

Environmental Impact Statement

'Gunyah Park', Dairy Expansion (4,000 head), Blighty, NSW

Report Number 24675.112831.0



Prepared for

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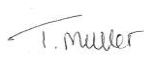


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Executive Summary

Yurunga Farms Partnership (YFP) has operated a pasture based dairy at ‘Gunyah Park’ business since 2005 (18214 Riverina Highway, Blighty NSW).

The site is located within the Riverina Murray Regional Area and intensive agriculture has been a key contributor to the expanding economy in the Riverina Murray Region.

The pasture based dairy herd was 400 cows using irrigated pasture. The YFP business is seeking to expand their existing dairy herd, up to a herd of 4,000 head of dairy cattle including, 2000 lactating (wet) cows (milkers), 400 dry cows, 640 replacement heifers, and 400 calves.

The YFP business is transitioning its business from a pasture based system to a full fed system where stocks are confined into feed pens (dry lot systems). They are fed a prepared ration. The milking parlour and its holding areas and operations are a separate but directly linked component of the operation.

Australia’s dairy industry is a significant economic contributor to the regions in which it operates, and to Australia as a whole. Economic analysis completed in 2021 indicates that on average, a \$1 increase in dairy industry output drives a \$1.23 increase in Australia’s GDP, and every \$1 million of dairy sales generates 9.65 full time equivalent jobs (Dairy Australia, 2024d).

The economic value of the expanded dairy operation will be approximately \$20M/yr to the local economy. It will employ twenty-one (21) full time employees and some casual employees as needed.

The Australian dairy is committed to sustainable dairy production, with great focus on key elements such as animal care, farmer livelihoods, adapting to climate change, and people’s health and nutrition (Dairy Australia, 2024c). Equally, YFP is committed in adhering with Australian and NSW Government dairy industry guidelines in order to ensure sustainability and compliance for its proposed dairy development.

A Secretary’s Environmental Assessment Requirements (SEARs) were obtained from the Department of Planning, Housing and Infrastructure (DoPHI) on the 27th March 2024, and this EIS addresses the aspects detailed in the SEARs.

Assessment of the project determined that the key aspects with the potential to cause environmental impacts were:

- | | |
|--|--------------------------|
| • Waste management; | • Traffic and transport; |
| • Animal welfare, bio-security and disease management; | • Biodiversity; |
| • Air quality; | • Bushfire; |
| • Soil and water; | • Visual; and, |
| • Noise and vibration; | • Heritage. |

Environmental impact assessments have shown that there are no issues of significant concern as any issues identified can be managed appropriately through a comprehensive Environmental Management Plan.

The proposed development has been designed to avoid impacts to the environmental values of the site where practicable and minimise any remaining potential impacts through appropriate design and operational management measures.

Community consultation occurred throughout the EIS development with relevant stakeholders and the provided advices, comments and concerns have been addressed in this EIS document. Neighbours are aware and supportive of the development.

The dairy development may cause nuisance such as odour, noise, dust and traffic impacts. They can all be mitigated. The level of impact is low and risks to the environment and community are low. Operational monitoring and management can attend to any issues that arise from seasonal and other challenges. In conclusion, we find that the overall benefit to local community outweighs any potential impact. The dairy development not only supports the demand for agribusiness growth in the region, it also draws additional employment and economic opportunities to the local area.

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1. Introduction

1.1 Development Overview

Yurunga Farms Partnership (YFP) has operated a pasture based dairy at ‘Gunyah Park’ business since 2005 (18214 Riverina Highway, Blighty NSW).

The pasture based dairy herd was 400 cows using irrigated pasture. The YFP business is seeking to expand their existing dairy herd, up to a herd of 4,000 head of dairy cattle including, 2000 lactating (wet) cows (milkers), 400 dry cows, 640 replacement heifers, and 400 calves.

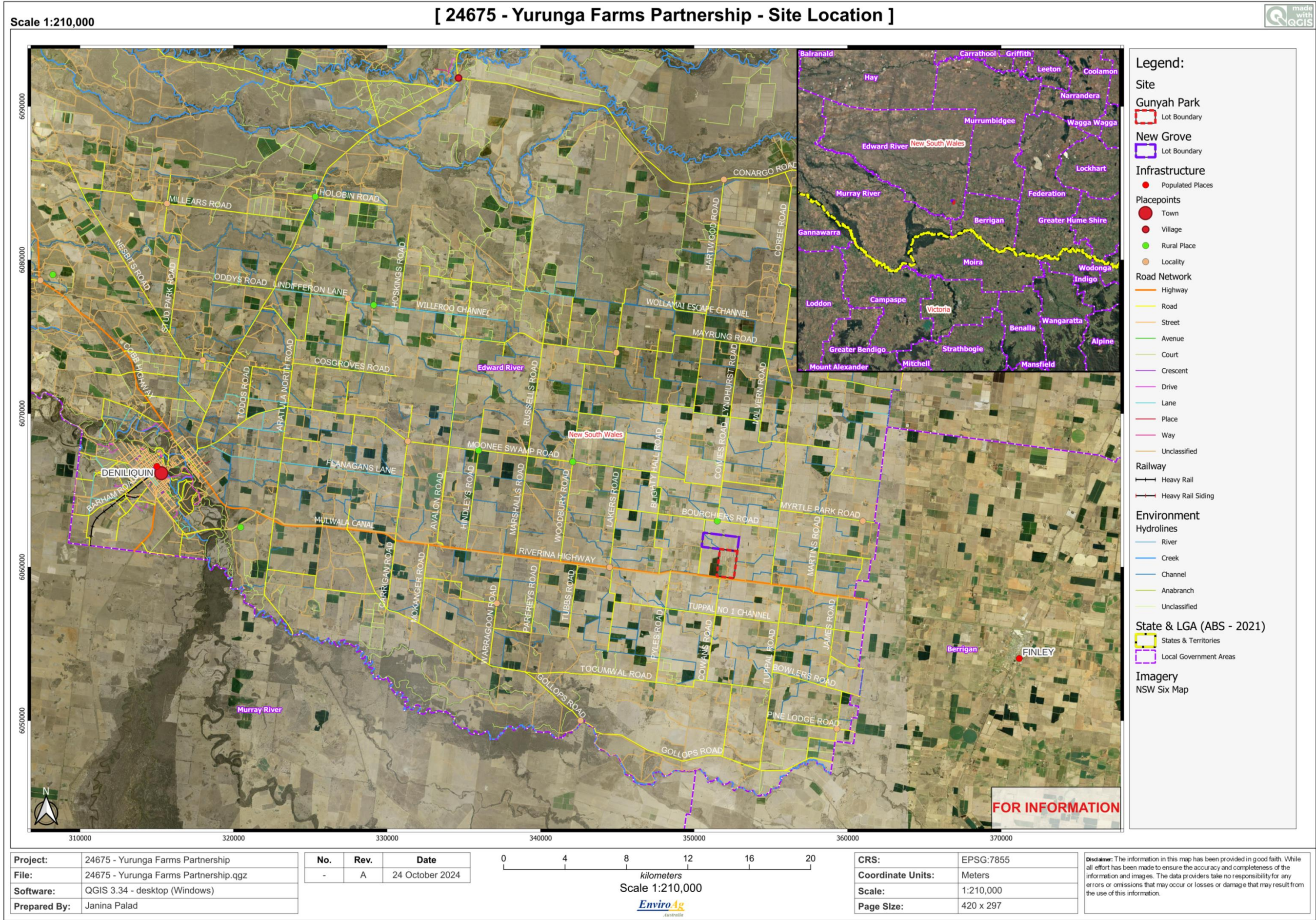
The YFP business is transitioning its business from a pasture based system to a full fed system where stocks are confined into feed pens (dry lot systems). They are fed a prepared ration. The milking parlour and its holding areas and operations are a separate but directly linked component of the operation.

The site is located within the Riverina Murray Regional Area (Department of Primary Industries, New South Wales, 2018), and intensive agriculture has been a key contributor to the expanding economy in the Riverina Murray Region (NSW Department of Planning & Environment, 2023).

A summary of proponent details is provided in Table 1. A site location plan is provided in Figure 1.

Table 1 Proponent Details

Operator/Proponent			
Entity Name:	The Trustee for ALM Operating Trust & the Trustee for LCM Operating Trust		
Business/Trading Name:	Yurunga Farms Partnership		
ABN:	45 370 667 469		
Mailing Address:	18214 Riverina Highway, Blighty, NSW 2713		
Phone:	0419667053		
Development Property/Site			
Property/Site Name:	‘Gunyah Park’		
Address:	18214 Riverina Highway		
Land Owner:	Lachlan Marshall and Adam Marshall		
ABN:	45 370 667 469		
Lot & Plan:	82/DP756251	‘New Grove’	Blighty school road
	87/DP756251	‘Gunyah Park’	18214 Riverina Highway
Total Area of Property:	New Grove (216.930ha) Gunyah Park (201.580ha)		
Local Government Area:	Edward River Council		
Land Use Zoning:	RU1		
Tenure:	Freehold		
Nearest Watercourse	Mayrung Channel, Blighty No 1 Channel, Blighty Retreat Channel		



The Riverina Murray area has prioritised agribusiness development as one of its' key objectives as part of the 2041 plan, the proposed dairy expansion will build on the principles of the Riverina Murray Regional Plan 2041 (RMRP) and assist with ensuring the region continues to be prosperous in agricultural aspects (NSW Department of Planning & Environment, 2023).

Australia's dairy industry is a significant economic contributor to the regions in which it operates, and to Australia as a whole. Economic analysis completed in 2021 indicates that on average, a \$1 increase in dairy industry output drives a \$1.23 increase in Australia's GDP, and every \$1 million of dairy sales generates 9.65 full time equivalent jobs (Dairy Australia, 2024d).

The economic value of the expanded dairy operation will be approximately \$20 M/yr to the local economy. It will employ twenty-one (21) full time employees and some casual employees as needed.

The Australian dairy is committed to sustainable dairy production, with great focus on key elements such as animal care, farmer livelihoods, adapting to climate change, and people's health and nutrition (Dairy Australia, 2024c).

YFP is committed to implement Australian and NSW Government industry guidelines on sustainable dairy production. YFP believes the production to be derived from the proposed dairy development will provide enhanced competition in the market place and complement existing agricultural activities in the regional area.

1.2 Development Objectives

The primary objective of this development application is to obtain Local and State Government planning approval for the proposed dairy development operations at 'Gunyah Park'.

The dairy development aims to reduce the environmental impacts by developing on land that is currently disturbed and already utilised for dairy and cropping purposes. This will preserve established ecosystems surrounding the dairy site, as much as practical.

While the dairy development may have potential impacts that may cause nuisance such as odour, noise, dust and traffic generation, the overall benefits to local community far outweigh the potential impacts that may result. The dairy development not only supports the demand for agribusiness growth in the region, it draws additional employment and economic opportunities to the local area.

The development is anticipated to support local and regional agribusiness in the Edward River Council area and beyond.

Specifically, the development aims to achieve the following:

- Sustainable use of by-products being manures and wastewaters;
- Improve potential odour and dust generation management measures;
- Provide safe access for milk trucks and other vehicles entering and leaving the site;
- Provide on-site workers accommodation to reduce development vehicle traffic generation;
- Efficient use of irrigation water; and,
- Sustainable and resilient business operations.

1.3 Development Options

The proposed site has been operating as a dairy since 1980, with Yurunga Farms Partnership purchasing the property in the 2005.

Following the restriction of water supply to the dairy during the 'Millenium Drought' (year 2000), the pasture-based dairy has been progressively restructured to allow cattle to be fed fodder from a central area within the site.

Given the scarcity and cost of water, the dairy has been maintained its feeding operations since the mid-2000s.

In deciding whether or not to proceed with a development application for the expansion of the existing dairy, the following options were considered:

- Revert to a smaller herd and pasture based operation;
- No action taken – maintain an expanded herd that is partially/fully fed without all ancillary facilities;
- New construction in a new location; or,
- Expand to the 4,000 head (2,000 milkers) on site.

1.3.1 Revert to Base Operations

The base operation was a 400 head milker herd sustained on pasture. Downsizing the original business model is not economic.

1.3.2 No Action Taken

No action taken would result in the existing partially expanded dairy (900 milkers, partially confined - fed) to continue operating without adapting to current sustainable dairy production practices.

Sustainability commitments involve improved animal care, farmer livelihoods, adapting to climate change, and people's health and nutrition.

Without increasing current dairy production capacity and improving current production systems into a more sustainable one, Australian dairy industry sustainability commitments will not be achieved. Potential economic benefits to the local community will continue to be limited, including the potential for agribusiness development in local and regional areas.

1.3.3 New Construction in a New Location

Establishing a new dairy facility in a location that may be more feasible for its reduced potential to impact sensitive receptors may generate other environmental issues. These include further impacting established ecosystems and reducing the quantity of quality primary production land or potentially removing the economic benefits from the surrounding community by relocating the development to a different Council area.

This option is not viable because of:

- Risks to approvals and approval time for a new development
- Costs of developing a green field site and
- Disruption to the existing production operations.

1.3.4 Expand on Site

Having operated as a dairy for over 40 years, the proposed development site is a more strategic and a more advantageous locale for the proposed dairy expansion because:

- Surrounding landholders are already aware that a dairy has been operating on site for many years;
- There are established government regulatory methods and tools for the assessment and management of potential environmental risks that may result from any development; and,
- Implementation of a monitoring program is successful in detecting variabilities in environmental quality which then prompts government regulators to require businesses to take action, timely and by using appropriate strategies.

2. Overview of Methodology

This EIS was undertaken in general accordance with *NSW Dairy Development and Environment Guidelines* (Department of Primary Industries and Regional Development, 2024).

It has considered:

- Requirements set out by the SEARs;
- Outcomes of the consultation undertaken with local government agencies, state government agencies, and surrounding landholders; and,
- Relevant industry guidelines.

The methodology is discussed further in the following sub-sections.

2.1 Secretary's Environmental Assessment Requirements

A Secretary's Environmental Assessment Requirements (SEAR) was requested for the proposed development.

The proposed dairy is considered as designated and integrated development under Part 4 of the Environmental Planning and Assessment Act 1979. The proposed development requires approvals under the Protection of the Environment Operations Act 1997, Roads Act 1993, Water Management Act 2000, and the National Parks and Wildlife Act 1974.

The outcomes of SEAR request is documented in SEAR 1861 issued on 27th March 2024, refer to Appendix A. The SEAR is accompanied by formal advices by the following NSW Departments:

- WaterNSW;
- NSW Environment Protection Authority (EPA); and,
- NSW Department of Primary Industries Agriculture (DPI Ag).

The SEARS identify the following key issues (by summary) in Table 2 below.

Table 2 SEARs Key Issues Summary

Issue	Description	EIS Reference
Strategic and Statutory Context	<ul style="list-style-type: none"> • Consistency with all relevant planning strategies, EPIs, DCPs • List and description of any required new and/or amendment approvals and/or licences prior to development • Integration of proposal with existing on-site operations 	<ul style="list-style-type: none"> • Section 3 • Section 3.5 • Section 1.3, Section 4, Section 5
suitability of the site	<ul style="list-style-type: none"> • Development justification and site suitability per DPI Agriculture guidelines • Land Use Conflict Risk Assessment • Justification that operational environmental impacts are manageable • Site plans 	<ul style="list-style-type: none"> • Section 1.3.4, Section 12.1 • Section 7.1 • Section 8, Appendix N • Section 5.2, Appendix E
waste management	<ul style="list-style-type: none"> • Waste handling (transport, identification, receipt, stockpiling, quality control, off-site disposal) • Waste management (disposal of manure and dead cattle) • Waste type, quantity and classification • Wastewater key pollutant concentrations before and after treatment per water quality guidelines 	<ul style="list-style-type: none"> • Section 5.3.4 • Section 8.1, Appendix N • Section 5.3.4.1, Section 5.3.4.2 • Appendix M

animal welfare, bio-security and disease management	<ul style="list-style-type: none"> • Compliance with relevant codes of practice and guidelines • Head load assessment • All pest, weed and disease control measures • Contingency for mass disposal of livestock in a disease outbreak 	<ul style="list-style-type: none"> • Section 9 • Section 9.1.4.4 • Section 9.2 • Section 9.2.3, Appendix N
air quality	<ul style="list-style-type: none"> • All potential air and odour emission sources during construction and operation • Air quality impact assessment per EPA requirement • Air quality impact mitigation and monitoring measures 	<ul style="list-style-type: none"> • Section 8.2, Section 8.10 • Appendix H • Section 8.2, Section 8.10, Appendix H, Appendix N
soil and water	<ul style="list-style-type: none"> • Local soils, topography, drainage, landscapes • Water usage including existing and proposed water licencing requirements • Measures for development compliance with requirements of relevant water sharing plan or water source embargo • Site water balance • Potential impacts on floodplain and stormwater management • Sediment and erosion controls • Potential impacts on waterfront land if applicable • Potential impacts on surface water and groundwater (quality and quantity) • Stormwater and wastewater management (including sewage) • Water monitoring program • Impact mitigation and monitoring measures 	<ul style="list-style-type: none"> • Section 6.3, Section 8.3 Appendix L, Appendix M • Section 5.3.5.1, Section 5.3.5.2, Section 6.3 • Section 8.3 • Section 8.3 • Section 8.3 • Section 8.3 • Not Applicable • Section 8.3, Appendix M • Section 8.3, Section 5.3.4.2, Section 5.3.4.3, Section 8.1, Appendix M, Appendix N • Section 10.2, Appendix M, Appendix N • Section 8.3, Section 10.2, Appendix M, Appendix N
noise and vibration	<ul style="list-style-type: none"> • All potential noise and vibration sources (construction and operation) • Noise and vibration assessment per EPA guidelines • Noise and vibration mitigation measures 	<ul style="list-style-type: none"> • Section 8.4, Appendix N
traffic and transport	<ul style="list-style-type: none"> • Road transport route and access to the site • Construction and operational road traffic predictions • Impacts to safety and function of road network and details of road upgrades required 	<ul style="list-style-type: none"> • Section 8.5 • Section 8.5, Appendix I • Appendix I
biodiversity	<ul style="list-style-type: none"> • Potential vegetation clearing and any impacts to flora and fauna 	<ul style="list-style-type: none"> • Section 8.6
bushfire	<ul style="list-style-type: none"> • Bushfire risks and APZ per NRFS guideline 	<ul style="list-style-type: none"> • Section 8.7
visual	<ul style="list-style-type: none"> • Impacts at private receptors and public vantage points 	<ul style="list-style-type: none"> • Section 8.8
heritage	<ul style="list-style-type: none"> • Aboriginal and non-Aboriginal cultural heritage 	<ul style="list-style-type: none"> • Section 8.9

2.2 Consultation

The planning and assessment process is reliant on open and transparent stakeholder engagement. YFP is committed to working with the community and being an active and responsible member of the local community.

The stakeholder engagement process has been undertaken as part of the environmental impact assessment process including engagement with relevant local, State and Commonwealth Government authorities, and surrounding landowners and occupiers.

2.2.1 Local and State Government Authorities

Consultation with some local and state government authorities was undertaken. Each stakeholder received a formal letter from YFP together with a copy of SEAR so they were made aware of the development. Each was invited to respond and contact was also made with them.

The standard letter was replicated for all intended recipients. The letter provided a brief description of the development, its potential impacts and enclosed a site plan. The letters were finalised on 16th October 2024 and were disseminated to relevant authorities on 17th October 2024 via email with copy of SEAR attached. Refer to Appendix B for the letter format as well as emails sent through to each relevant authority.

The community response due date was noted as 6th November 2024. A summary of the email consultation is shown in Table 3. Refer to Appendix C for the details of advices and responses provided by the consulted authorities.

Table 3 Local and State Government Consultation

Agency	Date of Email	Response Provided	Comments
Department of Climate Change, Energy, the Environment and Water <ul style="list-style-type: none"> Water Group Environment Protection Authority National Parks and Wildlife Services 	17/10/2024	Yes, except for NPWS	Water Group acknowledged receipt on 17/10/2024. EPA responded on 21/10/2024. No additional comments to add to the SEAR. No response from National Parks and Wildlife Services was received.
Department of Regional NSW <ul style="list-style-type: none"> Department of Primary Industries – Agriculture Local Land Services 	17/10/2024	Yes, except for MLLS	DPI Ag responded on 24/10/2024. No additional comments to add to the SEAR. No response from Murray Local Land Services was received.
Transport for NSW	17/10/2024	Yes	Acknowledged receipt on 18/10/2024. Response letter issued 05/11/2024.
NSW Rural Fire Service	17/10/2024	Yes	RFS responded on 22/11/2024. No specific concerns raised; development must comply with <i>Planning for Bush Fire Protection 2019</i> .
Water NSW	17/10/2024	Yes	WaterNSW responded on 22/10/2024. No additional comments to add to the SEAR.
Deniliquin Local Aboriginal Land Council	17/10/2024	No	No response received from this agency.

2.2.2 Edward River Council

Consultation with Edward River Council was undertaken through a formal in-person meeting. The details of the meeting are summarised in Table 4.

Table 4 Council Consultation Summary

Date:	31 st October 2024	
Time:	11:00 AM to 12:00 PM	
Location:	Edward River Council, 1 Civic Pl, Deniliquin NSW 2710	
Attendees:	Edward River Council Marie Sutton (Manager Development Services) Maddison Gunter (Planning Officer) Michael Williams (Design and Project Engineer) EnviroAg Australia Simon Lott (Specialist Scientist/Engineer) James Laycock (Specialist Planner) Janina Palad (Project Manager/Scientist)	
Agenda:	Welcome remarks and introduction Overview of the project Any issues specific to the EIS over and above that are required by SEARs (Council) Process and timing – EIS and DA Closing remarks	
General Comments and Responses:	Council Comments	EnviroAg Responses
	Clearly state in the EIS the totality of the development.	An overall site plan will form part of the EIS.
	Compliance with relevant legislation and industry guidelines.	Compliance with standard planning instruments and provisions will form part of the EIS.
	Traffic – access upgrade, car parking plan, manoeuvring plans, consult Transport NSW.	A traffic impact assessment has been completed by engaged subcontractor. No significant issues identified. Car parking and site access upgrade were recommended. Details to be included in the EIS.
	Proposed infrastructure with full set of plans (floor plan, elevations, layout)	Detailed drawings to be included in the EIS.
	Odour – level 3 assessment	Odour modelling is in progress by an odour specialist. The report will form part of the EIS.
	Water supply – appropriate setback distance to neighbour's water supply; sufficient water supply for the increase in stock, effluent utilisation areas, groundwater impacts, consult MIL.	All government authorities in the SEARs have been consulted and are to provide comments by 6 th November 2024. WaterNSW advices were provided as part of SEARs – will be addressed. Client has water licence to cover development water requirements. Effluent (and manure) utilisation areas will be included in the overall site plan. Groundwater impacts will be addressed in the EIS. MIL was consulted and communications are ongoing (refer to Appendix B and Appendix C).

2.2.3 Surrounding Residents

Consultation with surrounding residents was undertaken using a formal letter signed by YFP. This was the same standard consultation letter disseminated to relevant government authorities (refer to Appendix B).

Receptors were identified within 2 km buffer from the property boundary of the development site. Ten (10) landowners were considered for this consultation.

The Managing Director of YFP hand delivered letters to the neighbours' respective mailboxes. This action was followed up with a text message as an informal advisory.

Five (5) responses were received, most were advising they have no issues with the proposed development. One of the respondent suggested developing a tree belt down the eastern boundary to manage any potential odour issue. This suggestion has been included in the planning and design.

Detailed responses are shown in Appendix C.

2.3 Industry Guidelines

In undertaking this impact assessment, several government and industry guidelines were appraised and cross-referenced.

The structure of this EIS generally follows the format set out in the *Planning Guidelines Intensive Livestock Agriculture Development* (NSW Department of Planning and Environment, 2019). It is well-supported by the *NSW Dairy Development and Environment Guidelines* (Department of Primary Industries and Regional Development, 2024).

Other guidelines include:

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024b),
- *Effluent and Manure Management Database for the Australian Dairy Industry* (Dairy Australia, 2008),
- *National Guidelines for Beef Cattle Feedlots in Australia* (MLA, 2012),
- *Use of Effluent by Irrigation* (Department of Environment and Conservation (NSW), 2004),
- *Ferticare® Technical Standards for Nutrient Management Planning on Australian Dairy Farms* (Gourley, 2020),
- *Irrigation Guide – Efficient Water Use for Dairy* (Department of Agriculture, Water and the Environment & Dairy Australia, 2021), and,
- *Managing Biosecurity Risks in Land Use Planning and Development Guide* (Department of Primary Industries, 2020).

3. Statutory Requirements

This section outlines statutory requirements that are relevant to the proposed development.

Specifically, these include local environmental plans (LEPs), state environmental planning policies (SEPPs), and other state and federal legislations.

3.1 State Environmental Planning Policies (SEPPs)

State Environmental Planning Policies (SEPPs) relevant to the proposed development are summarised below.

3.1.1 SEPP (Transport and Infrastructure) 2021

The aim of this Policy is to facilitate the effective delivery of infrastructure across the State by:

- Improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services;
- Providing greater flexibility in the location of infrastructure and service facilities;
- Allowing for the efficient development, redevelopment or disposal of surplus government owned land;
- Identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development);
- Identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development;
- Providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing; and,
- Providing opportunities for infrastructure to demonstrate good design outcomes.

The relevant matter to be addressed in this policy is;

Section 2.22 General requirements for complying development.

The proposed dairy expansion complies with **Section 2.22**, as the development:

- is not exempt development under the SEPP;
- is permitted development with consent under the Conargo LEP;
- any new structures will be assessed under the Building Code as part of the detailed design phase;
- has an erosion and sediment control plan developed utilising the NSW Blue Book and IECA best practice guidelines;
- will not involve removal of vegetation that requires permit or development consent;
- is not with 1m of any sewer infrastructure; and does not involve the removal of asbestos.

3.1.2 SEPP (Primary Production) 2021

The aims of this Policy are as follows:

- To facilitate the orderly economic use and development of lands for primary production;
- To reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources;
- To identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations;
- To simplify the regulatory process for smaller-scale low risk artificial waterbodies, and routine maintenance of artificial water supply or drainage, in irrigation areas and districts, and for routine and emergency work in irrigation areas and districts;
- To encourage sustainable agriculture, including sustainable aquaculture;

- To require consideration of the effects of all proposed development in the State on oyster aquaculture; and,
- To identify aquaculture that is to be treated as designated development using a well-defined and concise development assessment regime based on environment risks associated with site and operational factors.

The relevant matter to be addressed in this policy is:

Schedule 4, Part 3, Section 4 Intensive livestock agriculture.

The proposed dairy expansion complies with *Schedule 4, Part 3, Section 4* because:

- Proposed dairy expansion requires development consent as the proposed quantity of dairy animals is greater than 50 heads;
- Odour impacts have been assessed and are outlined in Section 8.2 and Appendix H;
- Surface and groundwater impacts have been assessed and are outlined in Section 8.3 and Appendix M;
- Land impacts have been assessed and are outlined in Section 7.1 and Section 8.3;
- Mitigation and management measures for all anticipated environmental and community impacts are detailed in Section 8 and Appendix N;
- Animal welfare is discussed in Section 9.1 and Appendix N.

3.1.3 SEPP (Resilience and Hazards) 2021

Chapter 3 Hazardous and offensive development of this Policy sets out:

Hazardous industry means a development for the purposes of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would pose a significant risk in relation to the locality:

- (a) To human health, life or property; or
- (b) To the biophysical environment.

Offensive industry means a development for the purposes of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would emit a polluting discharge (including, for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land in the locality.

The aims of this Policy are as follows:

- To amend the definitions of hazardous and offensive industries where used in environmental planning instruments;
- To render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy;
- To require development consent for hazardous or offensive development proposed to be carried out in the Western Division;
- To ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account;
- To ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact; and,
- To require the advertising of applications to carry out any such development.

The relevant matter to be addressed in this policy is:

Chapter 3, Part 3, Section 3.12 Matters for consideration by consent authorities.

The proposed dairy expansion complies with ***Chapter 3, Part 3, Section 3.12*** because:

- The proposed dairy expansion will require an EPL regulated by the EPA for livestock accommodation purposes. OEH will also have the opportunity to review this EIS and provide advices/conditions, where required, in regard to environmental impacts associated with the proposed dairy expansion.
- Wastes generated on site can be a concern for hazardous provisions. Appropriate management of these wastes, as outlined in this EIS document, will ensure that any potential offensive nature that the site operations may have to nearby receptors would be as minimal as possible.
- Noise can be a concern for offensive provisions. A noise impact assessment is completed in Section 8.4. Appropriate noise mitigation and management measures will be implemented onsite during operations.
- Odour can be another concern for offensive provisions. The site has been operating as a dairy facility for over 40 years and no formal odour complaint has been received by the proponent. The dairy complex is located within appropriate separation distance from nearby receptors. The odour assessment report (refer to Appendix H) showed that the proposed dairy operations are compliant with EPA requirements.

3.2 Environmental Protection Licences

3.2.1 Environmental Planning and Assessment Act (EP&A) 1979

The proposed dairy expansion requires development consent under Part 4 of this Act and the Conargo Local Environmental Plan.

The proposed development is not considered State Significant Development (SSD) under Part 4, Division 4.7 of this Act.

The proposed development is considered Integrated Development under Part 4, Division 4.8, Section 4.46 of this Act. The proposed development will require an EPL under the POEO Act, and the application cannot be approved until the EPA has issued the general terms of approval.

Under Part 5, Subdivision 3 of EP&A Act, an Environmental Impact Statement (EIS) for a dairy development is required to be assessed by the determining authority. This EIS shall be made available for inspection for a period of not less than 28 days after publication is announced.

The proposed development will comply with this requirement upon submission of this EIS.

3.2.2 Environmental Planning and Assessment Regulation (EP&A) 2021

The proposed dairy expansion is considered as designated development under Schedule 3, Part 2, Clause 22 of the *Environmental Planning and Assessment Regulation 2021*, it details that the development will accommodate more than 800 cattle for milk production.

Designated development applications involve the following:

- An EIS to be developed for the activity;
- Require public notification of at least 28 days;
- Can be the subject of merits appeal to the Land and Environment Courts by objectors; and,
- Other statutory approvals or licences.

The proposed development will comply with this requirement upon submission of this EIS.

3.2.3 Protection of the Environment Operations (POEO) Act 1997

The proposed dairy expansion is considered as an integrated development under Schedule 1, Part 1, Section 22 *Livestock intensive activities* of the *Protection of the Environment Operations Act 1997*.

The proposed development is for accommodating 4,000 head of dairy animals, which is more than the threshold for dairy animal accommodation scheduled activity of 800 dairy animals at any time.

An Environmental Protection Licence (EPL) will be required for this development.

The proposed development will comply with this requirement by lodging an application of an environmental protection licence to EPA NSW upon receipt of the *Development Consent*.

3.2.4 Roads Act 1993

Section 138 of this Act outlines the requirements for approval to carry out works within the vicinity of a road. This section states that a person must not, without consent of the appropriate roads authority:

- Erect a structure or carry out a work in, on or over a public road, or,
- Dig up or disturb the surface of a public road, or,
- Remove or interfere with a structure, work or tree on a public road, or,
- Pump water into a public road from any land adjoining the road, or,
- Connect a road (whether public or private) to a classified road.

Consent from appropriate roads authority will be obtained prior to upgrading the site access intersection with Riverina Highway.

3.2.5 Water Management Act 2000

The aims of this Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations and, in particular:

- To apply the principles of ecologically sustainable development;
- To protect, enhance and restore water sources, their associated ecosystems, ecological processes and biological diversity and their water quality;
- To recognise and foster the significant social and economic benefits to the State that result from the sustainable and efficient use of water, including:
 - benefits to the environment;
 - benefits to urban communities, agriculture, fisheries, industry and recreation;
 - benefits to culture and heritage; and
 - benefits to the Aboriginal people in relation to their spiritual, social, customary and economic use of land and water.
- To recognise the role of the community, as a partner with government, in resolving issues relating to the management of water sources;
- To provide for the orderly, efficient and equitable sharing of water from water sources;
- To integrate the management of water sources with the management of other aspects of the environment, including the land, its soil, its native vegetation and its native fauna;
- To encourage the sharing of responsibility for the sustainable and efficient use of water between the Government and water users; and,
- To encourage best practice in the management and use of water.

The proposed development complies with the Act by utilising sustainable and efficient water and wastewater management systems for its operations. YFP also has approved water licences which are sufficient to support the dairy expansion's water requirements.

The design of water infrastructure (Refer to Section 5.3.4.2, 5.3.4.3 & 5.3.5) and operational management (Refer to Appendix N) are in accordance with best practice management by Dairy Australia and other relevant industry guidelines outlined in Section 2.3.

3.2.6 National Parks and Wildlife Act 1974

The objects of this Act are:

- The conservation of nature, including, but not limited to, the conservation of:
 - habitat, ecosystems and ecosystem processes;
 - biological diversity at the community, species and genetic levels;
 - landforms of significance, including geological features and processes; and,
 - landscapes and natural features of significance including wilderness and wild rivers,
- The conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:
 - places, objects and features of significance to Aboriginal people;
 - places of social value to the people of New South Wales; and,
 - places of historic, architectural or scientific significance.
- Fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation; and,
- Providing for the management of land reserved under this Act in accordance with the management principles applicable for each type of reservation.

The proposed development complies with the Act by conducting biodiversity and heritage assessments for the site prior to expansion (Refer to Section 8.6 and Section 8.9). The results of the assessment are considered in site planning.

No biodiversity and heritage were identified to be impacted by the proposed development. An *Environmental Management Plan* was developed for the site for overall site management (Refer to Appendix N).

3.3 Local Environmental Plans (LEPs) and Other Planning Instruments

3.3.1 Conargo Local Environmental Plan 2013

The Conargo LEP aims to make local environmental planning provisions for land in Conargo in accordance with the relevant standard environmental planning instrument under section 3.20 of the Act.

The particular aims of this LEP are as follows:

- (a) to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts;
- (b) to encourage sustainable economic growth and development in Conargo;
- (c) to provide for a range of development opportunities that contribute to the social, economic and environmental resources of the area and support the long-term and economic viability of the local community;
- (d) to protect, enhance and conserve agricultural land through the proper management, development and conservation of natural and human-made resources;
- (e) to promote the efficient and equitable provision of public services, infrastructure and amenities;
- (f) to conserve, protect and enhance the environmental and cultural heritage of Conargo;
- (g) to identify, protect, conserve and enhance the natural assets of Conargo.

The 'Gunyah Park' dairy site is located in the RU1 Primary Production Zone of the Edward River Council government area.

The proposed development must meet the objectives of this land use zone. Compliance of the development against the objectives of this zone is detailed in Table 5.

Table 5 Conargo LEP – Zone RU1 Primary Production Objectives

Relevant Objectives of Zone	Applicant Response
<ul style="list-style-type: none"> To encourage sustainable primary industry production by maintaining and enhancing the natural resource base. 	<p>The proposed dairy expansion is not anticipated to have impacts on the surrounding primary production lands.</p> <p>It will operate as a closed system and any potential contamination that may arise from activities conducted on site are sufficiently contained within the property.</p> <p>It does not involve clearing of existing undisturbed lands.</p> <p>All development will be restricted to existing property boundaries that is operated by YFP.</p>
<ul style="list-style-type: none"> To encourage diversity in primary industry enterprises and systems appropriate for the area. 	<p>The dairy will operate as a diverse activity for the area.</p> <p>The majority of surrounding properties are utilised for cropping or grazing purposes which is concurrent with the operations of a dairy in this area.</p>
<ul style="list-style-type: none"> To minimise the fragmentation and alienation of resource lands. 	<p>No fragmentation or alienation of resource lands is anticipated from the proposed development.</p>
<ul style="list-style-type: none"> To minimise conflict between land uses within this zone and land uses within adjoining zones. 	<p>A Land Use Conflict Risk Assessment is completed per Section 7.1.</p> <p>It is not anticipated that the proposed dairy will result in any substantial land use conflicts with neighbouring properties or uses.</p>
<ul style="list-style-type: none"> To provide opportunities for employment-generating development that adds value to local agricultural production and integrates with tourism. 	<p>The proposed dairy expansion will support agribusiness in the local area. It will employ 21 FTE and casual employees (as required).</p>

Intensive Livestock Agriculture development is ‘permitted with consent’ under this zone. The development must comply with **Part 5, Section 5.18 Intensive livestock agriculture** of the LEP. Compliance of the development against corresponding matters under this provision is detailed in Table 6.

Table 6 Conargo LEP – Intensive Livestock Agriculture

Relevant Matters	Applicant Response
(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,	<p>The adequacy of information for the EIS is driven by compliance with the SEARs requirements.</p> <p>All SEARs matters have been addressed (Refer to Section 2.1).</p>
(b) the potential for odours to adversely impact on the amenity of residences or other land uses within the vicinity of the site,	<p>An odour assessment was completed (Refer to Section 8.2 and Appendix H).</p> <p>The development is compliant with EPA requirements.</p> <p>Any potential odour issues are to be managed using measures specified in the EMP (Refer to Appendix N).</p>
(c) the potential for the pollution of surface water and ground water,	<p>Water quality impact assessment was completed (Refer to Section 8.3).</p> <p>All identified issues impacting water quality will be mitigated and managed using measures specified in the CIMP (Refer to Appendix M).</p> <p>Water quality monitoring will be conducted per Section 10.2 and per EPL.</p>
(d) the potential for the degradation of soils,	<p>Soil quality impact assessment was completed (Refer to Section 8.3).</p> <p>All identified issues impacting soil quality will be mitigated and managed using measures specified in the CIMP (Refer to Appendix M).</p> <p>Soil quality monitoring will be conducted per Section 10.2</p>

	and per EPL.
(e) the measures proposed to mitigate any potential adverse impacts,	Mitigation and management measures for all potential environmental impacts are outlined in the EMP (Refer to Appendix N).
(f) the suitability of the site in the circumstances,	The site is an existing dairy (Refer to Section 1.3.4). It is not anticipated to have conflicts with the surrounding land uses (Refer to Section 7.1). All potential environmental impacts are manageable (Refer to Section 8 and EMP, Appendix N).
(g) whether the applicant has indicated an intention to comply with relevant industry codes of practice for the health and welfare of animals,	Compliance and commitment to animal welfare are detailed in Section 9.
(h) the consistency of the proposal with, and any reasons for departing from, the environmental planning and assessment aspects of any guidelines for the establishment and operation of relevant types of intensive livestock agriculture published, and made available to the consent authority, by the Department of Primary Industries (within the Department of Industry) and approved by the Planning Secretary.	The dairy expansion is a rural development in a rural zone.

The development must also comply with **Part 6 Additional local provisions**. The relevant provision for the site is **Section 6.1 Earthworks**. Compliance of the development against corresponding matters under this provision is detailed in Table 7.

Table 7 Conargo LEP – Additional Local Provisions – Earthworks

Relevant Matters	Applicant Response
(a) the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development,	The site is relatively flat and the proposed dairy expansion site is already disturbed. Given its topography, it is not anticipated to have detrimental effect on drainage patterns and soil stability on site.
(b) the effect of the development on the likely future use or redevelopment of the land,	The site is anticipated to be consistently used for agricultural purpose. All current statutory requirements are being complied with for this development. Any future use or redevelopment will address statutory requirements at the time.
(c) the quality of the fill or the soil to be excavated, or both,	A geotechnical assessment was conducted (Refer to Appendix L). The site has suitable quantity and quality of clays for construction use.
(d) the effect of the development on the existing and likely amenity of adjoining properties,	A Land Use Conflict Risk Assessment and visual amenity assessment was conducted (Refer to Section 7.1 and Section 8.8). The development has no significant impact on the amenity of surrounding properties.
(e) the source of any fill material and the destination of any excavated material,	The site has suitable clays on site for construction materials. Cut and fill quantities are to be optimised in the detailed design planning, prior to construction. Excess materials are to be stockpiled and managed appropriately on site.
(f) the likelihood of disturbing relics,	Heritage assessment was completed (Refer to Section 8.9). The site is unlikely to have presence of relics.
(g) the proximity to, and potential for adverse impacts on, any waterway, drinking water catchment or environmentally sensitive area,	Murray Irrigation Channels are proximate to the property. Water quality impact assessment was completed (Refer to Section 8.3). All identified issues impacting water quality will be mitigated and managed using measures specified in the CIMP (Refer to Appendix M). Water quality monitoring will be conducted per Section 10.2 and per EPL.
(h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.	Mitigation and management measures for all potential environmental impacts are outlined in the EMP (Refer to Appendix N).

3.3.2 Deniliquin Development Control Plan (DCP) 2016

The general aims of this DCP are as follows:

- Promote growth and development to support and enhance the vitality of the Central Business District;
- Encourage development that responds to the needs of the community;
- Encourage residential development of a high standard to improve the quality of the urban environment;
- Encourage development that respects and minimises the impacts on surrounding land and the wider environment;
- Encourage new development that will enhance streetscapes and vistas;
- Ensure that development incorporates safe, effective and convenient pedestrian, bicycle and vehicle access, movement and parking areas;
- Encourage energy efficiency in building design;
- Provide for effective and well-utilised open space with security and access for the community;
- Control and minimise the impact of stormwater run-off;
- Ensure that new development is fully integrated into Council's sewerage system wherever possible; and,
- Promote the orderly and efficient development of land to ensure that provision of services to that land is adequate.

The DCP outlines that:

"Where an environmental planning instrument states that a type of development on particular land is "permitted with consent", development consent must first be obtained by way of a development application or application for a complying development certificate. In assessing an application Council must ensure the development would not generate significant impacts and that it is compatible with relevant plans, policies and the objectives and controls of this DCP."

DCP requirements relevant to the proposed development are specified in Table 8.

Table 8 Deniliquin Development Control Plan - Relevant Controls

Deniliquin DCP Requirements	Relevant Controls and Applicant Responses
5 Rural Zone	
5.2 Other Development	
5.2.1 Access and Parking	<p>The number of car parking spaces provided on the development site shall be in accordance with Chapter 12 - Car Parking.</p> <p><i>A Traffic Impact Assessment was conducted and is detailed in Appendix I. The traffic specialist recommended a car parking for at least 6 passenger vehicles.</i></p> <p>Car parking spaces must be clearly indicated on plans submitted with a development application for development within a rural zone.</p> <p><i>A car parking area is dedicated in the site plan (Refer to Appendix E). Detailed car parking design will be developed according to relevant guidelines and will be submitted to Council for approval.</i></p> <p>Car parking spaces must be sited in a safe and convenient location on site.</p> <p><i>The proposed car parking is located at the entrance to the dairy complex which is a safe and convenient location for workers.</i></p> <p>Car parking areas, access driveways and vehicle movement areas are to be constructed of impervious materials. This may include suitably compacted gravel or road based material.</p> <p><i>Proposed car parking, access and manoeuvring areas are to be constructed with appropriate materials. Detailed technical specifications are to be submitted to</i></p>

Council for approval prior to construction.

The location of new access points must achieve adequate sight lines.

A Traffic Impact Assessment was conducted and is detailed in Appendix I. The assessment confirmed sight lines are adequate for the site access.

Adequate area must be provided on site to allow for access and manoeuvrability of all vehicles likely to access the site for the operation of the proposed development.

The proposed development has adequate area to support required operational vehicle access and manoeuvrability.

A dedicated area for loading and unloading must be provided on site where delivery vehicles will not conflict with visitor vehicular movements. The size of the loading and unloading area must be suitable for the type and size of vehicles that will be utilising the area.

Appropriate loading and unloading areas will be dedicated for the milking centre and feed centre areas.

A development application must include details of the frequency and types of vehicles that are likely to access the site during the operation of the proposed development.

A Traffic Impact Assessment was conducted and is detailed in Appendix I. The report assessed anticipated traffic generation and vehicle types during construction and operational phases of the development.

5.2.3

Building Appearance and Design

Building exteriors must use high quality non-reflective materials and finishes.

Proposed new buildings must not present large areas of blank walls. Visual interest can be incorporated through the use of varied materials and colours, windows or building articulation.

A visual impact assessment is located in Section 8.8. Visual amenity is unlikely to be a significant issue for the development. The proposed buildings will be constructed in accordance with appropriate Australian standards and guidelines.

The design of proposed new buildings, additions or alterations must give due consideration to Crime Prevention Through Environmental Design (CPTED) principles.

The proposed buildings will consider CPTED principles.

5.2.5

Waste and Trade Waste

A waste storage area must be provided on-site for all development.

A waste collection area is dedicated for ease in collection.

The waste storage area must be in a location that is convenient for users and waste collection contractors.

During operations, skip bins are to be placed beside the buildings. The waste collection area is located at the entrance of the dairy complex, beside the car park.

The size of the waste storage area must be appropriate for the nature and scale of development.

Skip bins of sufficient size will be dedicated for the site operations. Skip bins will be moved to the waste collection point prior to collection by the waste contractor.

A trade waste agreement must be made with Council where liquid waste will be disposed to Council's sewerage system.

The site will have an OSWMS, per Section 5.3.4.3.

5.2.6

Impacts on Surrounding Land

The proposed development must not unreasonably affect surrounding properties by way of any type of pollutant such as noise and vibration, air emissions, dust, water pollution or odour.

Noise and vibration, air quality (dust and odour), and soil and water assessments were undertaken for the site and any potential impacts occurring are to be managed

appropriately to avoid affecting surroundings unreasonably (Refer to Sections 0, 8.2 and 8.3).

The hours of operation for a proposed development must not significantly impact the amenity of neighbouring residential areas.

The site operates 24 hours a day, 7 days a week. Any activity that are anticipated to cause nuisance to the receptors are to be conducted at appropriate times of the day.

10 Hazards

10.1

Bushfire Prone Land

Development on land that is mapped as being bush fire prone must satisfy the requirements of Planning for Bush Fire Protection 2006 (or as amended).

A basic bushfire assessment is detailed in Section 8.7. The site will implement general fire protection measures to satisfy requirements of Planning for Bush Fire Protection 2006.

Development on land that is mapped as being bush fire prone must satisfy the requirements of Australian Standard 3959: Construction of Buildings in Bush Fire Prone Areas.

All proposed buildings will be in accordance with AS3959.

3.3.3 Riverina Murray Regional Plan 2041

The Riverina Murray Regional Plan 2041 (RMRP) outlines that:

“The region is known as Australia’s food bowl and is the largest value-adding agricultural region in NSW. The region’s competitive advantages are its location between Australia’s biggest metropolitan cities and international airports and ports, its links with Victoria, and its agribusiness and value-adding manufacturing sectors.”

The proposed dairy must build on the RMRP objectives and support the continued agricultural development in the region.

3.4 Onsite Wastewater Management System

The proposed accommodation and milking centre precinct include an Onsite Wastewater Management System (OSWMS) for treating domestic wastewater. The treated effluent will be utilised for land application through the wastewater irrigation tailwater drains, in accordance with environmental and health regulations.

This subsection follows the requirements set out in the *Environment & Health Protection Guidelines: Onsite Wastewater Management* (NSW Office of Local Government, 2023). The guidelines aim to assist councils in NSW to manage and regulate onsite wastewater management systems (OSWMs) in a systematic way and reduce risk to public health and the environment.

3.4.1 Local Government Act 1993

Prior approval of the Council is required under Section 68 before certain activities can be carried out, including:

- Part C (5) Install, construct, or alter a waste treatment device or a human waste storage facility or a drain connected to any such device or facility;
- Part C (6) Operate a system of sewage management (with the meaning of Section 68A); or,
- Part F (10) Carry out an activity prescribed by the regulations or an activity of a class of description prescribed by the regulations.

3.4.2 Local Government (General) Regulation 2021

Part 2, Division 4, Subdivision 7, Clause 44 outlines that a system of sewage management must be operated in a manner that achieves the following standards:

- The prevention of the spread of disease by micro-organisms;

- The prevention of the spread of foul odours;
- The prevention of contamination of water;
- The prevention of degradation of soil and vegetation;
- The discouragement of insects and vermin;
- Ensuring that persons do not come into contact with untreated sewage or effluent whether treated or not) in their ordinary activities on the premises concerned;
- The minimisation of any adverse impacts on the amenity of the premises and surrounding lands; and,
- If appropriate, provision for the re-use of resources (including nutrients, organic matter and water).

Prior approval from the Edward River Council is required for any works involving the installation, construction, alteration, and ongoing operation of an OSMS (Edward River Council, n.d.).

3.5 Planning Approval

A summary of approvals required for the proposed development are summarised in Table 9.

Table 9 Approvals required for the proposed development

Approval/Licence	Issuing Authority	Act/Regulation/Law
Environmental Protection Licence	Environmental Protection Authority	POEO 1997 <ul style="list-style-type: none"> • Clause 43(b) • Clause 48(1) <ul style="list-style-type: none"> ◦ Schedule 1 Part 1 Clause 22 (Livestock Intensive Activities – Dairy animal accommodation) • Clause 55
Approval for Work	Transport for NSW	Roads Act 1993
Water Licence	WaterNSW	Water Management Act 2000
Wastewater Approval	Edward River Council	LG Act 1993
Development Consent	Edward River Council	EP&A 1979 EP&A 2021

4. Description of Original Development

The original dairy development is shown in Appendix D. It consists of a family-operated, pasture-based system supporting approximately 400 lactating cows.

Key features of the existing infrastructure include:

- **Single Rotary Dairy:** A rotary platform used for milking the 400 lactating cows efficiently.
- **Flood Irrigation System:** Pastures are flood irrigated to provide feed for the dairy herd.
- **Family-Operated Business:** The original system relies on family labour and traditional methods for farm operation and management.

5. Description of Proposed Development

The proposed development of Yurunga Dairy represents a major step forward in modernising and expanding existing operations to meet the growing demands of the industry.

The dairy is to move from a modest 400 milker pasture based operation producing about 25 L of milk per cow to a large fully confined operation of 2,000 milkers generating about 37 L of milk per cow.

The enlarged dairy will be designed to include;

- (i) Best practice animal welfare;
- (ii) Operational efficiency; and,
- (iii) environmental sustainability.

The development will enhance productivity while ensuring compliance with regional and national standards.

5.1 Herd Composition

The proposed dairy will accommodate a total of 4,000 head of livestock animals.

The herd composition is detailed in Table 10 below.

Table 10 Herd Composition

Type	No. of Animals	Adult Equivalent (SCU)	Total Adult Equivalent (SCU)
Lactating Cows	2,000	1.0	2,000
Dry Cows	400	0.7	280
Heifers (1-year-old)	640	0.6	384
Calf (Weaned)	400	0.3	288
Total Herd Size			2,952

5.2 Concept Plan

A concept plan was developed based on;

- (i) Development needs;
- (ii) On-site assessments; and,
- (iii) Design and modelling.

The overall site plan for the proposed development is shown in Appendix E. It represents a significant expansion and modernisation of the existing dairy operation to support 2,000 lactating cows, thereby improving efficiency, productivity, and sustainability.

The key components of the proposed facilities include:

Milking Facilities

- **New Rotary Dairy:** A modern rotary dairy system will be constructed to accommodate the increased herd size and improve milking efficiency.
- **Phasing Out of Old Rotary Dairy:** The existing rotary dairy will be decommissioned once the new rotary facility is operational.

Dry Lot Systems

- **Lactating Cow Dry Lot:** Designed for milking cows, the dry lot will house up to 2,000 lactating cows and provide suitable facilities for feed, water, and shelter to ensure optimal production and animal welfare.

