an intimate spiritual, as well as a physical, attachment to the landscape of the Aboriginal people inhabited.

3.2.1 POST CONTACT

During the early 1800s, rapid expansion of European settlement occurred north west of the Blue Mountains, with John Oxley and his team reaching the northern tablelands on his exploration of the region in 1818 (NSW NPWS 2011). At the time of first contact, Europeans observed that the Gamilaroi were hunter-fisher-gatherers, undertaking a semi-sedentary lifestyle (Landskape 2010).

Very little information is documented of local Aboriginal groups at the time of European settlement, and early ethnographic records and references were mainly in reference to the Aboriginal names for mountains and creeks in the area (Gaynor and Wilson 1995).

Major Thomas Mitchell recorded his observations of how Aboriginal people obtained clean drinking water in the area). Mitchell in 1839 also described the deserted bark shelters of a 'numerous encampment' of Aborigines beside a billabong of the Namoi River near present-day Boggabri. Whilst near Moree on the Gwydir River, he noted an abandoned village of circular huts with conical roofs made from reeds, grass and boughs. Similarly, colonial botanist Allan Cunningham recorded 14 huts with bark floors and conical roofs on Cocks Creek, northwest of the study area (Landsape 2010; O'Rourke, 1997).

This rapid expansion of settlement to the area severely impacted on Aboriginal. Initial interactions between the two groups led to violent conflicts as they were pushed away from creeks and waterholes, with the women and girls seized. During the early days of post contact with the Europeans, the local Aboriginal people were subject to violence and disease, which resulted in diminished resources and population decline (Mitchell, 1839; Parker, 1905; O'Rourke, 1997). Aboriginal groups were poisoned and shot or were quickly displaced from their land by squatters and pastoral settlers and, in retaliation sheep, stockmen and shepherds were attacked with spears.

At the emergence of pastoralism in the region, places for Aboriginal settlement diminished. The Aboriginal people, disconnected from their traditional ways, now considered 'fringe dwellers', were succumbed to labourer work for survival living adjacent to pastoral homesteads (O'Rourke, 1997). By 1895, an Aboriginal ('mission') Reserve was gazetted on a 150-acre allotment of land adjacent to the Mooki River at Caroona and subsequently expanded to 230 acres in 1899. Aboriginal people lived in cottages located on the reserve and grew crops, grazed dairy cattle and sheep for survival. The Caroona Aboriginal Reserve was revoked in 1962, however, occupants were allowed to remain there until 1973, when the land was transferred to the Aboriginal Lands Trust under the Aboriginal Act 1973.

Today many local Aboriginal people of the North West slopes live in regional centres such as Tamworth, Werris Creek and Quirindi.

3.3 Land Use

By the 1830s, the area was occupied by squatters as suitable grazing land and by 1837 large runs were being established in the northern tablelands areas such as Inverell (NSW NPWS 1991). As European settlement increased cattle grazing became the dominant farming practice in the region, later replaced by sheep grazing at the turn of the century as pastures and farming infrastructure improved (NSW NPWS 1991).

By the 1850s as the gold rush boom began, increased settlement to the area occurred resulting in development of small towns around the goldfields or other mining centres. Valuable metals were being processed alongside wheat and pastoral centres with fertile soils increased farm yields.

The Liverpool Plains supported the estates of the Australian Agricultural Company from 1832 (HO and DUAP 1996), when the squatters were driven further north. By the 1850s as urban development began to increase, towns such as Tamworth soon developed. Population increased and the town was situated in a prime location on the travel route from the north and the introduction of the railway in 1873. Other towns such as Inverell also thrived on agricultural production, particularly wheat, with the advent of more sophisticated equipment introduced in the 1860s and 1870s. The railway reached Quirindi in 1877 and by the 1890s this area too was a major wheat centre (HO and DUAP 1996). Soft wood timber was abundant in the bioregion although it was difficult to retrieve. Many forests were dedicated as state forests around 1900 and most are still managed by State Forests of NSW (NSW NPWS 1991).

3.4 Archaeological Context

A limited number of archaeological investigations or publications relating to Aboriginal Heritage have been prepared in and around the study area. However, histories of the wider local area and research into the AHIMS database provides some understanding of the broader archaeological context in the region of Rushes Creek and the Tamworth Regional area.

In 1994 Wilson undertook research on axe quarry distribution patterns in the Tamworth region expanding on work undertaken by Binns and McBryde in 1969-1927. The assessment looked at local distribution patterns and raw material types of axe production compared to those that were produced locally and distributed up to 1000 km from their source. The study found that andesites such as greywacke pebbles sourced from local Currabubula polymictic conglomerates were used as the raw material.