- **Dry Cow, Heifer and Calf Dry Lots:** This area will accommodate 2,000 animals, including dry cows, heifers and calves. The dry lot is designed to provide yards, hospital pens, drains, shade, and sediment ponds to manage animal welfare and environmental impacts.
- **Heifer Rearing Area:** Areas will be dedicated to raising retained calves for heifer replacements, supporting the farm's long-term sustainability and herd regeneration.

Animal Welfare and Handling Facilities

- **Handling and Veterinary Facilities:** New infrastructure will include modern handling yards and veterinary treatment areas to ensure animal health is maintained efficiently.
- **Calf Rearing Facility:** A purpose-built facility for rearing calves, with appropriate space, feeding systems, and shelter to support young stock development.
- **Hospital Pens:** Designated pens for sick or injured cattle to allow isolation, treatment, and recovery.

Waste Management Systems

- **Wastewater Systems:** The dairy will implement a wastewater management system, including sediment ponds, holding ponds, and tailwater return systems, to minimise environmental impacts.
- **Manure Storage Area:** A dedicated area for manure storage and composting will be established. Dead animals will be managed through composting or removal by accredited facility, with burial pits excluded due to shallow groundwater concerns.
- **Waste Utilisation and Disposal:** Wastewater (effluent) and manure (raw and/or composted) will be strategically applied to designated waste utilisation-disposal areas (WUDA) to enhance soil fertility and minimise waste accumulation. Tailwater in these areas are to be managed through reuse by irrigation.

Water Supply and Management

- **Groundwater Supply:** A groundwater bore with appropriate licence from WaterNSW will be utilised for operational and emergency use.
- **Surface Water Supply:** The property has access to irrigation channels managed by Murray Irrigation Limited (MIL).
- **Fresh Water Storage:** Dedicated fresh water storage facilities will ensure an adequate water supply for livestock, irrigation, and operational needs.
- **Wastewater Ponds:** The site will have wastewater ponds that will contain wastewater from the milking operations and capture stormwater runoff from the silage, manure storage, and dry lot areas.
- **Tailwater Drains:** Tailwater drains capture excessive water from irrigation and holds this water for reuse (recycling system).
- **WUDA Terminal Ponds:** Terminal ponds are recommended for the WUDA areas to store the excess water captured by the tailwater drains.
- **Head Ditches:** Head ditches supply water to cropping areas for flood irrigation.
- **Sump:** Dedicated as water storage for centre pivot irrigation.

Cropping/Waste Utilisation-Disposal Areas

- **Flood Irrigation Area:** All flood irrigation areas are to be applied with manure and effluent (flood irrigation).
- **Centre Pivot Irrigation Area:** Two centre pivots will be installed to improve water use efficiency. All centre pivot areas are to be applied with manure and effluent (centre pivot irrigation).
- **Rain-fed Area:** All rain-fed areas are to be applied with manure.

Feed Management Facilities

- **Feedmill Area:** The feedmill area/feed centre consists of: a small mill equipment, silos (for grain storage) and dry fodder storage shed.

- **Silage Pits:** Onsite silage pits will be developed to store and manage silage for year-round feeding.
- **Hardstand Areas:** Hardstand areas will be dedicated for any farm operations that are necessarily being conducted in such areas.

Supporting Infrastructure

- **Accommodation Facilities:** Onsite accommodation will include multiple rooms, along with kitchen and laundry facilities for farm staff.
- **Office and Amenities:** A new office space will be established to manage farm operations, alongside designated parking areas for staff and visitors.
- **Site Access and Car Parking:** The development will ensure access for light and heavy vehicles to facilitate efficient dairy farm operations (e.g., transport of livestock, feed, and other materials).
- **Washdown Facility:** Dedicated wash down areas will be constructed for vehicles, machinery, and equipment to maintain biosecurity standards.
- **Farm and Machinery Sheds:** Additional sheds will be developed to house farm machinery, tools, and maintenance equipment.
- **Tree Screens:** Tree screens will be established to improve visual aesthetics, reduce dust and noise, and provide shelter for livestock.

5.3 Design Considerations

5.3.1 Rotary Milking System

The proposed robotic dairy must be developed in accordance with relevant dairy design standards and animal welfare requirements. The design drawing for the milking centre is in Appendix F.

The following guidelines were considered for the design of the milking centre;

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024b); and,
- *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016a).

The milking centre floor plan has L shaped layout with the robotic milking parlour at the junction point. Holding pens are extending to the north, and the work area consisting of equipment and employee areas extends to the east of the rotary milking parlour. The milking parlour has a total height of 9 m while the equipment and employee area has a total height of 5.5 m.

The proposed robotic dairy is at the forefront of automated milking technology. The rotary milking system includes;

- | | |
|---|---------------------------------|
| • modern rotary dairy | • toilets |
| • holding pen and expansion holding pen with rubber covered floor | • herdsmen's office |
| • milk room | • elevated observation room |
| • equipment room | • sand-bedded down-cow pen |
| • workshop | • transition area |
| • employee breakout room | • travel lanes and return lanes |
| • work room/laboratory | • veterinary room |
| • parts storage | |

5.3.2 Dry Lot Systems

Dry lot areas specific to the herd types must be developed in accordance with relevant dairy design standards and animal welfare requirements.

The design drawing for the lactating cow dry lot is in Appendix F.

The following guidelines were considered for the design of the earthen lots, shade structures, feedpad, water troughs, feed lanes and travel lanes:

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024b); and,
- *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016a).

The corresponding stocking density for each dry lot pen is specified in Table 11.

Table 11 Feedlot Stocking Density

Dry Lot	Stocking density*	
	(m ² per stock)	(m ² per SCU)
Lactating Cow	48.5	48.5
Dry Cow	30.3	43.3
Heifer	50.3	83.9
Calf	54.5**	181.6

*Calculated based on whole pen management area

**Calf pen area is 15 m²/calf

5.3.3 Animal Welfare and Handling Facilities

Animal welfare and handling facilities must be developed in accordance with relevant dairy design standards and animal welfare requirements.

The following guidelines were considered for the handling and veterinary facilities, calf-rearing facilities, and hospital pens:

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024b); and,
- *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016a).

5.3.4 Waste Management Systems

The proposed development is anticipated to generate various types of wastes. The proposed management method for each waste type is summarised in Table 12.

Table 12 Waste Management Summary

Waste Type	Management Method
Site Construction	
General waste including putrescibles & organic (food waste), some plastics, cardboard and paper	Where possible recyclables separated. All wastes stored in suitable skip bins on site for their individual use. Disposal via a suitably licensed waste contractor.
Excavated waste (soil)	Top soil reused where possible, unsuitable soils stockpiled for use in earthen bunds.
Timber and steel	Stockpiled on site in a designated location and taken to a licenced local waste management facility for recycle or disposal.
Plastics and poly pipe	Stored on site in a designated construction skip bin and disposed of by licensed contractor.
Concrete	Taken to a licenced landfill for disposal or recycling.
Sewage effluent	Construction phase will utilise existing facilities which are connected to onsite septic system.
Site Operations	

Waste Type	Management Method
Regulated waste (oil, fuels, batteries and tyres)	Stockpiled on site in a designated area. All hazardous substances and dangerous goods to be stored in accordance with Australian Standards. Waste will be taken to licenced local waste management facility for recycle or disposal.
Paints and resins	Stockpiled on site in a designated area. All hazardous substances and dangerous goods to be stored in accordance with Australian Standards. Waste will be taken to licenced local waste management facility for recycling or disposal.
General wastes including putrescibles & organic (food waste), some plastics, metals, cardboard and paper	Where possible recyclables separated. All wastes stored in suitable skip bins on site for their individual use. Disposal via a suitably licensed waste contractor. Metals are separated and collected by scrap metal service.
Sewage effluent	Operational phase will utilise existing facilities which are connected to onsite septic system. The proposed milking centre will also require a new septic system. Refer to Section 5.3.4.3 <i>Onsite Wastewater Storage System</i> .
Feed spoilage	Placed into the manure storage area for composting.
Liquid effluent from pens	Drainage will be constructed on site to direct liquid effluent from pens (run-off in rain events) towards the sediment and holding ponds. This waste product will be utilised on site through irrigation. Refer to Section 5.3.4.2 <i>Effluent Management</i> .
Liquid effluent from milking parlour	Drainage will be constructed to: <ul style="list-style-type: none"> direct a percentage of liquid effluent to be recycled for yard washing in the milking centre; and, direct excess liquid effluent towards the sediment and holding ponds to be recycled through irrigation. Refer to Section 5.3.4.2 <i>Effluent Management</i> .
Manure	Bedding material, land application on site cropping areas or other YFP sites, or selling to neighbouring land holders (where permissible). Refer to Section 5.3.4.1 <i>Manure Management</i> .
Separated solids, sediments, sludge	Land application on site cropping areas for sludge; Other sediments/solids to be stockpiled or disposed to a licensed facility. Refer to Section 5.3.4.2 <i>Effluent Management</i> .
Biohazard waste	Disposed of by best practice disposal per HACCP accreditation.
Dead carcasses disposal (including mass death occurrences)	Sent to localised pet food processing facility, composting on site (manure storage area) or fire pyre.

5.3.4.1. Manure Management

This section pertains to the management of manure that are not flushed as part of liquid effluent. These manure are proposed to be collected from dairy sheds and feedpad areas using vacuum tanker.

The following guidelines were considered for the proposed manure management systems;

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024b);
- *National Guidelines for Beef Cattle Feedlots in Australia* (MLA, 2012); and,
- *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016a).

The anticipated manure production was calculated based on the herd size equivalent in SCU (refer to Section 5.1). On average, raw manure production is 24 kg/SCU/day. For 2,952 SCU herd size, the anticipated annual raw manure production is 24,797 tonnes.

Raw manure will have a reduction in quantity through decomposition over time. Composted manure is being used in the dairy as bedding material for the dry lots.

Due to animal welfare, YFP attends daily to the dry lot pens. Most of the raw manures collected from these areas are being applied to the waste utilisation disposal areas (WUDA) immediately after collection.

A manure storage area is proposed primarily for temporary stockpiling and/or composting of manure. Stockpiled manure is to be applied to cropping areas, while composted manure is to be used as bedding material. Other uses of manure storage area include composting of feed spoilage and dead carcasses.

The manure storage area must be greater than 100 m x 100 m, according to Section 2 *Solid Waste Storage and Processing of National Guidelines for Beef Cattle Feedlots in Australia* (MLA, 2012).

5.3.4.2. Effluent Management

The following guidelines were considered for the effluent system design;

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024b); and,
- *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016a).

The estimated wastewater from the dry lot controlled drainage catchment is 156 ML/year. All rainfall-runoff waters from the dry lot areas must be captured and must be drained into the dedicated sediment and holding ponds.

The estimated wastewater from the milking operations is 30 ML/year. Liquid effluent from the milking operations must pass through an appropriate solids separation system. Separated solids (sediments etc.) are to be stockpiled on site for land application or removal by a licensed facility.

Separated liquid will be directed to a concrete sump (for temporary storage) to be recycled in the milking centre through yard washing. Excess recycled effluent is directed to the ponding system for other uses (washdown cleaning and irrigation).

The design considerations for wastewater storages are described further in Section 5.3.5 *Water Storage, Supply and Drainage Systems*.

5.3.4.3. Onsite Wastewater Storage System

An onsite wastewater management system (OSWMS) for the proposed milking centre will be installed for sewage treatment and disposal of treated wastewater to land.

The OSWMS design will follow the requirements set out in the *Environment & Health Protection Guidelines: Onsite Wastewater Management* (NSW Office of Local Government, 2023).

5.3.5 Water Storage, Supply and Drainage Systems

The following guidelines were considered for designing proposed water storage, supply and drainage systems required for the site operations:

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024b);
- *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016a);
- *Effluent System Design* (Dairy Australia, 2024a); and,
- *Effluent and Manure Management Database for the Australian Dairy Industry* (Dairy Australia, 2008).

5.3.5.1. Water Requirements

YFP has existing annual water access licences (WAL) for groundwater and surface water taking being 1,150 ML and 1,396 ML, respectively (refer to Section 6.3). The estimated recycled water (effluent) generation from the proposed operations is 187 ML/year (refer to Section 5.3.4.2). The water opportunity for the site is a total of 2,733 ML/year.

The estimated water requirements for the proposed dairy expansion are detailed in Table 13. The estimated water requirement for the site operations is 2,558 ML/year.

With an estimated water usage of 2,558 ML/year and a water access of 2,733 ML/year, YFP has more than sufficient water resources to sustain core operations for its proposed development.

Table 13 Estimated Water Requirements

Water Usage	Type	Water Requirements (ML/year)
Stock Consumption	Clean	130
Irrigation	Clean and/or Effluent	2,270
Milking Parlour	Clean	12
Milking Yard Washing	Clean and/or Effluent	10
Feedpad and General Washdown Cleaning	Clean and/or Effluent	146
Feed Centre Operations	Clean	0.5
Total		2,558

5.3.5.2. Water Supply

The ‘Gunyah Park’ dairy complex has existing water infrastructure. For the proposed expansion, the aim is to utilise all existing infrastructure and develop additional infrastructure as required.

For existing infrastructure, to meet the requirements of the proposed expansion, adjustments can be applied in the management and maintenance measures.

The design and sizing of proposed water infrastructure have considered being able to support the management requirements of the existing infrastructure.

A summary of existing and proposed water supply infrastructure is provided in Table 14.

Table 14 Water Supply Infrastructure

Water Supply Infrastructure	Size (ML)	Considerations
Existing		
Sediment Pond A	~2 ¹	The minimum volume required for the dairy expansion is 1.70 ML. ² Desludging is to be done every 2 to 3 months using vacuum tanker
Holding Pond A	~5 ¹	The minimum volume required for the dairy expansion is 8.56 ML. ¹ Excess wastewater is transferred to tailwater drain (recycling system)
Holding Pond B	~18 ¹	Excess goes to holding pond C
Tailwater Drain	42 ³	Recycling system; connected to irrigation head ditches; connected to MIL lawful drainage point.
Fresh Water Storage	~28 ¹	For clean water storage and emergency use.
Groundwater Bore		Clean water supply; licenced take of 1,100 ML/year via temporary transfer (see Section 6.3, "Groundwater").
Head Ditch		For licenced water take of 1,396ML/year from MIL irrigation channel (see Section 6.3, "Surface Water"); For flood irrigation supply at 'Gunyah Park'; Adequately sized for respective cropping area irrigation bays.
Sump	15	For licenced water take of 1,396ML/year from MIL irrigation channel (see Section 6.3, "Surface Water"); For running centre pivot irrigator.
Centre Pivot Irrigator 1		For centre pivot irrigation at 'New Grove.'
Proposed		
Sediment Pond B	7.5	Desludging is to be done every 2 to 3 months using vacuum tanker
Holding Pond C	63	Designed based on FSIM modelling; Excess goes to tailwater drain.
Centre Pivot Irrigator 2		For additional centre pivot irrigation at 'New Grove.'
Milking Parlour Effluent System (Solids Trap and Sump)	0.3	For recycled effluent required in daily yard washing during milking operations. Design will be based on Effluent System Design by Dairy Australia.
Tailwater drain		Additional or modifications to tailwater drains are recommended for the WUDA areas to include recommended terminal ponds.
Terminal Pond ('Gunyah Park')	33	Recommended per NSW EPA Environmental Guidelines (Department of Environment and Conservation (NSW), 2004). Volume based on capture of first 25 mm (first flush) of rainfall runoff event.
Terminal Pond ('New Grove')	53	Recommended per NSW EPA Environmental Guidelines (Department of Environment and Conservation (NSW), 2004). Volume based on capture of first 25 mm (first flush) of rainfall runoff event.

Notes:

1. Approximation based on Surface Area vs Depth calculations
2. *Effluent Toolkit* v11.6 (McDowell & Birchall, 2016)
3. Based on volume calculation in *Effluent Toolkit* v11.6 (McDowell & Birchall, 2016)

5.3.5.3. Drainage

The proposed development will utilise the existing drainage system on site. However, modification of the tailwater drains to accommodate the inclusion of two terminal ponds ('Gunyah Park' and 'New Grove') is recommended to comply with NSW EPA environmental guidelines Recommended per NSW EPA Environmental Guidelines (Department of Environment and Conservation (NSW), 2004). The tailwater drainage network is connected to the MIL lawful discharge point to allow release of excessive stormwater runoff from the site.

5.4 Operational Hours and Workforce

The dairy farm will continue to operate 24 hours daily, 7 days a week.

The proposed site operations and required staffing are outlined in Table 15.

The proposed dairy operations would require twenty-one (21) staff. There will be a managing director who oversees all dairy operations 7 days a week. All other employees work full-time, with rosters being managed to ensure daily operations are sustainable.

For the cropping activities, casual farm hands are to be employed as required and all are proposed to be accommodated temporarily on-site for the whole duration of employment period.

There are existing site accommodation and the details are outlined Table 16.

Table 15 Site Operations

Period	Operations/Activities	Required Staffing
1 am to 2 am	Milk Collection	1 managing director or delegate
4 am to 10 am	Milking/Herd Management	1 herd manager 1 shift supervisor 4 milk harvesting operators
12 pm to 6 pm	Milking/Herd Management Stock Feed Delivery	1 herd manager 1 shift supervisor 4 milk harvesting operators
8 pm to 12 am	Milking/Herd Management	1 herd manager 1 shift supervisor 4 milk harvesting operators
5:30 am to 1:30 pm	Feed Mixing	1 feed mixer
7:30 am to 3:30 pm	General Farm Operations	1 farm operator

Table 16 Site accommodation

Type	No. of Bedrooms	Estimated Capacity (person)
Manager's House	3	3-6
Brick House	3	3-6
Demountable Accommodation	12	12-24
Demountable Cabin	1	1-2
Total		19-38

6. Existing Environment

6.1 Climate

The climate at the site is classified as Bsk (cold semi-arid), according to the Köppen-Geiger climate classification (Kottek et al., 2006). Cold semi-arid climates at higher latitudes tend to have dry winters and wetter summers, while cold semi-arid climates at lower latitudes tend to have dry summers and wet winters.

The nearest weather station to the site is Tuppal (74208), approximately 13.7 km west of the 'Gunyah Park' dairy.

Climate data is obtained as Patched Point Data from the Queensland Government SILO database. SILO (Scientific Information for Land Owners) is a database of historical climate records for Australia. Patched Point Data is a daily time series of data at a point location consisting of station records which have been supplemented by interpolated estimates, including Computerising the Australian Climate Archives (CLIMARC) data, when observed data are missing. This allows for a full data set from the 1st January 1889 through to the current date.

Mean long-term rainfall is highest in this area over the winter periods, generally around June (41.0 mm), and lowest in summer periods around February (26.5 mm) (refer to Table 17 and Figure 2). Mean long-term temperature varies with diurnal averages between 14.1 °C and 31.9 °C in summer, and between 3.2 °C and 15.7 °C in winter (refer to Table 17 and Figure 2).

Based on a long-term annual average evaporation of 1681.0 mm and a long-term annual average rainfall of 408.6 mm, the site has a moisture deficit. This deficit occurs in every month (refer to Figure 3) and on an annualised basis results in a total deficit of approximately 1272.4 mm.

Table 17 Climate statistics for Tuppal (74208) from 1889 to 2024

Month	Ave. Max Temp (°C)	Ave. Min Temp (°C)	Ave. Rainfall (mm)	Ave. Evaporation (mm)
Jan	31.88	15.88	29.90	276.69
Feb	31.47	15.82	26.43	222.57
Mar	28.03	13.28	31.56	179.31
Apr	22.81	9.32	29.33	101.27
May	18.06	6.37	36.80	55.43
June	14.56	4.20	40.92	36.28
July	13.77	3.25	37.66	39.04
Aug	15.72	4.27	38.24	60.20
Sep	18.98	5.99	35.15	95.09
Oct	22.97	8.73	39.36	150.74
Nov	26.94	11.53	31.54	206.80
Dec	29.96	14.08	31.90	258.63
Ave	22.93	9.39	34.06	140.17
Total			408.78	1682.04

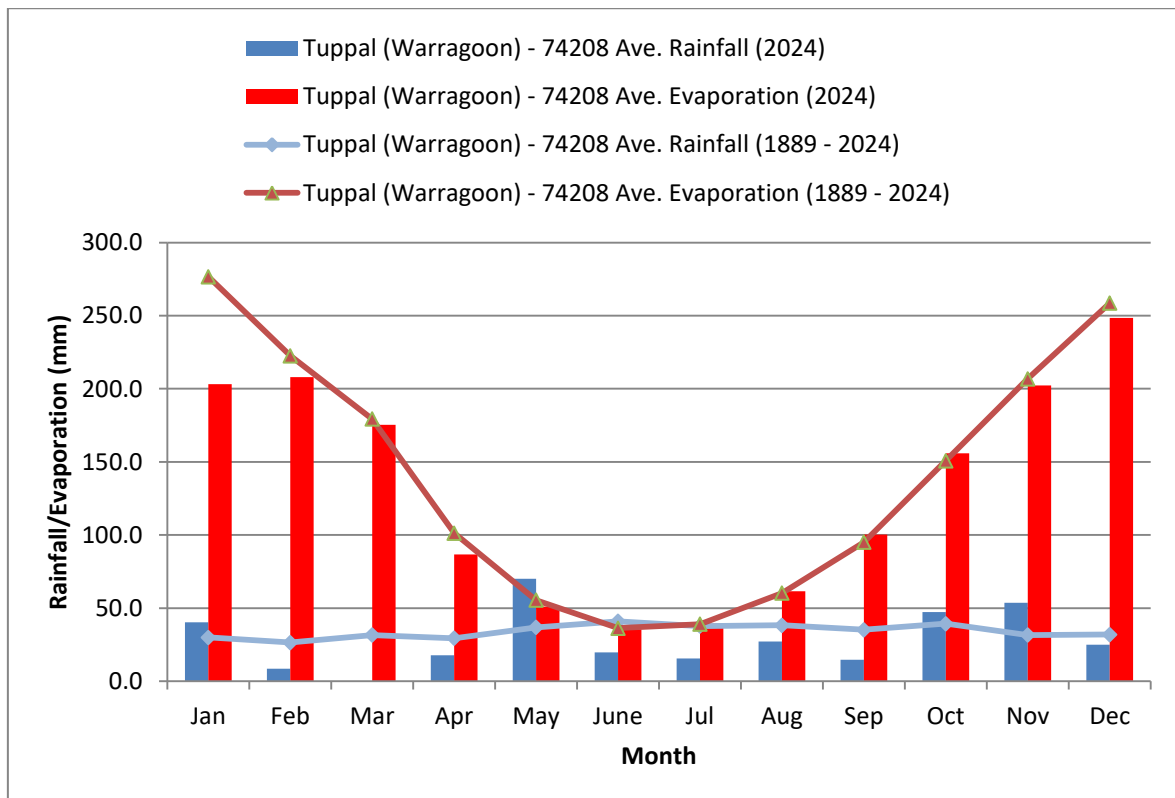


Figure 2 Average rainfall and evaporation

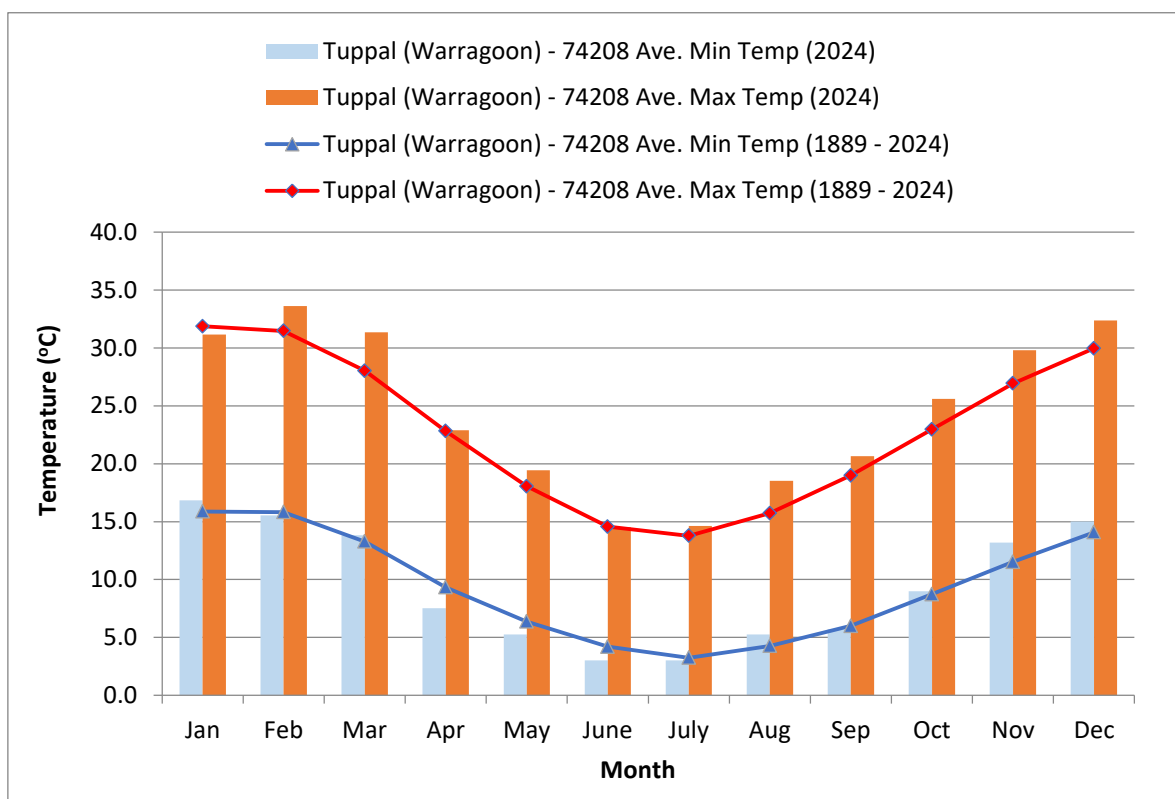


Figure 3 Average temperatures

Wind direction data for the proposed site has been obtained from the BOM Deniliquin Airport (Site No. 074258). This site is considered as the closest available location that contained this data. Being approximately 30.2 km away from the proposed 'Gunyah Park' dairy, it is considered representative of the area for general wind conditions experienced on site.

General wind direction for the site has been recorded as follows:

- Morning (9 am) – predominantly from the northeast between 10 and 20 km/h for the majority of the annual recording periods (refer to Figure 4).
- Afternoon (3 pm) – winds predominantly blowing from the southwest between 20 and 30 km/h for the majority of the annual recording periods (refer to Figure 5).

Rose of Wind direction versus Wind speed in km/h (03 Jun 1997 to 10 Aug 2024)

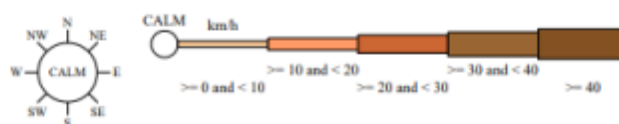
Custom times selected, refer to attached note for details

DENILIKUIN AIRPORT AWS

Site No: 074258 • Opened May 1997 • Still Open • Latitude: -35.5575° • Longitude: 144.9458° • Elevation 94m

An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



9 am
9899 Total Observations

Calm 2%

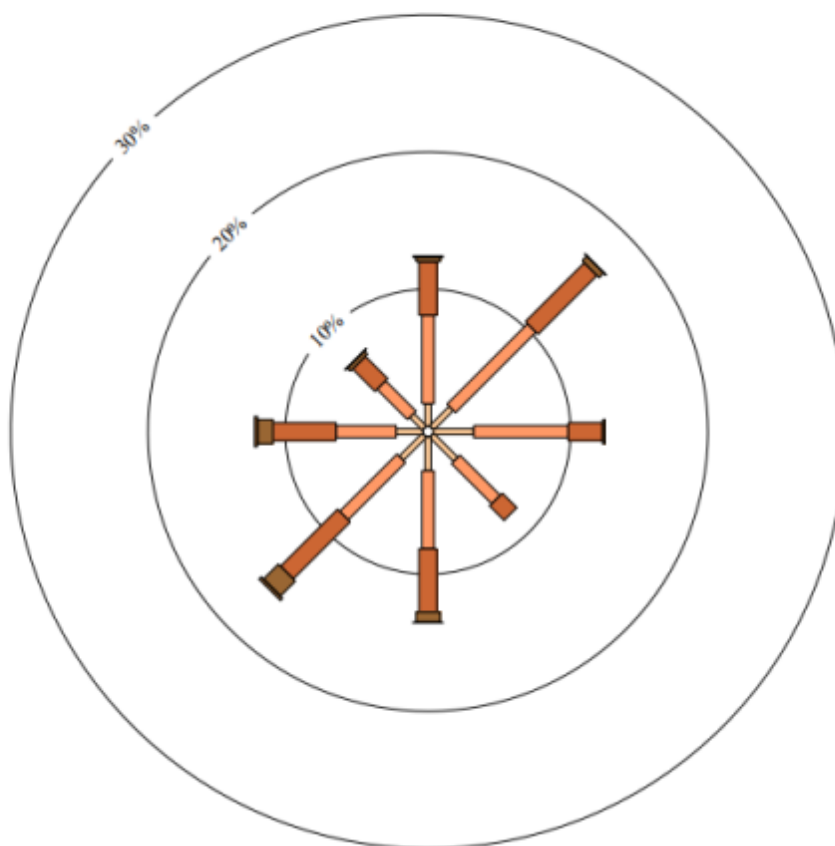


Figure 4 Windrose 9 am

Rose of Wind direction versus Wind speed in km/h (03 Jun 1997 to 10 Aug 2024)

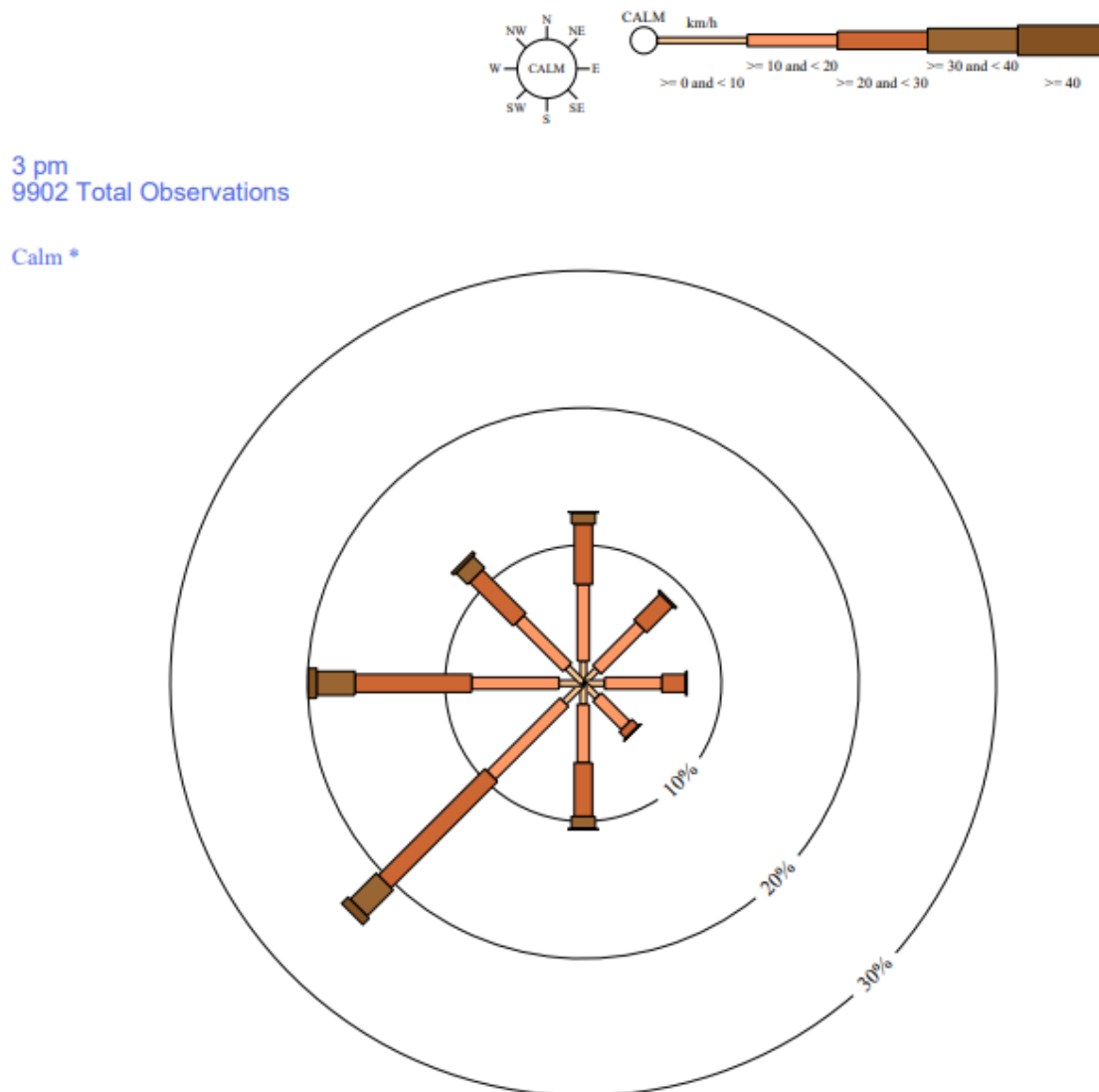
Custom times selected, refer to attached note for details

DENILQUIN AIRPORT AWS

Site No: 074258 • Opened May 1997 • Still Open • Latitude: -35.5575° • Longitude: 144.9458° • Elevation 94m

An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.

**Figure 5 Windrose 3pm****6.2 Receptors**

Nearby receptors from the property were identified within 2 km buffer from the dairy site property boundaries, and are shown in Figure 6.

The on-site dwelling was identified as Receptor 1 and 2. The nearest receptor is the property building located 250 m south of the property. This is identified as a residential building. The commercial receptor is located to the east of the property, approximately 1.3 km.

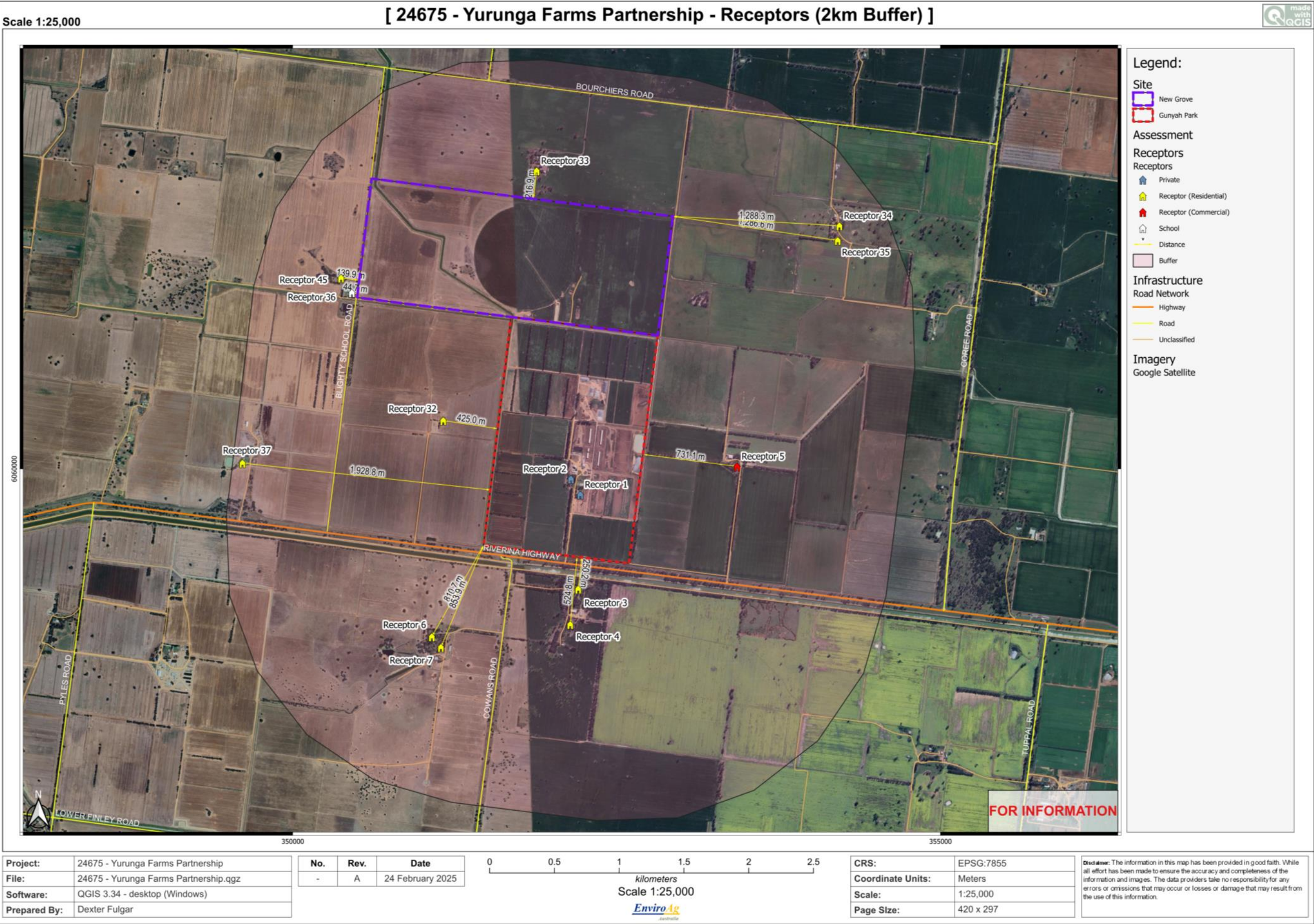


Figure 6 Receptors

6.3 Spatial Information: Review of Environmental Factors

Spatial information on various environmental parameters being considered by NSW Government are accessible through the *ePlanning Spatial Viewer* (NSW Government, 2020).

Additional site information can be obtained through site visits, desktop assessment, stakeholder consultation and field investigation.

A summary of existing information relevant to key issues in planning and environmental assessment are provided in Table 18.

Table 18 Summary of existing environment

Environmental Factor	NSW Planning Portal	Additional Information
State vegetation mapping	<p>Gunyah Park: Grasslands and grassy woodlands located south of the lot boundary.</p> <p>New Grove: Few grassy woodlands are present in the middle and upper left corners of the lot boundaries.</p>	<p>Historically, site has been highly disturbed by past agricultural practices.</p> <p>Site visit confirmed that proposed development site is clear of any native vegetation.</p>
Flooding	No significant observations	Driveway flood routing conflict
Heritage	No significant observations	Aboriginal Heritage Information System (AHIMS) search within 50 km buffer did not identify any Aboriginal places or sites in or near the property.
Soil	<p>Oc3 Sodosol Dr2.33</p> <p>Plains with domes, lunettes, and swampy depressions, and divided by continuous or discontinuous low river ridges associated with prior stream systems--the whole traversed by present stream valleys; layered soil or sedimentary materials common at fairly shallow depths: chief soils are hard alkaline red soils</p>	<p>A soil survey was conducted on site to determine actual soil information on the development site.</p> <p>194 ha of land are currently used for intensive cropping. The sodosol soils are reasonably structured and maintained in productive form by minimisation of tillage and regular application of organic wastes. Baseline measurements show that;</p> <ul style="list-style-type: none"> (a) The soils are reasonably structured; (b) The soils have adequate to good nutrient levels; (c) No shallow groundwaters are present; and, (d) The root zone is about 0.7-1.0m deep. <p>Refer to <i>Soils Assessment</i> in Appendix L for the agronomic assessment details.</p>
Surface Geology	<p>Czsws1</p> <p>Unconsolidated to poorly consolidated mottled variegated clay, silty clay with lenses of polymictic, coarse to fine sand and gravel; partly modified by pedogenesis, includes intercalated red-brown paleosols. Form extensive flat alluvial floodplains.</p>	
Biodiversity Values	No significant observations	
Bushfire Prone Land	Vegetation Category 3 is considered to be medium bush fire risk vegetation.	The proposed development site is already a cleared area, and no presence of any native vegetation was observed during site visit.

Ground water Dependent Ecosystems (GDE)	Gunyah Park: No significant observations New Grove: Has low potential for terrestrial GDE				
Groundwater	Gunyah Park:			Gunyah Park: Water Access Licence (WAL)	
	Bore ID	Usage	Depth	Licence No.	Details
	GW053606	Irrigation	6	30478	Lower Murray Shallow Groundwater
	GW501828	Irrigation	6		Shares: 50.00 Units
	GW503493	Irrigation	193		Lots: 194DP756305
	GW073017	Water supply	5		Water supply works and water use
	New Grove: No NSW Bores inside the lot boundary			13795	Lower Murray Shallow Groundwater Shares: 1,100.00 Units Lots: 87DP756251 Water supply works
Aquifers	Shepparton Formation				
Land and Soil Capability	Class 3 – High Capability Land: Moderate limitations. Land capable of sustaining high impact land uses using more intensive, readily available and accepted management practices. (NSW Office of Environment and Heritage, 2012)			The site is generally flat, with less than 2% slope. Part of the land are being utilised for intensive cropping, while some remain as dryland cropping. Gunyah Park: 116.63 ha is used for flood irrigation New Grove: 77.39 ha is used for low pressure centre pivot irrigation 128.36 ha is used for dryland cropping	
Surface Water	The site is within the Murray catchment. The catchment supports extensive floodplains and wetlands. The catchment is regulated by weirs and dams along the Murray River to regulate flow and service irrigation areas.			Murray Irrigation Limited (MIL) channels run across both properties. Gunyah Park: Blight No 1 Channel New Grove: Mayrung Channel Lawful Point of Discharge: Blighty Retreat Channel MIL Water Entitlement:	
				Licence No.	Details
				1009768	Class: Class C Water Supply Landholding No: E541 Lots: 82 and 87/DP756251 Entitlements: 1396 ML of WAL 9426
Recycled Wastewaters	The site has tailwater recycling system with an estimated storage capacity 42 ML for wastewater reuse via irrigation.				

Visual Amenity

There is existing sparse vegetation between the highway and property, with approximately fifty (50) trees. The existing dairy area has a setback distance of 750 m from the highway. Existing buildings on site are less than 15 m.

Traffic and Access

At 1,000 head milking operations, traffic generation is:

1 milk truck daily

3 feed trucks weekly

4 employee cars daily

Site access requires upgrade.

7. Environmental Assessment

An environmental assessment must be conducted based on the following:

- (i) Alignment with statutory requirements; and,
- (ii) Site-based risk assessment.

The environmental assessment must consider compliance with statutory requirements that are relevant to the development. The relevant statutory requirements for the proposed development are detailed in Section 3 *Statutory Requirements*.

The primary goals for the proposed development are minimising land use conflicts, and environmental protection.

The following potential environmental impacts specific to the site need to be assessed as required by EPA NSW and the SEARs;

- Air;
- Noise;
- Water;
- Land;
- Waste and chemicals;
- Animal welfare, bio-security and disease;
- Traffic and transport;
- Biodiversity;
- Bushfire;
- Visual; and,
- Heritage.

7.1 Land Use Conflict Risk Assessment

The land use conflict risk assessment is a system to identify and assess the potential for land use conflict to occur between neighbouring land uses.

Land use conflicts occur when one land user is perceived to infringe upon the rights, values or amenity of another. In rural areas land use conflicts commonly occur between agricultural and residential uses (Department of Primary Industries, 2011).

The DPI Land Use Conflict Risk Assessment Guide (2011) outlines that there is 3 types of issues associated with conflicting land uses, these are:

- **Rural amenity** issues include impacts to:
 - Air quality due to agricultural and rural industry (odour, pesticides, dust, smoke and particulates);
 - Use and enjoyment of neighbouring land e.g. noise from machinery; and,
 - Visual amenity associated with rural industry e.g. the use of netting, planting of monocultures and impacts on views.
- **Environmental protection** issues include:
 - Soil erosion leading to land and water pollution;
 - Clearing of native vegetation; and,
 - Stock access to waterways.
- **Direct impacts from neighbouring land uses** on farming operations can also cause conflict, such as:
 - Harassment of livestock from straying domestic animals;
 - Trespass;
 - Changes to storm water flows or water availability; and,
 - Poor management of pest animals and weeds.

The land use conflict risk assessment aims to:

- **Accurately identify** and address potential land use conflict issues and risk of occurrence before a new land use proceeds or a dispute arises;
- **Objectively assess** the effect of a proposed land use on neighbouring land uses;
- **Increase the understanding** of potential land use conflict to inform and complement development control and buffer requirements; and,
- **Highlight or recommend strategies** to help minimise the potential for land use conflicts to occur and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.

A summary of the land use conflict risk assessment is outlined in Table 19. Assessment of land use conflict has been conducted in accordance with the DPI *Land Use Conflict Risk Assessment Guide* (2011). It is not anticipated that the proposed dairy will result in any substantial land use conflicts with neighbouring properties or uses.

The Land Use Conflict Risk Assessment Matrices are shown in Figure 7, Figure 8 and Figure 9.

Level	Descriptor	Description
A	Almost certain	Common or repeating occurrence
B	Likely	Known to occur, or 'it has happened'
C	Possible	Could occur, or 'I've heard of it happening'
D	Unlikely	Could occur in some circumstances, but not likely to occur
E	Rare	Practically impossible

Figure 7 LUCRA Probability Table

Level: 1	Descriptor: Severe
Description	<ul style="list-style-type: none"> Severe and/or permanent damage to the environment Irreversible Severe impact on the community Neighbours are in prolonged dispute and legal action involved
Example/ Implication	<ul style="list-style-type: none"> Harm or death to animals, fish, birds or plants Long term damage to soil or water Odours so offensive some people are evacuated or leave voluntarily Many public complaints and serious damage to Council's reputation Contravenes Protection of the Environment & Operations Act and the conditions of Council's licences and permits. Almost certain prosecution under the POEO Act
Level: 2	Descriptor: Major
Description	<ul style="list-style-type: none"> Serious and/or long-term impact to the environment Long-term management implications Serious impact on the community Neighbours are in serious dispute
Example/ Implication	<ul style="list-style-type: none"> Water, soil or air impacted, possibly in the long term Harm to animals, fish or birds or plants Public complaints. Neighbour disputes occur. Impacts pass quickly Contravenes the conditions of Council's licences, permits and the POEO Act Likely prosecution
Level:3	Descriptor: Moderate
Description	<ul style="list-style-type: none"> Moderate and/or medium-term impact to the environment and community Some ongoing management implications Neighbour disputes occur
Example/ Implication	<ul style="list-style-type: none"> Water, soil or air known to be affected, probably in the short term No serious harm to animals, fish, birds or plants Public largely unaware and few complaints to Council May contravene the conditions of Council's Licences and the POEO Act Unlikely to result in prosecution
Level: 4	Descriptor: Minor
Description	<ul style="list-style-type: none"> Minor and/or short-term impact to the environment and community Can be effectively managed as part of normal operations Infrequent disputes between neighbours
Example/ Implication	<ul style="list-style-type: none"> Theoretically could affect the environment or people but no impacts noticed No complaints to Council Does not affect the legal compliance status of Council
Level: 5	Descriptor: Negligible
Description	<ul style="list-style-type: none"> Very minor impact to the environment and community Can be effectively managed as part of normal operations Neighbour disputes unlikely
Example/ Implication	<ul style="list-style-type: none"> No measurable or identifiable impact on the environment No measurable impact on the community or impact is generally acceptable

Figure 8 LUCRA Measure of Consequence

PROBABILITY	A	B	C	D	E
Consequence					
1	25	24	22	19	15
2	23	21	18	14	10
3	20	17	13	9	6
4	16	12	8	5	3
5	11	7	4	2	1

Figure 9 LUCRA Risk Ranking Matrix

Table 19 Land Use Conflict Risk Assessment

Activity	Identified Potential Conflict	Risk Rating			Management Strategy	Revised Risk Rating		
		P	C	L		P	C	L
Milk collection and stock feed delivery trucks entering and leaving site	<ul style="list-style-type: none"> Heavy vehicle noise nuisance; Increased heavy vehicle movements on the road; Dust generation from heavy vehicle movements on unsealed roads; 	C	3	13	<ul style="list-style-type: none"> Truck movements restricted to specific operational hours. Community consultation to occur for any anticipated out of hours works. Unsealed roads to be sealed where practical. Complaints register to be maintained and all complaints addressed. 	D	3	9
Livestock feeding	<ul style="list-style-type: none"> Dust from vehicle movements across the site; Dust from livestock movements; Noise generation from livestock; Vermin from feed storage; Odour from (Livestock) waste generation. 	C	3	13	<ul style="list-style-type: none"> Livestock feeding to occur at nominated times during authorised operational hours. Site to be designed, operated and maintained in accordance with the <i>National Guidelines for Dairy Feedpads and Contained Housing</i> (Dairy Australia, 2024b). Dust suppression of unsealed surfaces to occur when necessary. 	D	3	9
Pen cleaning	<ul style="list-style-type: none"> Dust generated if conducted during poor weather conditions; Vermin from improper management; Odour from improper management; Contamination of groundwater and surface waters from improper management. 	C	4	8	<ul style="list-style-type: none"> Pen cleaning to be carried out in accordance with the <i>Environmental Management Plan (EMP - Appendix N)</i> which was prepared in accordance with the <i>National Guidelines for Dairy Feedpads and Contained Housing</i> (Dairy Australia, 2024b). Appropriate waste management systems to be implemented on site. 	E	4	3
Waste management from livestock on site	<ul style="list-style-type: none"> Vermin from improper management; Odour from improper management; Contamination of groundwater and surface waters from improper management. 	C	2	18	<ul style="list-style-type: none"> Manure and effluent are to be managed appropriately with consultation from a suitably qualified professional. Dairy waste management to be in accordance with the <i>EMP</i>. 	E	2	10
Wastewater storage and management	<ul style="list-style-type: none"> Odour from holding ponds; Insect (vermin) breeding; Potential groundwater contamination from inappropriate pond design and construction. 	C	2	18	<ul style="list-style-type: none"> Wastewater ponds are to be designed by an experienced effluent system designer, with reference to relevant industry guidelines. Wastewater pond management to be in accordance with the <i>EMP</i>. Management of pests to be in accordance with the <i>EMP</i>. 	E	2	10

Activity	Identified Potential Conflict	Risk Rating			Management Strategy	Revised Risk Rating		
		P	C	L		P	C	L
Wastewater application to WUDA	<ul style="list-style-type: none"> Odour from application of wastewater to wastewater utilisation areas; Contamination of groundwater and surface waters from improper application of wastewaters. 	C	2	18	<ul style="list-style-type: none"> Wastewaters to be applied in accordance with the approved <i>EMP</i>. Wastewater utilisation areas are to be monitored for potential contamination issues. Monitoring bores established on site are to be monitored in accordance with EPL requirements to determine any potential groundwater contamination issues. 	E	2	10
Manure application to WUDA	<ul style="list-style-type: none"> Odour from manure application; Contamination of groundwater and surface waters from improper application to designated areas. 	C	2	18	<ul style="list-style-type: none"> Manure application on site is to be in accordance with the <i>EMP</i>. 	E	2	10
Mass livestock death	<ul style="list-style-type: none"> Odour from improper management; Vermin from improper management; Contamination of groundwater and surface waters from improper management. 	C	2	18	<ul style="list-style-type: none"> Mass livestock deaths are to be managed in accordance with the <i>EMP</i>. 	E	2	10
Harvesting of crops from wastewater utilisation areas.	<ul style="list-style-type: none"> Dust from crop harvesting operations causing receptor nuisance; Noise from crop harvesting operations causing receptor nuisance; Potential fire risk during dry conditions. 	C	4	8	<ul style="list-style-type: none"> Dedicated WUDA are to be located considering appropriate setback distances from receptors. Harvesting to be conducted during day time to avoid nuisance. Harvesting to be conducted in a timely manner, avoiding strong wind conditions. 	E	4	3

Note:

P – Probability

C – Consequence

L – Risk Ranking Level

7.2 Environmental Risk Assessment

An environmental risk assessment was conducted for the proposed development. Desktop information based on satellite imagery and government database searches was used for the assessment.

The findings of the assessment are detailed in Section 5 *Environmental Impacts and Risks* of the *Environmental Management Plan* (refer to Appendix N).

A summary of the environmental risks that are anticipated to result from the proposed dairy expansion is provided below.

Table 20 specifies those that may result from the construction activities on site, while Table 21 specifies those that may result from the operational activities.

Table 20 Summary of construction environmental risks

Construction Activity/Aspect/Hazard	Initial Risks		
	L	C	R
Earthworks causing irreversible damage to Cultural and European Heritage.	2	2	L
Earthworks causing fauna deaths.	3	1	L
Construction and clearing works causing nuisance noise.	2	3	M
Construction and clearing works causing dust.	4	2	M
Construction and clearing causing sediment runoff and erosion.	4	2	M
Construction activities increasing traffic on local roads.	4	2	M
Earthworks and construction of infrastructure causing light pollution.	3	1	L
Construction activities causing the spread of weeds and pests.	2	3	M
Earthworks and construction of infrastructure increasing waste creation and uncontrolled waste leaving site.	4	2	M

Table 21 Summary of operational environmental risks

Operational Activity/Aspect/Hazard	Initial Risks		
	L	C	R
Transport			
Light and heavy vehicles entering and leaving site increasing traffic risk of safety. Light vehicles contribution relates to transport of employees. Heavy vehicles contribution relates to milk collection and feed deliveries.	5	5	S
Light and heavy vehicles entering and leaving site increasing traffic on local roads.	5	5	S
Light and heavy vehicles entering and leaving site generating dust.	4	5	S
Light and heavy vehicles entering and leaving site generating noise.	5	2	H
Light and heavy vehicles entering and leaving site generating greenhouse gas emissions.	5	1	M
Milking and Dry Lot Management			
Keeping livestock onsite causing loss of amenity.	2	5	H
Keeping livestock onsite causing odour.	5	4	S
Keeping livestock onsite causing dust.	4	5	S
Keeping livestock onsite causing noise.	5	2	H
Dust from very dry pens caused by very low stocking rates in extreme droughts.	4	5	S
Offensive odour from continuously wet pens causing anaerobic conditions.	5	4	S
Keeping livestock onsite spreading pests, weeds and vermin.	4	3	H

Improper/irregular pen cleaning causing an increase in weeds, pests and vermin.	4	3	H
Keeping livestock onsite increasing Greenhouse gas emissions.	5	1	M
Keeping livestock onsite creating biohazardous waste.	4	5	S
Mass death and disposal by fire pyre causing odour and smoke.	4	4	H
Mass death increasing pest and vermin population.	4	3	H
Mass death causing a spread of disease.	3	4	H
Surface runoff/spills of effluent to surface water causing contamination.	4	4	H
Leaching of effluent to groundwater causing contamination.	4	5	S
Solid waste management			
Collecting and stockpiling manure for compost causing pests, odour, dust and noise.	5	2	H
Collecting and stockpiling manure for compost causing spontaneous combustion and fire.	3	4	H
Turning compost causing odour, dust and noise impacts.	4	2	M
Turning compost causing dust.	5	1	M
Application of raw and/or composted manure to waste utilisation area causing dust and noise.	4	2	M
Application of raw and/or composted manure to waste utilisation area causing soil and water contamination from excessive nutrients.	4	3	H
Wastewater management			
Offensive odour from holding ponds that are overloaded with organic matter.	3	4	H
Offensive odour from holding ponds that have not been desludged or dewatered and maintained in a dewatered state.	3	4	H
Spills from holding ponds caused by the failure to dewater by irrigation.	4	5	S
Escape of tailwaters/spills of wastewater to Murray Irrigation due to overloaded irrigation areas, failure to return tailwaters for reuse, insufficient land areas.	4	5	S
Increase in biting insect population.	4	2	M
Leaching of effluent to groundwater causing contamination.	4	5	S
Hazardous Materials			
Diesel spill contaminating surface water, ground water or soil.	3	3	M
Lime spill contaminating surface water, ground water or soil.	3	3	M
Cleaning of ponds with front end loader causing noise.	4	1	L
Applying effluent to pasture areas causing accumulation of nutrients in soils.	4	2	M
Applying effluent to pasture areas causing soil waterlogging.	4	2	M
Applying effluent to pasture areas causing soil erosion.	4	2	M
Cropping and feedmill management			
Harvesting crops by baling causing dust and noise impacts.	4	2	M
Harvesting crops by bailing causing fire.	2	3	M
Processing feed causing dust and noise impacts.	4	2	M
Feed wastage/spoilage increasing pests and vermin.	4	2	M
Feed wastage/spoilage increasing odour.	3	1	L
Weed and pest management			
Preparing herbicide (e.g. mixing herbicide and water/surfactants) contaminating surface water or soil.	3	3	M
Applying herbicide to weeds causing contaminated surface water.	2	2	L
Applying herbicide to weeds causing damage to off target plants.	2	2	L

Emergency management			
Livestock disease resulting livestock deaths.	3	3	M
Fire and/or Flooding resulting in livestock deaths or loss of infrastructure.	3	3	M
Cumulative effects			
Vegetation clearance impacting on flora and fauna communities.	2	1	L
Groundwater water use.	2	3	M
Wastewater treatment and application.	4	5	S

7.3 Key Environmental Risks

The preliminary site assessment identified potential environmental impacts that may result from the development's construction and operational activities.

For the construction phase, the environmental risks are related with earthworks, clearing works and construction traffic.

For the operational phase, the environmental risks are related with the development traffic, milking and dry lot operations, waste generation (solid and wastewater), hazardous materials storage, pasture and feedmill operations, weeds and pests occurrence, and emergencies.

The identified risks were ranked according to their severity. The most significant risks were related to potential operational impacts on traffic, air quality, soil quality, water quality and animal welfare.

A summary of key (high / severe) environmental risks is provided in Table 22 below.

Table 22 Key environmental risks

Operational Activity/Aspect/Hazard	Initial Risks		
	L	C	R
Light and heavy vehicles entering and leaving site increasing traffic risk of safety. Light vehicles contribution relates to transport of employees. Heavy vehicles contribution relates to milk collection and feed deliveries.	5	5	S
Light and heavy vehicles entering and leaving site increasing traffic on local roads.	5	5	S
Light and heavy vehicles entering and leaving site generating dust.	4	5	S
Keeping livestock onsite causing odour.	5	4	S
Keeping livestock onsite causing dust.	4	5	S
Dust from very dry pens caused by very low stocking rates in extreme droughts.	4	5	S
Offensive odour from continuously wet pens causing anaerobic conditions.	5	4	S
Keeping livestock onsite creating biohazardous waste.	4	5	S
Leaching of effluent to groundwater causing contamination.	4	5	S
Spills from holding ponds caused by the failure to dewater by irrigation.	4	5	S
Escape of tailwaters/spills of wastewater to Murray Irrigation due to overloaded irrigation areas, failure to return tailwaters for reuse, insufficient land areas.	4	5	S
Wastewater treatment and application.	4	5	S

7.4 Site-Specific Assessments

Detailed site assessments were undertaken to obtain further information in order to appropriately manage the most significant risks that may result from the development. The detailed assessments allow for appropriate risk management through the following;

- Application of best practice design on the proposed site infrastructure;

- Implementation of proper and compliant operational procedures;
- Implementation of site-based management plans.

Results of the detailed site assessments are further discussed in Section 8 *Environmental Impact Assessment*, under the corresponding environmental sub-sections.

A summary of reference to this EIS is shown in Table 23 below.

Table 23 EIS reference for site-specific assessments on key environmental risks

Site-Specific Assessment	EIS Reference
Traffic impact assessment	Section 8.5 <i>Traffic and Transport</i>
Site-specific odour impact modelling	Section 8.2 <i>Air Quality</i>
Soil surveying (soil sampling and laboratory testing) on site based on Australian Guidelines (National Committee on Soil and Terrain, 2009)	Section 8.3 <i>Soil and Water</i>
Nutrient budgeting and soils risk assessment	Section 8.3 <i>Soil and Water</i>
Overall site hydrological assessment: dairy effluent modelling and dry lot hydrological modelling;	Section 8.3 <i>Soil and Water</i>
Geotechnical assessment of soils	Section 8.3 <i>Soil and Water</i>
Groundwater quality assessment and piezometers installation	Section 8.3 <i>Soil and Water</i>
Animal welfare, biosecurity and disease management	Section 9 <i>Animal Welfare, Biosecurity and Disease Management</i>

8. Environmental Impact Assessment

8.1 Waste Management

The proposed development will produce the following waste;

- General waste;
- Solid waste; and,
- Wastewater.

The proposed waste management systems for different waste type are outlined in Section 5.3.4. General wastes are to be managed by skip bins for collection by a waste contractor. Solid and liquid effluent wastes are to be managed through land application (irrigation on cropping areas).

The primary solid waste produced by feedlots is manure bi-products from the livestock (Lott & Upton, 1999). Other solid wastes that are produced on site include spoilt silage, mill run and mortalities. The nutrient content, organic matter, solids, pathogens and odorous compounds are of particular concern to the environment and local community (Tucker et al., 2015).

Wastewater from milking operations and runoff from dry lot pens are the main wastewater concern for the development. Urine is the main source of wastewater generated on a dairy facility. The nutrient content, organic matter, solids, pathogens and odorous compounds are of particular concern to the environment and local community.

Nitrogen and phosphorous can have substantial impacts on waterway health by increasing the biological productivity (Tucker et al., 2015).

The impact of wastewater to the environment, staff, and stock can be reduced through construction of relevant dairy infrastructure with mitigation measures in place.

The potential impacts of the development wastes are detailed in the following appendices;

- Dairy Effluent Assessment (Appendix I);
- Dry Lot Hydrological Assessment (Appendix K); and,
- Soils Assessment (Appendix L).

The appropriate management and mitigation measures for the identified impacts are detailed in the following plans;

- Crop Irrigation Management Plan (Appendix M); and,
- Environmental Management Plan (Appendix N).

8.2 Air Quality

Two air quality parameters have been highlighted as issues of concern for the development – dust and odour.

A Level 3 odour assessment is recommended by NSW EPA as applicable to this development. This involved dispersion modelling using CALPUFF. CALPUFF is an advanced non-steady-state meteorological and air quality modelling system.

The air quality assessment report is shown in Appendix H. The report outlines any identified potential dust and odour impacts that will result from the development, including corresponding appropriate mitigation and management measures.

The identified potential odour sources for the development are shown in Figure 10. These include dairy dry lot pen areas, manure storage area and wastewater ponds.

A total of 34 receptors have been modelled at ground level and second storey to represent the nearby dwellings.

A 10 x 10 km sampling area with a grid spacing of 100 m has been used for the CALPUFF output data to allow for the creation of concentration plots.

The location of modelled receptors and grids is shown in Figure 11.

Odour concentrations at modelled receptors are shown in Figure 12. Dispersion modelling results showed;

- compliance with the odour limit of 4.2 OU;
- dry lot pens are the primary odour source on-site; and,
- odour is unlikely to be an issue at all receptor locations.

Specialist assessment recommendations for management of odours and design of the yards;

- Pens are cleaned so as the manure depth does not exceed a depth of an average of 15 mm;
 - For open pens, this can be achieved by cleaning at least every 14 days;
 - Scraped manure will be mounded within each pen at least each fortnight and the mounds will be removed at least each quarter.
- Wet and dry dairy feed pens:
 - Maintain good drainage:
 - ensure a minimum slope of 2-4%.
 - less than 1% cross-slope gradient to prevent pen-to-pen drainage.
 - ensure drains are unblocked (removal of waste, sediment build-up and vegetation).
 - Maintain level surface with no areas for liquid pooling – backfill where necessary.
 - Regular cleaning of pens to avoid build-up of waste/material/liquids:
 - fence lines (waste build up can prevent proper drainage).
 - feeding systems and water troughs.
 - Maintain water troughs to prevent leakage.
 - Maintain all cleaning equipment (e.g. scrapers, front-end loaders).
 - Besides regular inspections, carry out additional inspections after rainfall event.
- Deceased cattle are to be removed from site immediately to avoid potential build-up of odour which can occur if stored on site;
- Feed is to be kept in dry storage;
- Visually observe dust from the site – utilise water sprays (where appropriate) on exposed surface if wind-blown dust is observed (i.e. potentially under dry/windy conditions);
- Make odour observations around the site on a daily basis – where unusual/atypical or elevated odours are identified, investigate further and take ameliorative action where necessary; and,
- Manure application and effluent irrigation to be avoided during wet weather, when receptors are downwind the application area, early mornings or evenings, calm wind conditions.

The site design has responded with incorporation of these recommendations. The site has been designed with 2% fall in the pens and cross falls of about 0.2-0.5%.

Management of the site has also taken up the recommendations. These are set out in the management plans.

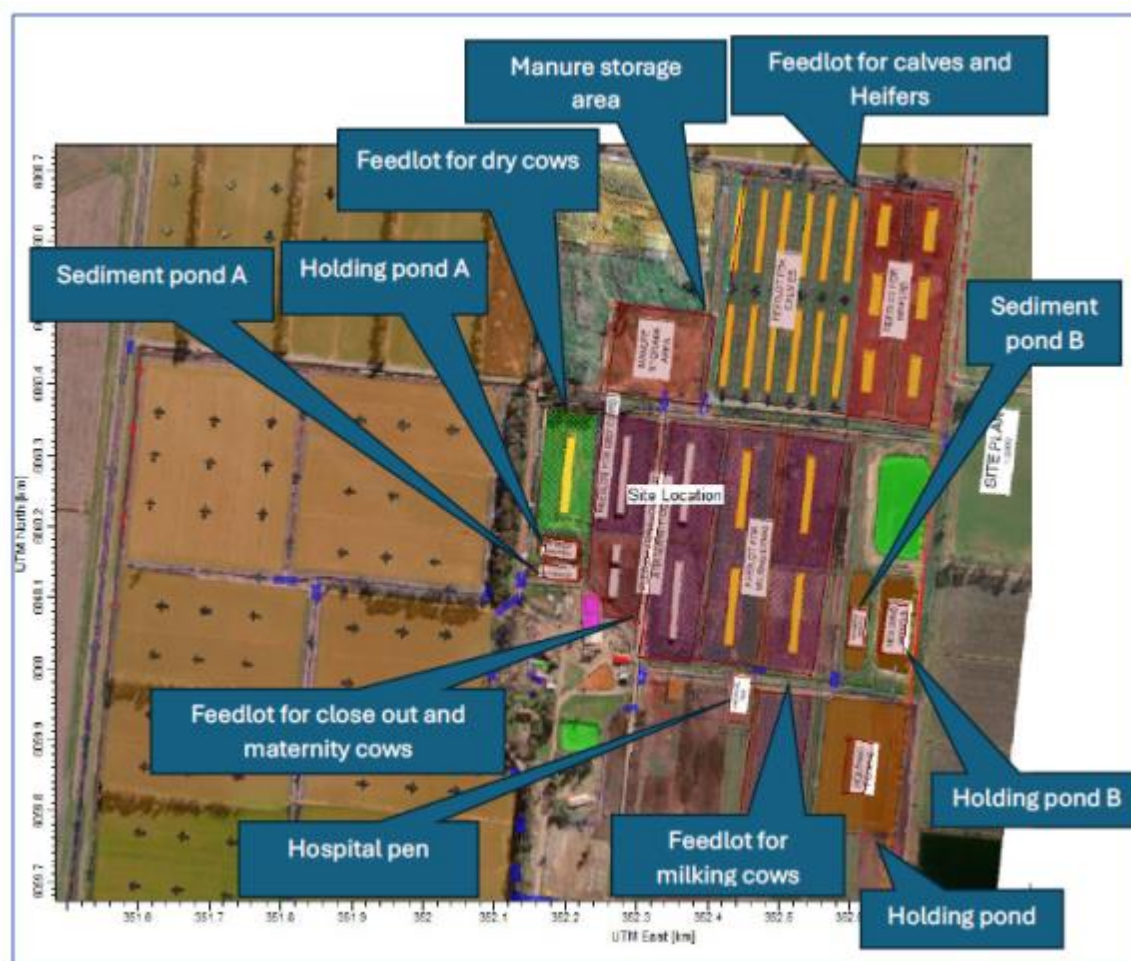


Figure 10 Modelled Potential Odour Sources

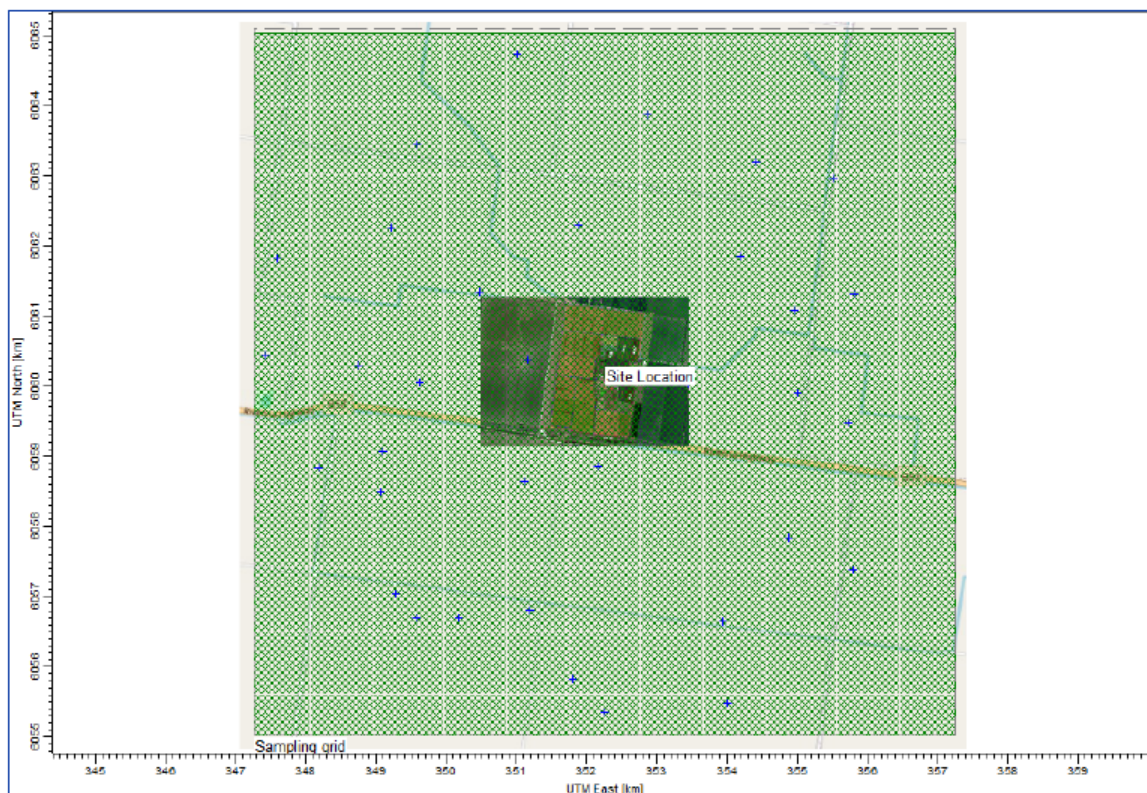


Figure 11 Modelled Receptor Locations

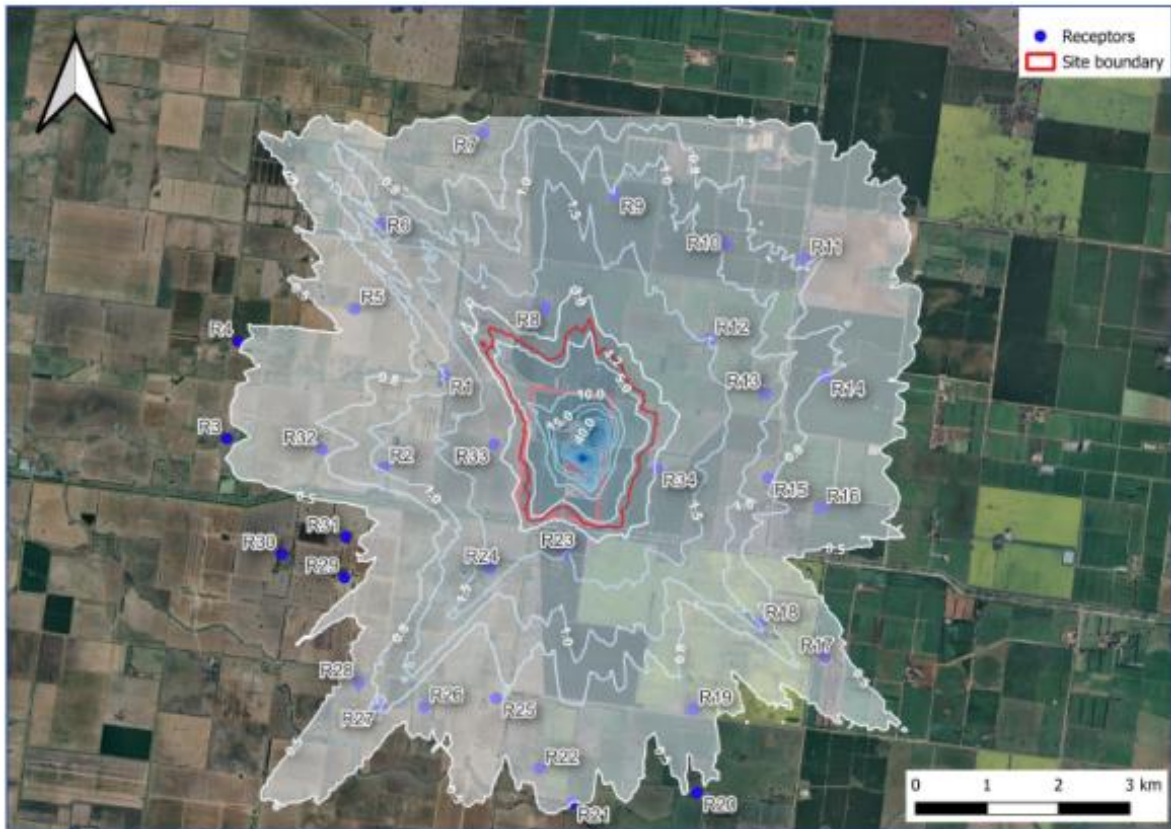


Figure 12 Odour Concentration Plot

8.3 Soil and Water

Field assessments were conducted on 28th October to 1st November 2024. These include soil survey, geotechnical assessment, piezometer installation and groundwater sampling. A summary of the field work plan is presented in Figure 13.

Site-specific information is required in order to assess and identify the potential impacts of the development on soil and water quality. Soil, surface water and groundwater impacts can be mitigated by properly designed stormwater and wastewater management infrastructure.

Geotechnical assessment was conducted to determine if site soils are of suitable quality for the construction of effluent and other water storages required for the development. Results showed that the site has a generous amount of suitable clay that can be used as liner for the required effluent ponds and drains.

Stormwater runoff must be contained within the property to avoid impacts on neighbouring lands. This can be managed effectively by dividing the site catchment areas according to the land uses. A site catchment plan is shown in Figure 14. Catchments are divided as follows:

- Catchment A – to manage dairy effluent from milking operations and rainfall-runoff from other land uses;
- Catchment B – to manage dry lot effluent (rainfall-runoff) from the dry lot area; and,
- Catchment C – to manage tailwaters (rainfall-runoff) from the waste utilisation disposal areas (WUDA).

Water management for each catchment is detailed in the process flow diagram shown in Figure 15.

Collected field information assisted in undertaking the following:

- Soils risk assessment (Refer to Appendix L);
- Dairy effluent assessment and Catchment A system design (Refer to Appendix J); and,
- Dry Lot hydrological assessment and Catchment B system design (Refer to Appendix K).

Appropriate soil and water management measures are specified in the following reports:

- Crop and Irrigation Management Plan (refer to Appendix M); and,
- Environmental Management Plan (refer to Appendix N).

8.3.1 Soils Risk Assessment

The soil survey was conducted on the cropping areas, in accordance with Australian Guidelines (National Committee on Soil and Terrain, 2009). This aims to provide details of local soils in the area and to assess waste application risks on soils.

Site slope is generally flat and is less than 2%. An area of 194 ha is currently being used for intensive cropping. Site soils are classified as Sodosol. The soils on site are reasonably structured and maintained in a productive form, through minimisation of tillage and regular application of organic wastes. Baseline measurements show that:

- The soils are reasonably structured;
- The soils have adequate to good nutrient levels;
- No hear surface groundwaters are present; and,
- The agronomic root zone is about 0.7-1.0 m deep.

A nutrient budget for land waste application was calculated using inputs and outputs for the proposed irrigation area. The calculation was based on the proposed wastewater and manure application rate and estimated crop production. The net position of nutrient for different waste types to be applied on the cropping areas are summarised in Table 24.

Table 24 Nutrient Budget

Type of Waste	Net Position of Nutrient (kg/ha/yr)			
	N	P	K	Na
Effluent and Solid Waste	93.5	81.5	524.5	547.6
Solid Waste	-154.8	20.8	-105.1	171.7

The nutrient budget for effluent and solid waste application shows that:

- Cropping areas are generally overloaded on annual basis with excess N, P, K, Na from application of solid and liquid wastes;
- Greater uptake of P and K is expected and due to be compensated by plant luxuriant uptake; and,
- Due to high excess amount of K and Na, the health of the soil will be directly related to management of sodium (to prevent a salt build up) and potassium.

The nutrient budget for solid waste application shows that:

- Cropping system is N and K deficit. The irrigable area will require application of inorganic fertilisers to sustain maximum dry matter production; and,
- There is an excess of P and Na. Use of ameliorants is recommended to displace Na and then push it below RZ and leach it.

Excessive sodium loads and an “out of balance” ratio of sodium to other cations will result in sodification of soils and soil structural decline. Salt overloads will cause salinisation that causes reductions in crop productivity.

Wet years are responsible for the largest “flushing” events in a soil profile, in addition to the leaching fraction afforded by clean water irrigation. It is expected that the combined inputs of irrigation and rainfall will assist in management of gross salt load by leaching fraction.

To address deficits and excess and in particular sodicity and salinity, in the medium to long term, it is recommended to:

- Expand the size of WUDA areas;

- Sell some manure and sludge off site; and,
- Use ameliorants to displace sodium to allow them to be mobilised downwards and below the root zone (RZ) (that is to an allowable leaching fraction and process).

The leaching fraction is estimated to be approximately 10mm/year (average). It will take considerable time for the sodium to be removed from the profile due to the high clay content and relatively low rainfall.

Given the leaching fraction; ongoing careful management of potential loss of nitrogen and phosphorus is important. This is best achieved by:

- Frequent moderate applications of irrigation;
- Maintaining an active plant growth;
- Maximising organic matter content to maximise nutrient holding capacity;
- Management of soil meta-metal balances by application of gypsum/lime, and,
- Maximising nutrient recovery by crop harvest.

It is recommended that either the available irrigable area for waste utilisation-disposal is doubled. Alternately, half of the manures and sludge are sold off the site to equalise the N and P nutrient balance as a short to medium-term priority.

In the long-term (>10yrs), the existing area will need to be rested (reduced waste applications) and alternate areas sought to allow sustainable reductions in salt load that may have accumulated over time.

Offsite sales of manure and sludge may allow some delay in expansion of the irrigable and or dry land utilisation-disposal areas. Notably, it cannot completely mitigate the need to expand the areas because the excess nutrient and salt load is primarily driven by wastewater/effluent loadings.

8.3.2 Dairy Effluent Assessment

A complete dairy effluent assessment is detailed in Appendix J. The assessment was conducted in order to properly design the effluent system for Catchment A.

The dairy assessment showed that the milking operations require a total water use of 60,860 L/day. Effluent can be recycled in the milking centre through yard washing. The estimated amount of recycled effluent use is 27,400 L/day.

The most effective approaches in managing effluent generation by the new milking centre are as follows:

- Manage the milking parlour effluent in one catchment, separate from other rainfall-runoff catchments in the property:
 - wastewater to be generated from the dry lot areas;
 - tailwaters to be generated from effluent irrigation/reuse system; and,
 - clean stormwater;
- Utilise existing effluent storage and reuse systems and expand according to the increased wastewater generation;
- Include an appropriate solids separation system to reduce total solids (TS) loads from the dairy effluent; and,
- Include a concrete sump system to allow for collection of effluent to be recycled for applicable usage in the milking centre operations.

8.3.3 Dry Lot Hydrological Assessment

A complete dry lot hydrological assessment is detailed in Appendix K. The assessment was conducted in order to properly design the runoff control structures for Catchment B.

8.3.3.1 Pen Drains

Runoff from the dry lot pen areas is to be captured in the drain situated at the bottom of the pens. The drain need to be designed to both contain the flow volume and provide flow velocities that do not threaten channel

stability at a peak flow rate equivalent to that from a design storm having an average recurrence interval (ARI) of 20 years (MLA, 2012). The maximum allowable flow velocity in channels is dependent on the characteristics of the material lining of the channel.

8.3.3.2. Sediment Pond

The aim of sedimentation system design is to provide flow velocities in the system low enough to allow for the settling of a minimum of 50% of the solids entrained in the CDA runoff in a design storm also having an ARI of 20 years (MLA, 2012). This level of sedimentation typically occurs when flow velocities are less than 0.005 m/s (Lott & Skerman, 1995). A performance standard requiring the settling of more than 50% of the entrained solids would require an exponential increase in detention time within the sedimentation system (as well as a correspondingly lower flow velocity) and therefore is generally impracticable and inefficient.

The minimum required volume to comply with the storm design criteria is 7.5 ML.

8.3.3.3. Wastewater Storage Pond

The principal design function of storage ponds is to store dry lot area runoff until such time as the pond effluent can be safely used for irrigating the wastewater utilisation area.

The FSIM model was used to simulate the hydrological performance of the 'Gunyah' dry lot catchment including the holding pond and effluent utilisation area.

The optimum capacity for the holding pond able to satisfy the design criteria of overflowing of "spilling" at a frequency less than 1 in 10 years is 60 ML.

The development will utilise the previously constructed holding pond (Holding Pond B). Holding Pond B has a capacity of 10 ML. An additional holding pond C will be constructed to a capacity of 63 ML.

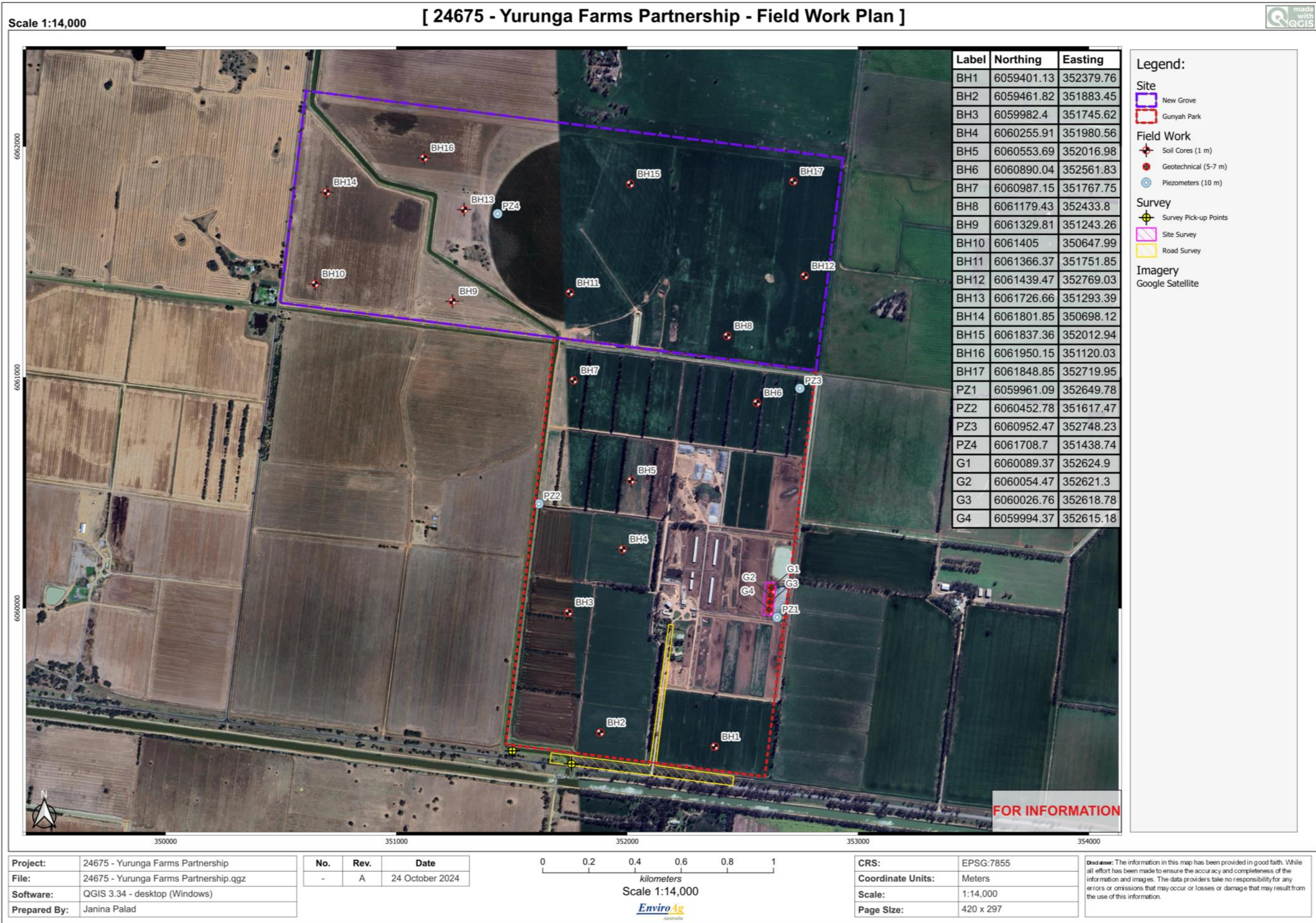


Figure 13 Field Work Plan



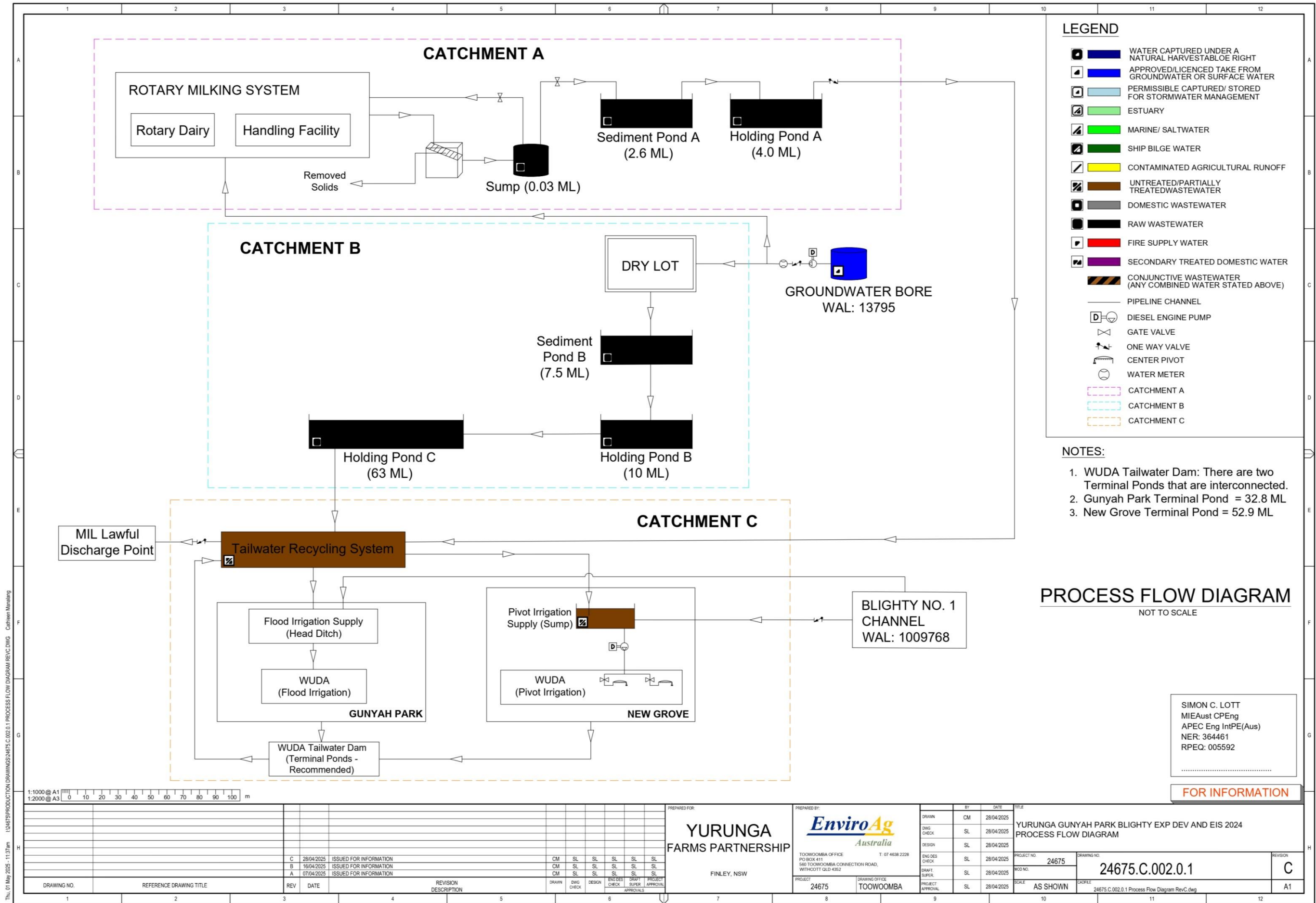


Figure 15 Process Flow Diagram

8.4 Noise and Vibration

Noise may arise from stock handling activities, vehicle movements including feed trucks and stock transports, feed milling and handling, and other plant or equipment used at the site (NSW Agriculture et al., 1997).

Noise anticipated to be generated from the site from the proposed development includes the following:

- site construction works;
- truck movements on site;
- heavy vehicle reversing alarms;
- operation of any on site pumps;
- operation of on-site irrigation equipment (dependant on the type installed);
- operation of any heavy machinery on site (including tractors, front-end loaders, etc.);
- manure and carcass management operations;
- pen cleaning;
- animals held on site; and,
- workshop operations.

Background noise levels in rural environments are generally perceived to be quite low level; however, it is often variable dependant on a range of extenuating factors. Ambient background noise levels can range from approximately 25 dBA to 45 dBA (Meat & Livestock Australia, 2016). This dramatic fluctuation in noise levels can be attributed to a range of natural and man-made factors, some examples are:

- Wind interacting with vegetation;
- Presence of vocal fauna species (such as cicada's, birds, frogs, etc.); and,
- Seasonal factors that result in more noise being generated by man-made factors (such as crop harvesting).

The NSW EPA (NSW Environmental Protection Authority, 2017) determined background noise levels at sensitive receptors for rural areas are as follows:

- Day (7 am to 6 pm): 40 dB(A).
- Evening (6 pm to 10 pm): 35 dB(A).
- Night (10 pm to 7 am): 30 dB(A).

The noise in the area is dominated by natural sounds. The land zoning, the subjective assessment of the acoustic environment in the area, and the acquired background noise levels would support a rural residential RU1-Primary Production Zone according to the *Noise Policy for Industry* (NSW EPA 2017) (refer to Table 25).

Table 25 Estimated Noise Level for Different Time Period (NSW EPA 2017)

Period	Intrusiveness noise level	Project amenity noise level
Day	45 dB LAeq, 15 min (40+5)	48 dB LAeq, 15 min (50-5+3)
Evening	40 dB LAeq, 15 min (35+5)	43 dB LAeq, 15 min (45-5+3)
Night	35 dB LAeq, 15 min (30+5)	38 dB LAeq, 15 min (40-5+3)

Notes:

1. Intrusiveness noise level is $LA_{eq,15\text{ min}} \leq RBL + 5$ (Section 2.1 of Noise Policy for Industry).
2. Project amenity noise level (ANL) is urban ANL (Table 2.1 of Noise Policy for Industry) minus 5 dB(A) plus 3 dB(A) to convert from a period level to a 15-minute level (dB = decibel; dB[A] = decibel [A-weighted]; RBL = rating background noise level).

The project noise trigger level is the lower value of the intrusiveness and amenity noise levels.

A noise study conducted by Golder Associates (Golder and Associates Pty Ltd, 2016) for a 14,000 cattle feedlot in Victoria has identified that feedlot operations (i.e. movement of trucks, cattle loading and unloading and cattle movement into pens) produces a noise level of approximately 33 dB(A) at an outside location of sensitive receptors approximately 1 km away from the feedlot source.

The operation scale of the dairy farm is only 4,000 head and is relatively lower than the Victorian cattle feedlot site. Therefore, the noise generated from the dairy is anticipated to be less than 33 dB(A).

The nearest receptor is located 250 m south of the property and approximately 1.15 km away from the dairy complex (refer to Section 6.2). Given the dairy dry lot noise is 33 dB(A), and attenuation over this distance, there is no concern for noise. It is below the EPA intrusiveness noise level set out in Table 25.

According to NSW EPA guidelines, traffic noise in a rural area is typically considered to be around 60 dBA during the day, with lower levels at night, depending on the specific road type and volume of traffic. This is higher than the anticipated noise level anticipated from the dairy dry lot. The property is buffered by the Riverina Highway to the nearest receptor, and any potential noise impact from the development is considered negligible.

Suitable noise mitigation and management measures will be implemented onsite during operations to ensure that noise levels generated from the site are not obtrusive for nearby receptors. Fixed plant such as milking plant, water pumps, and vacuum pumps will all be muffled according to industry standards. Any mobile plants are to be turned off and stored when not in use. Noisy farm activities are to be conducted at appropriate times to avoid causing nuisance to surrounds.

8.5 Traffic and Transport

Additional heavy vehicle traffic on local roads can impact road safety, road quality and condition as well as increase overall noise associated with road use.

A traffic impact assessment has been completed to identify potential road impacts associated with the proposed development and whether it is feasible to utilise the proposed transport routes. The report was completed by a suitably qualified professional and is attached as Appendix I.

Access to the site will be from the Riverina Highway. The anticipated traffic generation that will result from the proposed development are as follows:

- Construction Phase
 - 18 vehicles per day (vpd)
 - 6 vehicles per hour (vph) during the AM and PM peaks
- Operational Phase
 - 26 vpd
 - 1 vph during the PM peak only

Results of the assessment showed that:

- The car parking demand for the site is likely to be up to 6 spaces across both the construction and operational phases with no heavy vehicle parking spaces required;
- No casualty crashes have occurred in the vicinity of the subject site in the last five years of available data (2018 – 2022);
- The site access to Riverina Highway satisfies the SISD requirement for light vehicles (285 m) and heavy vehicles (303 m) based on a design speed of 110 km/h and 100 km/h respectively; and,
- Turn lanes are not required due to the low volume of right and left turning entries to the site during both the temporary construction phase and the operational phase of the development.

The proposed development is can proceed subject to implementation of the following:

- Designation of a car parking area to cater for at least 6 passenger vehicles during construction and operational phases, and,
- Site access to be upgraded in accordance with the concept plan.

YFP will implement the specialist recommendations as part of the development.

8.6 Biodiversity

The dairy industry in Australia has had an impact on Australia's biodiversity; this ranges from the direct impacts of land clearing for conversion to exotic pastures, overgrazing and trampling, to indirect impacts such as the introduction of weeds, changes to fire regimes, altered hydrological flows and major impacts on soil.

Well-managed dairy minimises impacts to biodiversity by managing and maintaining facilities to minimize pollution. They use best practice management tools such as vegetated riparian buffers to filter runoff, protect aquatic ecosystems, and provide habitat for pollinators, wildlife, and predators of pests.

Biodiversity mapping on the proposed development location did not show existence of any matters of concern.

Historically, the site has been highly disturbed by past agricultural practices. Site visit confirmed that proposed development site is clear of any native vegetation.

The development is unlikely to have any potential significant impacts on biodiversity values. Any potential risk to biodiversity will be managed through biodiversity conservation measures outlined in the Environmental Management Plan (refer to Appendix N).

8.7 Bushfire

The magnitude and threat of bushfires can be significant if not properly managed. Reducing the risk of bushfire hazards and impacts on the development require appropriate management strategies to protect further impacts to the environment, site, personnel, and equipment.

The principal vehicles for adverse impacts from fires potentially are:

- Building and feed sheds not being segregated properly, which aids to spread and cause additional damage from fires;
- Not having a pre-planned bushfire strategy; and,
- Compost manure pad not being routinely checked for presence of fires.

Bushfire assessment was conducted in accordance with *Planning for Bushfire Protection 2019* (NSW Rural Fire Service, 2019).

The property is located in a designated bushfire prone area, per NSW RFS bushfire prone land mapping. Specifically, the site was mapped as having medium bushfire risk, with vegetation category 3. Vegetation under this category includes grasslands, freshwater wetlands, semi-arid woodlands, alpine complex, and arid shrub lands.

Satellite imagery of the site capture in 1996 has shown that the site has been cleared of native vegetation and is being cultivated. The proposed dairy expansion area is currently cleared. Therefore, there is no concern for bushfire on site.

The site will implement general fire protection measures to ensure compliance with the aims and objectives identified in *Planning for Bushfire Protection 2019* (NSW Rural Fire Service, 2019) – provide protection of human life and minimise impacts on property from the threat of fire.

This includes dedication of appropriate utilities for fire-fighting purposes (e.g. adequate water supply and fire extinguishers etc.), proper storage of any hazardous materials and/or dangerous goods, and implementation of emergency management and evacuation procedures.

8.8 Visual

The development is a rural pursuit in a rural environment.

Visual pollution is usually being caused by tall structures. Visual amenity was identified in the risk assessment as being on potential note because the property is located along the Riverina Highway.

Visual amenity is unlikely to be a significant issue for the development due to the following reasons:

- The Blighty Retreat Channel separates the property from the highway;
- There is existing vegetation between the highway and the drainage channel; and,
- The setback of development site (dairy complex) from highway is approximately 750 m.

Visual screen in the form of trees of at least 6 m height is will be planted between the Riverina highway and the facility, if required.

Given the existing vegetation, road corridor, and setback distance between the dairy complex and site entrance, sufficient barrier exist to not cause visual impact issues.

Appendix E shows proposed location of trees screen, if required. Vegetated strata will be higher than all of the proposed buildings for the development.

8.9 Heritage

Changes in land use practices in relation to construction, development, cultivation, etc. can have an adverse effect on any structures or objects of heritage or cultural significance in the area.

There is no mapped heritage on the property, as per NSW spatial viewer.

Aboriginal Heritage Information System (AHIMS) search within 50 km buffer did not identify any Aboriginal places or sites in or near the property.

The development is unlikely to cause any heritage impacts.

8.10 Greenhouse Gas

The greenhouse gas (GHG) emissions assessment for the proposed wet and dry lot dairy includes an analysis of major emission sources, their contribution to the overall emissions profile, and proposed mitigation strategies to reduce environmental impacts.

The primary sources of GHG emissions in dairy operations include:

1. **Enteric Fermentation:** Methane (CH₄) emissions produced during the digestion process of ruminant cattle.
2. **Manure Management:** Decomposition of manure produces methane (CH₄) and nitrous oxide (N₂O) emissions, especially in anaerobic storage systems (e.g., ponds).
3. **Fertilizer Use:** Application of nitrogen-based fertilizers and manure to pastures or feed production areas releases nitrous oxide (N₂O).
4. **Energy Consumption:** Use of electricity and fuel for milking, feeding, irrigation systems, and other mechanical operations results in carbon dioxide (CO₂) emissions.
5. **Feed Production and Transport:** Emissions are associated with growing, processing, and transporting feed inputs.

The following strategies are found to minimise GHG emissions:

1. **Improved Feed Efficiency:** Use of high-quality feed and feed additives to improve digestion and reduce methane production.
2. **Manure Management:**
 - Adoption of aerobic composting systems to reduce methane emissions.
 - Regular cleaning of feedpads to minimise the accumulation of manure.
3. **Energy Efficiency:**
 - Use of renewable energy systems, such as solar panels, to power operations.
 - Adoption of energy-efficient equipment in milking and feeding systems.
4. **Pasture and Soil Management:** Application of precision irrigation and optimised fertilizer management to reduce nitrous oxide emissions.

5. **Carbon Sequestration:** Planting of trees and vegetation in buffer zones and tree screens to offset emissions through carbon sequestration.

If required by a regulatory agency, GHG emissions will be estimated following the National Greenhouse Accounts (NGA) methods or other approved models. The method will account for emission factors specific to dairy cattle, manure systems, and land use will be applied to account for the local climate and operating conditions in NSW.

If required by a regulatory agency, regular monitoring of emissions will be conducted to ensure compliance with relevant environmental regulations. Any required annual reporting of emissions, mitigation actions, and outcomes will be incorporated in a revised Environmental Management Plan.

9. Animal Welfare, Biosecurity and Disease

9.1 Animal Welfare Management

9.1.1 Commitment

Yurunga Farms Partnership (YFP) is committed to animal welfare, with 96.35% results in the recent welfare audit conducted on 17th December 2024. The animal welfare procedures being followed by YFP is attached as Appendix G.

Key principles guiding Yurunga Dairy's animal welfare practices include:

1. **Ethical Responsibility:** Ensuring that all cattle, regardless of age or production stage, are treated humanely and with respect.
2. **Health-Centric Management:** Proactively managing cattle health to prevent disease and promote long-term productivity.
3. **Continuous Improvement:** Regularly reviewing and improving welfare practices to align with advancements in research, industry standards, and community expectations.

9.1.2 Compliance

YFP adheres to all relevant legislation and guidelines governing animal welfare and husbandry in New South Wales and Australia, including:

- **NSW Prevention of Cruelty to Animals Act 1979** (New South Wales Department of Primary Industries, 1979): This legislation underpins the dairy's commitment to humane treatment by ensuring cattle are protected from unnecessary pain or suffering.
- **Australian Animal Welfare Standards and Guidelines for Cattle** (Animal Health Australia, 2016a): These national standards provide a framework for best practices in managing the welfare of dairy cattle across housing, nutrition, health, and handling.
- **Dairy Australia Sustainability Framework:** Yurunga Dairy aligns its practices with the framework, emphasising responsible management of animal welfare, environmental impacts, and community relations.

The standards and guidelines are developed by the Australian Animal Welfare Strategy (AAWS) and are designed to ensure that cattle, including dairy cows, are raised in environments that support their health, welfare, and productivity. The Animal Welfare Standards for Cattle cover a range of topics relevant to dairy farming, including:

- Housing and Facilities: Guidelines for appropriate housing conditions, such as space, ventilation, lighting, and access to bedding, to ensure cattle are kept in clean, safe, and comfortable environments.
- Nutrition and Feeding: Standards related to providing a balanced diet appropriate for the physiological needs of dairy cows at various stages of production (e.g., lactating cows, dry cows, and calves).
- Health Management: Requirements for maintaining cattle health, including the use of preventive health measures like vaccinations, parasite control, and the management of diseases common in dairy herds. It also outlines the importance of regular health checks and veterinary care.
- Animal Handling: Recommendations for low-stress handling techniques, the design of handling facilities, and practices to minimise animal anxiety and injury during tasks like milking and transportation.
- Reproduction and Calf Care: Guidelines for managing reproduction, including breeding, calving assistance, and calf rearing practices to ensure the well-being of both adult cows and their offspring.
- Euthanasia and End-of-Life: Standards regarding the humane euthanasia of cattle that are suffering or at the end of their productive life.