In 1995 Gaynor and Wilson prepared an Aboriginal heritage assessment for the proposed andesite hard rock quarry at Currabubula (Current Boral Quarries site) approximately 45km southeast of the study area. The assessment included an archaeological survey of the proposed quarry site, processing plant site and proposed haul road. Three sites were recorded during the survey. Overall the artefact assemblage represented reliance on locally available raw materials of high quality, either sourced from the Peel River or Mooki River to the north west.

In 1998 Jo McDonald undertook Aboriginal heritage investigations for a proposed gas pipeline route between Tamworth and Dubbo. The assessment identified that past Aboriginal sites are mostly associated with more permanent watercourses in the area such as the Mooki River, with most sites within 50 m of a stream course (McDonald, 1998).

In 2002 Gaynor completed an archaeological survey of the Doona State Forest and a travelling stock route near Carroona, approximately 48km southwest of the current study area. Through this investigation, 21 modified trees and two sites with axe-grinding grooves were identified (Gaynor, 2002).

In 2010, Umwelt undertook several archaeological investigations approximately 30-35km from the current study around the Carroona region for a proposed BHP Billiton coal mine. Umwelt identified three modified trees, two stone artefact scatters and four isolated finds of stone artefacts and twelve locations with axe-grinding grooves. It was noted that scarred tree site types were recorded in close proximity to water, located on the floodplain of the Mooki River or near Quirindi Creek (Umwelt, 2010). Other site types such as stone artefact scatters, although recorded in smaller densities, and isolated finds were also located on the floodplain of the Mooki River. Artefacts represented flakes of a range of lithologies including chert and rhyolite. Axe grinding grooves were located on sandstone outcrops in the ranges of the Doona State Forest and Nicholas Ridge (Umwelt, 2010).

More recently in 2020, Werris Creek Coal Pty Limited commissioned Landskape to undertake a cultural heritage assessment to extend the life of its mining operations (LOM Project) located 62km south of the current study area site (Landskape 2010). One previously recorded site was identified in the original mine footprint (the Narrawolga Axe-Grinding Grooves) however, was relocated from the currently approved mining area (in 2008). The present survey did not encounter any additional items or places of Aboriginal cultural heritage significance in the LOM project site. The assessment identified that whilst the LOM Project may potentially impact upon cultural heritage sites, the nature of the potential impacts remains largely unchanged from those identified in earlier assessments.

In 2021 OzArk prepared an Aboriginal Cultural Heritage Management Plan for a proposed 1016 ha poultry farm located approximately 9km north of the current study area. The ACHMP was prepared as a result of 35 identified Aboriginal sites recorded during an archaeological assessment undertaken in 2018 (OzArk). The sites recorded consisted of isolated finds, artefact scatters, one PAD, a hearth and two scarred trees. The primary material used for tool production in the area included volcanic and fine grained siliceous rock, mudstone chert, quartz, quartzite and basalt flakes.

In 2023 Premise prepared an Aboriginal heritage assessment for the Boral Currabubula Quarry site for a proposed new dam location. The assessment was undertaken on the same site Gaynor and Wilson assessed in 1995. The site survey undertaken in 2021 identified several new Aboriginal sites consisting of isolated finds. Artefact material included stone discard (flakes) made of grey and green chert, mudstone, brown quartz. These isolated finds were located within 200m of an existing drainage line. All artefacts appear to be recorded in a secondary context most likely associated with historical stock or vehicle movement and/or distributed through downstream alluvial flow during wet weather events.

Based on the previous archaeological investigations in the region, predictive modelling of the landform suggests that archaeological sensitive areas mainly occur on creek banks, adjacent alluvial and colluvial terraces and floodplains, gently sloping low hillslopes and crests.

3.5 Archaeological Implications

Previous archaeological investigations in the area have identified that landform modification and distance from watercourses are significant factors in determining archaeological sensitivity of a particular area.

The most frequent Aboriginal cultural heritage places recorded in this region are open occupation areas represented by scatters of stone artefacts and culturally modified trees (NSW AHIMS site database). Burials, earthen features including mounds and hearths and stone features including stone quarries, ceremonial rings, axe-grinding grooves, rock shelters and rock art sites are also represented in the archaeological record (Landscape 2010: 41)

Aboriginal occupation in the Rushes Creek region would have focused on major drainage lines such as the Peel River and its tributaries, including Clay Gully (refer **Section 3**). Creek lines and associated ridge crests were also considered important transient landscapes where group movement between major occupation areas occurred, as well as providing valuable resources for hunting and gathering (Pearson 1981).

The diverse geological landscape including the volcanic and limestone outcrops surrounding the area were most likely a source of lithic raw materials used for subsistence resources. Valuable raw materials such as andesite outcrops and greywacke pebbles were used to manufacture stone axes for subsistence. Chert and sandstone were also available for use in stone tool production.

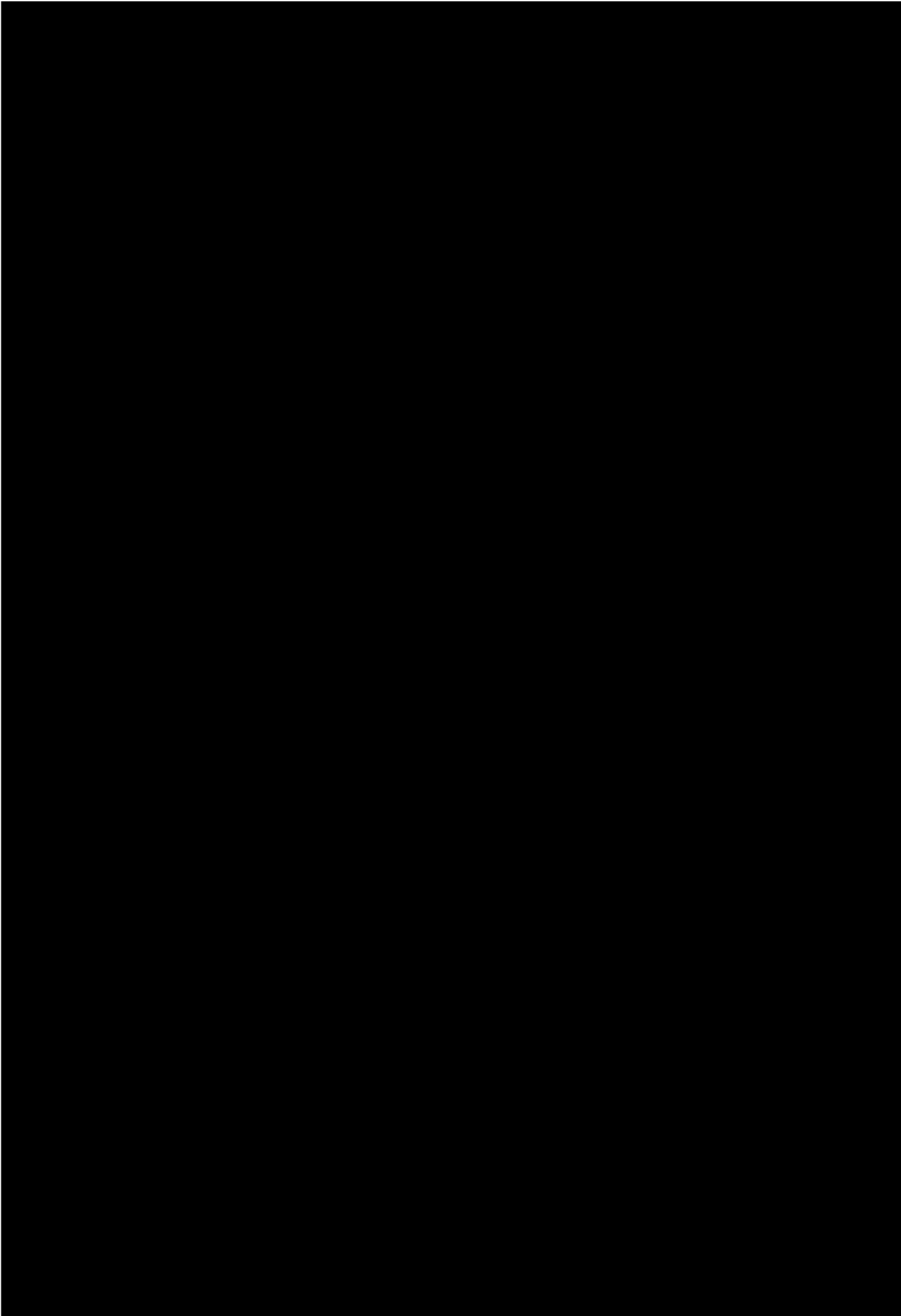
Areas near watercourses also have higher potential to contain Aboriginal objects as evidence of past occupation. This is evident with previously recorded sites located in close proximity to ephemeral drainage lines. Areas that have not been subject to disturbance also have high potential to contain artefactual material compared to those that have been disturbed.