The guidelines are designed to be flexible, allowing dairy farmers to adapt them to their specific farming practices while ensuring high standards of animal welfare are met.

Compliance with these standards is often assessed through audits, and they are referenced in various state and national regulations concerning animal welfare.

Compliance is supported through regular audits and internal reviews to ensure that YFP consistently meets or exceeds legal and industry requirements. YFP engages with the NSW Department of Primary Industries (DPI) to stay informed of any changes to regulations or emerging welfare issues.

9.1.3 Sustainability and Ethics

YFP's approach to animal welfare is closely aligned with its broader commitment to sustainability and ethical farming. By prioritising the welfare of its cattle, the dairy:

- Enhances productivity through improved animal health and longevity.
- Minimises environmental impacts by reducing waste and improving resource efficiency.
- Builds trust with the local community by demonstrating responsible and compassionate farming practices.

This holistic approach ensures that YFP not only meets the expectations of regulators and industry bodies but also aligns with consumer and societal values.

9.1.4 Standards and Guidelines

According to the *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016b), it is important for cattle operators and workers to understand their responsibility with respect to cattle management and perform the required tasks to minimise the risk to the welfare of cattle.

Dairy facilities should be designed and operated to ensure that they meet the animal welfare objectives of all standards:

- Cattle should have access to nutritionally adequate food and sufficient good quality water to maintain health;
- Risk management of extreme weather, natural disasters, disease, injury and predation should be implemented and regularly assessed to minimise the impact of these threats to cattle welfare;
- Well-designed cattle handling facilities and equipment should be constructed and maintained to minimise the risk of any natural hazards, and animal injury and disease;
- Animal handling, movement and husbandry practices should be operated in a reasonable manner to minimise any distress or pain;
- Castration, dehorning and spaying are done only when necessary and in a manner that minimises the risk to the welfare of cattle, particularly pain and distress. Surgical procedures should be performed under good hygienic conditions;
- Breeding management requires the responsible person to have an understanding of the reproduction and behaviour of both the cow and the bull;
- Calf-rearing systems must be managed ensuring calves have feed, water, proper shelter and access to appropriate disease diagnosis, prevention or treatment;
- Dairy management must ensure milking operations have appropriate facilities and strategies;
- Cattle in dry lots must be managed ensuring that sufficient feed and water are provided, facilities are well maintained, and excessive heat load risk is proactively managed;
- Humane killing, when necessary, must be done promptly and safely; and,
- Variable and sufficient supervision is needed to ensure dairy cattle are in sound and healthy condition, including regular inspection of stock density, availability of suitable feed, reliability of water supply, cattle behaviour and health condition (e.g. age, pregnancy status, disease prevention), climatic conditions and management practices.

9.1.4.1. Stocking Density

Overcrowding should be avoided. There are floor space requirements for calf and cattle outlined in the *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016b).

A minimum space requirement of 9 m² per SCU is required for cattle in feedlots and 1.5-2.0 m² per calf. Given that there is no specific stocking area required for dairy, the feedlot standard was adopted. The proposed dairy dry lot exceed the requirement (refer to Section 5.3.2).

9.1.4.2. Weather

Cattle should be provided with adequate shelter. The proposed dairy dry lots will be designed to have adequate shade structures in place. Prior to commencement of site operations, a drought management plan should be developed to ensure appropriate management measures are investigated and documented in the event that drought conditions arise on-site. Drought strategies should be implemented prior to drought conditions becoming critical.

9.1.4.3. Transport

According to the *Australian Animal Welfare Standards and Guidelines-Land Transport of Livestock* (Animal Health Australia, 2012), specific requirements (as shown in Table 26 and Table 27) also apply to minimise the potential risks during loading and land transport of cattle.

Table 26 Minimum space allowances/appropriate loading densities (Australian Government DAFF 2009)

Mean Live Weight (kg)	Minimum Floor Area (m ² /head)*	Number of Head per 12.5m x 2.4m deck
100	0.31	94
150	0.42	70
200	0.53	55
250	0.77	38
300	0.86	34
350	0.98	30
400	1.05	28
450	1.13	26
500	1.23	24
550	1.34	22
600	1.47	20
650	1.63	18

Table 27 Time off water requirements for each class of cattle during transport

Class	Maximum time off water (hours)	Minimum Spell duration (hours)
Cattle over 6 months	48	36
Calves 30 days to 6 months	24	12
Lactating cow with calves at foot	24	12
Calves 5 – 30 days old travelling without mothers	18	-
Cattle known to be more than 6 months pregnant, excluding the last 4 weeks	24	12

*Source: (Animal Health Australia, 2012)

9.1.4.4. Heat Stress

The term “heat stress” describes a state where animals are responding to excessive heat load (EHL).

Heat stress can result in reduced feed intake, along with depression, increased heart and respiratory rate. Heat stress is a significant stressor that in turn may reduce resistance to other pathogens. Panting and open mouth breathing predisposes to pneumonia. A continued rise in body temperature will eventually result in respiratory and circulatory failure and death (Barnes et al., 2004).

Environmental conditions that predispose to EHL include recent rainfall, high ambient temperature, high relative humidity, the absence of cloud cover or shelter with high solar radiation, minimal air movement over several days, and sudden adverse climatic conditions (Gobbet et al., 2014).

Animal factors that may predispose to EHL include breed, coat type (dark coats may be more likely to accumulate heat), body condition (fatter animals accumulate more heat), lack of adaptation to heat, and concurrent illness (Barnes et al., 2004).

To ensure that heat stress is prevented as much as practical in the livestock on-site, adequate shelter will be provided, as well as water and feed provisions and sanitary disease free conditions, which will reduce the chance of heat stress occurring. It is recommended that an EHL management plan is developed for the site and reviewed yearly, prior to the summer season commencing (Gobbet et al., 2014).

In the event that heat stress does occur, it is recommended that the following measures are implemented (Gobbet et al., 2014):

- Ensure there is unlimited access to clean, cool water for all animals.
- Minimise handling and disturbance of animals. Essential activities should be conducted at the coolest times of the day, usually early in the morning or late at night.
- Reduce stocking densities.
- Use low stress stock handling techniques.
- Erect shade that encourages air flow including over loading and unloading ramps.
- Consider moving affected animals to cooler pens with reduced stocking density, shade and better air flow.
- Remove barriers to wind.
- Temporarily reduce or cease feeding of concentrate and consider a higher roughage proportion in ration until other emergency measures are implemented.

Feeding management strategies for hot conditions can reduce the impact of heat stress on cattle (Barnes et al., 2004):

- Using high-energy diets, to account for reductions in dry matter intake and the associated increase in energy requirements to maintain homeostasis;
- Using supplements of dietary antioxidants to support immune function and oxidative status; and,

- Altering feeding time to reduce metabolic heat loads during the hottest hours of the day.

Heat load risk assessments should be documented and include:

- Site climatic factors for the dairy location;
- Animal factors including genotype, coat colour, days on feed and health status;
- Management factors, which may include the provision of shade, provision of additional water troughs, water temperature, ration type and manure management practices; and,
- Each class of cattle at the dry lot.

An EHL Action Plan should include the following minimum information / actions:

- Name of the dairy;
- Name and contact details of the person responsible at the dairy;
- Name and contact details of the consulting veterinarian and nutritionist;
- Allocation of responsibilities to relevant personnel;
- Threshold for activation of the Excessive Heat Load Action Plan;
- Actions to manage the excessive heat load event and the welfare of animals at that; and
- Time, which may include:
 - Monitoring of cattle, weather conditions, pen conditions, water and feed; and,
 - Operational practices to be implemented for the management of cattle, pens, feed, water and personnel.

9.1.4.5. Food and Water

A nutritious diet that is adequate for maintaining health, as well as meeting the appropriate physiological requirements for growth, should be provided at all times while the cattle are on-site (Primary Industries Standing Committee, 2004). Feed supply for cattle should minimise harmful metabolic and nutritional conditions and be based on (Primary Industries Standing Committee, 2004):

- Body weight, and/or fat/body condition score;
- Extra demands associated with growth, pregnancy, lactation and exercise; and,
- Prevailing/predicted weather conditions.

Regular assessment should be made of the needs of the cattle in relation to the quantity and quality of feed and water (Sneath & Bath, 2011a).

Feed ingredients must be free of residues; this can be achieved by obtaining and keeping details on crop/feed treatments, and checking new feed ingredients according to a written QA manual (Sneath & Bath, 2011a).

It is desirable that cattle are fed at the same time each day to reduce the incidence of metabolic upsets. In wet weather, it may be necessary to feed two to three times a day to avoid feed spoilage/wastage. It is important that cattle have feed in the troughs at all times. Empty feed troughs are a prime cause of grain poisoning (Sneath & Bath, 2011b).

Feed space requirements vary with ration, cattle size and feeding frequency, Table 28 provides a guide for typical feed space requirements in a feedlot (Sneath & Bath, 2011b). This was used as basis for the proposed dry lots.

Table 28 Feed Space Requirements

Development Stage	Feed Troughs (cm/head)	Self Feeders (cm/head)
Yearling	25 to 30	10 to 20
18 months to 2 years	30 to 38	20 to 25
Bullocks (equivalent to mature cow)	38 to 46	25 to 30

Cattle require sufficient access to clean water, which is free of toxic levels of salts or other contaminants at all times, with a minimum of 60 litres of water per head (based on hot and humid weather) (Hamlyn-Hill, 2011). Water troughs are to be kept clean and a cleaning regime implemented on-site to ensure this occurs.

The quality of water livestock consume directly impacts on daily water intakes, and can in turn impact on overall performance. The suitability of water for stock depends on a number of factors: type, age and condition or health of the animal, climate, time of the year, composition of pastures and feed, distance walked, and other water sources available.

All mechanical equipment controlling the delivery of water to the dry lot area will be regularly inspected to ensure it is functioning adequately (Hamlyn-Hill, 2011). It is recommended that water quality tests are acquired of drinking water sources at least bi-annually to ensure water quality is adequate, tests should be conducted for:

- Total dissolved salts – should be less than 2,000mg/L;
- Calcium – should be less than 1,000mg/L;
- Nitrate – should be less than 400mg/L;
- Nitrite – should be less than 30mg/L;
- Fluoride – should be less than 1mg/L;
- Chloride – should be less than 4,000mg/L; and,
- pH – should be between 6.5 and 8.5.

All cattle water should meet the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality Volume 3 Chapter 9 Primary Industries 9.3 Livestock Drinking Water Guidelines* (ANZECC, 2000).

9.1.4.6. Herd Handling and Management

All personnel handling and managing the cattle on-site are to be appropriately trained to perform the required tasks in accordance with the *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016b). Management procedures carried out on cattle should be performed by competent persons under the direct supervision of an experienced operator.

Cattle contained in the dry lot should be checked by an experienced stock person at least once per day for signs of injury, changes in food and water intake, illness and distress.

The proposed development will take the following livestock welfare aspects into account:

- Integrated animal welfare consideration across animal nutrition, disease and breeding practices;
- Stress and risk management in animal handling, movement and transport;
- Pain and risk management in surgical operations;
- Regular heat stress assessment of cattle and providing shade and shelter to protect from heat and cold stress;
- Dairy facility and equipment monitoring and supervision;
- Monitoring cattle performance through regular weighing and fat scoring; and,
- Continuous welfare monitoring and improvement.

9.1.5 Future Goals

YFP is dedicated to ongoing improvement in animal welfare, with future goals including:

- **Technology Integration:** Exploring the use of precision farming tools, such as wearable sensors, to monitor cow behaviour and health in real time.
- **Facility Upgrades:** Investing in advanced housing designs and cooling systems to enhance cow comfort in both wet and dry lot environments.
- **Staff Development:** Expanding training programs to incorporate the latest research on animal behaviour and welfare.

By embedding these initiatives into its operational strategy, YFP ensures that animal welfare remains a cornerstone of its success and sustainability.

9.2 Biosecurity Management

9.2.1 Pest Management

Many pests have the potential to breed in or derive shelter and sustenance in feedlots and water holding ponds. They may have an impact on community amenity, directly and indirectly affecting the health of people and domestic animals, reducing biodiversity in the natural environment, damaging crops and degrading soil and water resources (Animal Health Australia, 2013b).

Mice and rats are a seasonal or sporadic problem, breeding in the open under warm conditions and entering buildings and feedlots seeking food and shelter under cold and or wet conditions. They may spoil food, carry and spread disease, damage buildings, and can threaten agricultural productivity because they feed heavily on grain. The proposed development may make the site more attractive to these rodent pests (Animal Health Australia, 2013a).

Biting insects and flies may also be a problem. The proposed site will install wastewater ponds and a composting pad, which could potentially act as breeding grounds. Flies tend to be a seasonal problem in most rural areas, breeding in material such as animal dung under favourable temperature and moisture conditions. These insects may cause nuisance and amenity issues, as well as carry disease (Animal Health Australia, 2013a).

Of the major fly species found at feedlots, only house flies and stable flies breed at the feedlot; other species predominantly breed elsewhere. Flies breed in a number of relatively small areas, the most common being manure, vegetation and moist areas (e.g. in hospital and induction areas, under fence-line manure, drains, silage pits and heavily grassed areas adjacent to the feedlot).

Pen cleaning has a short-lived effect on fly breeding since manure quickly builds up under fences after cleaning. Because this manure is not trampled by the livestock it provides good larvae habitat. Most feedlots use fly control including baits, insecticide sprays and traps. Fly baits have limited effectiveness as they attract and kill only adult house flies. There are also resistance issues with these. On the whole, insecticidal treatments have limited effectiveness (Tucker et al., 2015).

Urech et al. (2004) outlines the best control of nuisance flies at a feedlot site:

- Reduce fly breeding sites through:
 - manure management: clean under fence lines, sedimentation basins, drains, hospital pens and manure stockpiles;
 - clean up feed spilled near the bunks, hospital pens, stables and feedmill good feedstuff storage – some ingredients, such as molasses and silage, attract more flies. Clean up spills and keep silage well covered;
 - appropriate mortality management – compost and cover completely; and,
 - maintaining feedlot troughs, drains and sedimentation basins and vegetation management, mowing or slashing around the feedlot complex, particularly areas adjacent to drains and pens.
- Using insecticides selectively:
 - rotate chemical groups;
 - target insecticide use towards hot spots;
 - use residual adulticides, particularly on resting sites rather than manure;
 - use larvicides that will not affect beneficial insects; and,

- use baits for house flies with rotation between chemical groups.
- Lot feeding design principles, including:
 - suitable pen foundation and slope;
 - good feed bunk and water trough design;
 - fence design that allows for ready drainage and easy cleaning;
 - excellent overall site drainage;
 - good construction of drains, sedimentation systems and effluent holding ponds; and,
 - well-designed manure stockpile and composting area.
- Enhancing populations of biological control agents through:
 - biological control agents, such as parasitic wasps, predatory mites and entomopathogenic fungi, that can play an important role in killing larvae and flies; (further development is needed);
 - sustaining target parasite and predator populations through appropriate management; and,
 - boosting parasite populations through strategic releases.
- Systematically monitor fly populations by:
 - scouting adults and larvae to determine population thresholds;
 - using traps for adults; larval density ratings for immatures; and,
 - observing animals.

9.2.2 Weed Management

The proliferation of noxious and environmental weeds on and adjacent to this site may have significant impacts, including degradation of water quality, increased intensity of fires, toxic effects on stock, displacement of native flora and fauna, as well as legal implications for failing to control such weeds (Animal Health Australia, 2013b).

This development will have the potential to introduce weeds to the site and surrounds in several ways. They may be introduced to the site or spread to other sites via livestock (hooves, hides and manure), transport trucks, construction and operation vehicles, and by vertebrate pests (e.g. foxes). Additionally, weeds can be transported downstream if stormwater retention is found to be inadequate (Animal Health Australia, 2013a).

Appropriate management of weeds will need to be undertaken to ensure that the spread of noxious weeds does not occur.

9.2.3 General Biosecurity Measures

The biosecurity objectives of the site are to:

- Manage and control noxious and environmental weeds and pests within the site area;
- Prevent the introduction of new weed or pest species to the site area as a result of construction and operational activities; and,
- Prevent the spread/increase of current weed and pest populations within the site area or any areas adjacent to the site.

The following construction and operational mitigation and management procedures will be applied:

- Vehicles will be inspected while being washed at the wash-down facility to ensure that there are no “hitchhiking” weeds or pests;
- Additional manure will be added to burial piles with dead livestock to hide the smell from potential scavengers;
- Good “house-keeping” of the feed storage and feedmill areas will prevent infestation by rats, mice and rock doves. This is critical to reduction of feed spoilage and minimisation of disease risks;
- Any debris lying around will be stored to ensure that suitable habitat is limited for smaller pests;
- All wastewater and freshwater ponds will be monitored for pests; and,

- Composting piles will be monitored for presence of pests.

Flies can breed in wet manure, decaying feed and dead animals. Fly breeding grounds will be eliminated with the following actions:

- Shaping all areas close to the facilities so that they are sloped and free draining so no wet areas exist;
- Manure will be managed so that there are no areas where wet manure can accumulate without being disturbed and aerated (by stock movement);
- Sludge will be collected frequently and taken to the compost area or applied directly to the WUDA(s);
- All spoiled feed will be collected and removed to the composting area; and,
- Dead animals will be composted on-site in windrows of manure and spent/spoiled feed (this is a common; and accepted practice in the Australian lot feeding industry; flies do not breed in hot compost windrows).

The best means of preventing infestations of midges and mosquitos is to ensure that there are as few open and unmanaged water bodies possible in which they can breed, and if such water bodies do exist, that they can be treated if required. Engineering and operational mitigation will be applied. This includes:

- All drains will have slopes $>0.5\%$ so no low spots occur, eliminating any pooling;
- The sedimentation pond will be self-draining and with concrete lined weirs and access ramps so it can be quickly and efficiently cleaned to expedite sludge removal;
- Holding ponds will be designed and constructed so that they can be dewatered completely (with a sump for the pump suction). They will have steep batters (1H:3V) to prevent any shallow areas and the floor of the ponds will have slopes of 1% ;
- Vegetation will be regularly cleared from the edges of water storages and holding ponds; and,
- Grassed areas close to drains, sedimentation basin, holding ponds and water storages will be regularly slashed; before the wet season and through the wet season where possible.

Recommended weed engineering and operational mitigation measures include:

- A wash-down area should be constructed to ensure that incoming vehicles and machinery do not bring weeds to the site;
- Livestock should be checked for cleanliness and if needed be washed down on arrival;
- Feed stuffs purchased for use on the property will be procured on the basis that they are free of weeds;
- The property should be monitored regularly for weed presence and effectiveness of weed treatment methods;
- Staff environmental training will be conducted to ensure that weed monitoring and treatment are carried out efficiently; and,
- Weeds should be controlled either with herbicide or manually.

Further details regarding biosecurity management measures are outlined in the Environmental Management Plan (refer to Appendix N).

9.3 Disease Prevention and Management

It is essential to monitor animal health status regularly. Cattle can be vulnerable to summer conditions as their immune systems can be significantly affected by heat. Therefore, provision of shade and spacing, good nutrition management and disease prevention can support reproductive success and a healthy feedlot system, especially during hot climatic conditions (Sneath & Bath, 2011b).

Diseases that cattle are prone to in New South Wales are outlined in Table 29 (NSW Government, 2025)

Table 29 Cattle Diseases

Bloat	Theileria	Lumpy skin disease
Bovine Ephemeral Fever	Ticks and livestock infestation	Phalaris Staggers
Bovine Vibriosis	Liver fluke	Pinkeye
Flood Mud Scours	Flystrike	Johne's disease
Foot and mouth disease		

Vaccinations are an important part of disease prevention in an animal health program. Vaccinations need to be combined with specific management practices for best control of some diseases (Vinson & Hamlyn-Hill, 2011).

Table 30 provides details about key vaccines used in New South Wales cattle (Robson, 2007).

Table 30 Vaccinations for Cattle

Disease	Animals to Treat
Clostridial diseases (Blackleg, tetanus, and pulpy kidney)	Calves from 6–8 weeks to 2 years old.
Leptospirosis	Maiden heifers and pregnant cows.
Three day sickness (Bovine ephemeral fever)	Current season's sale cattle and bulls.
Botulism	All susceptible animals.
Tick fever	All animals including home-grown and introduced, particularly animals considered 'at risk', e.g. cattle with lower Brahman content.
Vibriosis	All bulls and in infected herds, vaccinate two year old heifers with one dose about one month before mating.
Pestivirus (Bovine viral diarrhoea virus)	All breeding cattle including bulls. Introduced females and introduced bulls.

Table 31 provides details about prevention measures for common cattle diseases. These measures are going to be included in the YFP environmental management procedures.

Table 31 Common Disease and Prevention Measures (Meat & Livestock Australia, 2024)

Disease	Predisposing causes	Management for Prevention
Lameness	Lameness is one of the most common health issues in confined systems, especially in wet and dry lots where cows may stand or walk on hard, uneven, or wet surfaces for prolonged periods. This can lead to hoof problems such as hoof rot, laminitis, and digital dermatitis.	Proper hoof care, regular trimming, and the use of non-slip flooring in the dry lots can help reduce the risk.
Mastitis	Mastitis is an inflammation of the udder, typically caused by bacterial infections (e.g., <i>Escherichia coli</i> , <i>Staphylococcus aureus</i>). Wet environments, poor hygiene during milking, and overcrowding can increase the risk of infection.	Ensuring clean, dry bedding, proper milking hygiene, and good environmental management can help prevent mastitis.
Respiratory Disease	Respiratory diseases like bovine respiratory disease (BRD) or pneumonia are common in both wet and dry lot systems, especially when cattle are exposed to cold, wet, or poorly ventilated environments. The dust from dry lots can also irritate the respiratory system.	Ensuring good ventilation in the dry lot systems, maintaining proper hygiene, and minimising stress are essential in preventing respiratory infections.
Parasite Infections	Parasites, such as external parasites (e.g., flies, lice) and internal parasites (e.g., worms), can thrive in confined systems where cattle are in close proximity to each other. Wet environments, especially in dry lot systems, can also increase the risk of parasitic infestations.	Regular deworming programs, maintaining clean bedding, and controlling fly populations can help reduce the impact of parasites.

Disease	Predisposing causes	Management for Prevention
Bloat	Bloat is caused by the accumulation of gas in the rumen, which can occur in both wet and dry lot systems, particularly when cattle are fed a diet that is too rich in fermentable carbohydrates or rapidly fermenting forages.	Proper diet formulation, gradual changes in diet, and monitoring cattle's feed intake can help prevent bloat.
Foot and Mouth Disease (FMD)	While not exclusive to wet and dry lot systems, FMD is a highly contagious viral disease that can affect cattle in these environments, especially if biosecurity measures are lax or if cattle are exposed to infected animals.	Strict biosecurity measures, including vaccination where applicable, quarantine practices, and preventing exposure to contaminated animals or materials, are critical in preventing FMD outbreaks.
Johne's Disease	Johne's disease, caused by <i>Mycobacterium avium</i> paratuberculosis, is a chronic bacterial infection that primarily affects the intestines of cattle. It is transmitted through fecal-oral contact, and in confined systems, the risk of transmission increases due to close proximity and inadequate sanitation.	Implementing a biosecurity plan, regular testing, and managing cattle in smaller groups to reduce cross-contamination can help manage the risk of Johne's disease.
Pink eye	Irritation secondary to dusty conditions or grass seed infestation; vitamin A deficiency.	Minimise dust in the yards through pad structure and stocking density.
Acidosis	Ruminal acidosis occurs when cows are fed large quantities of high-starch, low-fiber diets (e.g., grains or silage), which can lead to an acidic environment in the rumen. This is especially common in intensive systems where feed management may not be well balanced.	Properly balanced diets with adequate fiber, gradual changes in feeding regimes, and monitoring of cows' ruminal health can help prevent acidosis.

10. Environmental Management: Summary

10.1 Environmental Assessment: Risk Assessment (Summary)

Key environmental risks for the environmental assessment of the proposed dairy expansion were identified in Section 7.3. Detailed environmental impacts were assessed and appropriate management and mitigation measures were outlined in the EMP.

Residual risks after implementing appropriate management and mitigation measures for all identified environmental risks for the development were calculated.

Residual risks for key environmental concerns are summarised in Table 32 below.

Table 32 Residual risk for key environmental concerns

Operational Activity/Aspect/Hazard	Initial Risks			Management/Mitigation Measures	Residual Risks		
	L	C	R		L	C	R
Light and heavy vehicles entering and leaving site increasing traffic risk of safety. Light vehicles contribution relates to transport of employees. Heavy vehicles contribution relates to milk collection and feed deliveries.	5	5	S	Completion of a traffic impact assessment. Refer to Section 8.5. Site access to be upgraded in accordance with relevant standards.	1	5	H
Light and heavy vehicles entering and leaving site increasing traffic on local roads.	5	5	S	Completion of a traffic impact assessment. Refer to Section 8.5 Designation of a car parking area to cater for at least 6 passenger vehicles during construction and operational phases.	1	5	H
Light and heavy vehicles entering and leaving site generating dust.	4	5	S	Completion of air quality assessment (Refer to Section 8.2). (Refer to Appendix N, EMP, Section 6.1). Dust management measures to be implemented during the construction and operational phases	1	5	H
Keeping livestock onsite causing odour.	5	4	S	(Refer to Section 8.2). Completion of air quality assessment (Refer to Section 5.2). Odour generating infrastructure located with appropriate setbacks from sensitive receptors (Refer to Appendix N, EMP, Section 6.1). Odour management measures are to be implemented	1	4	M
Keeping livestock onsite causing dust.	4	5	S	Completion of air quality assessment (Refer to Section 8.2). (Refer to Appendix N, EMP, Section 6.1). Dust management measures to be implemented during the operational phase	1	5	H
Dust from very dry pens caused by very low stocking rates in extreme droughts.	4	5	S	Completion of air quality assessment (Refer to Section 8.2). (Refer to Appendix N, EMP, Section 6.1). Dust management measures to be implemented during the operational phase	1	5	H
Offensive odour from continuously wet pens causing	5	4	S	Completion of air quality assessment (Refer to Section 8.2).	1	4	M

anaerobic conditions.				Odour generating infrastructure located with appropriate setbacks from sensitive receptors (Refer to Section 5.2). Odour management measures to be implemented (Refer to Appendix N, EMP, Section 6.1).			
Keeping livestock onsite creating biohazardous waste.	4	5	S	Identification of waste types and appropriate waste management systems (Refer to Section 5.3.4). Proper design of waste management systems (Refer to Sections 5.3.4 & 8.1). Implementation of waste management measures (Refer to Appendix N, EMP, Section 6.3).	1	5	H
Leaching of effluent to groundwater causing contamination.	4	5	S	Site-specific soils and water quality risk assessment on existing conditions (Refer to Section 8.3). Proper design of proposed effluent storage systems (Refer to Sections 5.3.4, 5.3.5 and 8.3). Appropriate construction materials to be utilised. Ponds and drainage must be lined with compacted clay. Implementation of EMP (Refer to Appendix N, Section 6.4). Implementation of CIMP (Refer to Appendix M). Environmental monitoring (Refer to Section 10.2).	1	5	H
Spills from holding ponds caused by the failure to dewater by irrigation.	4	5	S	Implementation of EMP (Refer to Appendix N, Section 6.3.2 & 6.4). Implementation of CIMP (Refer to Appendix M). Environmental monitoring (Refer to Section 10.2).	1	5	H
Escape of tailwaters/spills of wastewater to Murray Irrigation areas due to overloaded irrigation areas, failure to return tailwaters for reuse, insufficient land areas.	4	5	S	Implementation of EMP (Refer to Appendix N, Section 6.3.2 & 6.4). Implementation of CIMP (Refer to Appendix M). Expansion of waste utilisation disposal areas. Environmental monitoring (Refer to Section 10.2).	1	5	H
Wastewater treatment and application.	4	5	S	Implementation of EMP (Refer to Appendix N, Section 6.3.2 & 6.4). Implementation of CIMP (Refer to Appendix M). Expansion of waste utilisation disposal areas (progressive). Environmental monitoring (Refer to Section 10.2).	1	5	H

10.2 Environmental Management Plan

The Environmental Assessment and its Risk Assessment has been used to define the extents of environmental management of the site. It focuses on key residual risks.

A management-based conditions approach has been established for 'Gunyah Park' dairy to reduce potential environmental impacts arising from the dairy operations.

This is set out in an Environmental Management Plan (EMP).

Appendix N includes the full EMP. The EMP is:

- An environmental quality assurance document that is to be used by the site for its quality manual;
- A tool that ensures identification, documentation and management of environmental hazard/risk; and,
- A reference document that ensures YFP's environmental commitments are being implemented, monitored, audited/reviewed.

11.Environmental Monitoring: Summary

Due to the management of dairy wastes (manure and effluent) through land application, soil and water monitoring is required at the site.

Soil and water monitoring enable YFP to better manage soil fertility, crop production and nutrient and salt loadings across paddocks where manure/sludge and effluent are being applied.

Soil and water monitoring also enables the NSW EPA to effectively evaluate environmental conditions and implement environmental and public health protection measures. These are important in achieving sustainable development and long-term environmental protection.

The soil and water monitoring points are shown in Figure 16.

A summary of the ongoing (annual) environmental monitoring required at the proposed monitoring locations is presented in Table 33.

Table 33 Environmental Monitoring Parameters

Monitoring Point	Parameter	Method/Notes
Groundwater Quality		
PZ1, PZ2, PZ3, PZ4	Electrical conductivity, uS/cm	Representative sample
	Nitrogen (ammonia), mg/L	
	Nitrogen (nitrate), mg/L	
	Nitrogen (nitrite), mg/L	
	Nitrogen (total), mg/L	
	pH	
	Phosphorus, mg/L	
	Potassium, mg/L	
	Standing Water Level, m AHD	In situ
Effluent Quality		
E1, E2	Electrical conductivity, uS/cm	Representative sample
	Nitrogen (total), mg/L	
	pH	
	Phosphorus (total), mg/L	
	Potassium, mg/L	
	Sodium Adsorption Ratio	
Effluent Discharge Volume		
E1, E2	Volume, L	Must be measured daily during discharge. Flow meter and continuous logger.
Soil Quality		
SS1, SS2, SS3, SS4, SS5, SS6, SS7, SS8, SS9, SS10	Available phosphorus, mg/kg	Composite sample.
	Cation Exchange Capacity, meq	Auger sampling to these depths:
	Chloride, mg/kg	Top soils (0-30 cm)
	Electrical conductivity, uS/cm	Sub soils (30-60 cm).
	Exchangeable calcium, meq	
	Exchangeable magnesium, meq	

	Exchangeable potassium, meq	
	Exchangeable sodium, meq	
	Exchangeable sodium percentage, %	
	Nitrate, mg/kg	
	Organic carbon, %	
	pH	
	Phosphorus Sorption Capacity, mg/kg	
Weather		
	Wind Speed at 10 metres, m/s	The site is currently monitoring weather through a privately owned station 7 km away from the site, with consent from the owner. EPA to confirm YFP can keep current method.
	Wind Direction at 10 metres, °	
	Temperature at 2 metres, °C	
	Rainfall, mm	
Manure/Sludge Quality		
Manure, Sludge	Electrical conductivity, uS/cm	Representative sample
	Nitrogen (total), mg/L	
	pH	
	Phosphorus (total), mg/L	
	Potassium, mg/L	

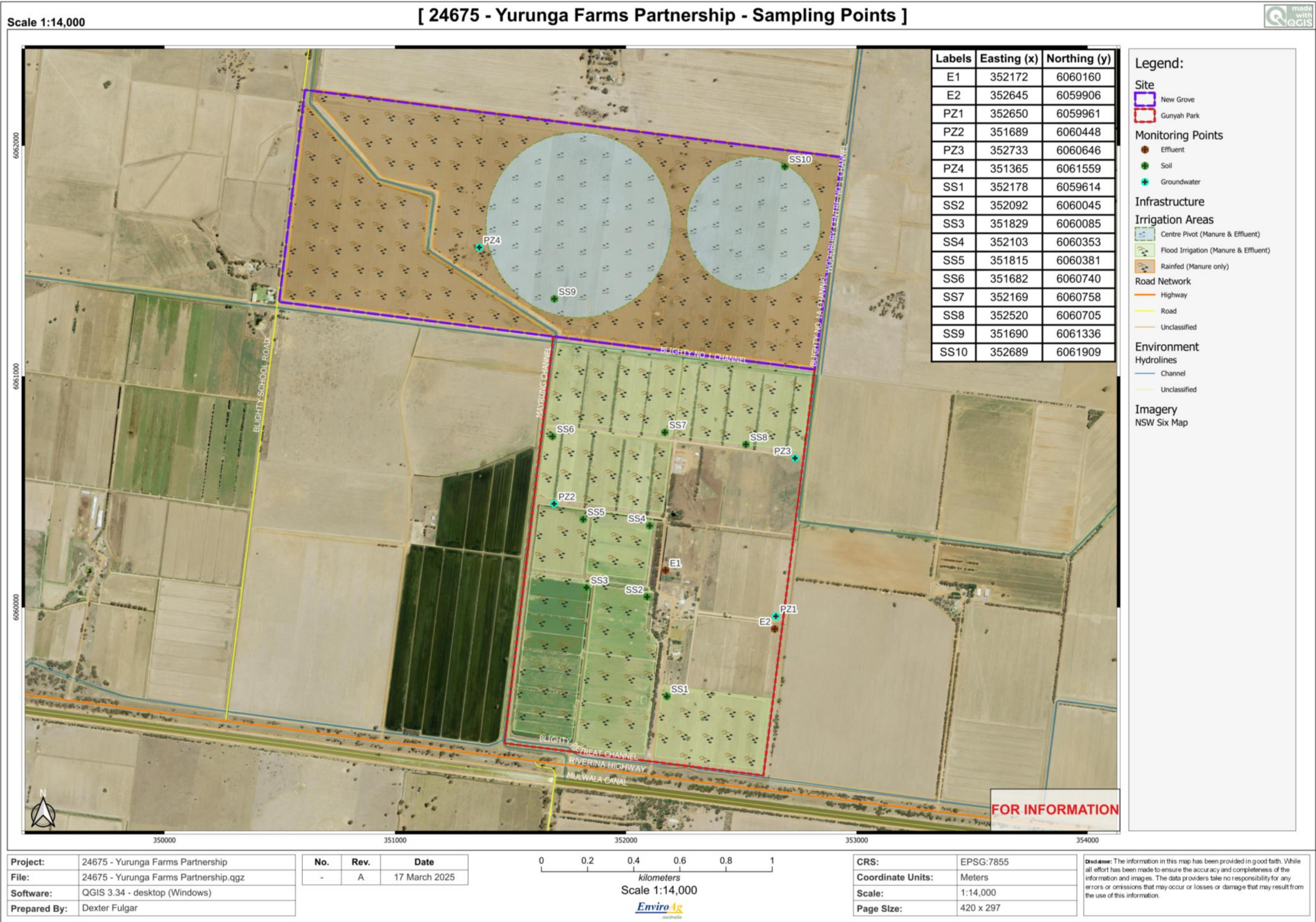


Figure 16 Environmental Monitoring Points

12. Conclusion

12.1 Justification of the Proposal

The proposed development is a rural pursuit in a rural environment.

The location of the site is suitable for the development due to the following;

- The land is zoned as RU1 Primary Production under the Conargo Local Environmental Plan 2013 (Conargo Local Environmental Plan 2013 - NSW Legislation, 2013);
- The site has an established dairy and has previously operated with < 800 head herd;
- The site is located in the Murray Irrigation District, some of which are dairy farming enterprises; and,
- The site has adequate access to surface and groundwater supply to sustain its proposed expanded dairy operations.

The proposed development will provide employment for at least 21 staff in its full operations, with additional farm hand casual jobs to be offered during peak cropping seasons. All of the employment requirements for the proposed dairy farm are to be sourced locally (as first preference).

The proposed development will provide support to local businesses from the construction of the expanded facility, through to ongoing maintenance required by the facilities. There will also be an increased quantity of feed stocks to be purchased from the neighbouring and nearby farms due to the increase in total dairy herd.

Based on the above biophysical, social and economic benefits, the proposed development will provide a positive contribution to its local and regional economy and community.

12.2 Summary of Environmental Assessment

The primary goals for the proposed development are minimising land use conflicts, and environmental protection.

A preliminary environmental risk assessment was conducted to align with statutory requirements and in relation with the actual site conditions. This was undertaken for: waste management, air quality, soil and water, noise and vibration; traffic and transport, biodiversity, bushfire, visual, heritage, animal welfare, biosecurity and disease (Refer to Section 7).

The identified risks were ranked according to their severity. The most significant risks were related to potential operational impacts on traffic, air quality, soil quality, water quality and animal welfare. Detailed site assessments were undertaken to obtain further information in order to appropriately manage the most significant risks (Refer to Section 7.3).

The environmental assessment showed that all environmental risks that may result from the proposed development can be mitigated and managed through implementation of appropriate measures. Little residual risk remains and those risks can be managed reasonably.

The outcomes of the environmental assessment formulated technical recommendations for YFP's implementation (Refer to Section 12.3).

12.3 Recommendations

It is recommended that:

- (a) this Environmental Assessment be accepted in support of the proposed development; and,
- (b) The Environmental Assessment and its Management Plans become part of the Approvals and Condition(s) (ing).

The following recommendations are to be implemented by YFP to ensure compliance:

- (i) The dairy expansion development will be in accordance with the Concept Plan and recommendations provided in each environmental assessment;
- (ii) Detailed design of proposed infrastructure must adhere with the design considerations outlined in Section 5.3;
- (iii) Intersection upgrade is required between site entrance and Riverina Highway (standard T Bal);
- (iv) Car parking of at least 6 passenger vehicles must be dedicated for construction and operational use;
- (v) The following site-based management plans must be adhered to:
 - a. Environmental Management Plan; and,
 - b. Crop and Irrigation Management Plan;
- (vi) Staged expansion of irrigable area to manage potential salinity issues in the future (Stage A = 2-3 years, and Stage B in the next 5 to 10 years),
- (vii) Contracted off site sale of manure and sludge; and,
- (viii) Compliance with any Council requirements moving forward.

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Appendix A. SEARs

Department of Planning, Housing and Infrastructure

27 MARCH 2024

Mr Daniel Drum
Premise Australia Pty Ltd
PO BOX 1963
Orange NSW 2800

EF24/2458
SEAR 1861

Dear Mr Drum,

Proposed Dairy
18214 Riverina Highway, Blighty (Lot 87 and DP756251) - Deniliquin LGA
Planning Secretary's Environmental Assessment Requirements (SEAR) 1861

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 may require approvals under the *Protection of the Environment Operations Act 1997*, *Roads Act 1993*, *Water Management Act 2000* and the *National Parks and Wildlife Act 1974*. In preparing the SEARs, the Department of Planning, Housing and Infrastructure (the Department) has consulted with the Environment Protection Authority, Water NSW and Department of Primary Industries. A copy of their requirements is attached.

Unfortunately, National Parks and Wildlife Service and Transport for NSW were unable to respond in time. You must undertake direct consultation with them and address their requirements in the EIS.

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 Climate Change, Energy, the Environment and Water on (02) 6274 1111.

Should you have any further enquiries, please contact Greg Michales, Planning and Assessment, at the Department on (02) 8217 2049 or via greg.michales@dpie.nsw.gov.au

Yours sincerely



Joanna Bakopanos

A/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	1861
Proposal	Expansion of existing dairy operation, including construction of a new robotic dairy, decommissioning of existing dairy and re-purposing, construction of further dry lots, effluent management dams and liquid and solid waste application area.
Location	18214 Riverina Highway, Blighty Lot 87 DP756251
Applicant	Premise Australia Pty Ltd
Date of Issue	27 MARCH 2024
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 <i>Environmental Planning and Assessment Regulation 2021</i> .
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 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 for the proposal and suitability of the site for the development having regard to the matters raised by Department of Primary Industries - Agriculture – a Land Use Conflict Risk Assessment prepared in accordance with

	<p>relevant Department of Primary Industries guidelines.</p> <ul style="list-style-type: none"> - a detailed justification that the site can accommodate the proposed expansion, having regard to the scope of the operations and its environmental impacts and relevant mitigation measures - site plans depicting the proposed layout, including the location of machinery and equipment and waste application areas. <ul style="list-style-type: none"> • waste management – including: <ul style="list-style-type: none"> - details of waste handling including transport, identification, receipt, stockpiling and quality control including off-site reuse and disposal - detail of waste management including manure and disposal of dead cattle for the proposal - details of the type, quantity and classification of waste to be received at the site - details of the key pollutant concentrations of wastewater before and after treatment with reference to relevant water quality guidelines. • 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 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. • air quality – including: <ul style="list-style-type: none"> - a description of all potential sources of air and odour emissions during construction and operation - an air quality impact assessment in accordance with relevant Environment Protection Authority guidelines - a description and appraisal of air quality impact 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 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 - a detailed site water balance - an assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment - details of sediment and erosion controls
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	<ul style="list-style-type: none"> - an assessment of the potential impacts of the proposal on waterfront land in line with the Natural Resource Access Regulators' <i>Guidelines for controlled activities on waterfront land</i> - an assessment of potential impacts on the quality and quantity of surface and groundwater resources - 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"> • noise and vibration – including: <ul style="list-style-type: none"> - a description of all potential noise and vibration sources during construction and operation of the expansion, including road traffic noise and cumulative impacts - a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines - a description and appraisal of noise and vibration mitigation measures. • 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. • biodiversity – including a description of any potential vegetation clearing needed to undertake the proposal and any impacts on flora and fauna. • bushfire – including an assessment of bushfire risks and asset protection zones (APZ) in accordance with NSW Rural Fire Service guidelines. • visual – including an impact assessment at private receptors and public vantage points. • heritage – including Aboriginal and non-Aboriginal cultural heritage.
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 (Transport and Infrastructure) 2021 • State Environmental Planning Policy (Primary Production) 2021 • State Environmental Planning Policy (Resilience and Hazards) 2021 (Chapters 2, 3 and 4) • Conargo Local Environmental Plan 2013 • relevant development control plans and section 7.11 plans.
Guidelines	<p>During the preparation of the EIS you should consult the Department's Register</p>

	<p>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 Climate Change, Energy, the Environment and Water, specifically the: <ul style="list-style-type: none"> ○ Water Group ○ Environment Protection Authority ○ National Parks and Wildlife Services • Department of Regional NSW, specifically: <ul style="list-style-type: none"> ○ Department of Primary Industries – Agriculture ○ Local Land Services • Transport for NSW • NSW Rural Fire Service • WaterNSW • Deniliquin Local Aboriginal Land Council • Edward River 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 two years of the issue date of these SEARs, you must consult with the Planning Secretary in relation to any further requirements for lodgement.</p>

26 February 2024

greg.michales@dpie.nsw.gov.au

Contact: Simone Tonkin
Phone: 0427 138 188
Email: simone.tonkin@watnsw.com.au
Our ref:

Dear Mr Michales,

**Re: SEARs ID No. 1861– Lots 87 DP 756251, Dairy exceeding more than 800 head,
18214 Riverina Highway, Blighy NSW 2710**

WaterNSW has reviewed the supporting documentation accompanying the request for Secretary's Environmental Assessment Requirements (SEARs) and provides the following comments below, and further detail in **Attachment A**.

It is recommended that the EIS be required to include:

Access to surface and groundwater resources

- Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.
- Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).
- Assessment of the impact and approvals (Works and Use Approvals under the WMA 2000) required for the taking or storage of water.
- The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.
- A detailed and consolidated site water balance.

Impact on surface and groundwater resources

- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.
 - Full technical details and data of all surface and groundwater modelling.
 - Proposed surface and groundwater monitoring activities and methodologies.
 - Proposed management and disposal of produced or incidental water.
-

Flooding

WaterNSW is responsible for the management and licensing of flood work approvals.

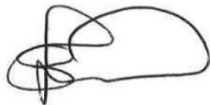
If the proposal is for an earthwork, embankment or levee, wherever situated or proposed to be constructed that is reasonably likely to affect the flow of water to or from a river or lake then the assessment is required to address potential impacts detailed further in attachment A.

Impact on waterfront land and water resource dependents

- Clear identification of "waterfront land" (as defined in the WMA 2000) and an assessment of impacts of works and activities on waterfront land. (Works on waterfront land may be subject to Controlled Activity Approval (CAA) under the *Water Management Act 2000*.)
- Details of the final landform of the site, including final void management (where relevant) and rehabilitation measures.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.
- Consideration of relevant policies and guidelines.
- A statement of where each element of the SEARs is addressed in the EIS (i.e. in the form of a table).

Please direct any questions or correspondence to **Simone Tonkin** at simone.tonkin@waterNSW.com.au.

Yours sincerely



Simone Tonkin
Water Regulation Specialist
WaterNSW

WaterNSW General Assessment Requirements

The following detailed assessment requirements are provided to assist in adequately addressing the assessment requirements for this proposal.

For further information visit the website, www.water.nsw.gov.au

Key Relevant Legislative Instruments

This section provides a basic summary to aid proponents in the development of an Environmental Impact Statement (EIS), and should not be considered a complete list or comprehensive summary of relevant legislative instruments that may apply to the regulation of water resources for a project.

The EIS should take into account the objects and regulatory requirements of the *Water Management Act 2000* (WMA 2000), and associated regulations and instruments, as applicable.

Water Management Act 2000 (WMA 2000)

Key points:

- Volumetric licensing in areas covered by water sharing plans
- Works within 40m of waterfront land
- SSD & SSI projects are exempt from requiring water supply work approvals and controlled activity approvals as a result of the *Environmental Planning & Assessment Act 1979* (EP&A Act).
- No exemptions for volumetric licensing apply as a result of the *EP&A Act*.
- Basic landholder rights, including harvestable rights dams
- Aquifer interference activity approval and flood management work approval provisions have not yet commenced and are regulated by the *Water Act 1912*
- Maximum penalties of \$2.2 million plus \$264,000 for each day an offence continues apply under the *WMA 2000*

Water Management (General) Regulation 2011

Key points:

- Provides various exemptions for volumetric licensing and activity approvals
- Provides further detail on requirements for dealings and applications.

Water Sharing Plans – these are considered regulations under the *WMA 2000*

Access Licence Dealing Principles Order 2004

Harvestable Rights Orders

Water Sharing Plans

It is important that the proponent understands and describes the ground and surface water sharing plans, water sources, and management zones that apply to the project. The relevant water sharing plans can be determined spatially at www.ourwater.nsw.gov.au. Multiple water sharing plans may apply and these must all be described.

The EIS is required to:

- Demonstrate how the proposal is consistent with the relevant rules of the Water Sharing Plan including rules for access licences, distance restrictions for water supply works and rules for the management of local impacts in respect of surface water and groundwater sources, ecosystem protection (including groundwater dependent ecosystems), water quality and surface-groundwater connectivity.
 - Provide a description of any site water use (amount of water to be taken from each water source) and management including all sediment dams, clear water diversion structures
-

with detail on the location, design specifications and storage capacities for all the existing and proposed water management structures.

- Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP, including:
 - Sufficient market depth to acquire the necessary entitlements for each water source.
 - Ability to carry out a “dealing” to transfer the water to relevant location under the rules of the WSP.
 - Daily and long-term access rules.
 - Account management and carryover provisions.
- Provide a detailed and consolidated site water balance.
- Further detail on licensing requirements is provided below.

Relevant Policies and Guidelines

The EIS should take into account the following policies (as applicable):

- NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012)
- NSW Aquifer Interference Policy (NOW, 2012)
- Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW, 2012)
- Australian Groundwater Modelling Guidelines (NWC, 2012)
- NSW State Rivers and Estuary Policy (1993)
- NSW Wetlands Policy (2010)
- NSW State Groundwater Policy Framework Document (1997)
- NSW State Groundwater Quality Protection Policy (1998)
- NSW State Groundwater Dependent Ecosystems Policy (2002)
- NSW Water Extraction Monitoring Policy (2007)

Policies can be accessed at the following links:

<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/default.aspx>
<http://www.water.nsw.gov.au/Water-licensing/Approvals/Controlled-activities/default.aspx>

An assessment framework for the NSW Aquifer Interference Policy can be found online at:
<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/Aquifer-interference>.

Licensing Considerations

The EIS is required to provide:

- Identification of water requirements for the life of the project in terms of both volume and timing (including predictions of potential ongoing groundwater take following the cessation of operations at the site – such as evaporative loss from open voids or inflows).
 - Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction from each water source as defined in the relevant Water Sharing Plan/s and all water supply works to take water.
 - Explanation of how the required water entitlements will be obtained (i.e. through a new or existing licence/s, trading on the water market, controlled allocations etc.).
 - Information on the purpose, location, construction and expected annual extraction volumes including details on all existing and proposed water supply works which take surface water, (pumps, dams, diversions, etc).
-

- Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring. All predicted groundwater take must be accounted for through adequate licensing.
- Details on existing dams/storages (including the date of construction, location, purpose, size and capacity) and any proposal to change the purpose of existing dams/storages
- Details on the location, purpose, size and capacity of any new proposed dams/storages.
- Applicability of any exemptions under the *Water Management (General) Regulation 2011* to the project.

Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered.

The Harvestable Right gives landholders the right to capture and use for any purpose 10 % of the average annual runoff from their property. The Harvestable Right has been defined in terms of an equivalent dam capacity called the Maximum Harvestable Right Dam Capacity (MHRDC). The MHRDC is determined by the area of the property (in hectares) and a site-specific run-off factor. The MHRDC includes the capacity of all existing dams on the property that do not have a current water licence. Storages capturing up to the harvestable right capacity are not required to be licensed but any capacity of the total of all storages/dams on the property greater than the MHRDC may require a licence.

For more information on Harvestable Right dams, including a calculator, visit:

<http://www.water.nsw.gov.au/Water-licensing/Basic-water-rights/Harvesting-runoff/Harvesting-runoff>

Dam Safety

Where new or modified dams are proposed, or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety issues that may arise. Conditions of approval may be recommended to ensure safety in relation to any new or existing dams.

See www.damsafety.nsw.gov.au for further information.

Surface Water Assessment

The predictive assessment of the impact of the proposed project on surface water sources should include the following:

- Identification of all surface water features including watercourses, wetlands and floodplains transected by or adjacent to the proposed project.
 - Identification of all surface water sources as described by the relevant water sharing plan.
 - Detailed description of dependent ecosystems and existing surface water users within the area, including basic landholder rights to water and adjacent/downstream licensed water users.
 - Description of all works and surface infrastructure that will intercept, store, convey, or otherwise interact with surface water resources.
 - Assessment of predicted impacts on the following:
 - flow of surface water, sediment movement, channel stability, and hydraulic regime,
 - water quality,
 - flood regime,
 - dependent ecosystems,
-

- existing surface water users, and
- planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.