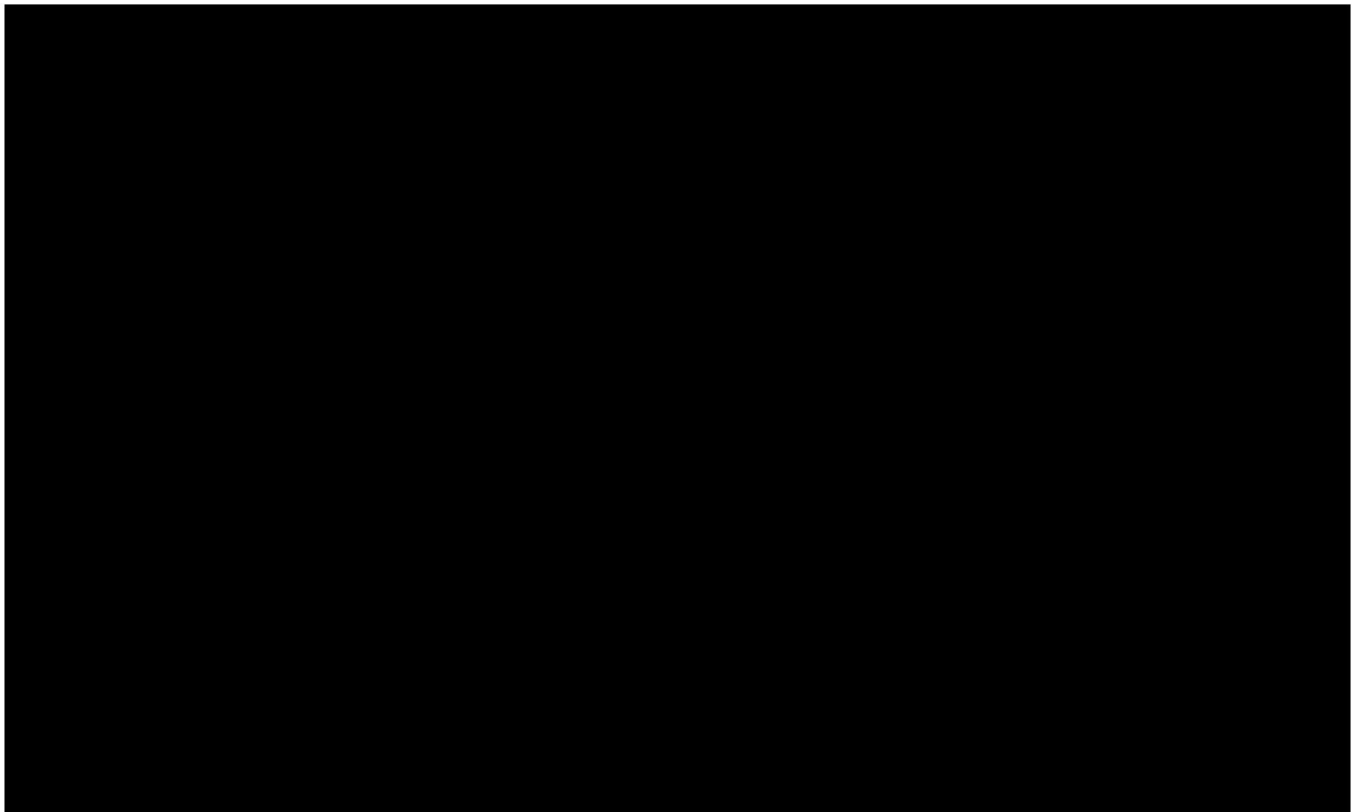
The study area is located on an undulating plain of the lower slopes. The study area has been previously disturbed, through historical grazing practices and construction of the existing Angora feedlot.

4. ABORIGINAL HERITAGE INFORMATION MANAGEMENT SYSTEM (AHIMS) SEARCH

The locations and details of Aboriginal sites are considered culturally sensitive information.

It is recommended that this information, including the AHIMS data, is removed from this report if it is to enter the public domain.





5. SITE INSPECTION

A site inspection was undertaken by Latisha Ryall (Archaeologist, Premise) and Tamworth LALC representative Michael Fermor between 22-24 February 2023.

The site inspection was undertaken in three stages over three days. The site inspection traversed the area of the proposed development footprint, focusing on ground observance for the presence of artefactual material or certain heritage landscape features. The site inspection was undertaken via a pedestrian survey combined with vehicle transects and spot checks. Pedestrian survey was undertaken by two persons spaced at roughly 10-20m intervals walking undefined transects across the site.

5.1 Overview

The study area is located north east of Gunnedah and north west from Tamworth within the lot boundaries as defined in **Section 1.2**. The site is located approximately 2km south east of Lake Keepit a manmade recreational park. The site is accessed from Oxley Highway onto Rushes Creek Road and commences at the intersecting Rannock Burn Road as the access point into the proposed feedlot expansion. The proposed development impacts occur across several parcels of land and covers an area of approximately 134.42 hectares (ha).

The site is characterised by agricultural land, predominately cleared for cropping and livestock grazing. Most of the study area had been subject to extensive ground disturbance from historical grazing practices and farming machinery running across the site. Scattered farm dams were also located across the study area, associated with drainage lines traversing the study area from north to south. Paddock boundary fences were erected with gate access to most paddocks allowing vehicle access.

The surrounding landscape consists of low slopes with rocky outcrops located on the eastern boundary. To the north and west a rural landscape could be seen with a view to mountain ranges such as the Baldwins range. To the south of the study area the Peel river is located.

During the site inspection, red-brown clay based loams were observed, transitioning to compact clays, typical of the Solodic Soils Greater Soil Group profile.

The existing Angora Feedlot buildings have been erected in the south eastern portion of the study area and include pens, sheds and silos for grain (Lucerne) production. Farming infrastructure located across the study area includes dams, roads, fence lines, underground telecommunications. Extensive ground disturbance was concentrated around the existing feedlot area and access road, whilst moderate ground disturbance has occurred across much of the site. Areas of exposure were observed around contour banks and at the base of trees.

Native vegetation observed across the site includes grassland and isolated patches of remnant woodland, with some planted native trees.

Rannock Burn Road and the northern portion of the study area

The site inspection commenced at the junction of Rushes Creek Road and Rannock Road leading to the existing 'Angora' feedlot property (Lot 19 DP752169). The road accessway was highly disturbed with introduced gravels and basalt for grading. Vegetation aligned the accessway, however no evidence of mature trees or cultural modification were observed.

The site inspection traversed through the northern paddocks proposed for irrigation dam locations and new feedlot infrastructure, where grazing stock occupied this area. The landform contained sporadic sandstone and volcanic rock, some river pebbles and mudstone scattered throughout with rock piling evident across the site. Ground visibility was fair in these locations, with contouring banks also positioned at intervals across the site. On the north eastern boundary, extensive cropping had occurred with a small patch of trees evident along the drainage line that traverses in a southerly direction through the study area.

South western portion proposed irrigation area

The larger irrigation development in the south west of the property was located in a cropped paddock, with vegetation clearance. Visibility was fair in this area due to the extensive cropping activities. Conditions were dry in this area, with alluvial soils observed in closer proximity to the drainage lines of the Peel River. No archaeological material in this area was observed.

Areas around the existing feedlot were heavily disturbed. The landform in this area had been cleared, with high density of river pebble, quartz and sandstone rock observed along contours from drainage lines. Dam walls were built up with introduced gravels. Exposure in these areas were high, however no artefactual material was observed.