Flooding

If the proposal is for an earthwork, embankment or levee, wherever situated or proposed to be constructed that is reasonably likely to affect the flow of water to or from a river or lake then the assessment is required to address potential impacts detailed below;

- the contents of any relevant floodplain management plan or any other relevant Government policy,
- the need to maintain the natural flood regimes in wetlands and related ecosystems and the preservation of any habitat, animals (including fish) or plants that benefit from periodic flooding,
- the effect or likely effect on water flows in downstream river sections,
- any geographical features, or other matters, of Aboriginal interest that may be affected by a controlled work,
- the effect or likely effect of a controlled work on the passage, flow and distribution of any flood waters,
- the effect or likely effect of a controlled work on existing dominant flood ways or exits from flood ways, rates of flow, flood water levels and the duration of inundation, the protection of the environment

Groundwater Assessment

To ensure the sustainable and integrated management of groundwater sources, the EIS needs to include adequate details to assess the impact of the project on all groundwater sources including:

- Works likely to intercept, connect with or infiltrate the groundwater sources.
 - Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes.
 - Bore construction information is to be supplied to DPI Water by submitting a “Form A” template. DPI Water will supply “GW” registration numbers (and licence/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting.
 - A description of the water table and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources).
 - Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and GDEs to establish a baseline incorporating typical temporal and spatial variations.
 - The predicted impacts of any final landform on the groundwater regime.
 - The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts.
 - An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality.
 - An assessment of the potential for groundwater contamination (considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal).
 - Measures proposed to protect groundwater quality, both in the short and long term.
 - Measures for preventing groundwater pollution so that remediation is not required.
-

- Protective measures for any groundwater dependent ecosystems (GDEs).
- Proposed methods of the disposal of waste water and approval from the relevant authority.
- The results of any models or predictive tools used.

Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:

- Any proposed monitoring programs, including water levels and quality data.
- Reporting procedures for any monitoring program including mechanism for transfer of information.
- An assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of the proposal.
- Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category).
- Description of the remedial measures or contingency plans proposed.
- Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.

Groundwater Dependent Ecosystems

The EIS must consider the potential impacts on any Groundwater Dependent Ecosystems (GDEs) at the site and in the vicinity of the site and:

- Identify any potential impacts on GDEs as a result of the proposal including:
 - the effect of the proposal on the recharge to groundwater systems;
 - the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections; and
 - the effect on the function of GDEs (habitat, groundwater levels, connectivity).
- Provide safeguard measures for any GDEs.

Watercourses, Wetlands and Riparian Land

The EIS should address the potential impacts of the project on all watercourses likely to be affected by the project, existing riparian vegetation and the rehabilitation of riparian land. It is recommended the EIS provides details on all watercourses potentially affected by the proposal, including:

- Scaled plans showing the location of:
 - wetlands/swamps, watercourses and top of bank;
 - riparian corridor widths to be established along the creeks;
 - existing riparian vegetation surrounding the watercourses (identify any areas to be protected and any riparian vegetation proposed to be removed);
 - the site boundary, the footprint of the proposal in relation to the watercourses and riparian areas; and
 - proposed location of any asset protection zones.
 - Photographs of the watercourses/wetlands and a map showing the point from which the photos were taken.
 - A detailed description of all potential impacts on the watercourses/riparian land.
-

- A detailed description of all potential impacts on the wetlands, including potential impacts to the wetlands hydrologic regime; groundwater recharge; habitat and any species that depend on the wetlands.
- A description of the design features and measures to be incorporated to mitigate potential impacts.
- Geomorphic and hydrological assessment of water courses including details of stream order (Strahler System), river style and energy regimes both in channel and on adjacent floodplains.
- Works on waterfront land may be subject to Controlled Activity Approval (CAA) under the *Water Management Act 2000*. This is managed by DPI Water. Further information can be obtained from the DPI Water's website:
www.water.nsw.gov.au [Water licensing](#) > [Approvals](#) > Controlled activities

Drill Pad, Well and Access Road Construction

- Any construction activity within 40m of a watercourse, should be designed by a suitably qualified person, consistent with the *NSW Guidelines for Controlled Activities on Waterfront Land* (July 2012).
- Construction of all wells must be undertaken in accordance with the *Minimum Construction Requirements for Water Bores in Australia* (3rd edition 2012) by a driller holding a bore drillers' licence valid in New South Wales.
- The length of time that a core hole is maintained as an open hole should be minimised.

Landform rehabilitation (including final void management)

Where significant modification to landform is proposed, the EIS must include:

- Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems;
- A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape;
- Outline of proposed construction and restoration of topography and surface drainage features if affected by the project;
- Detailed modelling of potential groundwater volume, flow and quality impacts of the presence of an inundated final void (where relevant) on identified receptors specifically considering those environmental systems that are likely to be groundwater dependent;
- An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation; and
- The measures that would be established for the long-term protection of local and regional aquifer systems and for the ongoing management of the site following the cessation of the project.

Consultation and general enquiries

General licensing enquiries can be made to Advisory Services:

water.enquiries@water.nsw.com.au, 1800 353 104.

Assessment or state significant development enquiries, or requests for review or consultation should be directed to the Strategic Stakeholder Liaison Unit, water.referrals@dpi.nsw.gov.au.

A consultation guideline and further information is available online at:

www.water.nsw.gov.au/water-management/law-and-policy/planning-and-assessment



DOC24/143804
1 March 2024

Gregory Michales
Student Planner
Industry Assessments
Department of Planning, Housing and Infrastructure

By email: greg@michales@dpie.nsw.gov.au

Dear Mr Michales

SEAR 1861

I refer to your email dated 22 February 2024 to the Environment Protection Authority (EPA) requesting our information requirements for the Secretary's Environmental Assessment Requirements to be prepared for a proposed Intensive Livestock Activities – Dairy Farm located at Lot 87 DP756251, 18214 Riverina Highway, Blighty.

We have considered the details of the proposal and have identified the information required for the environmental impact assessment as outlined in Attachment A. The EPA's key information requirements for the project includes the following:

- Details on the potential environmental impacts such as odour, noise, dust, waste and contamination, including cumulative impacts and detail monitoring and mitigation measures that is proposed to be implemented to prevent or minimise these impacts;
- Details on an odour impact assessment completed in accordance with the *Approved Methods for Modelling and Assessment of Air Pollutants in NSW* (2016) and *Assessment and Management of Odour from Stationary Sources in NSW* (2006);
- Details on the proposed construction and management of the wastewater collection and treatment system, including a demonstration that surface water, ground water and soils will be protected from adverse impacts; and
- Details of the management of the waste that is to be produced by the proposal.

In carrying out the environmental impact assessment the guidelines in Attachment B should be referred to.

If you have any further enquiries about this matter please contact Briohny Seaman by telephoning (02) 6983 4918 or by electronic mail at info@epa.nsw.gov.au.

Yours sincerely

Phone 131 555
Phone +61 2 9995 5555
(from outside NSW)

Fax +61 2 6969 0710
TTY 133 677
ABN 43 692 285 758

PO Box 397
Griffith
NSW 2680 Australia

Suite 7
130-140 Banna Ave
Griffith NSW
2680 Australia

www.epa.nsw.gov.au
info@epa.nsw.gov.au

A handwritten signature in black ink, reading 'Nvanlijf'.

NICK VAN LIJF
Unit Head - Regulatory Operations
NSW Environment Protection Authority

ATTACHMENT A

The EPA's assessment of the proposal has identified the following areas that require further information.

Environmental impacts of the proposal

The Environmental Impact Statement (EIS) 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 provide sufficient information to enable the EPA to determine appropriate conditions, limits and monitoring requirements for an Environment Protection Licence (EPL).

The following potential environmental impacts of the project need to be assessed, quantified and reported on:

- Air
- Noise
- Water
- Land
- Waste and chemicals.

The EIS should address how the required environmental goals will be met for each potential impact.

The EIS should describe mitigation and management options that will be used to prevent, control, abate or mitigate identified potential environmental impacts associated with the project and to reduce risks to human health and prevent the degradation of the environment.

This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

Air Quality impacts

The goal of the proposal in relation to air quality should be to ensure sensitive receptors are protected from any adverse impacts from odour and dust.

Details need to be provided on the proposed measures to manage odour from all sources and in particular pens, manure stockpiles and associated waste water collection, treatment and storage ponds. Measures to prevent or control the emission of odour from these facilities must be detailed.

For a proposed of this scope we would expect an assessment of odour to be undertaken in accordance with the *Approved Methods and Guidance for the Modelling and Assessment of Air Pollution in New South Wales* (DECC, 2016) and the '*Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW*' (EPA, 2006).

The EIS needs to identify any other existing impacts on air quality within the area, and if necessary provide an assessment and commentary on the predicted cumulative impacts that may arise.

Emissions from any plant must meet the design criteria detailed in the *Protection of the Environment Operations (Clean Air) Regulation 2022*.

Surface and Groundwater impacts

The EIS must demonstrate how the proposed development will meet the requirements of section 120 of the POEO Act.

The goals of the project should include the following:

- No pollution of waters (including surface and groundwater), except to the extent authorised by the EPA (i.e., in accordance with an Environment Protection Licence);
- Polluted water (including effluent, process waters, wash down waters, polluted stormwater or sewage) captured on the site and collected, treated and beneficially reused, where this is safe and practicable to do so; and
- It is acceptable in terms of the achievement or protection of the River Flow Objectives and Water Quality Objectives.

The EIS should document the measures that will achieve the above goals.

The EIS should provide details of any water management systems for the site to ensure surface and ground waters are protected from contaminants. This should include an assessment of the following:

- Effluent storage and treatment measures, including the design storage capacity and overflow frequency of each wastewater storage pond;
- Effluent and sludge disposal measures, including sufficient detail to demonstrate sustainable irrigation and sludge disposal practices consistent with the *Environmental Guidelines: Use of Effluent by Irrigation (DEC, 2004)*;
- Measures to monitor effluent irrigation sustainability consistent with the *Environmental Guidelines: Use of Effluent by Irrigation (DEC, 2004)*, including an assessment of any effluent irrigation areas to determine soil capacity to accommodate hydraulic and nutrient loads;
- Details of management practices the proponent will implement on effluent areas, (e.g., effluent application rates, cropping regimes) to maintain sustainable hydraulic and nutrient loads; and
- Surface and groundwater conditions that may potentially be impacted by operations on site and any proposed environmental monitoring measures that the proponent will implement to monitor the receiving environment.

Land impacts

The goals of the project should include the following:

- No pollution of land, except to the extent authorised by the EPA (i.e., in accordance with an Environment Protection Licence);
- The potential impact of land erosion from the development is mitigated; and
- The land impacted by solid and liquid waste application are appropriately monitored and managed in accordance with relevant EPA guidelines.

The EIS should document the measures that will achieve the above goals.

Details on the proposed disposal or re-use applications of waste water and manure associated with the intensification must be provided including a demonstration of how any soils impacted will be monitored and protected.

Noise and vibration impacts

The EIS should include design, construction, operation and maintenance of the premises in accordance with relevant EPA policy, guidelines and criteria, and in order to minimise potential impacts from noise.

The EPA expects that potential noise sources are assessed in accordance with the *Noise Policy for Industry* (EPA 2017), and where required mitigation measures are proposed (e.g., appropriate equipment chose to minimise noise levels). All residential or noise sensitive premises likely to be impacted by the development must be identified and included in the assessment.

The proposed development may result in an increase in traffic movements associated with the proposal. The number of traffic movements associated with the proposal should be quantified and the potential noise impacts associated with these traffic movements need to be assessed in accordance with the *NSW Road Noise Policy* (DECCW, 2011).

Waste and chemical impacts

The EIS must assess all aspects of waste generation, management and disposal associated with the proposed development. The EIS should include the following:

- It is in accordance with the principles of the waste hierarchy and cleaner production:
- Where potential impacts associated with the handling, processing and storage of all waste materials generated at the premises are identified, these be satisfactorily mitigated;
- The beneficial reuse of all waste generated at the premises are maximised where it is safe and practical to do so;
- Details on the storage of any waste onsite, including the use of waste tyres for the management of silage;
- No waste disposal occurs on site except in accordance with an Environment Protection Licence; and
- Ensure that the environmental risks from hazardous chemicals and chemical waste are minimised.

The goal of the project should be to ensure that environmental risks from intensive livestock agriculture activities are minimised. The EIS needs to identify the proposed type, quantity and location of wastes to be stored and/or processed at the site.

Spill management measures, including items such as bunding, and emergency procedures should be clearly outlined.

Monitoring

The EIS must outline the proposed monitoring regime to be implemented in relation to the following potential impacts, where relevant:

- Surface runoff and ground water quality monitoring; and
- Effluent and soil quality monitoring.

ATTACHMENT B

<u>Title</u>	<u>Web address</u>
Relevant Legislation	
<i>Environmental Planning and Assessment Act 1979</i>	https://www.legislation.nsw.gov.au/#/view/act/1979/203
<i>Protection of the Environment Operations Act 1997</i>	https://www.legislation.nsw.gov.au/#/view/act/1997/156/full
Licensing	
Guide to Licensing	http://www.epa.nsw.gov.au/licensing/licenceguide.htm
Air Issues	
POEO (Clean Air) Regulation 2022	https://legislation.nsw.gov.au/view/pdf/asmade/sl-2022-811
Approved methods for modelling and assessment of air pollutants in NSW (2016)	http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf
Assessment and management of odour from stationary sources in NSW (DEC, 2006)	Technical framework: https://www.environment.nsw.gov.au/resources/air/20060440framework.pdf Technical notes: https://www.environment.nsw.gov.au/resources/air/20060441notes.pdf
Noise and Vibration	
Interim Construction Noise Guidelines (EPA, 2017)	https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/interim-construction-noise-guideline
Noise Policy for Industry (EPA, 2017)	https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)
NSW Road Noise Policy (EPA, 2011)	https://www.epa.nsw.gov.au/publications/noise/2011236-nsw-road-noise-policy
Assessing Vibration: a technical guideline (DEC 2006)	https://www.epa.nsw.gov.au/noise/vibrationguide.htm
Australian and New Zealand Environment Council: Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZECC 1990)	https://www.epa.nsw.gov.au/resources/noise/ANZECBlasting.pdf

Soils	
Managing Urban Stormwater: Soils and Construction (Landcom, 2004)	https://www.environment.nsw.gov.au/stormwater/publications.htm
Waste	
Waste Classification Guidelines (EPA, 2014)	https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines
Protection of the Environment Operations (Waste) Regulation 2014	https://www.legislation.nsw.gov.au/regulations/2014-666.pdf
Environmental Guidelines: Solid Waste Landfills, Second edition (EPA, 2016)	https://www.epa.nsw.gov.au/~media/EPA/Corporate%20Site/resources/waste/solid-waste-landfill-guidelines-160259.ashx
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
National Water Quality Management Strategy: Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000)	http://www.waterquality.gov.au/anz-guidelines/Documents/ANZECC-ARMCANZ-2000-guidelines-vol2.pdf
National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ, 2000)	http://www.waterquality.gov.au/anz-guidelines/Documents/ANZECC-ARMCANZ-monitoring-reporting.pdf
Using the ANZECC Guidelines and Water Quality Objectives in NSW (EPA, 2006)	https://www.epa.nsw.gov.au/~media/epa/corporate-site/resources/water/anzeccandwqos06290.pdf
Environmental Guidelines: Storage and Handling of Liquids (EPA, 2007)	https://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/compliance-audit-program/chemical-storage-handling-and-spill-management/storing-and-handling-liquids-trainers-manual
The NSW State Groundwater Policy Framework Document (DLWC, 1997)	http://www.water.nsw.gov.au/__data/assets/pdf_file/0008/547550/avail_ground_nsw_state_groundwater_policy_framework_document.pdf
The NSW State Groundwater Quality Protection Policy (DLWC, 1998)	http://www.water.nsw.gov.au/__data/assets/pdf_file/0006/548286/nsw_state_groundwater_quality_policy.pdf
National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC, 1995)	https://www.water.wa.gov.au/__data/assets/pdf_file/0020/4925/8728.pdf

Gregory Michales
Student Planner
Industry Assessments
Department of Planning
greg.michales@dpi.nsw.gov.au

Request for Input: Gunyah Park Dairy – 18214 Riverina Highway, Blighty – SEAR 1861

Dear Greg

Thank you for your correspondence of 22 February 2024 with the opportunity to provide input to the SEAR 1861 – Gunyah Park Dairy– 18214 Riverina Highway, Blighty.

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

DPI Agriculture's Land Use Planning team will typically consider planning issues such as site suitability, and potential impacts on or from adjoining land uses, including other agricultural land uses. Other teams within DPI may review issues relating to the management of the facility such as animal welfare, manure/effluent management and biosecurity management.

DPI Agricultural has reviewed the (limited) material provided and requires that the following matters are included in the issued SEAR for consideration in the EIS:

- Site Suitability
- Consideration of impacts on agricultural resources and land at the site and in the vicinity
- Suitable and secure water supply
- Biosecurity and Animal Welfare
- Traffic movements
- Land stewardship
- Community consultation
- Emergency Management

See attached for A. details on these matters and B. a table with links to industry resources which may be of assistance.

Should you require clarification on any of the information contained in this response, I can be contacted by email at landuse.ag@dpi.nsw.gov.au

Sincerely

Lilian Parker

Lilian Parker
Agricultural Land Use Planning
E-signed 5-3-2024

Attachment A: Matters for consideration

Site Selection including access to waters, soils, drainage, shelter, impacts on neighbours, vehicle access and chemical residues.

- An assessment of the soils on the site to indicate its appropriateness for the proposed dairy, dry loose pack dry lots, sheds, effluent management dams and effluent/manure reuse application areas.
- Detail the potential impacts from the proposed development on agricultural land and agricultural land uses, support services, processing and value adding industries on the site and in the locality.
- Demonstrate that all significant impacts on neighbouring properties from an odour, visual, noise and dust and any impacts on current and potential agricultural developments and resources can be reasonably avoided or adequately mitigated.
- A Land Use Conflict Risk Assessment is expected to be prepared to identify potential impacts on neighbouring properties, both residential and agricultural, and vice versa.
- 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.
- Detail the estimated water demand and water availability and the source of water and any sanitisation methods proposed. Backup water supplies may also be required.
- Outline any impacts to water resources and water use by agriculture on nearby land, and measures to mitigate against these impacts.

Construction

- The proposal should demonstrate that sheds, dry lots etc are located, designed, and managed to meet animal welfare standards and Best Practice Management as outlined in the industry guidelines.

Feed and Water Management

- Detail of where feed will be obtained, either on site or imported and if imported the traffic movements required.

Management

- Detail how effluent and waste will be effectively stored, handled, and recycled or disposed of in a lawful manner to protect environmental values and biosecurity.
- Where the proposed development is located within 100m of an intermittently flowing creek the potential for deposition and movement of nutrients within the facility is to be addressed.
- Provide details of any proposed reuse areas. Design of reuse areas is to include a reuse management plan based on a nutrient budget that considers proposed annual volumes and nutrient loads, soil types, current soil nutrient levels and pasture use rates.

Animal Health and Welfare

- Demonstrate how the proposed development will:
 - comply with the Animal Welfare Standards
 - provide all weather access or provisions on site to provide adequate food for the livestock for the duration of a flood event if applicable
 - provide emergency management strategies for sick or diseased livestock.

Dead Animal Management

- Details of dead animal management and disposal eg. if onsite disposal is proposed management and operations should be documented.

Biosecurity Matters Generally and Specifically as they relate to the Feedlot.

- Detail a biosecurity response plan to deal with identified risks as well as contingency plans for monitoring and mitigation measures in emergency animal diseases, disease (eg Q Fever), weed and pest management plans.

Attachment B: Industry guidelines and resource information

Dairies

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
Dairy Australia guidelines	https://www.dairyaustralia.com.au/feeding-and-farm-systems/farm-systems/farm-system-evaluator and Dairy Feedpads and Contained Housing National Guidelines 3rd Edition (dairyaustralia.com.au)
NSW Dairy Development Guide (currently under review)	https://www.dpi.nsw.gov.au/animals-and-livestock/dairy/dairy-developments/environmental-management-guidelines-for-the-dairy-industry
Infrastructure Proposals on Rural Land	https://www.dpi.nsw.gov.au/agriculture/lup/development-assessment2/infrastructure-proposals
Biosecurity Risk Management in Land Use Planning and Development	https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0018/1271241/managing-biosecurity-risks-in-land-use-planning-and-development-guide.pdf
Animal Welfare	<ul style="list-style-type: none"> The welfare of all animals is protected under the Prevention of Cruelty to Animals Act 1979 (POCTA) and its regulation, standards, codes and guidelines. Information on POCTA and animal welfare requirements including codes, standards and guidelines can be found at https://www.dpi.nsw.gov.au/animals-and-livestock/animal-welfare/animal-care-and-welfare/animal-welfare-regulation Project proponents should keep up to date with the NSW animal welfare reform process for current legislation, regulations and standards - https://www.dpi.nsw.gov.au/animals-and-livestock/animal-welfare/animal-welfare-reform
Effluent management	https://agriculture.vic.gov.au/livestock-and-animals/dairy/managing-effluent/effluent-system-designers https://cdn-prod.dairyaustralia.com.au/-/media/project/dairy-australia-sites/national-home/resources/2021/06/15/australian-dairy-irrigation-guide/australian-dairy-irrigation-guide.pdf?rev=1e6c3d071960449b9dafb190e5f54b00 – Chapter 10

Title	Website link
	https://cdn-prod.dairyaustralia.com.au/-/media/project/dairy-australia-sites/national-home/resources/2020/07/09/effluent-and-manure-mgt-database-2008/effluent-and-manure-mgt-database-2008.pdf?rev=5fd26b2d178d48418e8abc25939e7e97

Appendix B. Consultation Correspondences

Our Reference: 24675

Yurunga Farms Partnership
'Gunyah Park'
18214 Riverina Highway,
Blighty, NSW 2713

16th October 2024

Deniliquin Local Aboriginal Land Council
PO Box 846
Deniliquin NSW 2710

By email: lalcd@bigpond.com

To whom it may concern,

Re: SEAR 1861 – Proposed 'Gunyah Park' Dairy Expansion, Blighty NSW

Yurunga Farms Partnership is seeking to expand their existing dairy herd at 'Gunyah Park', 18214 Riverina Highway, Blighty NSW, from 2,000 to 4,000 head of cattle.

This herd increase 'triggers' preparation of an Environmental Impact Statement (EIS), which will be assessed by Local and State government entities and agencies under the *Environmental Planning and Assessment Act 1979*. The EIS is currently being prepared by EnviroAg Australia Pty Ltd. As part of this process community consultation is required to facilitate a thorough assessment of possible environmental impacts to the local area.

Amongst other possible environmental impacts, the proposal may generate some additional:

- Truck movements;
- Odour;
- Noise;
- Wastewater; and,
- Dust.

The proposed draft site plan is enclosed (refer to attachment). The project will be constructed and operated in accordance with *Dairy Australia* guidelines. The issues listed above will be mitigated and managed under an Environmental Management and Monitoring Plan, as well as a State enforced Environment Protection Licence.

Yurunga Farms Partnership and EnviroAg Australia invite you to provide any feedback that you may have in regard to this proposal by 5:00 pm, 6th November 2024. This will allow us to consider and include your comments in the EIS.

Should you have any feedback, questions, or comments, please contact the following using "24675" as a reference;

Yurunga Farms Partnership:

Lachlan Marshall, Managing Director
Email: lachlan@yurungafarms.com.au
Phone: (+61) 0419667053

EnviroAg Australia:

Janina Palad, Senior Scientist
Email: janina.palad@enviroag.net.au
Phone: (02) 6772 9010

If you would like additional information regarding the project please lodge an enquiry via email or phone.

Yours sincerely,



Lachlan Marshall
Managing Director
Yurunga Farms Partnership

From: Janina Palad
Sent: Thursday, 17 October 2024 2:59 PM
To: 'water.enquiries@dpie.nsw.gov.au'
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - DCCEE Water Group
Attachments: Local SEARs - SEAR 1861 Applicant Package.pdf; 24675_241015_YFP_DairyExpansion_GunyahPark_EIS_Consultation_WG_Rev0.pdf

Good afternoon,

I refer to the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW. Please find attached the following:

- SEARs
- Formal consultation letter with the proposed site plan

The Environmental Impact Statement (EIS) is being prepared for this development.

Are you able to review the attached documents and advise of any comments you may have regarding this proposed development?

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

Regards,

Janina Palad
Scientist

EnviroAg Australia Pty Limited
a: 82 Glen Innes Road, Armidale NSW 2350
m: PO Box 1775, Armidale NSW 2350
p: 02 6772 9010
w: www.enviroag.net.au

We value your feedback. Please [click here](#) to complete our brief feedback form.

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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

From: Janina Palad
Sent: Thursday, 17 October 2024 2:48 PM
To: 'info@epa.nsw.gov.au'
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - EPA NSW
Attachments: EPA Stationary A4 Letterhead.pdf; 24675_241015_YFP_DairyExpansion_GunyahPark_EIS_Consultation_EPA_Rev0.pdf; Local SEARs - SEAR 1861 Applicant Package.pdf

Good afternoon,

I refer to the following documents issued for the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW:

- SEAR 1861
- Input from EPA NSW

Please find attached formal consultation letter with the proposed site plan.

The Environmental Impact Statement (EIS) is being prepared for this development. We are seeking any further advices/comments apart from the inputs provided on 1st March 2024 (if any).

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

Regards,

Janina Palad
Scientist

EnviroAg Australia Pty Limited
a: 82 Glen Innes Road, Armidale NSW 2350
m: PO Box 1775, Armidale NSW 2350
p: 02 6772 9010
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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

From: Janina Palad
Sent: Thursday, 17 October 2024 3:02 PM
To: 'parks.info@environment.nsw.gov.au'
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - DCCEE National Parks and Wildlife Services
Attachments: Local SEARs - SEAR 1861 Applicant Package.pdf; 24675_241015_YFP_DairyExpansion_GunyahPark_EIS_Consultation_NPWS_Rev0.pdf

Good afternoon,

I refer to the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW. Please find attached the following:

- SEARs
- Formal consultation letter with the proposed site plan

The Environmental Impact Statement (EIS) is being prepared for this development.

Are you able to review the attached documents and advise of any comments you may have regarding this proposed development?

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

Regards,

Janina Palad
Scientist

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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

From: Janina Palad
Sent: Thursday, 17 October 2024 2:43 PM
To: 'landuse.ag@dpi.nsw.gov.au'
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - DPI Ag
Attachments: 24675_241015_YFP_DairyExpansion_GunyahPark_EIS_Consultation_DPI_Ag_Rev0.pdf; Local SEARs - SEAR 1861 Applicant Package.pdf; DPI Ag response_Gunyah Park Dairy_EARs.pdf1.pdf

Good afternoon,

I refer to the following documents issued for the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW:

- SEAR 1861
- Input from Department of Primary Industries - Agriculture

Please find attached formal consultation letter with the proposed site plan.

The Environmental Impact Statement (EIS) is being prepared for this development. We are seeking advices/comments from Department of Primary Industries – Agriculture, apart from the inputs provided on 5th March 2024 (if any).

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

Regards,

Janina Palad
Scientist

EnviroAg Australia Pty Limited
a: 82 Glen Innes Road, Armidale NSW 2350
m: PO Box 1775, Armidale NSW 2350
p: 02 6772 9010
w: www.enviroag.net.au

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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

From: Janina Palad
Sent: Thursday, 17 October 2024 3:28 PM
To: 'admin.murray@lls.nsw.gov.au'
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - Murray Local Land Services
Attachments: Local SEARs - SEAR 1861 Applicant Package.pdf; 24675_241015_YFP_DairyExpansion_GunyahPark_EIS_Consultation_LLS_Rev0.pdf

Good afternoon,

I refer to the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW. Please find attached the following:

- SEARs
- Formal consultation letter with the proposed site plan

The Environmental Impact Statement (EIS) is being prepared for this development.

Are you able to review the attached documents and advise of any comments you may have regarding this proposed development?

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

Regards,

Janina Palad
Scientist

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m: PO Box 1775, Armidale NSW 2350
p: 02 6772 9010
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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

From: Janina Palad
Sent: Thursday, 17 October 2024 3:35 PM
To: 'joanne.cheshire@transport.nsw.gov.au'
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - Transport for NSW
Attachments: Local SEARs - SEAR 1861 Applicant Package.pdf; 24675_241015_YFP_DairyExpansion_GunyahPark_EIS_Consultation_TNSW_Rev0.pdf

Good afternoon,

I refer to the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW. Please find attached the following:

- SEARs
- Formal consultation letter with the proposed site plan

The Environmental Impact Statement (EIS) is being prepared for this development.

Are you able to review the attached documents and advise of any comments you may have regarding this proposed development?

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

If you are not the right addressee for this consultation please let us know.

Regards,

Janina Palad

Scientist

EnviroAg Australia Pty Limited

a: 82 Glen Innes Road, Armidale NSW 2350

m: PO Box 1775, Armidale NSW 2350

p: 02 6772 9010

w: www.enviroag.net.au

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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

From: Janina Palad
Sent: Thursday, 17 October 2024 3:44 PM
To: 'pes@rfs.nsw.gov.au'
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - NSW Rural Fire Service
Attachments: Local SEARs - SEAR 1861 Applicant Package.pdf; 24675_241015_YFP_DairyExpansion_GunyahPark_EIS_Consultation_NRFS_Rev0.pdf

Good afternoon,

I refer to the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW. Please find attached the following:

- SEARs
- Formal consultation letter with the proposed site plan

The Environmental Impact Statement (EIS) is being prepared for this development.

Are you able to review the attached documents and advise of any comments you may have regarding this proposed development?

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

Regards,

Janina Palad
Scientist

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a: 82 Glen Innes Road, Armidale NSW 2350
m: PO Box 1775, Armidale NSW 2350
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w: www.enviroag.net.au

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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

From: Janina Palad
Sent: Thursday, 17 October 2024 2:52 PM
To: 'enquiries@waternsw.com.au'; 'simone.tonkin@waternsw.com.au'
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - WaterNSW
Attachments: 24675_241015_YFPDairyExpansion_GunyahPark_EISConsultation_WNSW_Rev0.pdf; Local SEARs - SEAR 1861 Applicant Package.pdf; SEAR 1861 - Response from WaterNSW.PDF

Good afternoon,

I refer to the following documents issued for the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW:

- SEAR 1861
- Input from WaterNSW

Please find attached formal consultation letter with the proposed site plan.

The Environmental Impact Statement (EIS) is being prepared for this development. We are seeking advices/comments from WaterNSW, apart from the inputs provided on 26th February 2024 (if any).

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

Regards,

Janina Palad
Scientist

EnviroAg Australia Pty Limited
a: 82 Glen Innes Road, Armidale NSW 2350
m: PO Box 1775, Armidale NSW 2350
p: 02 6772 9010
w: www.enviroag.net.au

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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

Janina Palad

From: Janina Palad
Sent: Thursday, 17 October 2024 3:51 PM
To: 'lalcd@bigpond.com'
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - Deniliquin Local Aboriginal Land Council
Attachments: Local SEARs - SEAR 1861 Applicant Package.pdf; 24675_241016_YFP_DairyExpansion_GunyahPark_EIS_Consultation_DLALC_Rev0.pdf

Good afternoon,

I refer to the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW. Please find attached the following:

- SEARs
- Formal consultation letter with the proposed site plan

The Environmental Impact Statement (EIS) is being prepared for this development.

Are you able to review the attached documents and advise of any comments you may have regarding this proposed development?

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

If you are not the right addressee for this consultation please let us know.

Regards,

Janina Palad
Scientist

EnviroAg Australia Pty Limited
a: 82 Glen Innes Road, Armidale NSW 2350
m: PO Box 1775, Armidale NSW 2350
p: 02 6772 9010
w: www.enviroag.net.au

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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

From: Maddison Gunter <Maddison.Gunter@edwardriver.nsw.gov.au>
Sent: Wednesday, 23 October 2024 2:17 PM
To: James Laycock
Cc: Janina Palad
Subject: RE: Preparation of EIS for DA – Proposed intensive livestock (dairy) expansion – 18214 Riverina Highway, Blighty NSW (Lot 87 DP756251)

Thanks James,
I have forward the email invite onto Marie (Manager Development Services) and Michael Williams (Design and Project Engineer).

Thanks for providing the brief agenda,
Regards,

From: James Laycock <james@blueprintplanning.com.au>
Sent: Wednesday, October 23, 2024 1:46 PM
To: Maddison Gunter <Maddison.Gunter@edwardriver.nsw.gov.au>
Cc: Janina Palad <janina.palad@enviroag.net.au>
Subject: RE: Preparation of EIS for DA – Proposed intensive livestock (dairy) expansion – 18214 Riverina Highway, Blighty NSW (Lot 87 DP756251)

Thanks Maddison,

Let's go with 11:00am on Thursday, 31 October at your office. I'll send a calendar meeting invitation with an Agenda shortly.

See you then

Regards
James

James Laycock
Blueprint Planning
T: 02 6023 6844
M: 0427 090 149
W: www.blueprintplanning.com.au

E-mail disclaimer

From: Maddison Gunter <Maddison.Gunter@edwardriver.nsw.gov.au>
Sent: Wednesday, 23 October 2024 8:20 AM
To: James Laycock <james@blueprintplanning.com.au>
Cc: Janina Palad <janina.palad@enviroag.net.au>
Subject: Preparation of EIS for DA – Proposed intensive livestock (dairy) expansion – 18214 Riverina Highway, Blighty NSW (Lot 87 DP756251)

Good Morning James,
Thank you for contacting Council regarding the proposed development at 18214 Riverina Highway, Blighty. Unfortunately, next Friday the 1st will not be suitable for everyone required to attend, would you be available on Thursday 31st October, any time between 10am – 2pm?.

Would you be able to provide council with a general agenda/outline for the meeting, and any questions prior to the meeting,

Thanks,

From: James Laycock <james@blueprintplanning.com.au>
Sent: Tuesday, October 22, 2024 11:38 AM
To: Maddison Gunter <Maddison.Gunter@edwardriver.nsw.gov.au>
Cc: Janina Palad <janina.palad@enviroag.net.au>
Subject: FW: Preparation of EIS for DA – Proposed intensive livestock (dairy) expansion – 18214 Riverina Highway, Blighty NSW (Lot 87 DP756251)

Hi Maddison,

I have left a telephone message with your office.

I was hoping to arrange a meeting with you and council's development engineer at your office on the following day and times please for the purpose of consulting with council about our preparation of the above EIS. We would have a small presentation and would need approximately 45 minutes to 1 hour for the total meeting. Could you please let me know your availability please?

- **Friday, 1 November 2024** – anytime between 10:00am to 3:00pm

Thank you

Regards
James

James Laycock
Blueprint Planning
T: 02 6023 6844
M: 0427 090 149
W: www.blueprintplanning.com.au

E-mail disclaimer

From: Janina Palad <janina.palad@enviroag.net.au>
Sent: Tuesday, 22 October 2024 9:22 AM
To: James Laycock <james@blueprintplanning.com.au>
Subject: Edward River Council - Contact Person

Hello James,

This is her details:

Maddison Gunter
Planning Officer

Edward River Council
180 Cressy Street, PO Box 270
Deniliquin, NSW, 2710
T: 03 5898 3000
M:
E: Maddison.Gunter@edwardriver.nsw.gov.au
W: www.edwardriver.nsw.gov.au

Regards,

Janina Palad
Scientist

EnviroAg Australia Pty Limited
a: 82 Glen Innes Road, Armidale NSW 2350
m: PO Box 1775, Armidale NSW 2350
p: 02 6772 9010
w: www.enviroag.net.au

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Maddison Gunter
Planning Officer

Edward River Council
180 Cressy Street, PO Box 270
Deniliquin, NSW, 2710
T: 03 5898 3000

M:
E: Maddison.Gunter@edwardriver.nsw.gov.au
W: www.edwardriver.nsw.gov.au



[<="" tr="">](#)

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From: Janina Palad
Sent: Thursday, 12 September 2024 10:00 AM
To: 'laura.barlow@murrayirrigation.com.au'
Cc: Richard Pillow; Pete Pearson; Reina Cabral
Subject: 24675 - Murray Irrigation Infrastructures - 18214 Riverina Highway, Blighty NSW

Good morning Laura,

As per correspondences below, we are assisting Lachlan in preparing the EIS for his proposed dairy expansion.

As we are applying effluent on the property for waste management, there is a concern related to any potential impacts (e.g. contamination due to excess irrigation/flooding) to the Murray Irrigation channels close to the property.

During the site visit, our engineer mentioned that there is a flood bypass next to the highway. There is a risk that when it floods, the flood would bypass to the highway.

We are currently in the process of preparing formal consultation documentation to be disseminated to government authorities.

Initially, it would be really handy for our assessments if you are able to provide the following (if you readily have them);

- Any related flooding studies on these channels
- Survey data for the irrigation channels close to the property
- Which are supply channels vs drainage channels
- Cross section of supply channels and drainage channels

Regards,

Janina Palad
Scientist

EnviroAg Australia Pty Limited
a: 82 Glen Innes Road, Armidale NSW 2350
m: PO Box 1775, Armidale NSW 2350
p: 02 6772 9010
w: www.enviroag.net.au

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EnviroAg Australia Pty Limited ACN 135 005 999 ABN 56 135 005 999

-----Original Message-----

From: Laura Barlow [<mailto:laura.barlow@murrayirrigation.com.au>]
Sent: Friday, 23 August 2024 3:02 PM
To: Lachlan Marshall
Cc: Janina Palad; Pete Pearson; Richard Pillow
Subject: RE: Introducing Enviroag

Hey there Lachy,

From: Janina Palad
Sent: Thursday, 17 October 2024 2:13 PM
To: 'Lachlan Marshall'
Cc: admin@yurungafarms.com.au
Subject: RE: 24675: EIS Consultation - Letters

Good afternoon,

The consultation letters are located here;

https://www.dropbox.com/scl/fi/ff4lghetn4loures15mg1/24675_Landowners_Consultation_PDF.7z?rlkey=jog1uuuar5pat2oyxqcxa9o2&st=751bj1q7&dl=0

Should you have trouble accessing the files, please contact myself.

All progress and outcomes (dates and details) must all be documented in the EIS.

In this regard can you please **ensure you keep records** of the following:

- Actual date when all letters have been delivered
- Details of any discussion for each landowner – please note of any concerns they will raise and your responses
- Advise myself of any landowner our team would have to get back with for some answers – name and contact number

You can either;

1. Have a working excel/word file documenting these and send to us after 6th November 2024; and/or,
2. Whenever you receive anything, just email to me and I will record them for you.

As my contact details are in the letters as well, I will update you if I receive any concern within the consultation period.

Regards,

Janina Palad
Scientist

EnviroAg Australia Pty Limited
a: 82 Glen Innes Road, Armidale NSW 2350
m: PO Box 1775, Armidale NSW 2350
p: 02 6772 9010
w: www.enviroag.net.au

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From: Lachlan Marshall [mailto:lachlanmarshall@icloud.com]
Sent: Wednesday, 16 October 2024 5:21 PM
To: Janina Palad

Cc: admin@yurungafarms.com.au

Subject: Re: 24675: EIS Consultation - Letters

Good afternoon.

We will get this done asap. There are multiple sites owned by one person so there are actually only 7 people we will need to send letters to and I would prefer to hand deliver them as you have recommended.

Thanks

Lachlan Marshall

Managing Director

Yurunga Farms Partnership

On 16 Oct 2024, at 11:30 AM, Janina Palad <janina.palad@enviroag.net.au> wrote:

Good morning Lachlan and Gen,

Updates:

Survey Data

Dale contacted me this morning and he is sending us survey data he has. We will review it as part of the field work preparation.

Consultation

The formal letters are still in our QA system. For now,

Here is a link to the receptors to be consulted:

<https://www.google.com/maps/d/u/0/edit?mid=1qkPLxy6yj6gaAa3Zcb0cZknYIV3p70&usp=sharing>

RECEPTORS	TYPE	PROPERTY ADDRESS	
1	Site Dwelling	18214 Riverina Highway Blighty 2713	
2	Site Dwelling	18214 Riverina Highway Blighty 2713	
3	Residential	29 Cowans Road Blighty 2713	
4	Residential	29 Cowans Road Blighty 2713	
5	Commercial	18088 Riverina Highway Blighty 2713	
6	Residential	66 Cowans Road Blighty 2713	
7	Residential	66 Cowans Road Blighty 2713	
32	Residential	18330 Riverina Highway Blighty 2713	
33	Residential	732 Bouchiers Road Blighty 2713	
34	Residential	930 Bouchiers Road Blighty 2713	
35	Residential	235 Coree Road Blighty 2713	
36	School	185 Blighty School Road Blighty 2713	
37	Residential	18468 Riverina Highway Blighty 2713	
38	Residential	235 Coree Road Blighty 2713	
45	Residential	197 Blighty School Road Blighty 2713	

Regards,

Janina Palad

Scientist

EnviroAg Australia Pty Limited

a: 82 Glen Innes Road, Armidale NSW 2350**m:** PO Box 1775, Armidale NSW 2350**p:** 02 6772 9010**w:** www.enviroag.net.au

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From: Janina Palad**Sent:** Tuesday, 15 October 2024 5:22 PM**To:** Lachlan Marshall; admin@yurungafarms.com.au**Subject:** 24675: EIS Consultation - Letters

Hello Lachlan and Gen,

I have prepared the consultation letters for the EIS. It is currently under our QA system. I have put in tomorrow's date in the letter. Consultation will be until 6th November – they can only provide feedback until then and we consider the comments in our EIS.

Within 3km buffer we have prepared letters for 10 impacted landowners/addresses.

Tomorrow I will send you the letters and a map of locations.

Notes for you;

1. Can you ensure you have 10 letter envelopes handy to enclose the letters? Size to fit in:
 1. Folded A4 letter and
 2. Folded A3 drawing showing site plan.
2. We advise if possible, to approach closest neighbours by actually talking/discussing the development with them
 1. Any technical question occurring, will be directed to myself – my contact details are in the letter
3. Otherwise, drop in their mailbox

I will touch base with you tomorrow for a further discussion.

I will be handling the government agencies consultation for you and it will also occur tomorrow.

Regards,

Janina Palad**Scientist**

EnviroAg Australia Pty Limited

a: 82 Glen Innes Road, Armidale NSW 2350**m:** PO Box 1775, Armidale NSW 2350**p:** 02 6772 9010**w:** www.enviroag.net.au

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Appendix C. Consultation Advices and Issues

From: DPIE Water Enquiries Mailbox <water.enquiries@dpie.nsw.gov.au>
Sent: Thursday, 17 October 2024 4:38 PM
To: Janina Palad
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - DCCEEW Water Group

Dear Janina,

Thank you for your email.

I have passed your enquiry to the Licensing and Approvals team. A member of that team will contact you directly.

Your reference number is IS-07641.

If you have any further questions or would like more information from us, please get in touch by reply email or phone 1300 081 047 to speak to the Water Enquiries team.

Regards,

Fiona Nuttall
Project Officer
Water Enquiries
**Department of Climate Change,
Energy, the Environment and Water**

P 1300 081 047 | E water.enquiries@dpie.nsw.gov.au

dcceew.nsw.gov.au

DCCEEW supports flexible working arrangements and I may be sending this message at a time that suits me. Please don't feel obliged to read, respond to or action it outside of regular working hours.



Our Vision: Together, we create thriving environments, communities, and economies.

The DCCEEW acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

[Please view our privacy statement](#)

From: Janina Palad <janina.palad@enviroag.net.au>
Sent: Thursday, October 17, 2024 2:59 PM
To: DPIE Water Enquiries Mailbox <water.enquiries@dpie.nsw.gov.au>
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - DCCEEW Water Group

Good afternoon,

I refer to the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW. Please find attached the following:

- SEARs
- Formal consultation letter with the proposed site plan

From: Nick Van Lijf <Nicholas.VanLijf@epa.nsw.gov.au>
Sent: Monday, 21 October 2024 10:48 AM
To: Janina Palad
Subject: RE: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - EPA NSW

Hi Janina,

Thank you for your email.

Please note, based on the information provided the EPA has no additional comments to provide in relation to the proposal at this stage.

If you have any questions or concerns, please do not hesitate to contact me.

Kind regards,

Nick van Lijf
Unit Head
Regulatory Operations
NSW Environment Protection Authority
T 02 6969 0704
7/130-140 Banna Ave, GRIFFITH NSW 2680

.....



www.epa.nsw.gov.au @NSW_EPA

The EPA acknowledges the Traditional Custodians of the land, waters and sky where we work.
As part of the world's oldest surviving cultures we pay our respect to Aboriginal Elders past and present.

I work on Wiradjuri Country.



Report pollution and environmental incidents 131 555 or +61 2 9995 5555

From: Janina Palad [janina.palad@enviroag.net.au]
Sent: 17/10/2024 2:48 PM
To: info@epa.nsw.gov.au
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - EPA NSW

Good afternoon,

I refer to the following documents issued for the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW:

1. SEAR 1861

From: Lilian Parker <lilian.parker@dpi.nsw.gov.au>
Sent: Thursday, 24 October 2024 4:27 PM
To: Janina Palad
Subject: Re: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - DPI Ag

Hello Janina

Thank you for the consultation letter.

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

The environmental impacts identified for the project are noted.

The Department provided very comprehensive requirements as you have noted, so, without seeing more detailed information, we are unable to provide any specific feedback at this stage.

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

Lilian

Lilian Parker

Agricultural Land Use Planning
Department of Primary Industries and Regional Development
Wagga Wagga Agricultural Institute Wagga Wagga NSW 2650
M: 0427 812 508 | E: lilian.parker@dpi.nsw.gov.au



**Department of Primary Industries
and Regional Development**
Protect. Support. Develop: Together

I acknowledge the Wiradjuri people as the traditional custodians of the land on which I live and work. I pay my respects to Wiradjuri Elders past, present and emerging.

From: Janina Palad <janina.palad@enviroag.net.au>
Sent: Thursday, 17 October 2024 2:42 PM
To: DPIRD Landuse Ag <landuse.ag@dpi.nsw.gov.au>
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - DPI Ag

Good afternoon,

I refer to the following documents issued for the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW:

- SEAR 1861
- Input from Department of Primary Industries - Agriculture

5 November 2024

TfNSW reference: STH24/00730
Your reference: 24675

Senior Scientist
EnviroAg Australia
By Email: janina.palad@enviroag.net.au
CC: lachlan@yurungafarms.com.au

Attention: Janina Palad

SEAR 1861: 24675 - Proposed Dairy Expansion Blighty – LOT 87 DP756251 – 18214 Riverina Highway, BLIGHTY

Dear Janina,

Transport for NSW (TfNSW) is responding to your correspondence in relation to feedback in preparation of an Environmental Impact Statement (EIS) for the 'Gunyah Park' dairy expansion dated 16 October 2024.

TfNSW has reviewed the information and requests the matters outlined in Attachment 1 should be addressed in the Environmental Impact Statement (EIS) prepared for the development.

TfNSW encourages discussions with proponents regarding the traffic and network matters associated with State Significant Development.

If you have any questions, please contact Cam O'Kane on 0417 508 107 or email development.south@transport.nsw.gov.au.

Yours faithfully

A handwritten signature in blue ink, appearing to read "Maurice Morgan".

Maurice Morgan
Team Leader, Development Services South

OFFICIAL

SEAR 1861: 24675 - Proposed Dairy Expansion Blighty – LOT 87 D756251 – 18214 Riverina Highway, BLIGHTY

Context

TfNSW notes for this application:

- The key classified state road is the Riverina Highway. The subject has frontage and existing access to the Riverina Highway within a 100kmh speed zone;
- The development proposes expansion of existing dairy operation from 2,000 to 4,000 head of cattle, including construction of a new robotic dairy, decommissioning of existing dairy and re-purposing, construction of further dry lots, effluent management dams and liquid and solid waste application area as shown in **Attachment 2**;
- TfNSW's input is requested by the Secretary under Schedule 3 of the Environmental Planning and Assessment Regulation 2021.

Secretary's Environmental Assessment Requirements (SEARs)

The supporting documentation identifies that traffic, particularly transport routes and the assessment of the impact on the road network, as issues to be addressed. TfNSW advises that in relation to traffic related issues the development should be addressed in two (2) distinct stages as follows;

- Establishment phase – the transport of materials and equipment/components for the establishment of the expanded facility and ancillary infrastructure, the movement and parking of construction related vehicles, including personal vehicles, during the construction period.
- Operational phase – the traffic generation due to the operation, maintenance and servicing of the various elements of the project in addition to the existing traffic generation from other activities on the subject site.

Given the scale of the development proposal a Traffic Impact Assessment (TIA) shall be prepared to address and manage traffic related issues generated by the development. The purpose of the TIA should be to address the impact of traffic generation on the public road and rail network and measures employed to ensure traffic efficiency and road safety during construction, operation.

The TIA is to provide for an informed assessment of the traffic implications of the development. For guidance in the preparation of the TIA the applicant is referred to the Austroads publications, particularly the Austroads Guide to Traffic Management Part 12 - Traffic Impacts of Development, Part 3 - Traffic Studies and Analysis and the Guide to Transport Impact Assessment 2024 prepared by Transport for NSW.

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The TIA should include an assessment of the predicted impacts of this development on the road network. The plan shall detail the potential impacts/delays associated with the development, the works required to the existing road infrastructure, the measures to be implemented to maintain the standard and safety of the network, and the procedures to monitor and ensure compliance. Where the development has an impact on the performance of an intersection on the road network, an appropriate intersection upgrade may need to be provided.