Existing Angora Feedlot

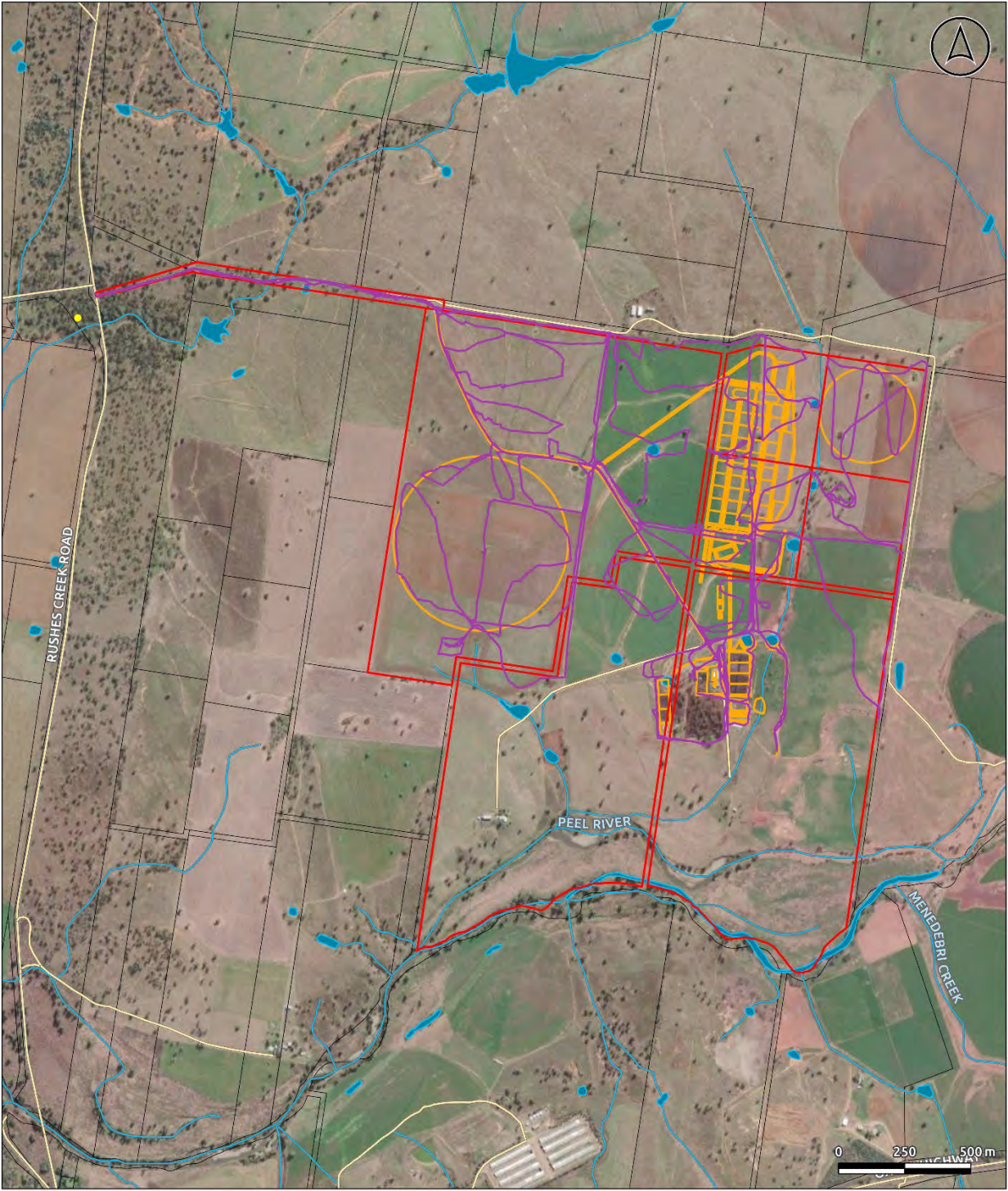
The existing feedlot consisted of pen enclosures with covered protection shade structures. Several paddocks housed cattle with small woodland vegetation. Fence infrastructure included electric fencing and barb wire fencing. Areas which could be accessed without entering livestock areas were inspected, however, some areas could not be entered due to the high density of cattle and the property being a live feedlot with silo production in operation. This area had been subject to high ground disturbance.

Eastern portion of Study Area

The eastern portion of the study area was heavily disturbed with cropped paddocks and small patches of remnant vegetation. Higher rock densities were also observed in this area.

Survey tracks for one surveyor are shown in **Figure 5**.

Figure 5 – Aboriginal Heritage Survey Tracks February 2023



Sources: © State of NSW, Department of Customer Service, Spatial Services 2023
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GDA2020 MGA Zone 56 File: 223029_01.aprx Prepared By: zindia.nanver Date: 24/08/2023

- Legend**
- | | |
|---|---|
|  Study Area |  AHIMS Site |
|  Cadastre |  Survey Tracks |
|  Roads |  Proposed Layout |
|  Waterbody | |
|  Watercourse | |

5.2 Summary

In summary the study area has been subject to extensive ground disturbance through both historical and current agricultural practices. Dense ground coverage with low visibility occurred in grazing areas, whilst areas with increased visibility were observed along contours and dam banks as well as areas associated with the feedlot pens. The eastern boundary revealed a higher density of rock material, compared to the rest of the site. Areas outside of the construction impact did not reveal archaeological material. Site photos are shown in **Appendix A**.

5.3 Archaeological sensitivity

This due diligence assessment provides a preliminary assessment of archaeological potential, to determine if there are, or are likely to be Aboriginal objects in the study area. A more comprehensive and detailed investigation of the extent and nature of archaeological potential would be completed during more detailed investigation, where required, under the OEH 'Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales'.

When assessing the study area for Aboriginal sensitivity it is essential to determine whether the site contains landscape features that indicate the likely existence of Aboriginal objects. Examples of such landscape features are rock shelters, sand dunes, waterways, waterholes, and wetlands. On assessing the site, considerations must be made if your proposed activity is:

- within 200m of waters, or
- located within a sand dune system, or
- located on a ridge top, ridge line or headland, or
- located within 200m below or above a cliff face, or
- within 20m of or in a cave, rock shelter, or a cave mouth, and
- is on land that is not disturbed land.

Archaeological sensitivity is closely related to the levels of ground disturbance. However, other factors are also considered when assessing archaeological potential as mentioned above, such as whether artefacts were located on the surface, and whether the area is within a sensitive landform unit according to the predictive statements.

This due diligence assessment has identified the study area has been subject to past ground disturbance. The *Due Diligence Code of Practice* (DECCW 2010) defines disturbed land as:

Sec 7.5 (4) For the purposes of this clause, land is disturbed if it is has been the subject of human activity that has changed the lands surface, being changes that remain clear and observable.

This includes disturbed land via:

- (a) soil ploughing*
- (b) construction of rural infrastructure*
- (d) clearing of vegetation,*
- (e) construction of buildings and the erection of other structures,*
- (f) construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure).*

The study area has been subject to previous ground disturbance with the construction of the original 'Angora' feedlot including stock and vehicle movement and disturbance through operational processes. The surrounding area has been subject to extensive agricultural practices including cropping and grazing. Works in these areas would impact on land that has had less disturbance.

The study area has also been subject to introduced fills such as gravels for access roads and dam banks. Historical ploughing and agricultural activities have also occurred on the adjoining properties, clearing the land of vegetation, and used for grazing stock.

Although the development area is considered to be located within an archaeological sensitive landform, <200 m to water located north of the Peel River, no archaeological material was identified in the impact area. Archaeological material was identified in an area along an ephemeral drainage line north west of the impact area, where previously sensitive areas had been identified (Navin Officer 2005).

No other sensitive landforms were observed. No cultural scarring to mature trees were observed.

It is recommended that further archaeological assessment be undertaken if works are to be done outside of the study area.

6. DUE DILIGENCE PROCESS

The results of the due diligence process are outlined in **Table 1**. The table contains a response to the questions included in the Due Diligence Code of Practice (DECCW 2010), which are intended to assist in determining whether or not a proposed activity may result in harm to Aboriginal objects, which are protected by the *National Parks and Wildlife Act 1974*.

The nature and location of the proposed activity has identified Aboriginal objects and areas of archaeological sensitivity, in the study area, however these sites can be avoided during construction of the dam.

Table 1 – Response to the due diligence process

1	Will the activity disturb the ground surface or any culturally modified trees?
	Yes, the proposed works will disturb the ground surface. Impacts will occur across all host lots. Impacts will also occur around existing infrastructure associated with the feedlot.
	No culturally modified trees have been identified in the study area.
	One culturally modified tree is recorded within 100m of Rannock Burn Road and Rushes Creek Road. This area will not be impacted.
2a	Are there any relevant confirmed site records or other associated landscape feature information on AHIMS?
	Yes, there is one recorded site located approximately 1.3km west of the main development footprint.
	The recorded site is located approximately 100m from Rushes Creek Road and Rannock Burn Road AHIMS # 20-5-0065.
	No sites were recorded during the site inspection.
2b	Are there any other sources of information of which a person is already aware?
	As above.
2c	Are there any landscape features that are likely to indicate the presence of Aboriginal objects?
	The study area is located within 200m of a watercourse, being the Peel River. The Peel River is located on the southern boundary of the study area; however the surrounding landscape is mostly cleared and devoid of vegetation.
	Areas to the west of the development area are largely intact are more likely to contain archaeological material.
	Tributaries that flow through the site did not reveal and archaeological material
	The location of AHIMS # 20-5-0065 was not located during the site inspection, due to dense ground coverage restricting access. This site will not be impacted on during construction.

3 Can harm to Aboriginal objects listed on AHIMS or identified by other source of information and/or can the carrying out of the activity at the relevant landscape features be avoided?

No sites were recorded during the site inspection and no impacts will occur to AHIMS # 20-5-0065. No relevant landscape features were observed across the host lots. Impacts of the proposed development will occur north of the Peel River in areas that have been subject to extensive ground disturbance.