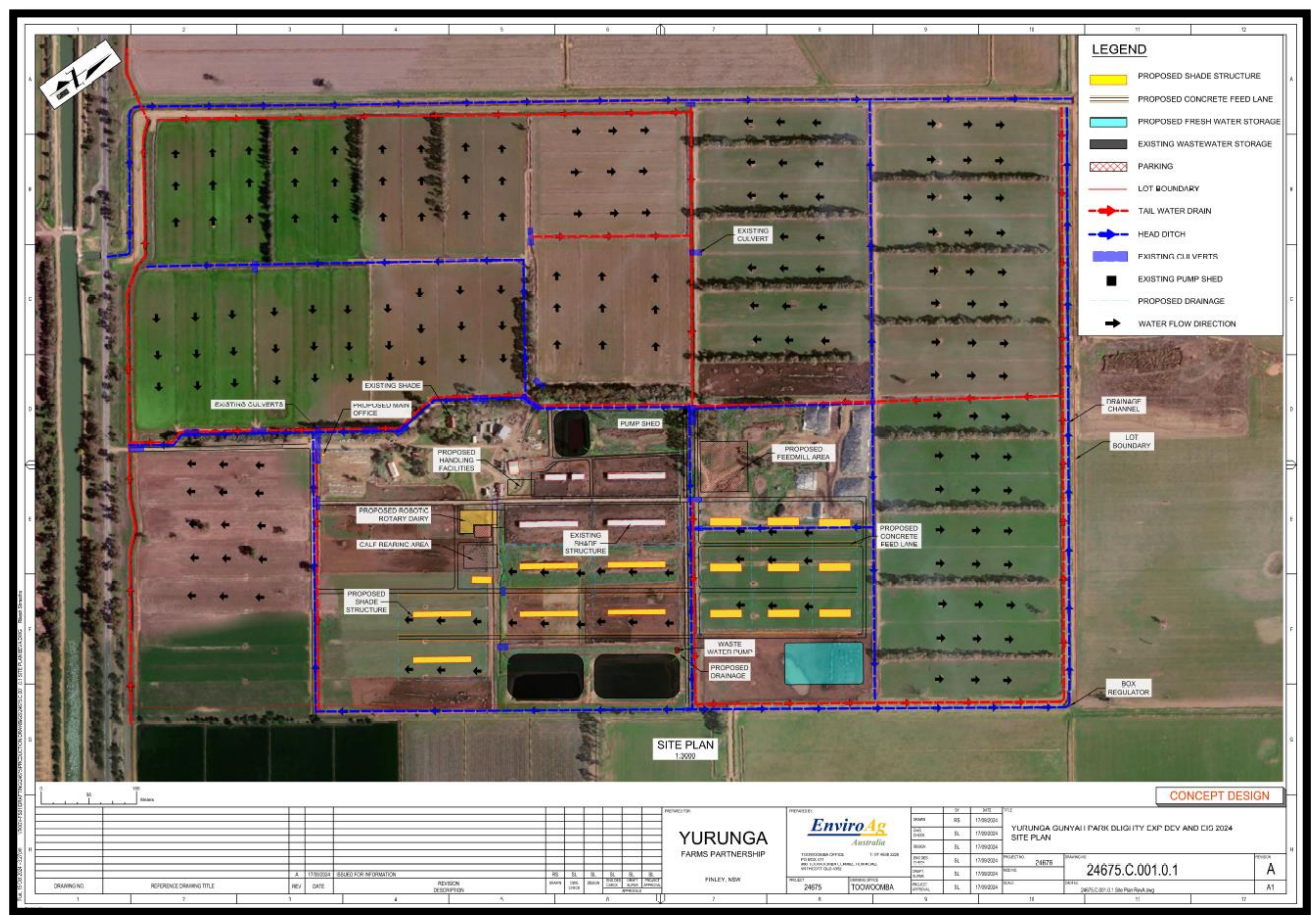
The TIA needs to address the impacts of traffic generated by this development upon the nearby road network. For this proposal, TfNSW is particularly concerned about the intersection of the existing access driveway with the Riverina Highway. Further to the above the TIA shall outline measures to address and manage traffic related issues generated by the development. The documentation submitted should address, but not be limited to:

- The potential impacts on the road network associated with the development during the lifetime of the project;
- An assessment of the existing and anticipated additional traffic generation on the surrounding road network, including vehicle types and average and peak traffic volumes;
- Travel and haulage routes along the road network for vehicles to and from the development site including appropriate swept paths for large heavy vehicles;
- Clearly define the maximum size vehicle to access the site and the potential for oversize and over-mass vehicle movements;
- Consideration of the cumulative impacts of the potential traffic generation when added to existing traffic volumes upon the surrounding road network shall be undertaken;
- An assessment of the likely transport impacts to the site access route and site access point, particularly in relation to the capacity and condition of the roads;
- Any works/upgrades required within the road network to accommodate the development including concept plans for these works;
- The measures to be implemented to maintain the standard and safety of the road network, and the procedures to monitor and ensure compliance;
- A description of the measures that would be implemented to mitigate any transport impacts during construction;
- A Construction Transport Management Plan and Driver Code of Conduct may be appropriate to outline measures to manage traffic related issues generated by the development.

Please note that the above does not claim to represent an exhaustive listing of all the issues to be considered in the assessment of the traffic impact of the development proposal.

TfNSW emphasises the need to minimise the impacts of the development on the existing road infrastructure and maintain the level of safety, efficiency and maintenance along the existing road network through the design, construction and operation of the development.

OFFICIAL



OFFICIAL

Janina Palad

From: Martin Webster <Martin.Webster@rfs.nsw.gov.au>
Sent: Friday, 22 November 2024 1:10 PM
To: Janina Palad
Subject: RE: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - NSW Rural Fire Service

Follow Up Flag: Follow up
Flag Status: Completed

Good afternoon Janina,

Apologies if this response has fallen outside your requested timeframes.

We have reviewed the information provided and raise no concerns subject to a requirement that, where relevant, the future development of the land complies with *Planning for Bush Fire Protection 2019*.

Regards,
Marty.

Marty Webster

Development Assessment and Planning Coordinator | Planning & Environment Services (South)



P 02 4472 0600 **M** 0429 438 896
Unit 2 63 Cranbrook Rd BATEMANS

www.rfs.nsw.gov.au



The RFS acknowledges the Traditional Owners of Country throughout Australia. We pay our respects to Elders past and present.

From: Janina Palad <janina.palad@enviroag.net.au>
Sent: Thursday, 17 October 2024 3:44 PM
To: Planning & Environment Services <CustomerService.Centre@rfs.nsw.gov.au>
Subject: Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - NSW Rural Fire Service

You don't often get email from janina.palad@enviroag.net.au. [Learn why this is important](#)

Good afternoon,

I refer to the proposed dairy expansion at 18214 Riverina Highway, Blighty NSW. Please find attached the following:

- SEARs
- Formal consultation letter with the proposed site plan

The Environmental Impact Statement (EIS) is being prepared for this development.

Are you able to review the attached documents and advise of any comments you may have regarding this proposed development?

If you can please respond to us **by 6th November 2024**, it will be very much appreciated.

Janina Palad

From: WaterRegSouth <WaterRegSouth@waternsw.com.au>
Sent: Tuesday, 22 October 2024 12:45 PM
To: Janina Palad
Subject: FW: CS0686499 - Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - WaterNSW-Janina Palad
Attachments: 24675_241015_YFPDairyExpansion_GunyahPark_EISConsultation_WNSW_Rev0.pdf; SEAR 1861 - Response from WaterNSW.PDF; Local SEARs - SEAR 1861 Applicant Package.pdf

Hi Janina

WaterNSW have no further comments to add to this SEAR. Please refer to WaterNSW's response dated 26th February 2024 for our requirements.

Kind regards,

Water Regulation South



1300 662 077
WaterRegSouth@waternsw.com.au
waternsw.com.au

Follow us on socials:



My work day may look different than your work day. Feel free to read, act on or respond during your working hours.

WaterNSW acknowledges the Traditional Custodians of the land and water on which we work and recognises the continuing cultural and spiritual connections that Aboriginal and Torres Strait Islander People have to Country. We pay our respects to Elders past and present.

From: Customer Service Desk <customer.helpdesk@waternsw.com.au>
Sent: Monday, 21 October 2024 11:26 AM
To: Licensing <licensing@waternsw.com.au>
Subject: CS0686499 - Consultation for SEAR 1861: 24675 - Proposed Dairy Expansion Blighty NSW - WaterNSW-Janina Palad

EIS - LETTER DROP FROM RECEPTORS

24/10/2024 LETTERS DROPPED IN MAIL BOXES

Each owner texted to let know letter dropped

School was however rung and notified

24/10 immediate response.

Sue Wier- thumbs up text message

Damion Sexton- texted no worries

Garry Webb - Thanks Lachlan

Ian Singleton - No worries thanks.

25/10/2024- damion sexton/ wife's point of view

Said might be a good idea to plant a tree belt down the eastern boundry.

When he goes onto a beef feedlot client of his, it stinks. Until he drives past the trees and then it's fine.

Lachlan asked if our dairy currently smells to him. Damion replied it's not a problem, but who knows in the future.

I don't want to be a pain and I don't want to stop it happening, and I havent got a problem with it.

But it would be a good idea to have.

From: Laura Barlow <laura.barlow@murrayirrigation.com.au>
Sent: Thursday, 19 September 2024 12:34 PM
To: Janina Palad
Cc: Richard Pillow; Pete Pearson; Reina Cabral; Lachlan Marshall
Subject: RE: 24675 - Murray Irrigation Infrastructures - 18214 Riverina Highway, Blighty NSW
Attachments: Map E541 Development EnviroAg.pdf

Thanks Janina

I'm looking into the following, bearing in mind MIL may or may not have this information:

1. Any related flood studies on these channels
2. Survey data for the irrigation channels near the property
3. Cross sections of supply and drainage channels

I've attached the following information:

1. Identification of supply channels vs. drainage channels
2. Drainage inlets connected to E541
3. Locations of monitoring piezometers on the site, including any historical water sampling and analysis data

Regarding the piezometers on or near E541, they are inspected annually as part of the company's compliance review. The last readings were taken in August, and they are as follows:

1. BQ1047 – 3.09M
2. BQ1049 – 4.03M
3. BQ1053 – 2.81M
4. BQ1033 – 3.40M

Ill be in touch as soon as I know more.

Kind Regards,

Laura Barlow
Team Leader Customer Engagement



443 Charlotte Street Deniliquin NSW 2710
T. 1300 138 265 F. 03 5898 3301 M. 0429 819 310
murrayirrigation.com.au

From: Janina Palad <janina.palad@enviroag.net.au>
Sent: Thursday, September 19, 2024 12:25 PM
To: Laura Barlow <laura.barlow@murrayirrigation.com.au>
Cc: Richard Pillow <richard.pillow@enviroag.net.au>; Pete Pearson <peter.pearson@enviroag.net.au>; Reina Cabral

From: Laura Barlow <laura.barlow@murrayirrigation.com.au>
Sent: Wednesday, 25 September 2024 4:01 PM
To: Janina Palad
Cc: Richard Pillow; Pete Pearson; Reina Cabral; Lachlan Marshall
Subject: RE: 24675 - Murray Irrigation Infrastructures - 18214 Riverina Highway, Blighty NSW

Follow Up Flag: Follow up
Flag Status: Flagged

Thanks Janina,

A have some further information for you. I have replied in Red to your outstanding questions.

1. Any related flood studies on these channels

We do not have flood studies for these channels

2. Survey data for the irrigation channels near the property

What do you need? For example, channel bank height, regulator height etc

3. Are you able to provide us information on groundwater flow/direction in this area? This will assist us in determining appropriate location for our investigation on baseline groundwater quality data.

As per the previous map that I sent through, there is no piezo in that location. We also do not test the quality of the water, purely the depth. We do offer water testing as a paid service; however we haven't tested piezo site before. Also worth noting that ALL customers are required to submit an application to drain into our drainage system. Water tests are required to determine the water quality prior to drainage. We use Enviro lab and ACS Laboratories.

4. Cross sections of supply and drainage channels

We have standard designs for varying capacities. We communicate these standard designs within our works policy.

<https://irp.cdn-website.com/ccd882c2/files/uploaded/QPM-002D-Works-Policy.pdf>

- The Mayrung channel has a capacity of 750ML
- The Blighty 1 has a capacity of 130ML reducing to 120ML within the property.

Below is the snip of the works policy which can be used to determine the channels profile on Mr Marshalls property by comparing the capacity to the table.

MEMBERS WORKS

The Corporation will, where possible provide unimpeded maintenance and operational access to at least one side of its supply and drainage channel infrastructure. In determining offset distances for silt deposit and access, the Corporation will take into account channel volumetric flow rates, and the design profile of the channel bed and banks together with the intention of providing for a minimum of top bank crest of 4 metres on the travelling side of the channel bank, a minimum of 1.5 metres on crest of the non travelling side and where the infrastructure includes stock proof fencing, the need for a further 1 metre offset. The offset distances have been determined on the basis of a 1 in 20 years silt accumulation factor.

The Corporation will, where possible, improve existing access by replacing channel side access with top of bank access, as detailed in Illustration No 2 - Bank Access below.

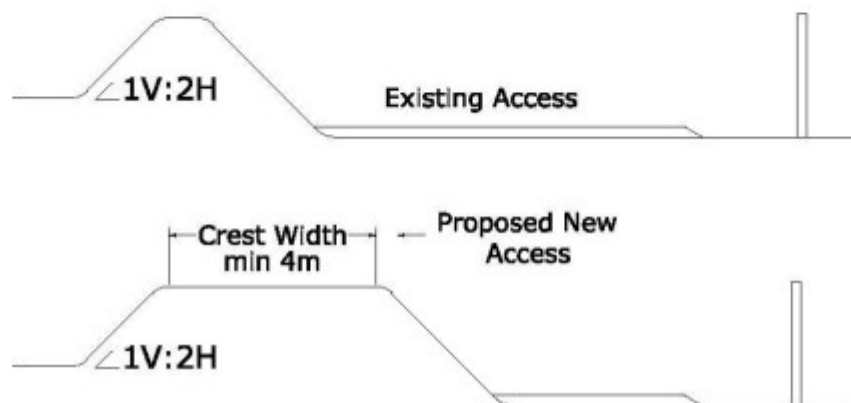


Illustration No 2 - Bank Access

Table of design profiles compared with volumetric flow rate, listed in Table 1 below:

Volumetric Flow Daily Rate (ML)	Design profile base (m)	Design profile sides (m)
50	1.5	1
75	1.5	1.2
100	2	1.5
250	3	1.5
500	5	2.2
1000	8	2.5
2500	15	2.5

Table 1 - Volumetric Flowrates - Base/Sides

Thank you, happy to chat about the benchmarks/ survey data if you can come back to me with more detail.

Kind Regards,

Laura Barlow
Team Leader Customer Engagement

Appendix D. Original Development



Legend:

Site

- New Grove
- Gunyah Park

Original Development

Buildings

- Single Rotary Dairy
- Machinery Shed
- Silos
- Brick House
- Main House
- Hay Storage
- Stock and Domestic Dam

Cropping Area

- Dryland Cropping
- Pasture-Based Dairy

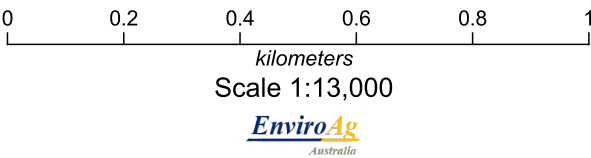
Imagery

2014

- Band 1 (Red)
- Band 2 (Green)
- Band 3 (Blue)

Project:	24675 - Yurunga Farms Partnership
File:	24675 - Yurunga Farms Partnership.qgz
Software:	QGIS 3.40 - desktop (Windows)
Prepared By:	Janina Palad

No.	Rev.	Date
-	B	04 April 2025



CRS:	EPSG:7855
Coordinate Units:	Meters
Scale:	1:13,000
Page Size:	420 x 297

Disclaimer: The information in this map has been provided in good faith. While all effort has been made to ensure the accuracy and completeness of the information and images. The data providers take no responsibility for any errors or omissions that may occur or losses or damage that may result from the use of this information.

Appendix E. Proposed Development



LEGEND

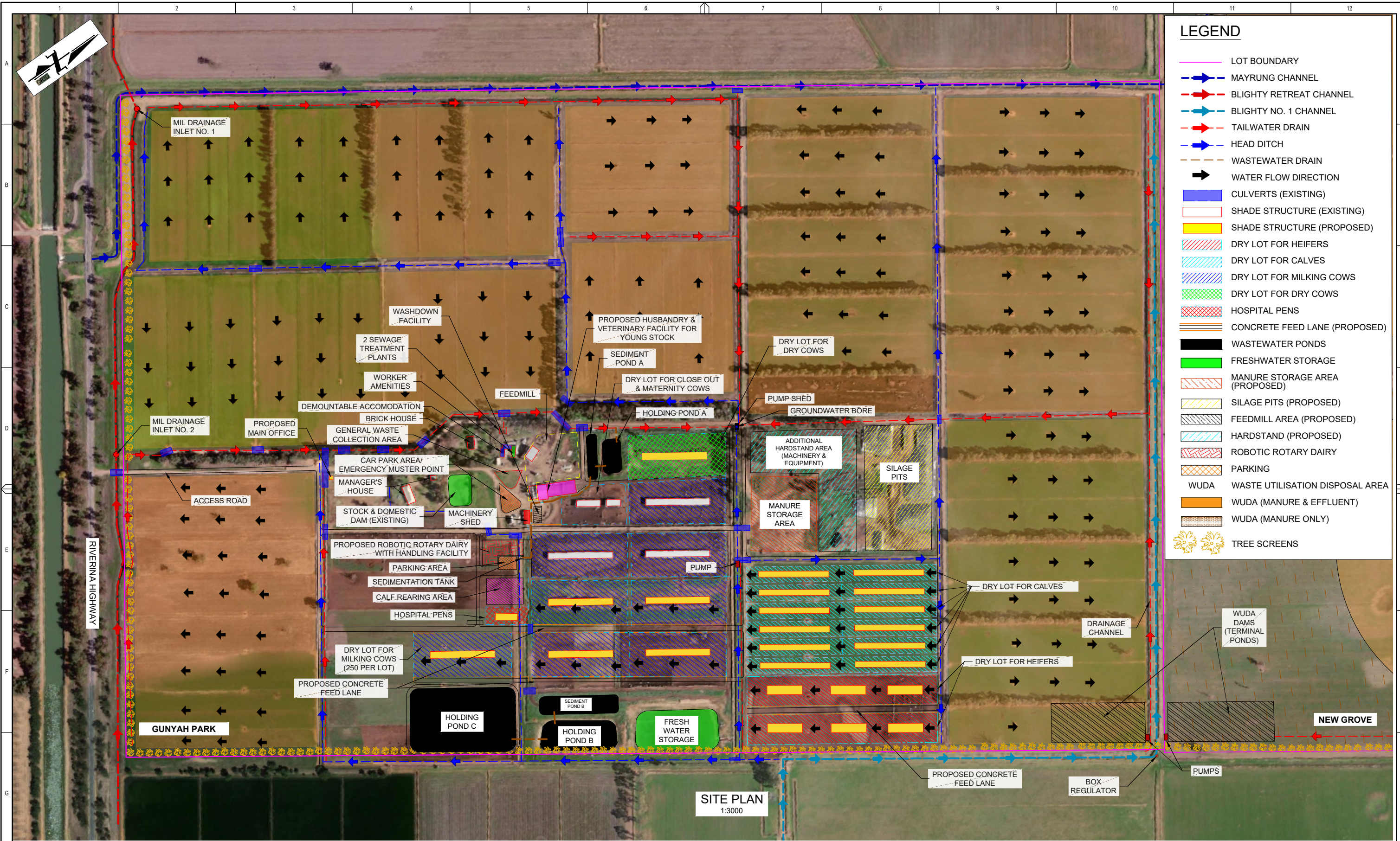
- LOT BOUNDARY
- MAYRUNG CHANNEL
- BLIGHTY RETREAT CHANNEL
- BLIGHTY NO. 1 CHANNEL
- TAILWATER DRAIN
- HEAD DITCH
- WASTEWATER DRAIN
- WATER FLOW DIRECTION
- CULVERTS (EXISTING)
- SHADE STRUCTURE (EXISTING)
- SHADE STRUCTURE (PROPOSED)
- DRY LOT FOR HEIFERS
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- FRESH WATER STORAGE PONDS
- MANURE STORAGE AREA
- SILAGE PITS (PROPOSED)
- FEEDMILL AREA (PROPOSED)
- HARDSTAND AREA (PROPOSED)
- ROBOTIC ROTARY DAIRY
- PARKING
- WUDA WASTE UTILISATION DISPOSAL AREA
- WUDA (MANURE & EFFLUENT)
- WUDA (MANURE ONLY)
- TREE SCREENS



SITE PLAN
NOT TO SCALE

CONCEPT DESIGN

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LEGEND

LOT BOUNDARY

MAYRUNG CHANNEL

BLIGHTY RETREAT CHANNEL

BLIGHTY NO. 1 CHANNEL

TAILWATER DRAIN

HEAD DITCH

WASTEWATER DRAIN

WATER FLOW DIRECTION

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HARDSTAND (PROPOSED)

ROBOTIC ROTARY DAIRY

PARKING

WUDA WASTE UTILISATION DISPOSAL AREA


WUDA (MANURE & EFFLUENT)

WUDA (MANURE ONLY)

TREE SCREENS

SITE PLAN
1:3000

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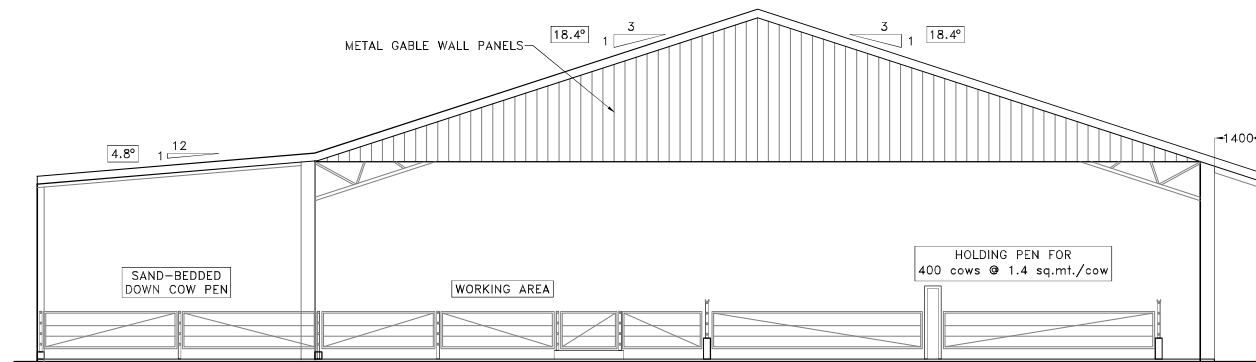


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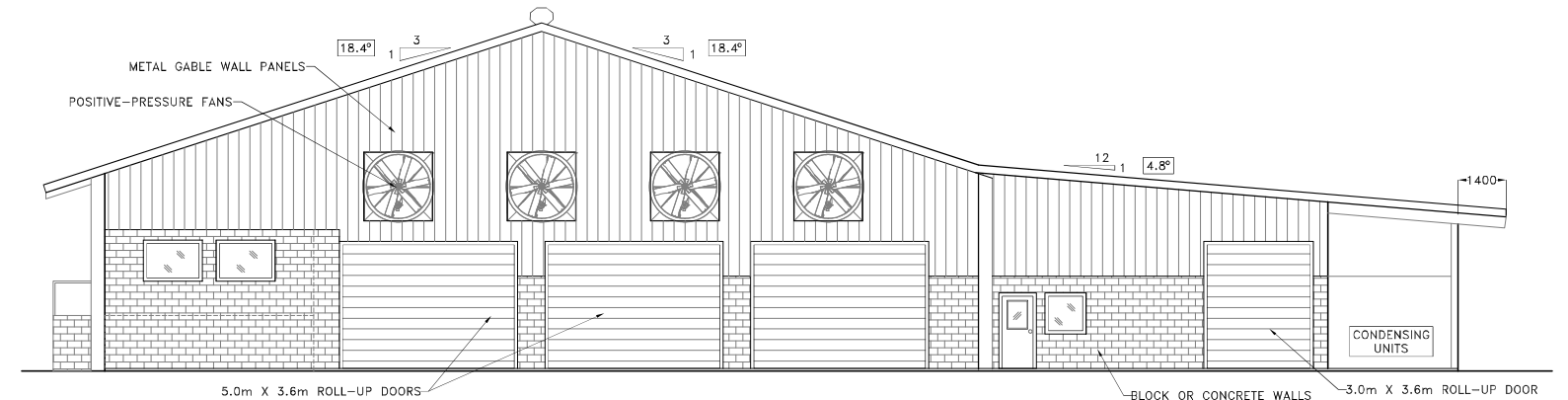
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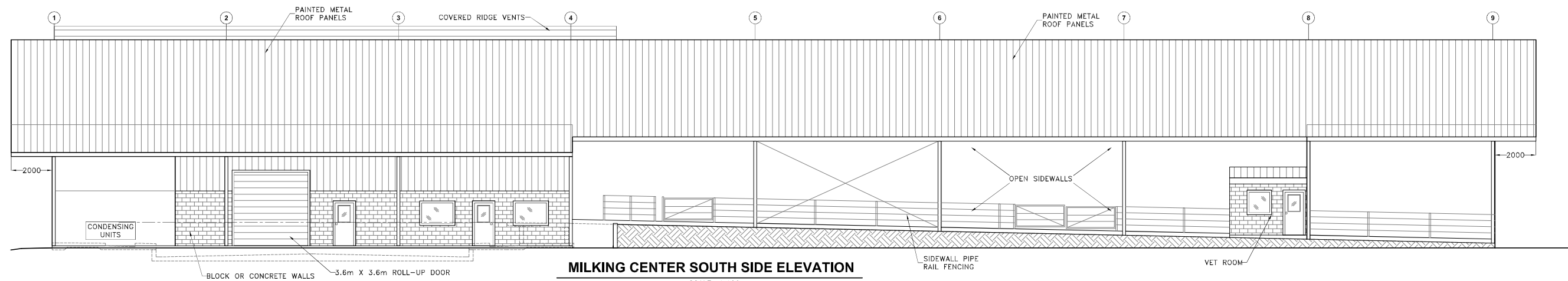
Appendix F. Design Drawings



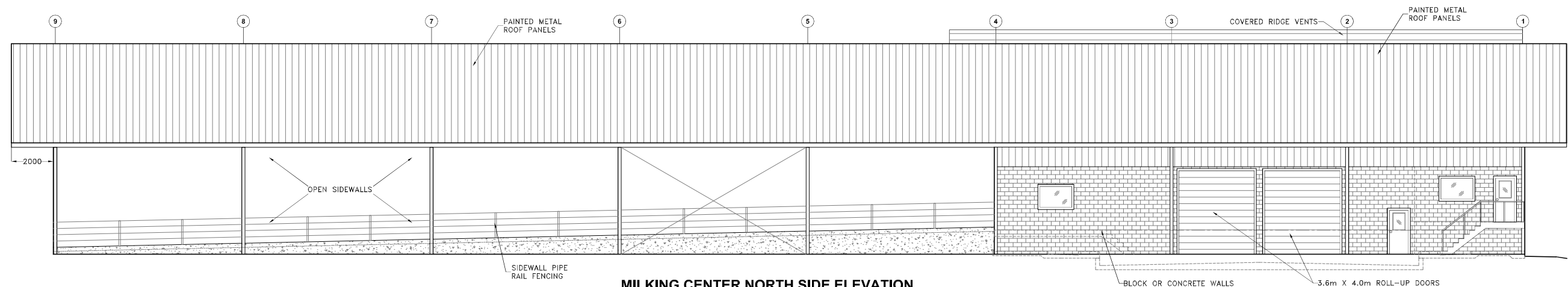
MILKING CENTER EAST END ELEVATION
SCALE: 1:100



MILKING CENTER WEST END ELEVATION
SCALE: 1:100



MILKING CENTER SOUTH SIDE ELEVATION
SCALE: 1:100



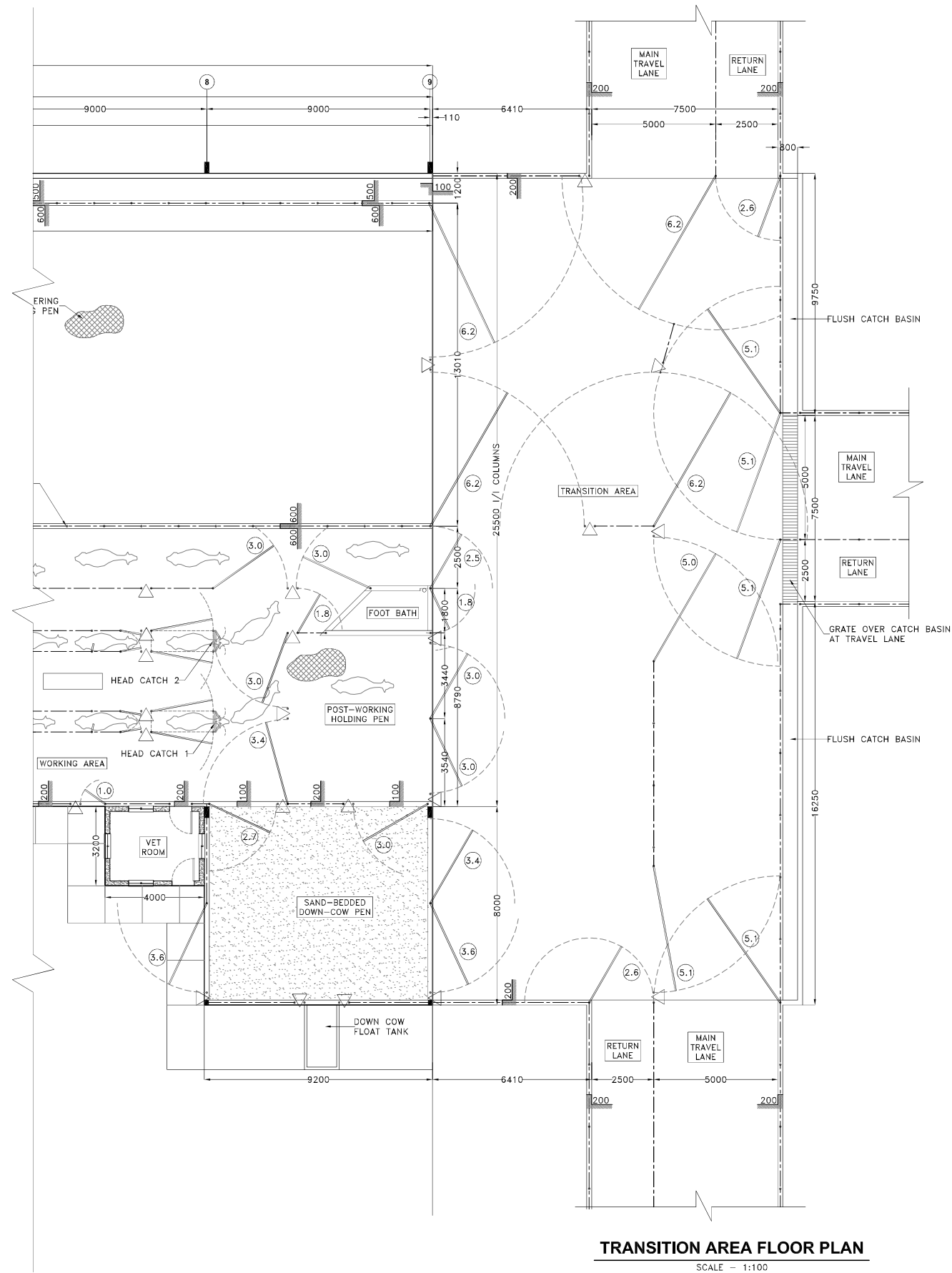
MILKING CENTER NORTH SIDE ELEVATION
SCALE: 1:100

**CONCEPTUAL DRAWING:
NOT FOR CONSTRUCTION
17 MAY 2023**

DAIRY RENOVATIONS
Yurunga Farms Partnership
Finley, New South Wales, Australia

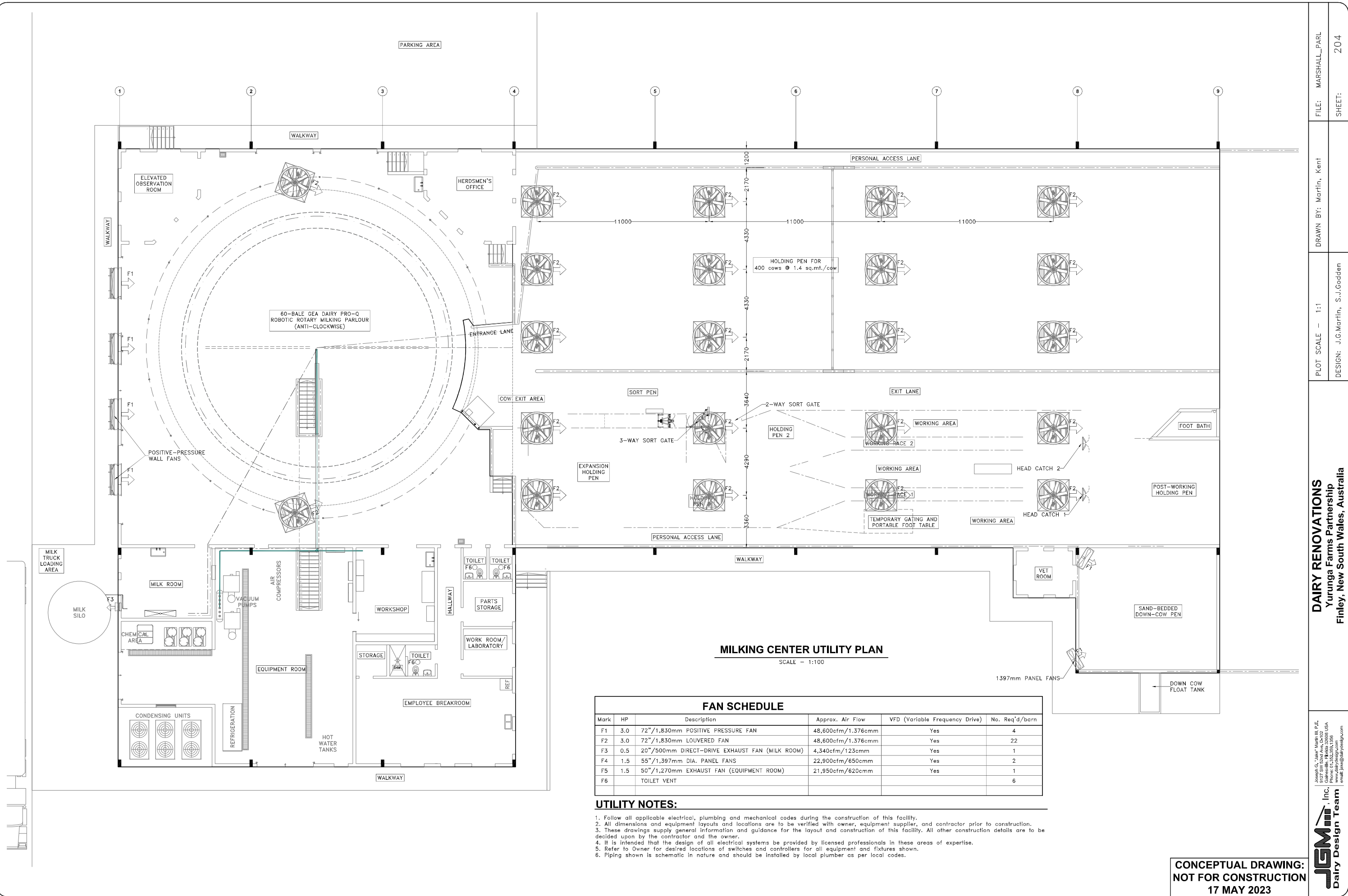
JGM
Dairy Design Team
Joseph G. "Jase" Martin III, P.E.
9127 SW 52nd Ave, D-402
Miami, FL 33155, USA
Phone: 01.352.358.1355
www.dairydesign.com
Email: jase@jgmfirm.com

FILE: MARSHALL_PARL
DRAWN BY: Martin, Kent
PLOT SCALE: 1:1
DESIGN: J.G. Martin, S.J. Godden
SHEET: 201



TRANSITION AREA FLOOR PLAN
SCALE — 1:100

CONCEPTUAL DRAWING:
NOT FOR CONSTRUCTION
17 MAY 2023

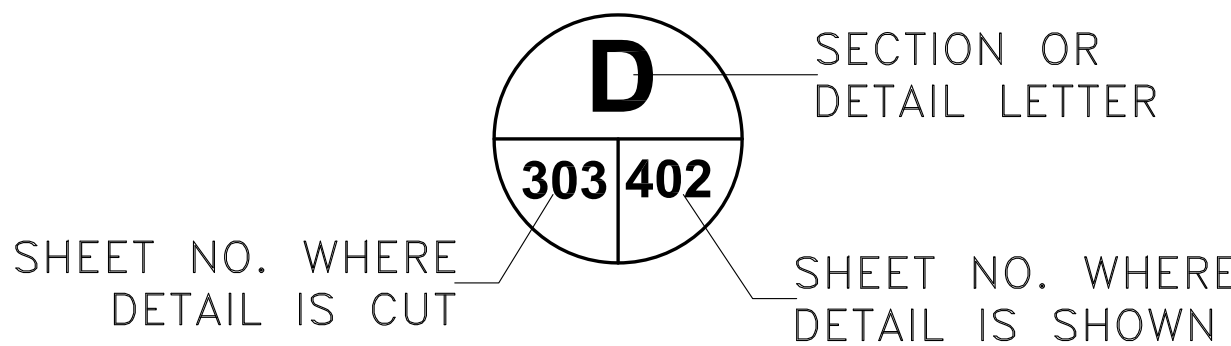


Dairy Renovations

YURUNGA FARMS PARTNERSHIP

Finley, New South Wales, Australia

by



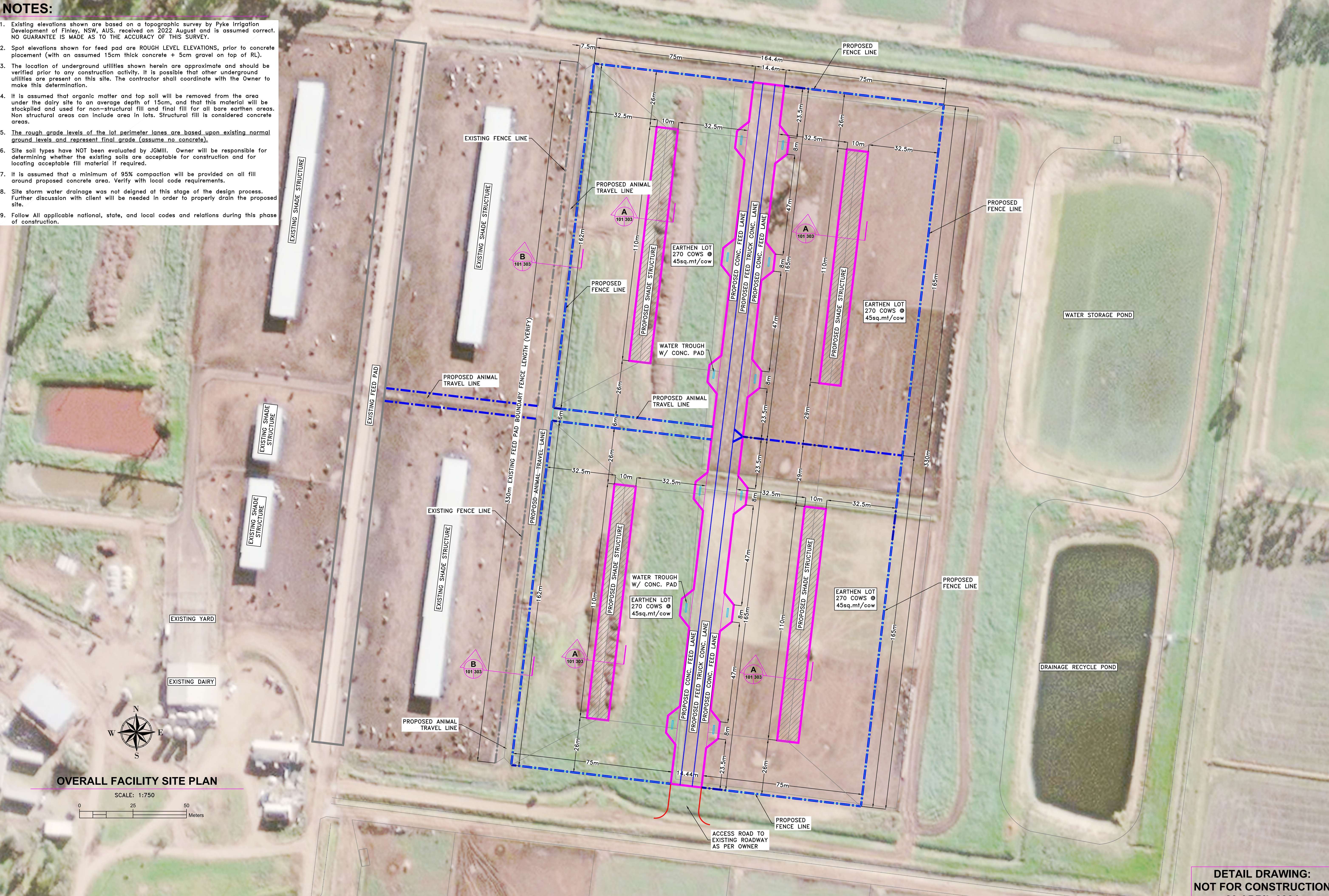
SECTION INDICATOR EXPLANATION

SHEET INDEX	
No.	Title
000	Title Sheet
101	Dairy Facility Site Plan
102	Feed Pad Rough Grade Elevations Site Plan
103	Feed Pad Cut/Fill Contours
104	Feed Pad and Lot Shade Profile Sections
301	Feed Pad Floor Plan
302	Feed Pad Sections and Details
303	Feed Pad Shade Cross Section

DETAIL DRAWING:
NOT FOR CONSTRUCTION
23 APRIL 2024

NOTES:

- Existing elevations shown are based on a topographic survey by Pyke Irrigation Development of Finley, NSW, AUS, received on 2022 August and is assumed correct. NO GUARANTEE IS MADE AS TO THE ACCURACY OF THIS SURVEY.
- Spot elevations shown for feed pad are ROUGH LEVEL ELEVATIONS, prior to concrete placement (with an assumed 15cm thick concrete + 5cm gravel on top of RL).
- The location of underground utilities shown herein are approximate and should be verified prior to any construction activity. It is possible that other underground utilities are present on this site. The contractor shall coordinate with the Owner to make this determination.
- It is assumed that organic matter and top soil will be removed from the area under the dairy site to an average depth of 15cm, and that this material will be stockpiled and used for non-structural fill and final fill for all bare earthen areas. Non structural areas can include area in lots. Structural fill is considered concrete areas.
- The rough grade levels of the lot perimeter lanes are based upon existing normal ground levels and represent final grade (assume no concrete).
- Site soil types have NOT been evaluated by JGMIII. Owner will be responsible for determining whether the existing soils are acceptable for construction and for locating acceptable fill material if required.
- It is assumed that a minimum of 95% compaction will be provided on all fill around proposed concrete area. Verify with local code requirements.
- Site storm water drainage was not deigned at this stage of the design process. Further discussion with client will be needed in order to properly drain the proposed site.
- Follow All applicable national, state, and local codes and relations during this phase of construction.



DETAIL DRAWING:
NOT FOR CONSTRUCTION
23 APRIL 2024

DAIRY RENOVATIONS
Yurunga Farms Partnership
Finley, New South Wales, Australia

JGM Inc.
Dairy Design Team
Joseph G. "Jase" Martin III, P.E.
10001 S.W. 15th St., Suite 200
Ocala, Florida 32068 USA
Phone: 01-352-356-1366
Email: jase@jgm-design.com
Website: jgm-design.com

PLOT SCALE - 1:1

DRAWN BY: Martin, Kent

FILE: MARSHALL_SITE

DESIGN: J.G.Martin, S.J.Godden

SHEET: 101

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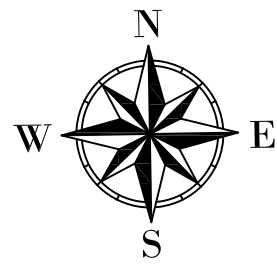
DETAIL DRAWING:
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23 APRIL 2024

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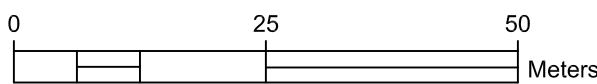
Cut/Fill Summary

Name	Cut Factor	Fill Factor	Cut	Fill	Net
STRIP CUTFILL (15cm)	1.000	1.150	11,774 Cu. M.	0 Cu. M.	11,774 Cu. M.<Cut>
EARTHEN LOT CUTFILL	1.000	1.150	3,070 Cu. M.	30,915 Cu. M.	27,846 Cu. M.<Fill>
FEED PAD CUTFILL	1.000	1.150	2,473 Cu. M.	145 Cu. M.	2,328 Cu. M.<Cut>
Totals			17,316 Cu. M.	31,061 Cu. M.	13,744 Cu. M.<Fill>



CUT/FILL CONTOURS

SCALE: 1:750



DETAIL DRAWING:
NOT FOR CONSTRUCTION
23 APRIL 2024

DAIRY RENOVATIONS
Yurunga Farms Partnership
Finley, New South Wales, Australia

JGM Inc.
Dairy Design Team
Joseph G. "Jase" Martin III, P.E.
1401 S. 1st St., Suite 100
Gary, South Dakota 57734
Phone: 605.352.3556, 3556
www.jgm-inc.com
email: jgm@jgm-inc.com

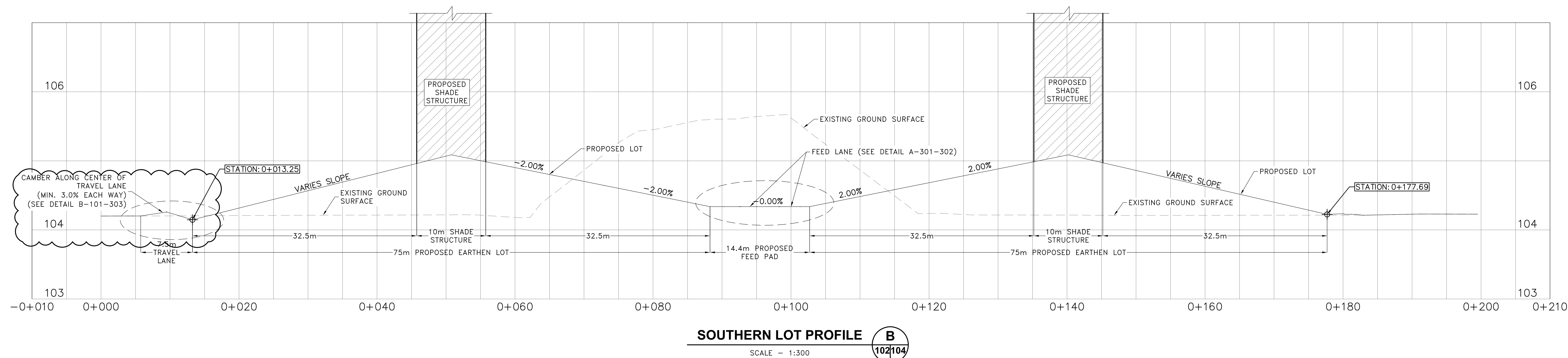
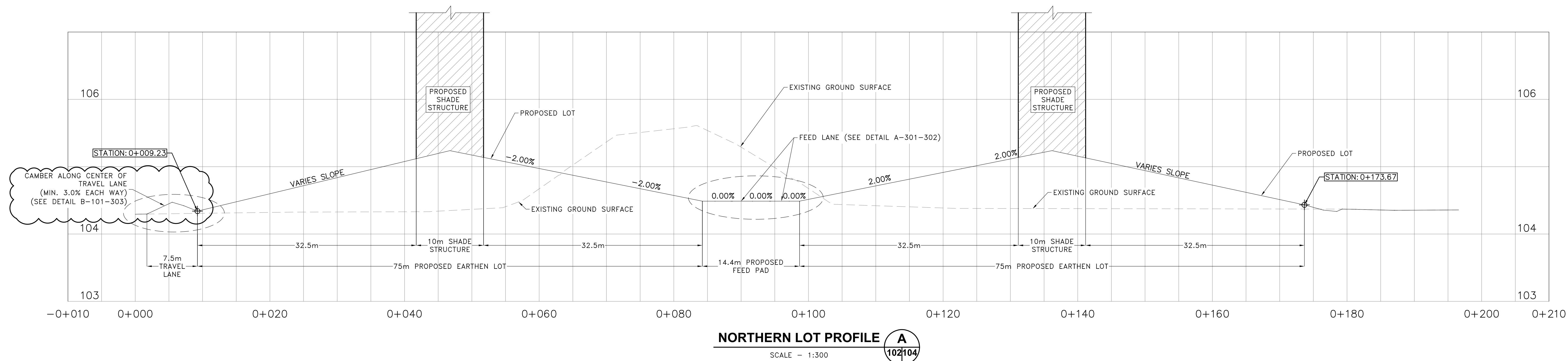
PLOT SCALE - 1:1

DESIGN: J.G.Martin, S.J.Godden

DRAWN BY: Martin, Kent

FILE: MARSHALL_SITE

SHEET: 103



DETAIL DRAWING:
NOT FOR CONSTRUCTION
23 APRIL 2024

DAIRY RENOVATIONS
Yurunga Farms Partnership
Finley, New South Wales, Australia

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Orlando, Florida 32806 USA
Phone: 01-352-356-1356
www.dairydesign.com
email: jase@ dairydesign.com

J&M
Design Team

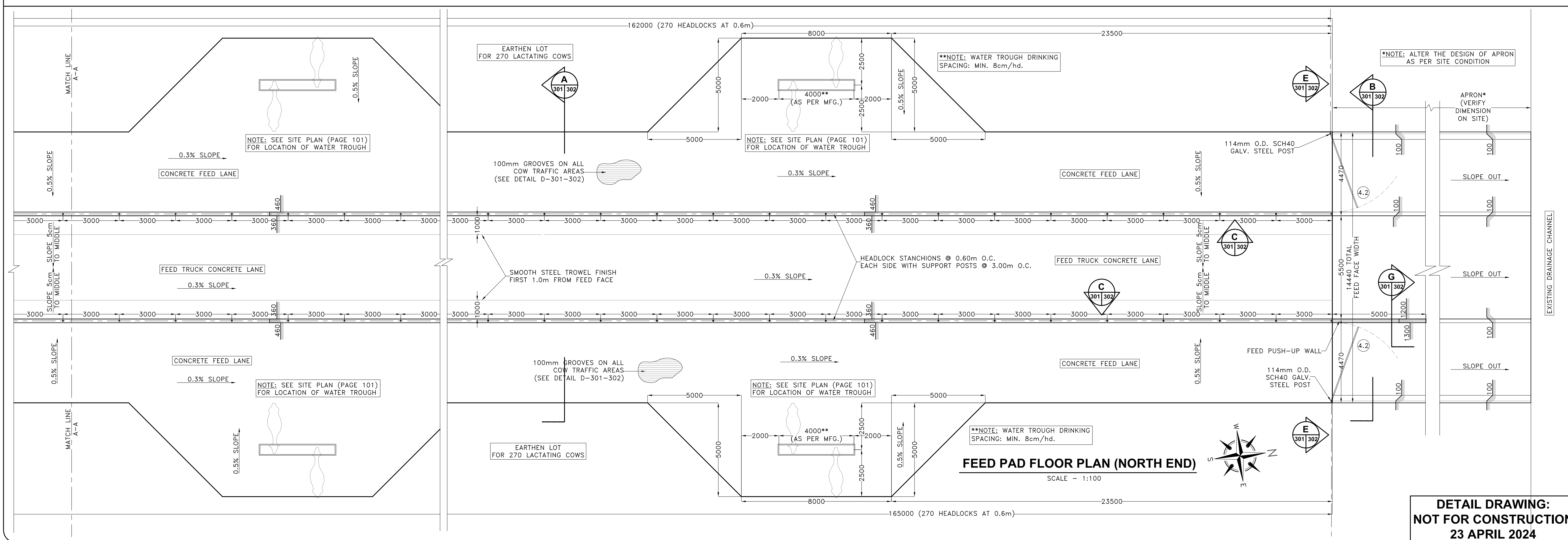
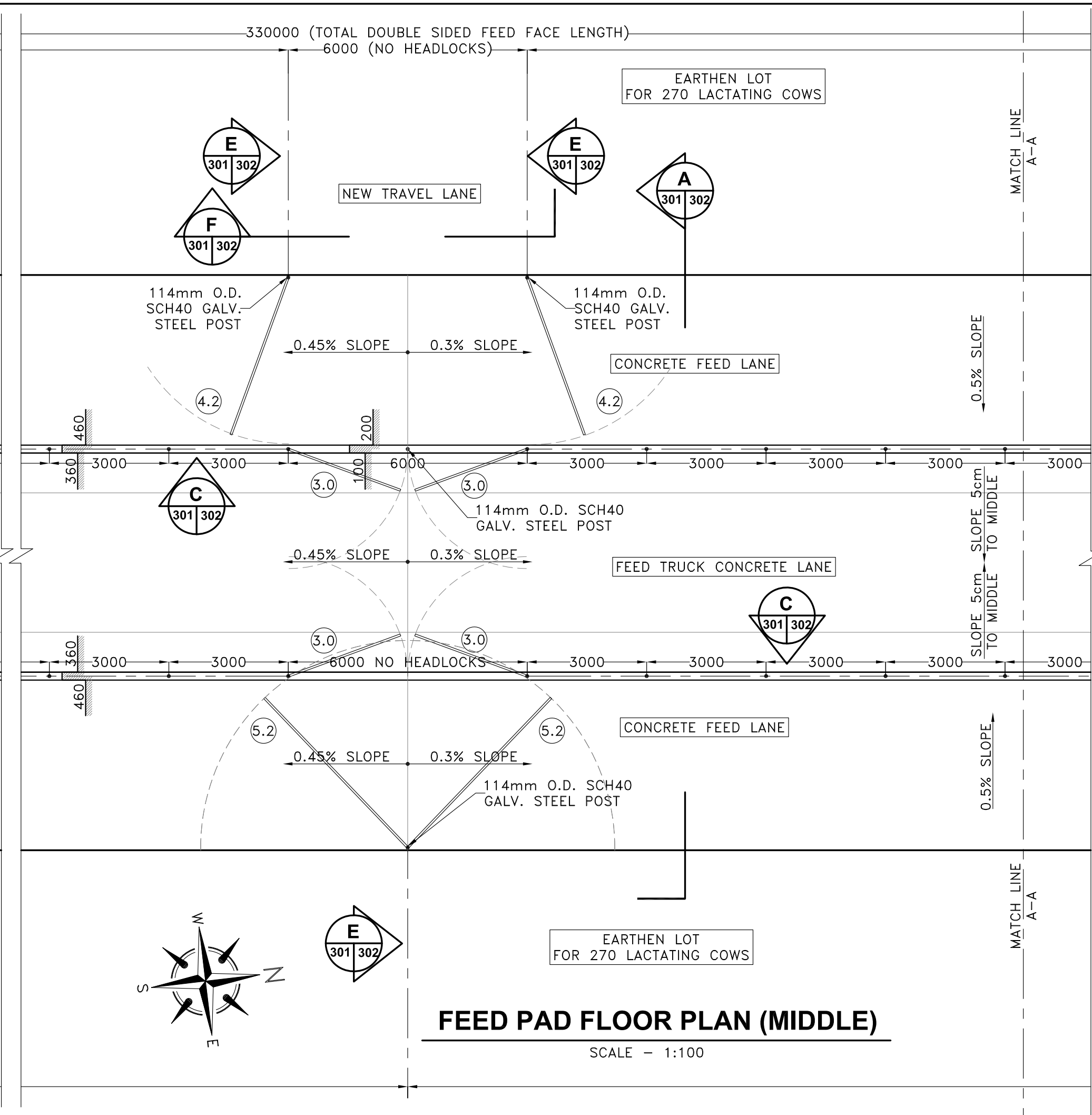
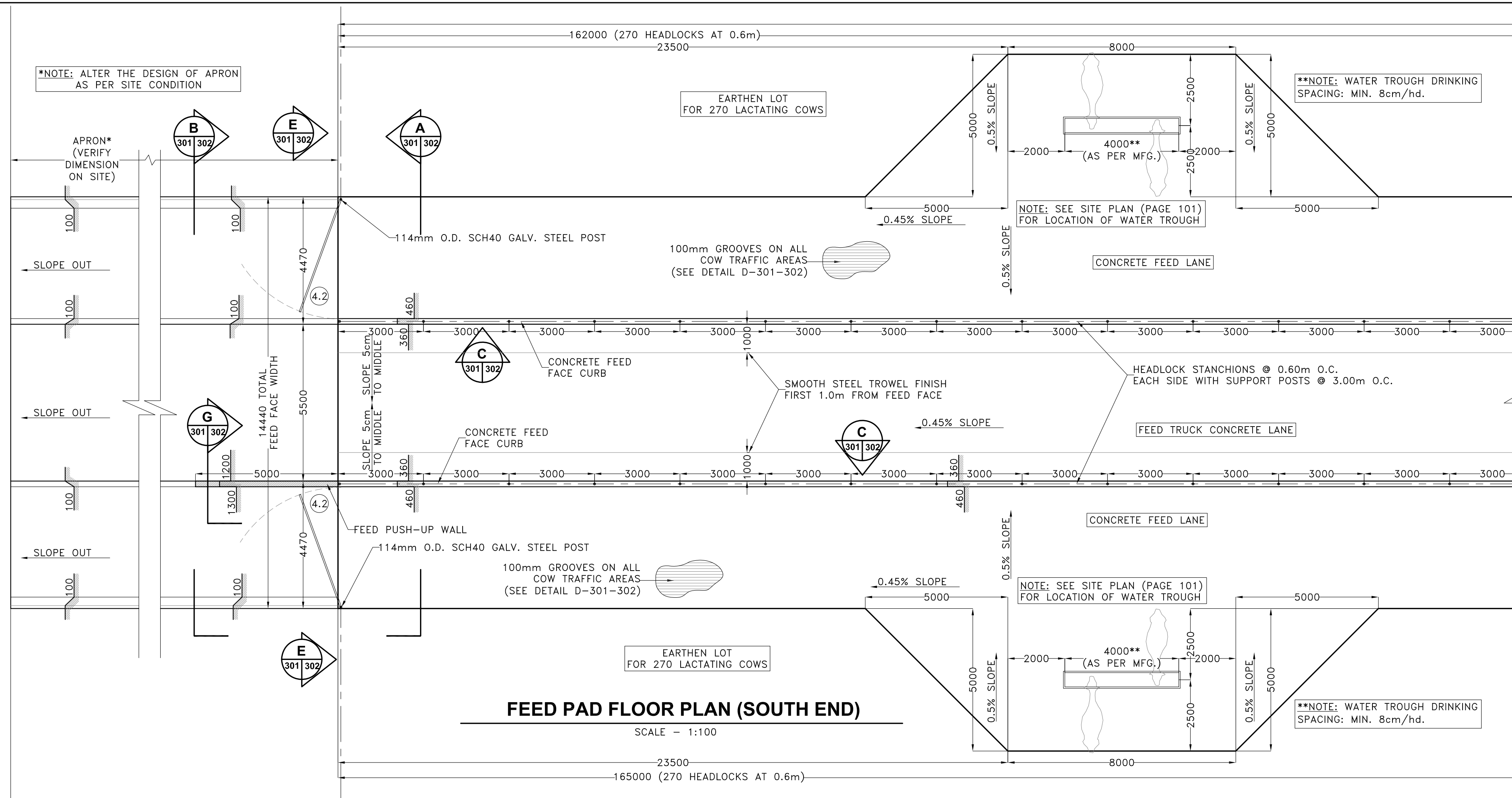
DRAWN BY: Martin, Kent

PLOT SCALE - 1:1

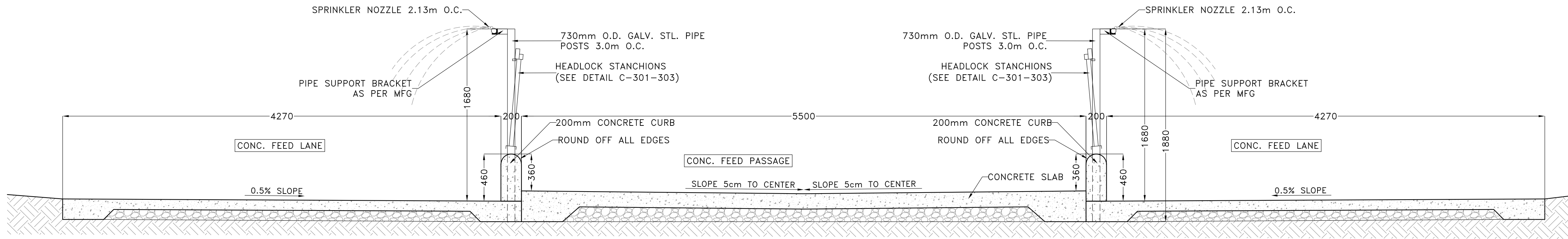
DESIGN: J.G.Martin, S.J.Godden

FILE: MARSHALL_SITE

SHEET: 104



**DETAIL DRAWING:
NOT FOR CONSTRUCTION
23 APRIL 2024**

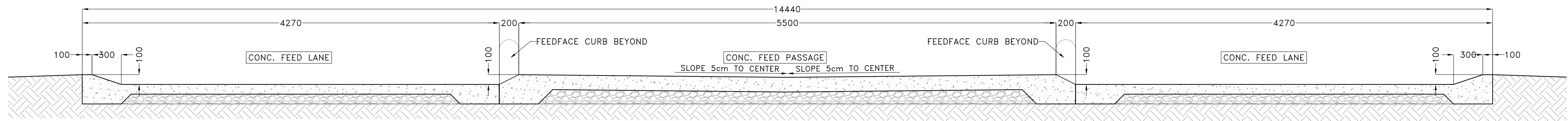


DOUBLE SIDED FEED FACE SECTION

SCALE - 1:25

A
301|302

NOTE: CONC. CURB AND FLOOR SHOWN IN DETAILS ARE SCHEMATIC IN NATURE. FLOOR THICKNESS, STRENGTH, AND REINFORCEMENT SHALL BE DESIGNED BASED UPON LOCAL CODES.

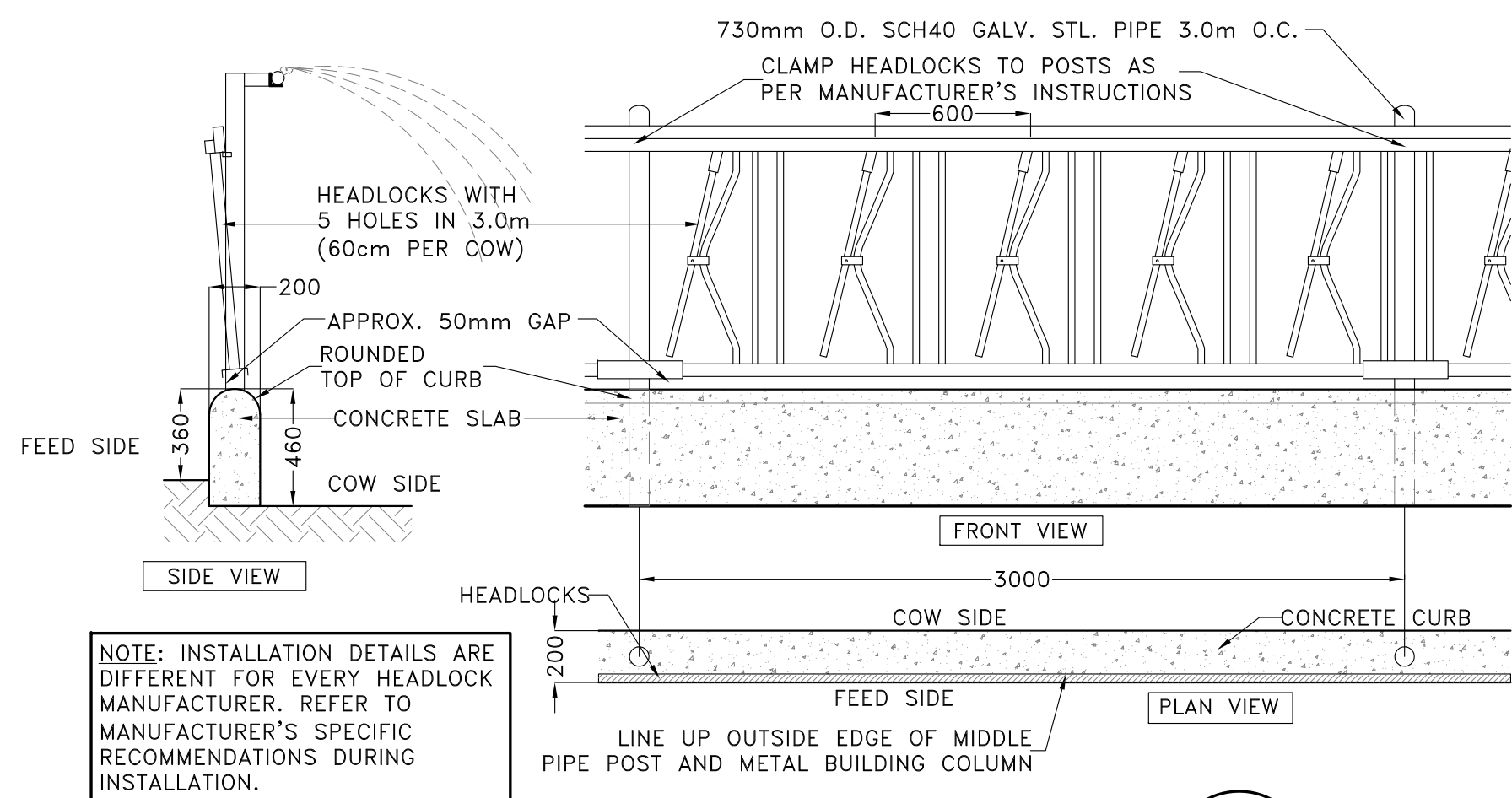


APRON AT ENDS OF FEED PAD SECTION

SCALE - 1:25

B
301|302

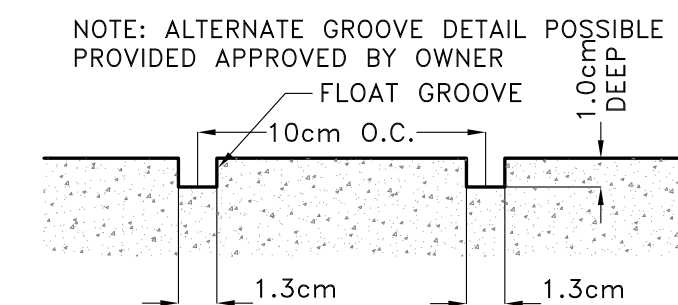
NOTE: ALTER THE DESIGN OF APRON AS PER SITE CONDITION



TYP. HEADLOCK DETAILS

SCALE - 1:25

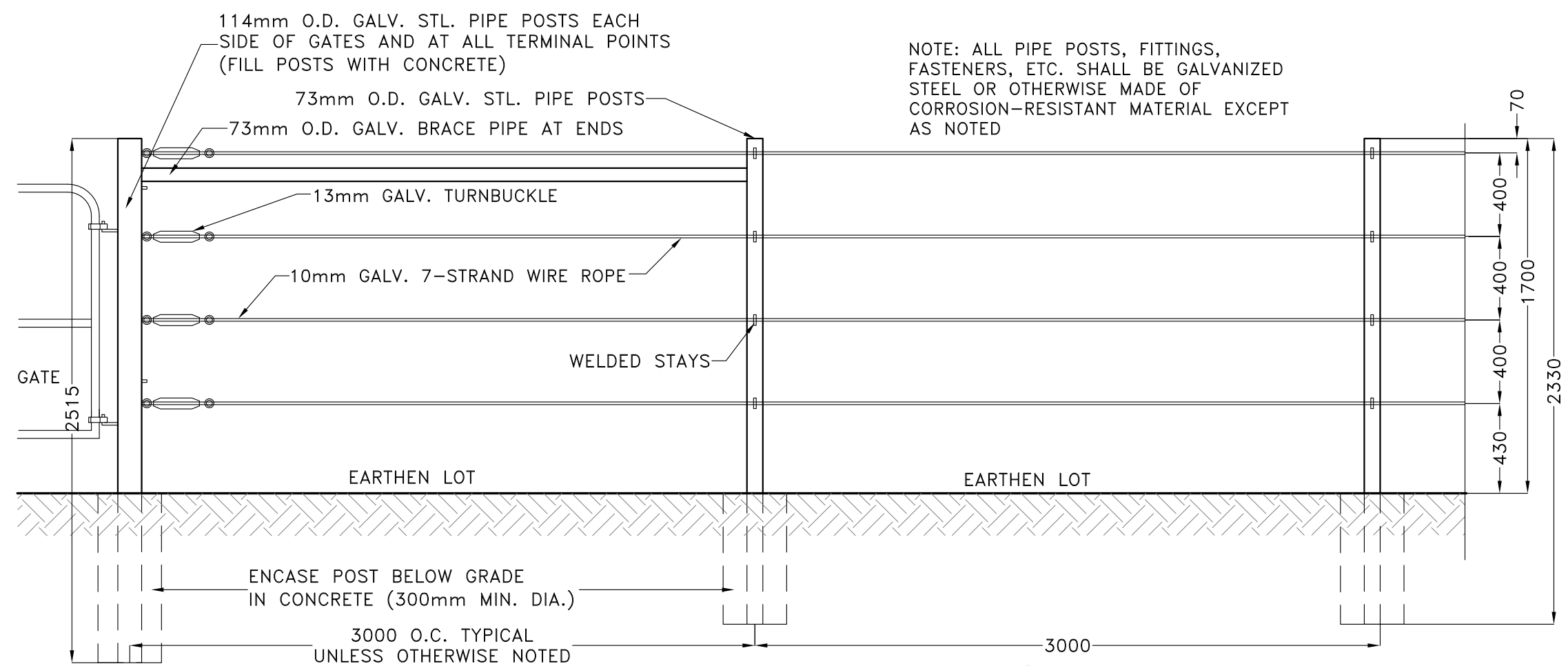
C
301|302



FLOOR GROOVE DETAIL

NOT TO SCALE

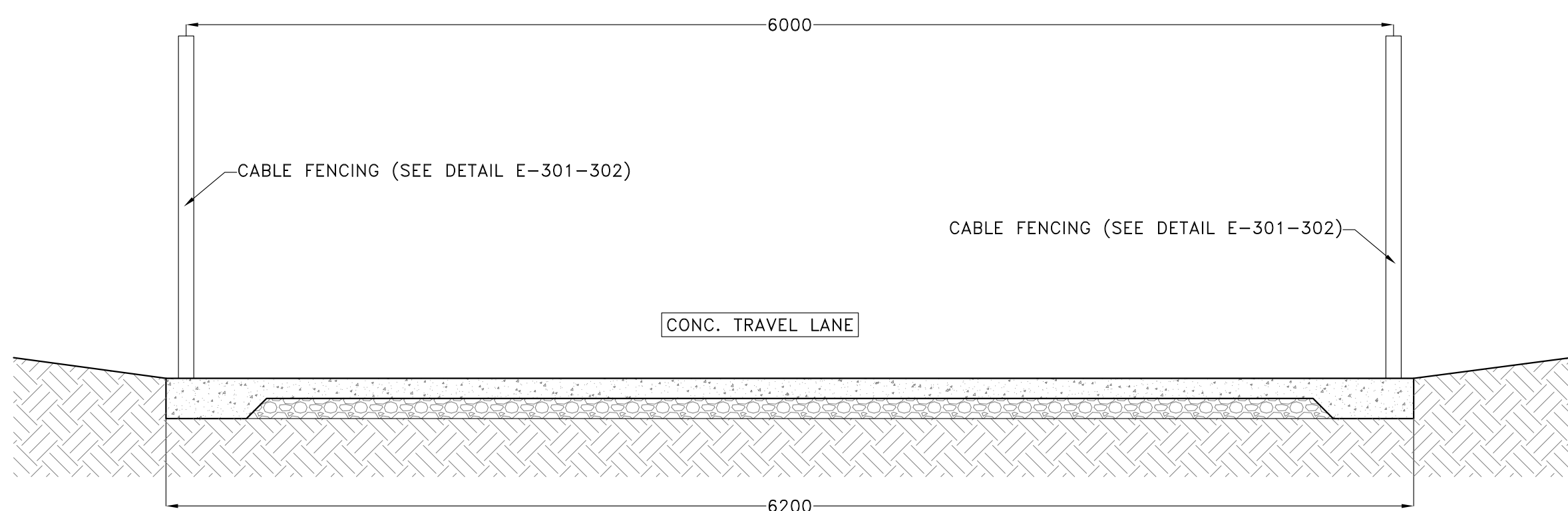
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TYPICAL LOT CABLE FENCE DETAILS

SCALE - 1:25

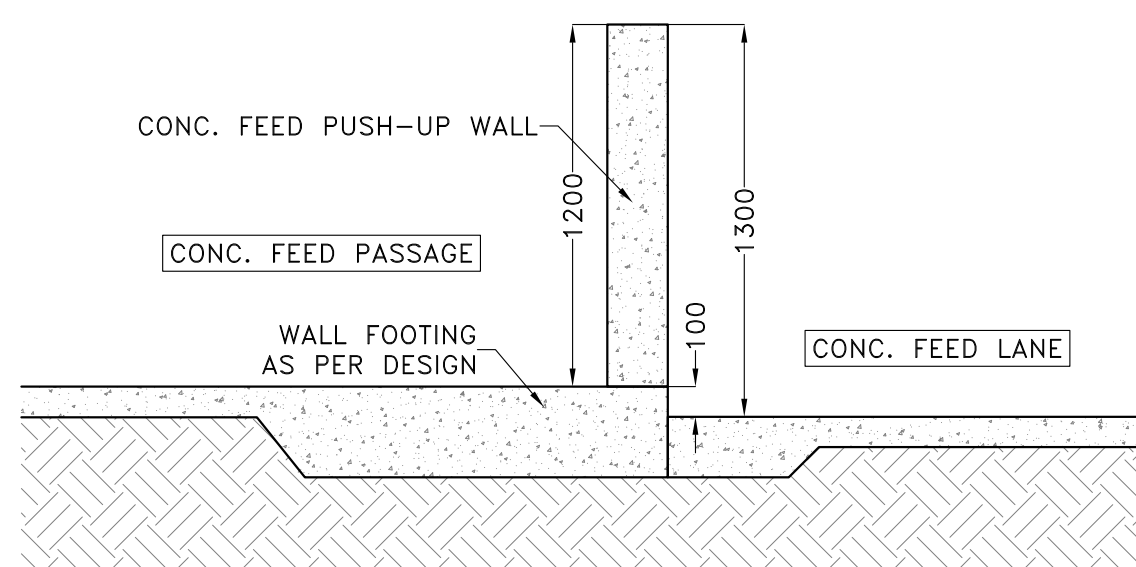
E
301|302



TRAVEL LANE SECTION

SCALE - 1:25

F
301|302



PUSH-UP WALL SECTION

SCALE - 1:25

G
301|302

DETAIL DRAWING:
NOT FOR CONSTRUCTION
23 APRIL 2024

DAIRY RENOVATIONS
Yurunga Farms Partnership
Finley, New South Wales, Australia

JGMD
Dairy Design Team
Joseph G. "Jase" Martin III, P.E.
Jase G. Martin, P.E.
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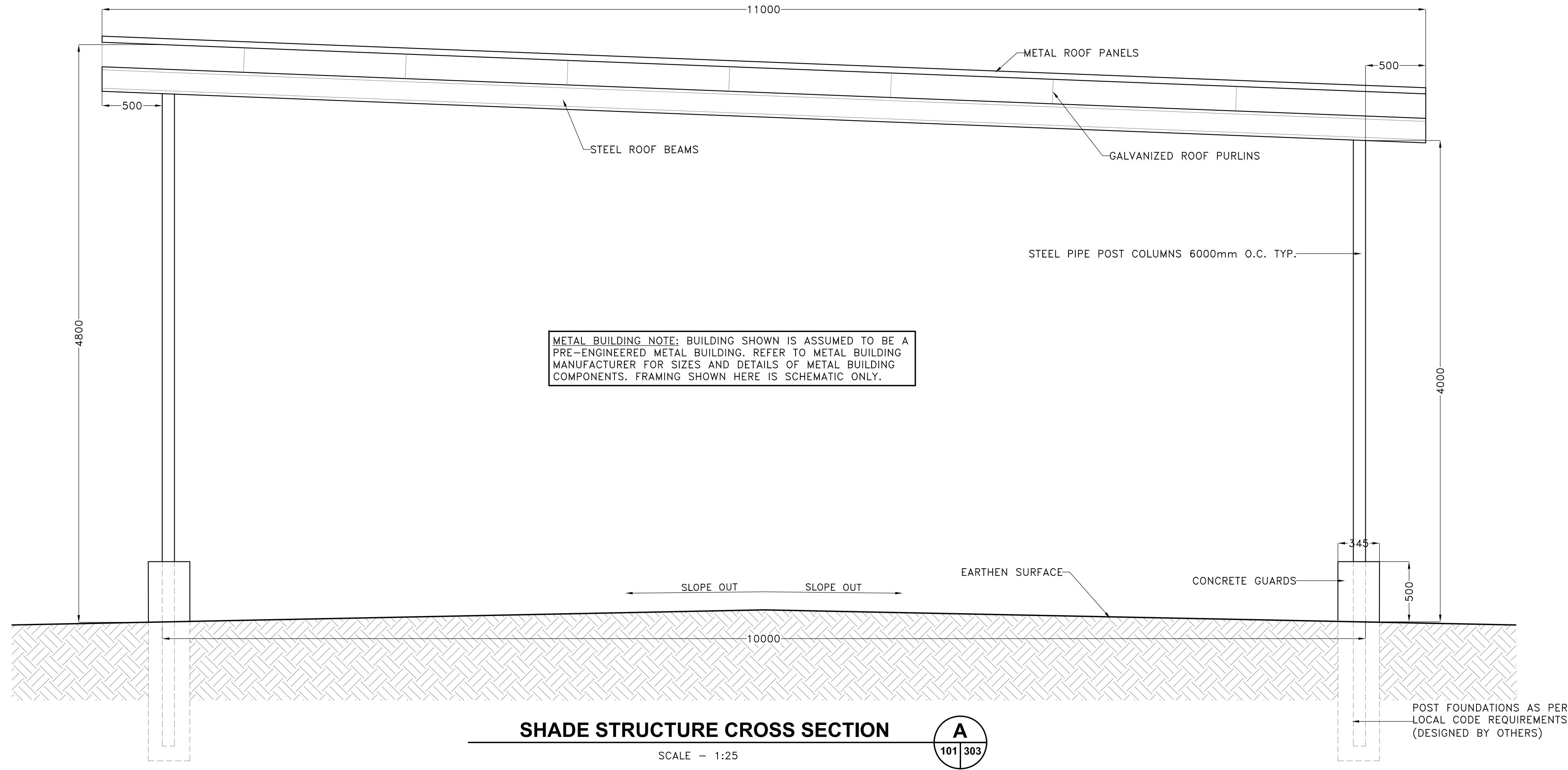
DRAWN BY: Martin, Kent

PLOT SCALE - 1:1

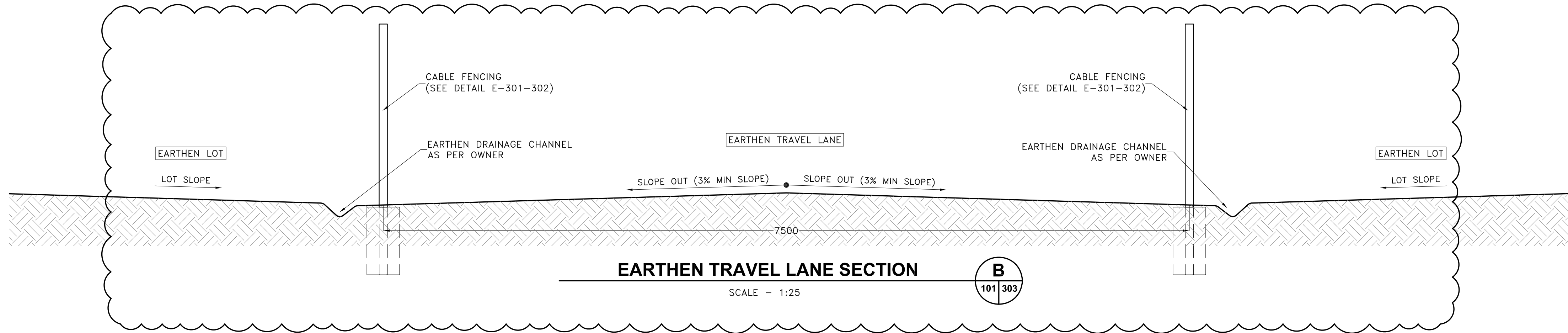
DESIGN: J.G.Martin, S.J.Godden

FILE: MARSHALL_FEEDPAD

SHEET: 302



SHADE STRUCTURE CROSS SECTION
SCALE - 1:25
A
101 | 303



EARTHEN TRAVEL LANE SECTION
SCALE - 1:25
B
101 | 303

METAL BUILDING NOTE: BUILDING SHOWN IS ASSUMED TO BE A PRE-ENGINEERED METAL BUILDING. REFER TO METAL BUILDING MANUFACTURER FOR SIZES AND DETAILS OF METAL BUILDING COMPONENTS. FRAMING SHOWN HERE IS SCHEMATIC ONLY.

DETAIL DRAWING:
NOT FOR CONSTRUCTION
23 APRIL 2024

Appendix G. YFP Animal Welfare Procedures

LLAN INVESTMENTS PTY LTD

ANIMAL WELFARE PROCEDURES

November 2023

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1. ANMIAL WELFARE POLICY

This policy is in place to protect the welfare of all animals on farm, to promote welfare and sense of well-being of all animals on farm, to safeguard their rights and to promote an appropriate environment for them to thrive. We have a zero tolerance for wilful neglect and abuse of animals and under no circumstances are animals to be wilfully mistreated abused or neglected.

Cows are Intelligent animals if they are put under undue stress by humans, they can be extremely dangerous, and whilst it may be necessary for some husbandry practices to cause discomfort for a short period, cruel and unnecessary aggression towards any animal on our farm will not be tolerated.

Dairy Industry codes of practice for the welfare of animals have been developed to encourage all people responsible to look after dairy animals to implement the highest standard of animal care possible. The code outlines five basic requirements:

- Freedom from thirst and hunger
- Provision of appropriate comfort and shelter
- Prevention or rapid diagnosis and treatment of injury, illness, or infection
- Freedom from distress
- The ability to display normal patterns of behavior.

If any person is wilfully not conforming to this animal welfare policy, they will be terminated from the premises immediately upon confirmation of the offence as per our animal and gross misconduct policy.

If anyone observes another person not conforming to the above policy, please contact Genevieve Marshall 0400675623.

Management will ensure that:

- All staff, visitors and contractors follow this policy.
- Act promptly to any animal welfare issue once brought to their attention; and
- All staff are made aware of all welfare requirements.
- All persons, including employees shall:
- Observe and apply all effort to ensure the animals' welfare.

Iunderstand reading policy, I acknowledge that proper animal treatment and welfare is an important part of the farms statement of ethics.

I..... understand the requirements and responsibility that I as an employee, contractor, or visitor to adhere to this policy and reporting requirements.

I understand that failure to comply with this policy is reason for employment termination and removal from property.

Signature.....

Date.....

2. HANDLING LIVESTOCK PROCEDURES

The purpose of these procedures is to ensure all farm employees know the correct way in which to handle an animal and it is done in a way to limit stress on the animal and to limit human injuries on farm due to unpredictable behaviour when placed under stress. All employees and farm personnel must adhere to these plans and procedures.

PERSONAL PROTECTIVE EQUIPMENT

- Protective Clothing and Foot Protection Must Be Worn
- Sunscreen Must Be Worn
- Hand and Eye Protection Must Be Worn as required
- Dust Protection Must Be Worn as required

PRE-OPERATIONAL SAFETY CHECKS

1. Check that all guards, gate latches, chains, gate handles and safety gates are in place, properly secured, and functional.
2. Check all gates are swinging freely and chains lock correctly.
3. Set up work area, gates, fences and equipment before beginning work.
4. Faulty equipment must not be used. Report suspect machinery immediately.
5. **You should not perform any duties with Cattle until adequate competency has been confirmed. If you have NOT been assessed as competent – DO NOT PROCEED**
6. **Lame stock should only ever be inspected and treated by management or a veterinarian.**

2.1 GENERAL REQUIREMENTS

1. Do not raise your voice unless you are in physical danger. Animals respond to calm commands, making handling easier;
2. Use of approved tools, water bottle, shaker, pool noodle. **No** pipes poly or other.
3. No electric prods are to be used to move animals unless no other method is effective. This may only be done by a member of management. Contact Genevieve Marshall if the manager is not available. If electric prods are to be used, they are not to be used on animals sensitive areas (eyes, ears, nose, genitals, or rectum);
4. Under no circumstances is hitting a cow allowed unless physical danger to yourself or the animal is evident;
5. No running or chasing of an animal is allowed;
6. Trained and approved methods of tail handling in moving animals to mitigate breaks;
7. Outgoing trailers moving calves under 2 weeks of age must be bedded;
8. Australian Animal Welfare Standards and Guidelines must always be adhered to;
9. In moving animals, remain calm, speak quietly, move slowly, and do not make eye contact with the animal. Anticipate where the animal is going and avoid approaching the animal's blind spots. This will keep you and the animal safe and comfortable with each other;
10. Moving animals for transport must be under the supervision of management; and
11. These procedures must be followed for all cows and calves.

2.2 ON FARM HANDLING

2.2.1 MOVEMENT OF COWS TO AND FROM DAIRY – ALL HERDS

1. Perform pre-use check of tractor – including fuel check;
2. Apply sunscreen and wear protective clothing, when applicable;
3. Never carry passengers. Tractor is a single seat;
4. Ride to collect herd, observing our agreed speed limits;
5. Reduce speed on slippery tracks and lanes; and
6. Report any bike mechanical faults to your supervisor immediately.

2.2.2 BRINGING IN THE MILKING HERDS

1. Current Pen order – Pen1, Pen2, Pen3, Hospital Pen (morning and noon shift only)
2. Set up Lan ways according to Pen entering lame. AM shift – run water on main lane during Pen1 and Pen 2 entry to lane (During winter periods or large dew events);
3. In summer months, turn fans on in dairy and yard sprinklers on before arriving at pen one;
4. Gently move herd towards the dairy at comfortable walking pace, taking note of any sick or lame cows. Ensure cows have time to drink;
5. Observe troughs and fences. Fix problems where possible. If not possible, report the problem to the group WhatsApp Chat;
6. If a cow is down or sick - treat or immediately report to herd manager. Use WhatsApp and Whiteboard for communications;
7. If lame cow is identified, report to WhatsApp, set draft gate to draft for herd management and move to hospital pen.; and
8. Animal observations every shift.

2.2.3 BRINGING IN THE HOSPITAL HERD

1. Gently move the herd towards the dairy at a comfortable walking pace, taking note of cow condition.
2. Ensure cows have time to drink.
3. Observe troughs and fences. Fix problems where possible. If not possible, report the problem to the group WhatsApp Chat;
4. If a cow is down or sick - treat or immediately report to herd manager. Use WhatsApp and Whiteboard for communications; and
5. Observations every shift movement into dairy and herd managers daily checks.

2.2.4 WHILE MILKING

1. First Position – scrubbing teats – use udder gun on all four teats to wash, holding for two seconds on each teat. Second pass over all four teats to dry holding for one second on each teat.
2. Second Position - cups on – Cup cow ensuring all teats are correctly attached (watch for teat kinks). Ensure any bales not working correctly are reported to shift leader and/or block bale until it can be fixed. Ensure four cow spaces between first position and cupping up;
3. Third Position – cups off – remove cups and apply iodine generously to all four teats. Ensure each individual mastitis filter is checked and/or mark the cow with a “C” and/or catch for treatment;

4. Any cows that look sick or un-well must be separated out. This can be achieved via draft gate or manual draft at cups off;
5. The herd manager is responsible for health and welfare of all cows and is to ensure they are looked after to the best of their ability. The herd manager and shift leaders are responsible for ensuring all milking staff follow all procedures correctly; and
6. Monitor laneways and report condition to management for manure removal protocols via vacuum tanking or dry scraping;

IMPORTANT: Always follow the backing gate procedure when in use.

IMPORTANT: Electric prod is only to be used if all other methods have been exhausted.

2.2.5 BACKING GATE PROCEDURE

To assist with cow flow backing gates must be well designed and used correctly:

1. Control gate from the gate monitoring platform area;
2. Must move the gate slowly – never push the cows up with the backing gate, It is only designed to reduce the yard size;
3. Bringing the gate forward as required and only if there is yard space;
4. Before moving the gate, make sure to look for coworkers in the yard;
5. Never move the backing gate with coworkers in the yards without their hand signals for guidance on movement;
6. Hand Signals – single finger up in the air, gate can move forward. Hand waving or full hand up, indicates STOP MOVING. If coworkers are in yards and no hand signal is given, gate is NOT to be moved.
7. Make sure you can see the back of the herd while pulling the lever.
8. Make sure that there is always a least half a meter between the gate and the back of the herd. If the gate is brought forward and lifted across cows, injuries will occur.
9. If a cow goes down, then immediately stop moving the backing gate and move the gate back to assess the situation;
10. Report any injury or situation (assisted lifting) that may have arisen to herd managers; and
11. Hydraulics should always be turned OFF when not in use.

Don't: Use the backing gate to push cows forward. It mixes up the pecking order and disrupts cow flow into the dairy.

IMPORTANT: If the herd is not moving forward, you must go out into the yard and move them into the dairy.

2.2.6 COWS AND CALVES – SPRINGERS PADDOCK

Pen to be monitored / observed at all possible times by herd and milking shift managers.

1. Identify Cow and Calves with neckties or ear tags immediately where possible after birth;
2. Avoid positioning yourself between mother and calf in the paddock. Always be aware of the mother and her actions;
3. Once Animals have been identified, place Cow number and calf and their necktie number sex of calf on herd dairy whiteboard, located in the dairy;
4. Colostrum tube feeding in paddock within 1 hour of birth – refer to calf protocols.

5. When loading calves into a trailer, ensure you use correct Manual Handling techniques to avoid strain and injury;
6. Move mother across into hospital pen; and
7. Ensure cows and calves are marked and tagged correctly and movement has been updated to white board to indicate calf has been picked up and mother has been moved to hospital pen.

2.2.7 MOVING YOUNG STOCK

1. Ensure laneways are clear of any hazards and set for cattle to move to correct location. This includes any debris that may 'spook' young stock;
2. Check cattle flow is suitable for stock, i.e. no sharp/sudden corners for young stock to turn; and
3. Remain calm and always move slowly with young stock.

2.2.8 YARD AND CRUSH AREA WORK

1. Maintain safe distance from cattle to avoid being kicked;
2. Only persons trained and supervised adequately are to work in the forcing pens;
3. Do not stand behind gates when moving cattle, you will get crushed;
4. If operating a cattle crush or calf marking cradle, ensure the instructions from the operation manual are followed;
5. Stand and work in the yards to help maintain a good flow of cattle to the crush; and
6. Do not put hands through gates, the race or crush as you may get a crush injury or broken bone.

2.3 TRANSPORT; OFF FARM

1. Cows being transported drafted or yarded and assessed to deem fit for transport prior to loading;
2. Transporting groups to be managed together separately from other groups;
3. Time management between yarding animals and loading trucks;
4. When loading ensuring only those who are trained in loading in to forcing crushes are in yards with animals;
5. The use of cattle prods is to be only used with management approval to assist if required only, please note not to be used on sensitive areas;
6. Animals to be loaded calmly with calm movement as to not cause distress or increase risk of injury to animals or humans handling the loading process;
7. To be deemed fit, animals must:
 - Able to walk weight bearing on all legs;
 - No visible signs of distress;
 - No visible signs of injury;
 - Full vision in both eyes;
 - Not heavily pregnant; and
 - Don't have a poor locomotion score.

Please note, if unsure of an animal's assessment, please seek approval from herd manager.

HOUSEKEEPING

1. Keep work area clean and free of accumulation of manure, dirt or debris. Wash down as required.
2. Keep the work area and implements in a clean and tidy condition.

POTENTIAL HAZARDS

1. Crush injury
2. Slip and fall hazards
3. Kick and strike injuries

SPECIAL NOTE NO PERSONNEL ARE TO HANDLE LIVESTOCK PRIOR TO OBTAINING:

- COMPETANCY IN THE CORRECT HANDLING TECHNIQUES
- READING THE STANDARD OPERATING PROCEDURE
- READING THE RELEVANT ANIMAL WELFARE STANDARDS AND GUIDELINES
- UNDERGOING THOROUGH PRACTICAL TRAINING WHILE PROPERLY SUPERVISED

3. HERD HEALTH PLAN

The purpose of these procedures is to ensure all farm employees know the correct way in which to treat animals in a way to limit stress on the animal. All employees and farm personnel must adhere to these plans and procedures.

Flagging animals for treatments plans through daily physical observations, and use of the collar system monitoring health reports and drafting animals for further investigation. Symptoms to observe for flagging in health reports sudden drops in rumination, ruminations score under 200, lameness, lethargic movements, general discomfort. Record animals identified to Management through WhatsApp farm communication, white board in dairy and Diary (transferred to computer)

Please note all herd health (young stock included) is to be recorded manually in the annual cattle diary daily and transferred to the herd SCR Computer program weekly. These notes include treatments for any ailments requiring administered medication, vaccinations, calving, foot health.

Herd health plan reviewed annually or as updated as needed.

All special needs/ treatment animals are segregated into the hospital pen. **NO** animal in milking pens is on treatment plans.

If animal is unresponsive to treatment plans within a 24/48hour period alert management or vet for consultation on further treatment plans or euthanasia decisions.

PERSONAL PROTECTIVE EQUIPMENT

- Protective Clothing and Foot Protection Must Be Worn
- Sunscreen Must Be Worn
- Hand and Eye Protection Must Be Worn as required
- Dust Protection Must Be Worn as required

PRE-OPERATIONAL SAFETY CHECKS

1. Check that all guards, gate latches, chains, gate handles and safety gates are in place, properly secured, and functional.
2. Check all gates are swinging freely and chains lock correctly.
3. Set up work area, gates, fences and equipment before beginning work.
4. Faulty equipment must not be used. Report suspect machinery immediately.
5. **You should not perform any duties with Cattle until adequate competency has been confirmed. If you have NOT been assessed as competent – DO NOT PROCEED**
6. **Lame stock should only ever be inspected and treated by management or a veterinarian.**

Animal Observations as part of animal health plans

- Milking herds observed daily at each shift.
- Dry cows observed daily in paddock for feeding and fortnightly in yards for drafting.
- Young stocks are observed daily at feeding and at minimum every second day by farm manager.

3.1 IDENTIFICATION OF TREATED STOCK

The purpose of this plan is to ensure all employees understand the correct coloured identification system and how it applies to various treated stock to ensure each cow is treated and milked correctly. All employees and farm personnel are to adhere to this plan.

COLOURED BANDS AND SPRAY PAINT ON COWS

RED tape means that the cow has been treated with antibiotics.

- **ALL RED TAPE COWS ARE SEGREGATED IN THE HOSPITAL HERD. ALL HOSPITAL HERD COWS ARE MILKED AND SPARTATED TO THE CALF TANKS.**

YELLOW tape means that the cow has been dried off and spray painted x on udder. No treatment.

Young stock – Are marked with any colour spray paint on the head to easily identify in pens.

Cows are cross checked with the computer to ascertain the period that their milk needs to be withheld from the Vat.

The colostrum cows are milked first milking on test buckets to harvest Colostrum. As no cow therapy at dry off, no milk withhold only on period to allow transition after calving.

3.2 SAFE NEEDLE AND MEDICAL WASTE DISPOSAL

DISPOSAL OF NEEDLES

All sharps must be properly disposed of using the container provided.

The container is located at cups off area.

Note: All sharps should be placed into a puncture-proof, leak-proof container. This can be either a purchased sharps container or a household container. If you use a household container, it must be:

- puncture-proof

- leak-resistant plastic
- tight-fitting lid
- properly labelled to warn of the medical waste inside the container, for example "Used Sharps".

DISPOSE OF CONTAINER

Once the container is full and requires disposal it is to be either collected by or delivered to Veterinary Clinics as they have a contracted service for disposing of medical/infectious waste.

Correct disposal of used sharps from livestock husbandry practices is about minimizing risks. Proper disposal minimizes the risk of injury to people and animals.

BROKEN NEEDLES

In the case of broken needles during use:

- Record animal number incident occurred;
- If needle is able to be retrieved from the animal, immediately use relevant tools to retrieve it;
- In cases where needles can't be retrieved immediately, minimise animal movements and keep contained. **IMMEDIATELY** contact management and vet for further instructions and treatment protocols.

3.3 TREATMENTS - HERD MANAGERS ONLY

Meloxicam/ Metacam– ANTI INFLAMMATORY / PAIN RELIEF

Administered usage –

- Dehorning/castration on Calves
- Mastitis udder swelling
- Masisi's systemic
- Metabolic (ketosis/ calving difficulties/twins/ retained membrane)
- Hoof ailments
- Pneumonia

Dexapent- Steroid- not pregnant cows

- Used for treatment for swelling in mastitis cows one off 5ml treatment only rumination hasn't declined.
- Used to help treat ketosis in fresh animals with a one-off treatment of 5ml before ruminations drops below 100.

Syntocin

- Used for first milking after calving treatment of 5mls to allow for milk let down promote reduction in uterus.

Alamycin oxytetracycline antibiotic

- Pneumonia in lactating animals
- hoof infections guided from vet and hoof trimming contractor

- other infections as vet prescribed- ear, navel, legs and body

Duplocillin – penicillin antibiotic

- Infections – feet, ear and other body areas

Draxxin

NOT TO BE USED ON LACTATING ANIMALS

- Pneumonia

Estroplan/ estromil

USE NEEDS TO BE USED CAREFULLY BY WOMEN AND ASTHMATICS.

PREGNANT WOMEN CAN NOT USE

- Used to induce luteolytic function (on heat)

GNRH/GONABREED

- Used to treat cystic or anestrus animals.
- 1-5ml treatments

All other medications used as per prescribed from vet.

3.4 HOSPITAL / TREATMENT HERD COWS

1. All treatment cows will be identified with **RED** tail tape; and
2. **All** cows in hospital pen are **NOT** to be milked into the vat – herd managers to separate milk to calf trailer for calf feeding.

3.5 MASTITIS TREATMENT

Every mastitis case is different and depending on the length of time the cow has had the infection to how long it will take to cure, also order of treatment may differ from cow to cow depending on the extent and type of the mastitis. It is important to identify if it is a new case or the same case that has reappeared. Please seek assistance if you are unsure.

1st Treatment plan – cups off/droving herds

1. If only a few spots on mastitis on filter, mark the cow with a “**C**” on udder using spray paint. Leave in milking herd;
2. If blood mastitis or clots are on filter, mark cow with “**B**” on udder using spray paint and draft immediately;
3. If observing swelling or clots remaining at end of teat canal/ more than a thumb nail of mastitis on **IMMEDIATELY DRAFT**; and
4. **if in doubt, DRAFT** and let shift leader or herd manager know.

2nd Management of mastitis in hospital herd – Herd managers only

1. Anti-inflammatories administered if swelling present or animal present ill. Recorded in manual diary and records transferred to computer;
2. Cows temperature taken and record results in diary;
3. Use of Acedex and or calcium if required; and
4. Consult with vets if help is required for further treatment plans.

3rd Treatment Plan

1. repeated movement of cows to hospital herd for treatment of mastitis add to the do not breed list- remove from herd when next plausible- herd managers task.

3.6 FRESH COW TREATMENT – Herd Managers ONLY

Check health index of all fresh cows for 30 days – use computer / collar reports on computer dashboard. Physical observation of animals in hospital pen.

1. Observe and treat true milk fever cases- two bags calcium IMMEDIATELY once animal is identified;
2. If a change in animal health becomes observant, take temperature and blood sample for ketone levels and record;
3. If retained placenta is suspected, herd manger to monitor health of cow via collars and visual observations. Gentle removal of membrane after 5 days. Treat with anti-inflammatory and antibiotics as prescribed by the vet if animal is unwell;
4. Use ketone testing where rumination is low after three days – treat with Acedex or gut fresh cow drench if required for three days or longer until cow has recovered;
5. Use anti-inflammatory drugs after twins / low health index;
6. If treatments and rumination aren't improving cow health, monitor for a displaced abomasum, check abdomen for sounds on both left and right. If unsure, consult vet for further investigation. If surgery is required, the use of pain medications and relevant vet prescribed medication is required;
7. Temperature check cows at start of treatments in cases of METRITIS use of broad spectrum antibiotics as prescribed by vet; and
8. Any changes or problems with the procedure must be approved by management and consulting vet.

3.7 DOWN COW

A down cow is a cow that cannot stand up for any reason, may be caused by injury or a metabolic disease or other ailments. Assess if metabolic / other or injury and follow procedure according to assessment.

Assisted protocols and notes.

- A down cow who is presenting cast (lying upside down, down a hill) needs IMMEDIATE action with a machine to right her position before treatment. This position will cause rapid death of the animal if left in this position. No treatment will help unless the position is corrected first.
- Use of machine pallet forks to roll an animal is only to be done by trained staff to not cause any injuries.
- Please note, hip clamps are for lifting only after animal is assessed for injuries and for short periods no longer than 30-minute periods.
- Moving animals who need assistance required two trained people to safely roll animals into a loader bucket and move to the required area for recovery.

- Use of the cow float tank is at the discretion of management on assessment of injury and if the need is required to help recovery.

METABOLIC/ OTHER

Down cows discovered in the pen/paddock/Yards.

- need to be treated IMMEDIATELY or within 30mins of you finding them. If this is not possible, report for help IMMEDIATELY;
- One packs of 4 in 1 in the vein, One pack under the skin: Safely aware of cows' movements under stress;
- If the down cow does not respond to initial treatment, they need to be lifted using hip clamps, to assist the cow in getting up, this is only to be carried out by a trained, experienced person. (A second person may be required to help in certain situations.) Hip clamps are for lifting only not moving an animal.
- Move animal to a safe area for recover (hospital pen, dam paddock)
- If animals cannot walk, assisted movement protocols are to be followed.

If the cow went down acutely due to a slip or fall, report to herd managers IMMEDIATELY Herd Managers:

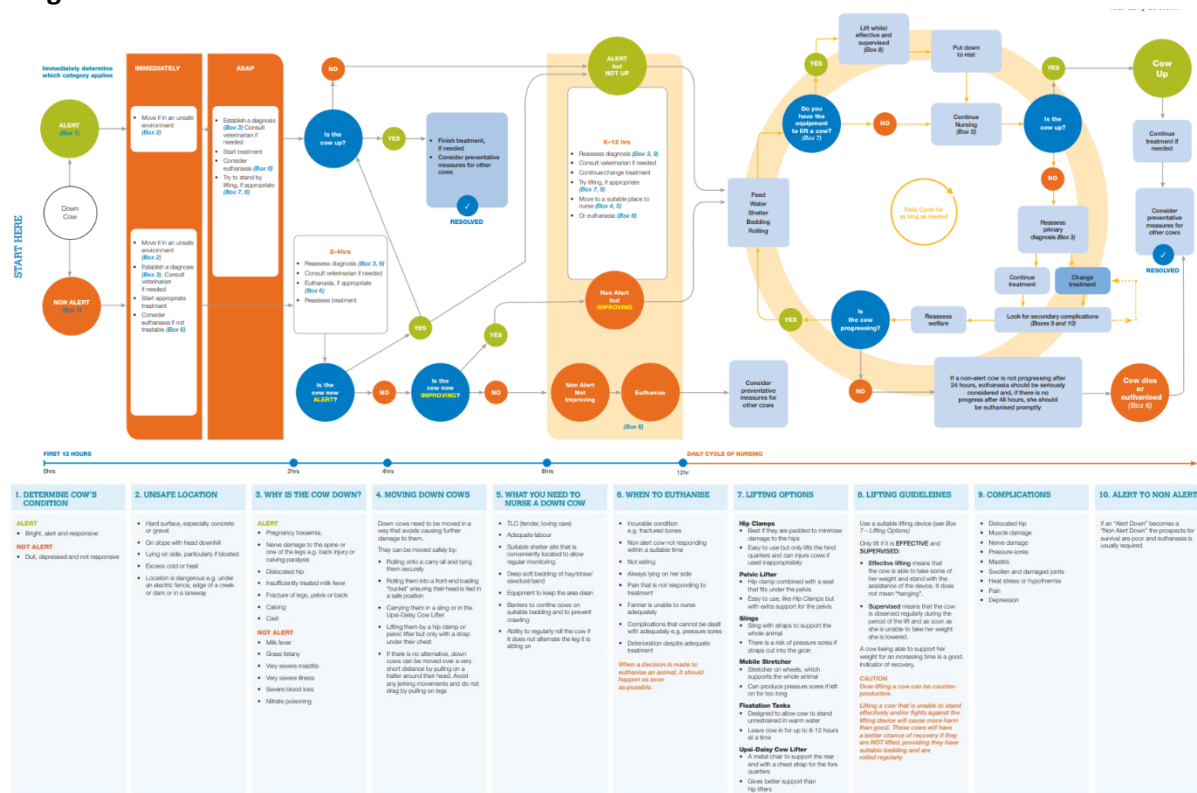
- cow is to be lifted and gently moved to a safe area.
- If the down cow cannot stand when assisted, then the cow must be moved to a paddock close to feed and water facilities and where ground is clean and dry.
- Feed must be the same diet animal was on prior to going down.
- Administer pain relief/calcium if animal doesn't stand immediately.
- Ensure the cow is sitting up with her legs underneath her body in a normal seated position.
- If injury consists of dislocation or broken legs- consult vet and euthanasia immediately if necessary; within 4 hours of diagnosis.
- Or If the reason for deterioration is unclear or further assistance is required contact the relevant veterinary clinic.
- calls AULDS for dead animal removal.