4 Does a desktop assessment and visual inspection confirm that there are Aboriginal objects or that they are likely?

No, this due diligence assessment confirms that there is no evidence of Aboriginal objects located across the study area. The landscape has been subject to disturbance and alteration in association with historical grazing and agricultural use for the extant Angora Feedlot.

There will be no direct harm to objects or sites of Aboriginal heritage and works can proceed.

7. RECOMMENDATIONS

The following recommendations regarding Aboriginal heritage are based on consideration of:

- Statutory requirements under the *National Parks and Wildlife Act 1974* (as amended).
- *Due Diligence Code of Practice* (DECCW 2010).
- The results of the background research, site survey and assessment.
- The likely impacts of the proposed development.

It was found that:

- No newly recorded sites were identified.
- Areas of archaeological sensitivity were identified within the surrounding area (sites recorded within 200m of water). One previously recorded Aboriginal site AHIMS # 20-5-0065 is located outside of the study area (within 100m of the access route commencement).
- One Native Title claim, determinations or registration is located within the study area, however, does not present any limitations for the proposed development.
- The proposed activity is located within a disturbed context.
- Tamworth LALC reviewed this report and are in support of the following recommendations.

The following recommendations are made:

- In accordance with the OEH due diligence guidelines, this assessment has not identified Aboriginal objects, or areas of archaeological sensitivity, within the proposed impact area.
- It is noted that AHIMS # 20-5-0065 is located out of the study area, however care must be taken to avoid any impacts to this site during construction. If impacts cannot be avoided further assessment must be undertaken in the form of ACHAR and an AHIP permit approval must be obtained before works commence.
- If the footprint of the study area changes, a review of Aboriginal sites and their location in regard to impacts must be addressed.
- If suspected Aboriginal objects are located during future works, works should cease, and an Aboriginal heritage consultant advised to assess the find and recommend if further investigation or permits are required.
- No further Aboriginal archaeological assessment is recommended.

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APPENDIX A

SITE PHOTOS – LANDSCAPE FEATURES

Figure 6 – View east along Rannock Burn Road



Figure 7 – View west to Rushes Creek Road intersection



Figure 8 – View east along Rannock Burn Road



Figure 9 – View east to Angora feedlot entry



Figure 10 – View west along Rannock Burn Road



Figure 11 – View south east across study area



Figure 12 – Contour banks view south west



Figure 13 – View south along paddock boundary fence



Figure 14 – View south across grazing land



Figure 15 – View southwest from access road



Figure 16 – View north to site boundary



Figure 17 – View east along access road to feedlot



Figure 18 – Landform showing cropped disturbance



Figure 19 – Farm dams view north west



Figure 20 –Remnant trees in central portion of site



Figure 21 – Ground Coverage – cropped land



Figure 22 –Rock piling observed across site



Figure 24 – Cropped landform view east



Figure 26 – Lucern crop view west



Figure 28 – South irrigation area towards Peel River



Figure 23 –Erosion along contours view north



Figure 25 – Landform showing cropped disturbance



Figure 27 – Lucern crop ground coverage



Figure 29 –Access road, view north west



Figure 30 –View northeast from feedlot



Figure 31 – View south east towards feedlot



Figure 32 –Ground exposure showing erosion patch



Figure 33 – Contour bank drainage line view south



Figure 34 – Dam north of Feedlot infrastructure



Figure 35 – View west across southern portion of site



Figure 36 – Ground exposure along drainage line



Figure 37 –Existing feedlot view south



Figure 38 – Existing feedlot view north east



Figure 39 –Existing feedlot view south



Figure 40 – Dam located south of feedlot



Figure 41 –Feedlot disturbance view north west



Figure 42 – Existing feedlot view north



Figure 43 –Existing hay shed and silo infrastructure



Figure 44 – Feedlot pens and native vegetation



Figure 45 –Existing feedlot view south east



Figure 46 – Ground exposure along feedlot access



Figure 47 –Existing feedlot ground disturbance



Figure 48 – Isolated trees observed on site



Figure 49 –Existing feedlot dam view south east



Figure 50 – View north on eastern boundary of site



Figure 51 – View east to remnant vegetation patch



Figure 52 – Farming infrastructure observed on site



Figure 53 – Landscape on north eastern portion of site



Figure 54 – Dam in northern portion of site



Figure 55 – Ground coverage density



Figure 56 – Eastern boundary of site view south



Figure 57 – Undulating landform view east



Figure 58 – Eastern boundary showing rock density



Figure 59 – South eastern boundary towards Peel River



Figure 60 – Native vegetation view north east



Figure 61 – Proposed irrigation area NE boundary





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