Note: If a cow remains down for more than 48hrs, she will need to be euthanized.

Any issues or changes to procedure please communicate with management.

Use the down cow decision tree to ascertain the reason why the cow is down and follow the appropriate protocol for the condition.

Diagram 1: Down Cow Decision Tree



3.8 DRY COW

1. Dry cows to be drafted fortnightly – using expected dry off report, aiming for an average 57 days dry. Animals recorded in diary and computer system.
2. Painted with **RED** paint and yellow tail tape.
3. Back line – worm treatment – Average cow 600-700kg (Required dose rates can be found on product label).
4. The draft of animals be submitted for maintenance hoof trimming before moving to dry pen.
5. Dry cows are most at risk of contracting mastitis within the first week after being dried off, however, the most critical period is 24-48 hours after. It is important the dry cow group is checked for swelling or other signs of ill health for two days. Collar health index report will indicate problems.
6. Dry cow pen monitored by all feed and herd managers daily.
7. Dry cows are moved into the close-up pen and started on Lead feed 21 days (average 25 days) before calving date.
8. If a dry cow happens to calve in the dry cow paddock, she is to be drafted out the day the calf is born and put into the hospital pen.
9. If there are any issues with dry cows or dry cow paddocks, it needs to be reported to management when first noticed.

3.9 HOOF TRIMMING MAINTENANCE AND LAMENESS TREATMENTS PROCEDURES

1. Slowly and carefully move the lame animal into the hospital herd or other suitable area as soon as lameness has been identified.
2. Examine the animal as soon as possible to determine the cause of lameness.
3. Serious wounds, dislocations or fractures require immediate veterinary attention and should be immediately referred to the vet or euthanasia policy followed.
4. Check the general appearance of the affected leg above the hoof for swelling, redness, wounds, or discharge.
5. Lame animals should be kept close to the dairy to allow them to rest and recover.
6. Ensure their nutritional requirements are being adequately met during their recovery period.
7. Frequently review lame cows as they reach their milk withhold expiry to determine if they are adequately recovered to return to the herd or resubmitted for future investigation.
8. All animals are to be submitted for hoof trimming with a contractor for further treatment and investigation.
9. All maintenance trimming and lameness information ie. Cause, which foot, date to be recorded in diary and computer.

Treatment:

Treatments as per instructions from Hoof trimming contractor and vet in accordance with the cause of the lameness:

- White Line disease
- Puncture or sole ulcers
- Digital Dermatitis
- Hoof rot
- Abscess
- Stifle injury

Contractor to Block, wrap and instruct if anti-inflammatory or antibiotics are required.

FOOT BATHS

1. Make sure all PPE is in working order;
2. Ensure the bath is kept clean and empty between use;
3. Baths are to be run every Wednesday each week throughout the year;
4. During wet months foot baths will increase to twice a week run on Mondays and Thursdays, herd managers to indicate frequency;
5. Fill the foot bath with fresh water and add Copper sulfate or formalin as per instructions; and
6. Each herd requires a fresh foot bath. At herd changes shift manger to empty clean and refill bath for the next herd.

4. VACCINATION PROGRAM

7 in 1 Vaccination

- **Calves** - 8 weeks initial and booster at four months
- **Milking herd** – April annually all completed on a noon shift.

- **Dry cows/ Springers**- April annually usually the day before milkers
- **Young stock** – April over a two-week period all boosted annually.

Longrange Botulism vaccination

- **Milking herd**- Month of May Biannually
- **Dry cows/springers**- Month of May the day before Milking herds
- **Pregnant young animals**- Month of May
- **Breeding young stock** – Month of May.

All vaccines administered usually short steel needles under the skin in the safest place.

- Tail head
- Neck
- Flank

Needles to be changed regularly and dipped in methylated spirits between animals.

Drench Programs

Wormer:

- adult cows back lined at dry off.
- Young stock as pre requirements 8-12 weeks depending on age and need.

Fly Treatment drench

- All stock back line on an as need basis in summer months.

Fly Management

- All young stock backline on an as needed basis
- Daily or as required –Fogging of main herds and calves and surrounding buildings.
- Natural chemicals are used to suppress and reduce fly's cycle.
- Fly curtain main yard- Milking herd to walk through daily using natural pyrethrums and oils to help coat and mitigate flies on backs.
- Ensuring pen management of manure is kept manicured and light, dry and fluffy.
- Ensuring weeds surrounding animals is controlled to reduce fly habitats.
- Ensuring manure piles surrounding animal pens are moved in summer months to reduce fly habitats and breeding areas.

Pink eye treatments

- **In summer months all pens observed for pink eye.**
- Treatment of eyes with the use of pink eye tubes, Alamycin spray or Terimycin powder treatment according to label to the effected eye area.
- Treated eyes patched using jean patches.
- If an animal does require both eyes covered for a period, the animal is shifted into a smaller pen to help animal with water and feed access.

5. EUTHANASIA PLAN

LLAN Investments Pty Ltd and its staff aim to minimize the instance of any cow with a low chance of recovery, in pain or discomfort being left to suffer and must be destroyed humanely on site.

Where it is necessary to euthanize cattle, it is done promptly, safely, and humanely within four hours of decision.

Only qualified staff or third parties can undertake the euthanasia process.

This must be authorized by Management.

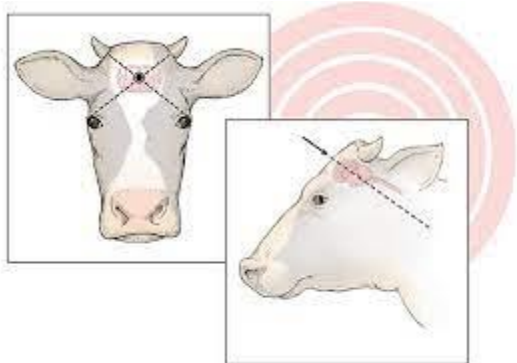
A timely decision to euthanize a cow or calf:

- has an incurable condition e.g. fractures, tendon ruptures.
- lack of response to treatment of the primary condition within a reasonable time.
- an alert down cow becoming non-alert, indicating further complications.
- is in pain and suffering.
- cow is lying on her side despite adequate treatment (unable or unwilling to maintain sternal recumbency)
- not willing to eat or drink despite adequate treatment; and
- Any calf that is found to be in pain, suffering or mentally deficient at birth.

Procedure for euthanasia:

- Ensure equipment (captive bolt or firearm) is clean, safe and ready for use and are qualified to perform euthanasia and method is appropriate for size and age of animal.
- Handle animals quietly and calmly
- Involve minimum amount of people in process.
- Ensure the animal is adequately restrained or immobilized depending on method.
- A person performing euthanasia assess safety to themselves and requests help if required.
- Equipment is returned clean to appropriate storage after use.

Image 1: Captive Bolt and Firearms position for blow.



Confirmation of death:

- No blink
- Fixed dilated pupil.
- No jaw tone.
- No tongue tone.
- No breathing
- No heartbeat.

If one of the reflexes is present, one of the follow up methods such as repeating blow or pithing is required.

It is very important that any cattle carcasses be disposed of appropriately.

The law prohibits leaving carcasses to rot or dumping them in waterways.

It is illegal in most states to allow anyone other than a licensed knackery to remove meat from a farm.

Disposal methods:

- Composting
- Burial
- knackery (Aulds)
- Emergency Burning of carcasses (last methods and only under the guild of Farm Vet, local lands or state vets)

Only authorized personnel are permitted to dispose of Livestock in accordance with Animal Welfare Standards and Guidelines.

6. NUTRITION PLAN

The purpose of this plan is to ensure all employees understand the correct nutrition requirements of all classes of stock on farm, to minimize malnutrition and stress on any animal. All employees and farm personnel are to adhere to this plan.

All herd rations are managed and balance by DR Chad Mullins of Best Axis LLC

Quarterly visits on farms and monthly Zoom Meetings to discuss changes and fodder budgeting. Available daily for any immediate problems.

All rations are managed and fed according to MILC ONE app with feed operators daily.

Milk results, animal health, animal growth and concerns monitored daily by herd, feed, and farm managers.

All Forage sent for comprehensive feed tests monthly.

Dry matters on forages are tested on farm weekly on Wednesdays.

Dry matters and testing of forages during the silage process to ensure correct dry matters at time entering pits with the use of inoculants for best practices fermentation.

Pit managed daily with forking and removal of mound and pit face management.

Water troughs cleaned daily dumped and scrubbed.

All feeding areas are clear from manure, in the event of a possible manure cross contamination for feed, notify management for plan to remove manure immediately.

All milking herds feed removed daily and weigh for reporting on refusal rates.

ALL Milking herds.

- Adlib clean water supply: troughs cleaned daily.
- Minerals are created and balanced by Dr Mullins sourced, made, and delivered by Riverina Australia
- Clean Commodities sourced.
- Grian either Barley and Wheat contracted annually and sourced.
- Canola Meal Sourced and contracted annually.
- Lupins Sourced and Delivered
- Forages are farm grown and ensilaged follow best practices in pits.
 - Cereals – wheat, barley, vetch
 - Lucerne
 - Corn
- Hay and straw are produced on farm.
 - Cereal stubble
 - lucerne

Target Volumes are planned for cropping and to ensure requirements for annual usage and allow for drought proofing with 12 to 18 months forward storage production.

Springing herd

- Adlib clean water supplied on calving pad;
- Ration is balanced by Dr Chad Mullins and
- Mixed and fed in accordance to MILC One app Daily
- Refusal and dry matters monitored daily
- Urine PH tests done monthly to help monitor the balance of springer minerals.

Dry cow herd

Ration is balanced by Dr Chad Mullins

- Adlib clean water supply;
- Mixed and feed in accordance with MILC One app Daily; and
- Body score condition monitored for balance diet.

ALL Young heifers in Pens

Ration is balanced by Dr Chad Mullins

- Adlib clean water supply;
- Mixed and feed in accordance to MILC One app Daily; and
- Body score condition monitored for diet balance.

Regular checks to ensure that they have Adlib clean water supply and adequate feed.

Animal and feed Facilities

Management endeavor to maintain all animal facilities to the highest standards of working order to provide the best facilities to promote an animal's environment to thrive while providing a safe workspace for personal.

Please communicate breakdowns of facilities immediately to management for maintenance.

Hot Weather procedure

In the event of temperatures above 20 degrees the following must be followed:

- Cows and all animals always have access to adlib water;
- All animals have access to shade.
- Before cows enter dairy, yards they must be sufficiently wet by sprinklers to ensure the concrete has had a chance to cool; Temperature above 25 degrees
- Dairy fans are running above temperatures of 16 degrees. Increase amount of fans according to increase in temperature. Herd/ Shift mangers to fan running configuration.
- Cows have time to access water as they are leaving dairy before returning to the paddock or pens.
- Spray lines in feed lots turned on days above 35 degrees.

Wet Weather procedure

- Cows and all animals have access where able protection from wet weather.
- Laneways are kept clean from manure and clays for ease of animals during wet weather.

Milking Pens including hospital and springers.

Summer / dry months

- Daily manicure of lot with tractor and drag buckets.
- Movement of wet and dry manure out and into sheds
- Lane ways are scraped.
- Around water troughs wet manure removed.
- Clean out of pens as needed (before winter/ April, after winter/ October, summer/ January)
- Maintain lots for cow comfort in sitting position in and out of sheds.

Winter/ wet months

- Daily manicure of lots/lanes and standing concrete areas with vacuum tanker
- Sheds are bedded as necessary according to weather daily with rice hulls, management to decide frequency.

Feed bunk/ troughs

- Kept clean from manure and mud from vehicles when required or a buildup is visible.
- Troughs are shoveled as needed or at minimum weekly on rotation.

Paddock pens

- Troughs are moved regularly.

- Fences are checked, report, repaired as required.
- Gateways are kept clean and functional.

Young Stock from Birth Breeding

Refer to Animal handling young stock.

Refer to yard and crush area work.

Refer to herd health plan for health management identification and treatment, vaccinations, drenches.

Refer to nutrition plan for young stock.

Refer to facilities animal and feed.

- Calves are raised in hutches individually for six to 8 weeks. Fed milk feeds twice a day and water twice a day, and pellets from day 7
- From 6-8 weeks calves are moved into pens of ten and fed milk via troughs once daily, unless excess milk then youngest fed twice daily, pens have access to water and solids 24/7 a day.
- Weaned at 10 weeks of age transition to calf mix and left in pen for a week before moving into pens of thirty, having access to water and solids 24/7
- Pens of thirty are transition to silage and moved to large heifer pens between 5-6 months of age. Having access to water and solids 24/7

7. CALF PROTOCOL

7.1 COWS AND CALVES – SPRINGERS PADDOCK.

Pen to be monitored/ observed at all possible times by herd and milking shift managers.

1. Identify Cow and Calves with neckties.
2. Identify with ear tags/ ear notch immediately where possible after birth.
3. Avoid positioning yourself between mother and calf in the paddock, always be aware of the mother and her actions.
4. Once Animals have been identified place Cow number and calf and their necktie number, sex of calf on herd dairy whiteboard in dairy.
5. Colostrum tube feeding in paddock within an hour of birth – refer calf protocols.
6. When loading calves into a trailer, ensure you use correct Manual Handling techniques to avoid strain and injury transport calves to calf hutch paddock.
7. Move mother across into hospital pen.
8. Ensure cows and calves are marked and tagged correctly; and movement has been updated to white board to indicate calf has been picked up and mother has been moved to hospital pen.

7.2 COLOSTRUM MANAGEMENT:

- All cows milk from first milking post calving separate, with the use of test buckets.
- Colostrum in test buckets test with a Brix Refractometer to assess quality, all colostrum over 22% to be kept. Under to be discarded.
- Storage of colostrum in reuse plastic milk containers, refrigerated or frozen.
- Testing of antibodies transfer to calves quarterly via blood tests.

7.3 FIRST FEEDINGS:

- **Four liters via tube within the first hour after birth (overnight period excluded)**
- **Two bottle feeds of 2 liters for the next feedings in hutches**
- **Followed by training onto a bucket of waste/calf milk of 4 liters each feed.**
- Calf Manager to ensure all animals are drinking and well.
- Reporting unwell animals to herd managers identify scours.
- All animals get up and come out to drink.
- Administer Electrolytes daily to flagged calves.
- Notes on animals flagged to be added to white board in dairy.
- Any treatments added to dairy and diary (transferred to computer)
- Monitor body condition.
- Use of suckers for Brown Swiss animals and ill calves that become sooky.
- Water is supplied fresh at each feeding. On extreme heat days an extra feeding of water supplied.

7.4 CLEANING OF EQUIPMENT AND HOUSING / BEDDING

- All equipment is to be cleaned after every feeding session.
 - Washed sanitized hot water.
 - Sprayed with chlorine.
 - Teats to be soaked weekly.
 - Suckers to be cleaned or replaced weekly.
- Cartage of milk equipment rinsed after each feeding session and sanitized nightly and scrubbed.
 - Additional cleaning and spraying down with chlorine weekly.
- Calf trailer for transporting calves clean twice a week unless muddy then daily.
 - Also, to be scrubbed and chlorine to be sprayed
 - Always after carting a dead animal.

7.5 CALF DEHORNING

Calves are only to be dehorned by qualified Pearson and supervised by management.

1. Check on birth dates that Calves to be dehorned are between 3-6 weeks old;
2. Check that all equipment is operating correctly and kept clean;
3. Position calf crush at the entrance to the calf hutch to be dehorned;
4. Guide calf into the crush carefully making sure that hoofs and legs don't get jammed;
5. Capture the calves' neck in the head bail of the crush so that the calf is securely held and not too tight;
6. Administer Pain relief;
7. Check dehorning iron to ensure it is hot;
8. Once the dehorning iron is hot, feel where the horn buds are and place dehorning iron over the top of the horn bud and hold firmly for the count of ten. Remove the iron and repeat on the other side of calves head for the second horn;
9. If the procedure has been followed successfully, there will be a golden coloured ring around the horn bud;
10. Release the head crush so calf can be released backwards back into its individual hutch;

11. Dehorning iron needs to be cleaned with the wire brush regularly between calves to remove burnt hair build up;
12. All calves are dehorned before weaning; and
13. Monitor all animals after procedure for any decline in health for complications.

7.6 CALF CASTRATION - Best preformed day two to week two.

1. Identify animals require castration;
2. Secure animal in hutch or in calf crush;
3. Administer Pain relief;
4. Secure rubber ring over the scrotum;
5. Check both testicles have descended past the ring;
6. Realign ring ensuring placement between body top of the neck of the scrotum to cut off blood supply; and
7. Monitor all animals after procedure for any decline in health for complications.

7.7 SOLIDS Nutrition

- **Pellets**
 - Introduction of 22% protein calf pellets from day 7 in hutches
 - Pellets fed in pens of ten until weaning.
- **Calf mix**
 - Fed to weaned pens of ten every second day.
 - Fed to pens of 30 every second day.
- **Silage**
 - Pens of 30 ready for moving in to larger groups transitioned onto silage in pens before moving for a minimum of 5 days prior.

8. BIOSECURITY PLAN

Emergency disease watch- 1800 675 888

Exotic plant pest hotline – 1800 084 881

The purpose of this plan is to reduce risks to LLAN Investments Pty Ltd by limiting the likelihood of introducing and spreading animal diseases, weeds and pests. This policy applies to all employees, visitors, contractors and farm personnel.

8.1 STOCK MOVEMENT

Prevention of diseases, weeds and pests:

- Carefully assessing the disease status of the originating property;
- Closed herd;
- Holding animals and observing them before allowing contact with other animals;
- Only purchasing semen from reputable sources;
- Checking National Vendor Declarations and ensuring that animal movements are notified to NLIS; and
- Limiting contact with wildlife, vermin, feral animals and neighbouring herds.

8.2 HERD HEALTH

Managing livestock in a way that prevents the occurrence of disease and limits spread if animals do become ill.

Our herd health program includes:

- Vaccinating and drenching to prevent diseases that occur in the region and on farm;
- Careful observation at milking;
- Comprehensive mastitis prevention measures and treatments;
- Working with neighbours to minimise spread of diseases and weeds from adjoining properties;
- Reporting unusual outbreaks of disease to our veterinarian; and
- Prompt disposal of dead stock - using stock removal company.

8.3 FARM INPUTS

The risks to biosecurity are minimised by:

- Purchasing stock feeds from reputable suppliers who provide commodity vendor declarations;
- Ensuring that all stock feeds are free of animal products;
- No access to water courses or run off areas;
- Observing withholding periods for introduced products such as animal manure fertilizers; and
- Checking sources of farm inputs prior to purchase if they are considered to pose risks.

8.4 VISITORS

The key activities are aimed at controlling who comes on to the farm and taking steps to manage visitors that pose the greatest risks.

These steps include:

- Contact management prior to arrival on the property;
- Limiting unnecessary movements over the farm;
- Having restricted areas of access for farm contractors and transport operators;
- Providing facilities for farm contractors and visitors to clean boots and equipment;
- Taking care to minimise risks of the employees spreading disease agents to or from our farm; and
- Supply of boot covers.

8.5 EFFLUENT AND WASTE

The risks to biosecurity are reduced by:

- Effluent use plan that includes controls to prevent the potential spread of disease;
- All staff understand the correct procedure for potentially contaminated waste materials such as bedding, used syringes and general waste;

- Capturing, containing and disposing of effluent from the dairy and yards within the boundaries of the farm; and
- Fencing effluent storage areas to prevent access by people and livestock.

8.6 NEIGHBOURS

The risks to biosecurity are reduced by:

- Securing boundaries by fences or geographical features to prevent uncontrolled movement of livestock on and off the property;
- Maintaining contact with neighbours;
- Inspecting and maintaining boundaries to ensure they remain secure; and
- Working with neighbours to limit the spread or impact of diseases, weeds and pests.

8.7 DEAD ANIMALS

To reduce the risks associated with dead animals our business:

- Has a Disposal Plan for dead stock;
- Engages with our veterinarian to investigate unusual outbreaks of disease in order to rule out exotic disease and reduce the potential to compromise the Biosecurity of the farm and Animals are moved out of areas that are accessible by livestock; and
- Stock removal company is contacted and animal is removed as soon as possible.

If anyone is unclear of any of our Biosecurity requirements, please contact management.

Appendix H. Air Quality Assessment Report

PROPOSED DAIRY LOT EXPANSION, BLIGHTY

18214 Riverina Highway, Blighty, NSW

Odour Assessment

EnviroAg Australia Pty Ltd

Date
2 April 2025

Report
247401.0124.R01V01

DOCUMENT CONTROL

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1. INTRODUCTION

1.1 Overview

Trinity Consultants Australia was commissioned by EnviroAg Australia Pty Ltd to provide an odour assessment for the proposed lot expansion at the existing dairy farm located at 18214 Riverina Highway, Blighty, NSW, 2713.

This odour assessment report is to accompany an Environmental Impact Statement and Development Application addressing the NSW Planning Secretary's Environment Assessment Requirements (SEARs 1861). The application is made over land at 18214 Riverina Highway, Blighty NSW 2713, and described as Lot 87 and DP756251). The SEARs documentation requires a quantitative odour assessment in accordance with the relevant guidelines. While the existing operations have been accepted since the 1980s, this will be the first time the site undergoes a formal environmental assessment.

It is understood that the existing dairy farm is seeking for expansion to accommodate a total herd of approximately 4,000 head. The expansion includes constructing a new robotic dairy, decommissioning and repurposing the existing dairy, constructing additional dry lots, effluent management dams, and a liquid and solid waste application area. Due to the potential for nuisance odours from the proposed additional on-site sources, a detailed Level 3 odour impact assessment has been adopted. It is noted that a level 3 assessment uses a more comprehensive, site-specific level of dispersion modelling, and involves at least one year of hourly average, site-representative meteorological data and, where available, hourly odour emission rates.

The assessment has been undertaken in accordance with the following guidelines:

- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (2022)
- Assessment and Management of Odour from Stationary Sources in NSW (2006) – Technical Framework and Notes.

This air quality report is to accompany a development application for consideration by the NSW EPA.

1.2 Information Request

The following sections provide responses in relation to air quality and odour from the information request by SEAR and the NSW EPA.

1.2.1 SEAR Information Request

A copy of the SEAR 1861 requirements for the air quality and odour assessment are presented in **Table 1.1**, along with reference to the relevant report sections.

Table 1.1: SEAR 1861 Information Request Items and Responses

Requested Information	Responses
A description of all potential sources of air and odour emissions during construction and operation	A description of review of the potential odour from construction and operations is presented in Section 3.3 .
An air quality impact assessment in accordance with relevant Environment Protection Authority guidelines	A quantitative assessment using air dispersion modelling in accordance with relevant Environment Protection Authority guidelines is presented in Section 4 – Section 9 .

Requested Information	Responses
A description and appraisal of air quality impact mitigation and monitoring measures	Section 10 presents a list of management measures that are to be incorporated on-site.

1.2.2 NSW EPA Information Request

A copy of the NSW EPA requested information relating to air quality and odour along with the responses based on this Air Quality Assessment are presented in **Table 1.2**.

Table 1.2: NSW EPA Information Request Items and Responses

Requested information	Response
1. The goal of the proposal in relation to air quality should be to ensure sensitive receptors are protected from any adverse impacts from odour and dust.	This report addresses this requirement.
2. Details need to be provided on the proposed measures to manage odour from all sources and in particular pens, manure stockpiles and associated waste water collection, treatment and storage ponds. Measures to prevent or control the emission of odour from these facilities must be detailed.	Details on the proposed measures to manage odour from pens, manure stockpile and associated waste collection, treatment and storage ponds are presented in Sections 3.3 and Section 10 .
3. For a proposed of this scope we would expect an assessment of odour to be undertaken in accordance with the Approved Methods and Guidance for the Modelling and Assessment of Air Pollution in New South Wales (DECC, 2016) and the 'Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW' (EPA, 2006).	A 'Level 3' odour impact assessment using air dispersion modelling in accordance with the Approved Methods for Modelling and Assessment of Air Pollutants in NSW (2022) and Assessment and Management of Odour from Stationary Sources in NSW (2006) is presented in Section 4 – Section 9 .
4. The EIS needs to identify any other existing impacts on air quality within the area, and if necessary provide an assessment and commentary on the predicted cumulative impacts that may arise.	There are no other odour sources in the area that could contribute to cumulative impacts.
5. Emissions from any plant must meet the design criteria detailed in the Protection of the Environment Operations (Clean Air) Regulation 2022.	There is no on-site plant associated with air emissions; therefore, this requirement has not been considered. All sources are fugitive in nature.

1.3 Scope

This report describes the assessment of the odour impacts, which is based on the following tasks:

- Review the project and associated potential air emissions.
- Calculate emission rates using available methodologies.
- Model meteorological conditions using TAPM and CALMET.
- Model the dispersion of expected air pollutants based on proposed activities using CALPUFF to estimate odour concentrations at sensitive receptors and develop contours over the modelling domain.

- Analyse the results of meteorological and pollutant dispersion modelling and compare modelling results with the relevant air quality criteria.

To aid in the understanding of the terms in this report a glossary is included in **Appendix A**.

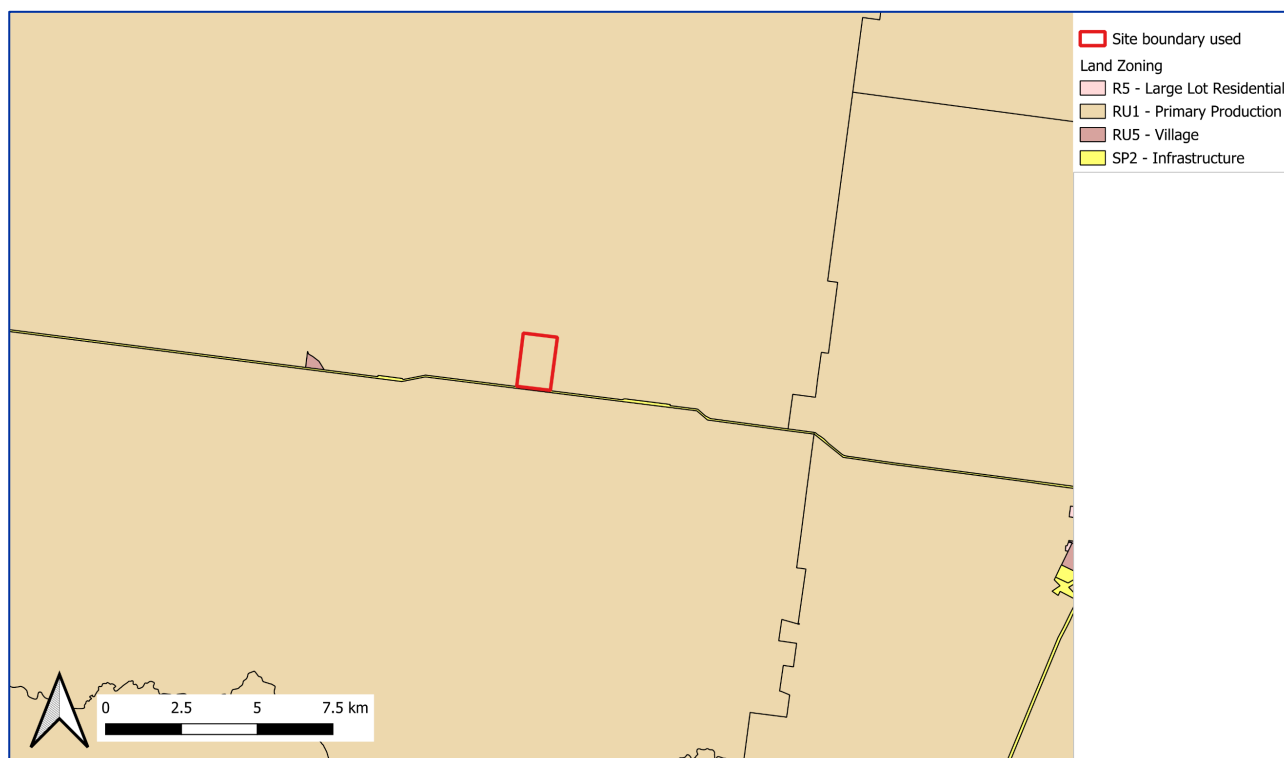
2. STUDY AREA DESCRIPTION

2.1 Zoning of Site and Surrounds

The site is located at Blighty of Edward River Council in the Murray region of New South Wales, Australia. The zoning of the dairy farm site and surrounding areas is shown in **Figure 2.1**

The development site is designated as being within a Primary Production zone. It is currently occupied by the existing dairy farm which includes sheds on the central part of the site, effluent dam to the east and south as well as feeding lots. The nearby land uses are predominantly farmlands surrounding the site and the Blighty Public School located approximately 2.2 km northeast.

Figure 2.1: Zoning Map (NSW City Plan)



The general locality of the site is shown in **Figure 2.2**.

Figure 2.2: Aerial Map of Site Location



2.2 Identification of Existing Sensitive Receptors

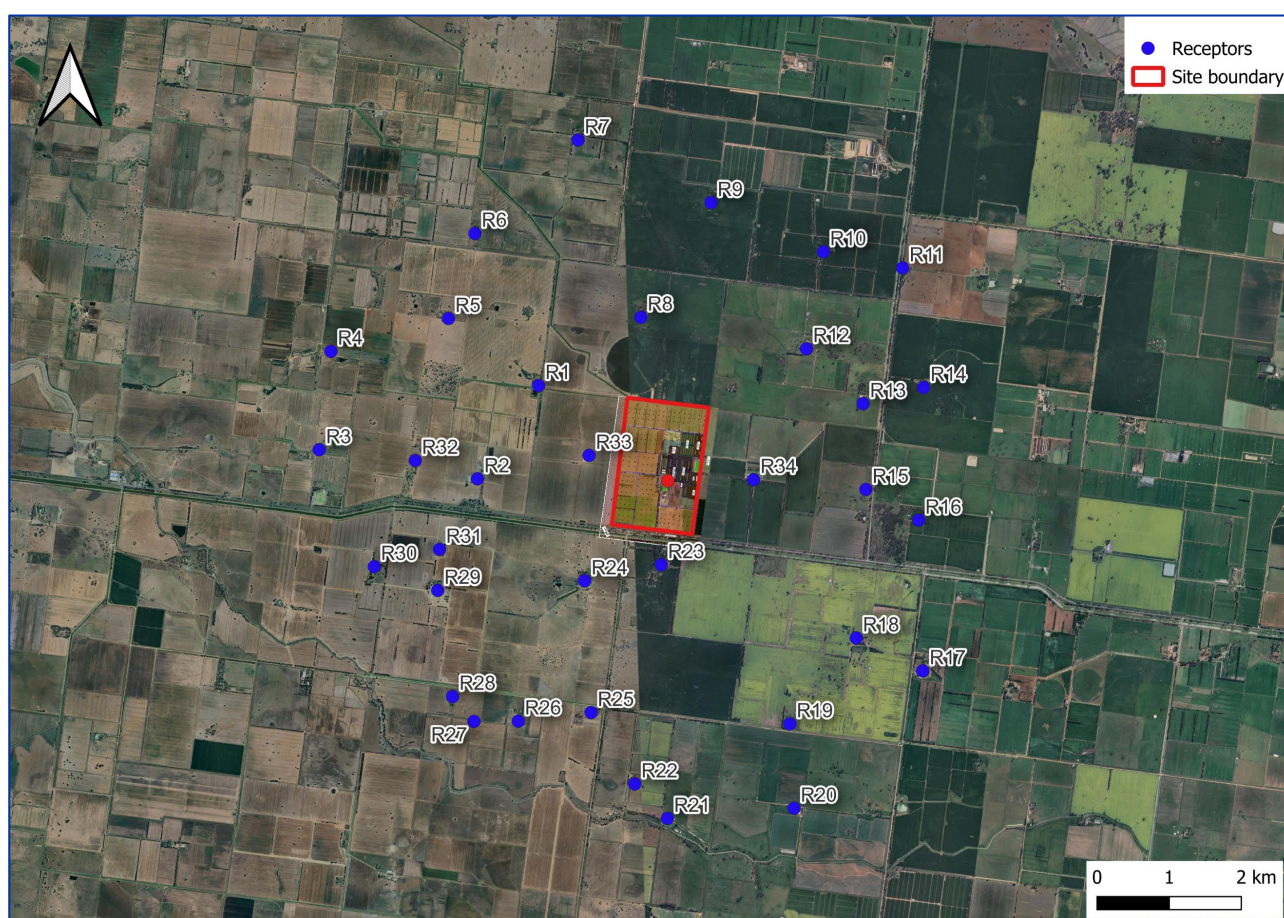
Receptors identified within a 5km radius buffer of the dairy farm operations representative of sensitive places are summarised in **Table 2.1** including their northing and easting locations and are shown in **Figure 2.3**. These locations were selected based on the presence of a residence, school and the distance and direction of the receptor from the site and other sensitive land uses or sensitive zones. These include public school, rural dwellings and agricultural businesses.

Table 2.1: List of Sensitive Receptors with UTM Coordinates

ID	Easting (m)	Easting (m)	Approximate Distance from Dairy Farming Operations (km)
R1	350464	6061340	2.1
R2	349615	6060048	2.6
R3	347420	6060450	4.8
R4	347583	6061814	5.0
R5	349213	6062269	3.8
R6	349579	6063446	4.4
R7	351010	6064740	5.0
R8	351883	6062286	2.8
R9	352853	6063874	4.1
R10	354413	6063193	4.0
R11	355512	6062969	4.5
R12	354179	6061849	2.7
R13	354964	6061089	2.9
R14	355803	6061313	3.9
R15	355001	6059901	2.8
R16	355734	6059476	3.5
R17	355792	6057388	1.3
R18	354869	6057845	3.4
R19	353948	6056653	3.7
R20	354006	6055486	4.7
R21	352250	6055345	4.5
R22	351797	6055822	4.1
R23	352164	6058857	1.0
R24	351102	6058635	1.6
R25	351191	6056810	3.2
R26	350181	6056692	3.8
R27	349566	6056688	4.1
R28	349269	6057033	4.1
R29	349064	6058503	3.3
R30	348184	6058832	4.2

ID	Easting (m)	Easting (m)	Approximate Distance from Dairy Farming Operations (km)
R31	349088	6059070	3.2
R32	348753	6060301	3.5
R33	351163	6060373	1.1
R34	353445	6060036	0.8

Figure 2.3: Location of Site and Sensitive Receptors



3. PROPOSED DEVELOPMENT

3.1 Project Description

The proposal is to expand the existing dairy farm to accommodate a total herd of approximately 4,000 head. The expansion will comprise the following:

- A new robotic dairy
- Additional dry lots (Feedlot for dry cows, hospital pen, milking cows, calves, heifers, close out and maternity cows)
- Effluent management dams (Holding Pond C, Sediment Pond B)

The dairy farm operates 7 days a week, 24 hours daily.

The site layout of the proposed extension at the existing dairy farm as provided by the client, is shown in **Figure 3.1**.

Figure 3.1: Site Layout

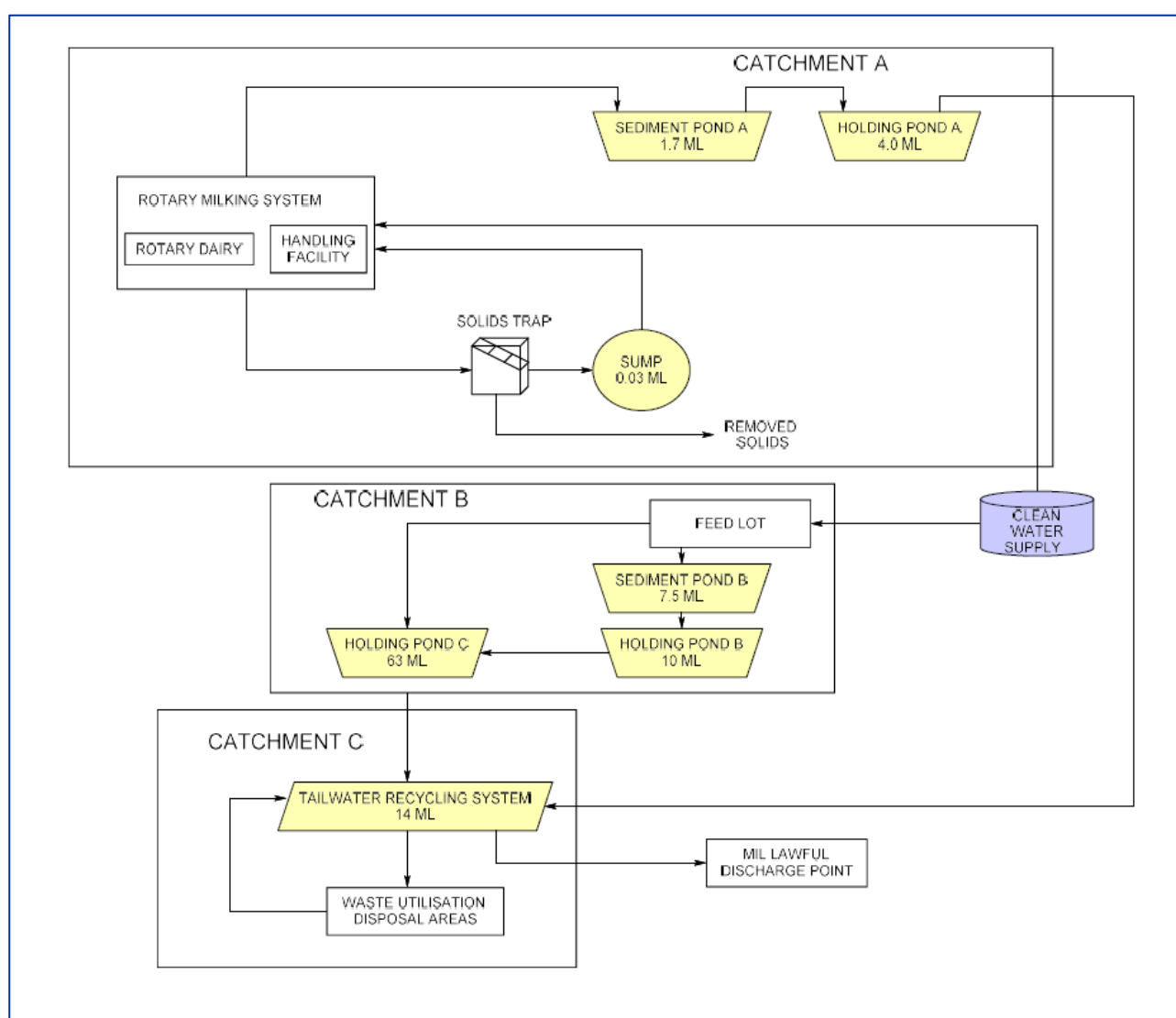


3.2 Description of Operations

The total maximum capacity of the Feedlot will be 4,000 SCUs. The proposed feedlots for milking cows, calves and heifer will accommodate 250 stocks/lot, 80 stocks/lot and 110 stocks/lot, respectively. An additional lot designated for dry cows will accommodate 400 stock per lot.

Multiple wastewater storages will be used to manage effluent that will result from the dairy operations at the site which include a 1.7 ML sediment pond A (existing), 7.5 ML sediment Pond B (proposed), 4.1 ML holding pond A (Existing), 7.5 ML holding pond B (Existing), 63 ML holding pond C (proposed) and a 14 ML tailwater drain (Recycling System). Wastewater will be held in sediment for 4 months, then to holding pond. Desludging of sediment ponds will be conducted approximately every 2 months using a vacuum tanker. Sludge will be applied directly into the paddocks. Excess wastewater from holding pond A will be transferred to the tailwater drain, as will wastewater from holding pond C. In contrast, the excess wastewater from holding pond B will be transferred to holding pond C. Effluent from the holding pond will be used to irrigate designated effluent irrigation areas as needed. The effluent flow diagram is shown in **Figure 3.2**.

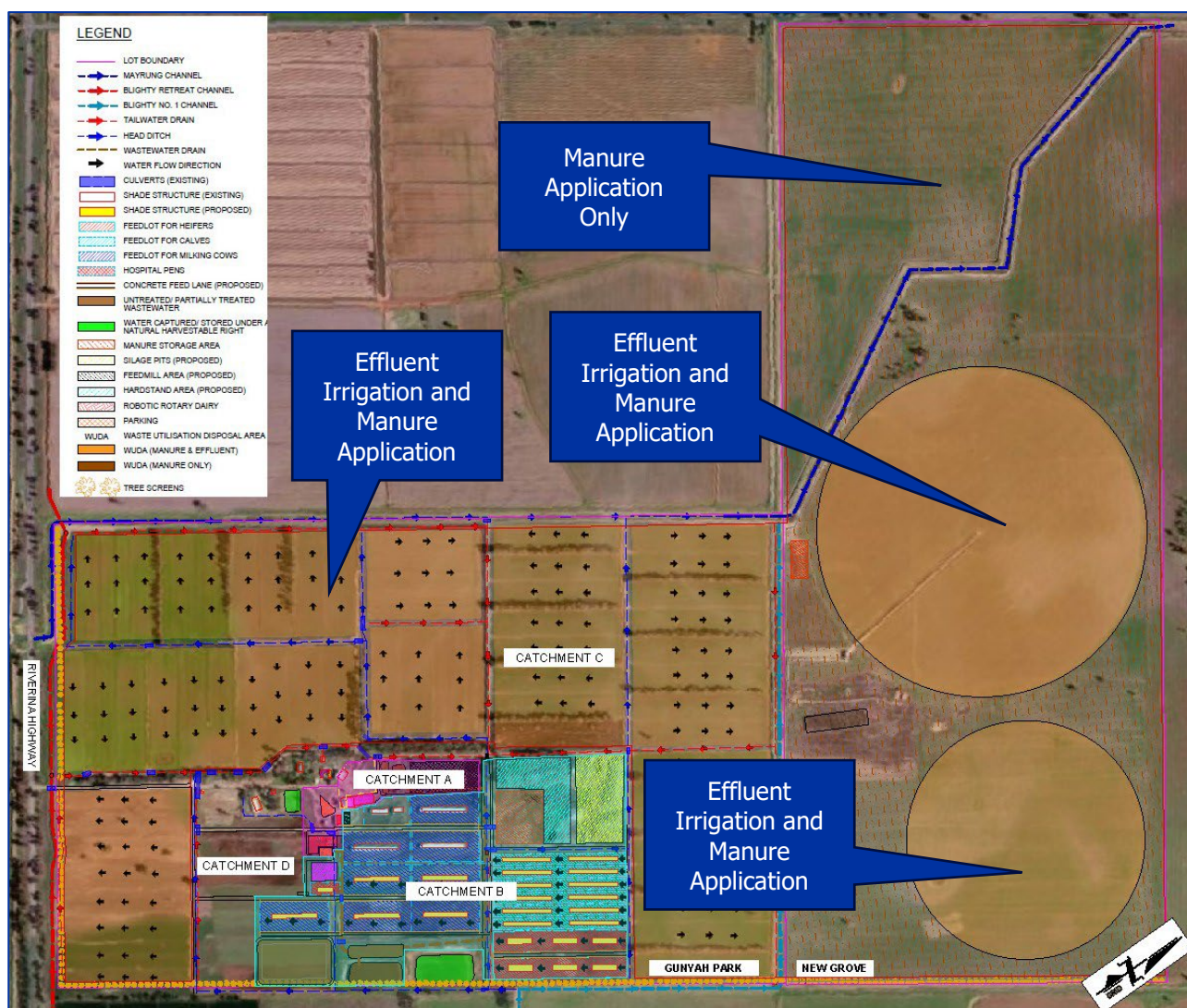
Figure 3.2: Proposed Effluent Flow Diagram



Manure generated in the pens will be transported to the manure storage area.

Manure application and treated wastewater irrigation will be conducted in the areas shown in **Figure 3.3**.

Figure 3.3: Irrigation and Manure Application Areas



The holding pens, manure storage area, sediment basin and holding pond locations were presented in Figure 3.1.

3.3 Air Emission Sources

Table 3.1 presents the expected odour emission sources associated with the operation of the dairy farm. Odour associated with the dairy farm is primarily due to the incomplete anaerobic breakdown of waste and manure. Potential odour emissions from the sites are variable due to the sensitivity of emissions to temperature and rainfall.

Table 3.1: Odour Emission Sources

Odour Source	Description
Feedlot pens	Odour emissions are primarily from manure, particularly if pen surfaces have a high moisture content. The manure thickness also has an influence on odour emissions, as a thicker layer retains higher levels of moisture (i.e. reduces drying rate of surface). The feedlot pens are cleaned daily such that the pad thickness does not exceed 15 mm at any time.
Manure storage area (Stockpiling)	Due to the frequent cleaning required for the feedlot pens, manure will be stockpiled in the manure storage area. The stockpile is not proposed to be covered, therefore, emission are expected to vary based on diurnal temperature changes.

Odour Source	Description
Sediment pond	Effluent from the feedlot pens will be directed to the sediment pond for treatment. Desludging of the sediment pond will be done at most every 2 months using vacuum tanker. In an anaerobic environment, the process releases odour compounds.
Holding pond	Effluent from the sediment pond will flow into a holding pond where further treatment will occur.
Other	Other potential odour sources include deceased cattle and odour from feed storage.

Manure spreading is another potential odour source. The odour from manure spreading is dependent on the moisture content and application method. Manure with a higher moisture content is associated with increased odour emissions. Manure that is spread at the surface of pastures is associated with increased odour emissions compared to manure injected below the surface. Manure spreading is to occur approximately once a month. As the frequency of manure spreading is to occur infrequently, best practice measures such as avoiding spreading during wet weather (or when rainfall is forecast) and when winds are not blowing towards the nearest receptors (westerly and easterly winds) should be adopted. In addition, activities that disturb stockpiled manure should be carried out away from nearby receptors and, as much as possible, during the middle of the day when weather conditions are more favourable for odour dispersion.

Moreover, the use of effluent water for irrigation has the potential to cause odour emissions depending on the method of distribution. Effluent will be mixed with fresh water prior to land application. This reduces the odour strength of effluent for irrigation. The irrigation methods are flood irrigation and pivot irrigation (low pressure spray irrigation). Pivot irrigators generate little aerosol, minimising odour from the irrigation process. The frequency of irrigation will depend on the crop type, time of year, and the need to empty effluent ponds to accommodate future runoff. Emissions from effluent irrigation can be minimised by irrigating under favourable conditions, such as during mid to late mornings and when winds are blowing away from nearby receptors, while avoiding early mornings, calm conditions, and weekends. These recommendations also apply to manure spreading.

Dust emissions from beef cattle feedlots are generally unlikely to cause impacts unless receptors are located nearby or conditions are exceptionally dry. Given the significant separation distances, typically at least 1 kilometre and often 3 kilometres or more, dust impacts from both the proposed and existing developments are expected to be minimal.

Dust may still occur under dry, windy conditions and with high animal foot traffic. Other potential sources include manure stockpiles, feed storage, and the use of tractors and loaders. The timing and management of activities involving dusty materials are important to minimise emissions. For example, moving dusty materials during high winds should be avoided.

Separation distances that are adequate to mitigate odour impacts at the closest sensitive receptors will usually also be adequate to mitigate dust impacts at these locations.

Dust from construction activities has not been assessed, as the impact is expected to be minimal. The proposed development will use existing infrastructure, with only the feedlot requiring construction.

3.4 Mitigation Measures

In order to minimise odour and dust generation on-site, the following mitigation measures are proposed:

- Pen maintenance will be done daily to keep areas dry and clean so that cows can sit and rest comfortably.
- Dust from stock movement will be minimized by pen maintenance and keeping the pens clean.
- Traffic dust will be suppressed by wetting tracks in extreme circumstances such as drought.
- Manure will be dry scraped across the entire pen to dry and be sterilised. It will then be picked up and spread on the paddocks for fertiliser.
- Composted manure will be used as bedding material under shade structures or around it.

- Manure application and effluent irrigation will be avoided during wet weather or when nearby receptors are downwind of the application area.
- Low-pressure spray irrigators will be used on-site to minimise aerosol generation and, consequently, the potential for odour impacts. Flood irrigation will be used at Gunyah Park, with effluent blended with fresh water before application. In both cases, blending with fresh water will reduce odour strength.

4. ODOUR CRITERIA

The Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2022) presents different criteria for odorous air pollutants depending on whether assessing individual odorous pollutants or complex mixtures of odours. Odour in feedlot developments is generated when organic matter decomposes, forming gaseous compounds in low concentrations but sufficient to cause offense to a person. Due to the complex nature of the mix of decomposition products, the method for calculating the impact assessment criterion for complex mixtures of odorous air pollutants is appropriate. The equation takes into consideration the range of sensitivity to odours within the community to provide additional protection for individuals with a heightened response to odours.

$$\text{Impact assessment criterion (ou)} = \frac{\log_{10}(\text{population}) - 4.5}{-0.6}$$

As mentioned in **Section 2.2**, 34 receptors were identified within a 5 km buffer of the proposed feedlot operations. A review of the Census data for the Edward River Council in the Murray region of New South Wales for 2021¹ shows that the average number of people per household is 2.8. Assuming an average of 3 people per residence, the calculated impact assessment criterion is 4.2 OU.

The criterion must be applied at the nearest existing or likely future offsite sensitive receptor and the incremental impact must be reported in units consistent with the impact assessment criteria (OU), as peak concentrations (i.e. approximately 1 second average) and as the 99th percentile.

Factors for estimating peak concentrations in flat terrain are presented in **Table 4.1** as detailed in the NSW Approved Methods for modelling guideline. Prior to comparison to the odour limit, the modelling results have been adjusted based on the relevant peak to mean ratio for area sources.

Table 4.1: Factor for Estimating Peak Concentration in Flat Terrain

Source Type	Pasquill-Gifford Stability Class	Near-field P/M60 ^a	Far-field P/M60 ^a
Area	A, B, C, D	2.5	2.3
	E, F	2.3	1.9
Line	A - F	6	6
Surface wake-free point	A, B, C	12	4
	D, E, F	25	7
Tall wake-free point	A, B, C	17	3
	D, E, F	35	6
Wake-affected point	A – F	2.3	2.3
Volume	A – F	2.3	2.3

^a Ratio of peak 1-second average concentrations to mean 1-hour average concentrations.

¹ <https://www.abs.gov.au/census/find-census-data/quickstats/2021/IQSLGA12730>

5. EXISTING ENVIRONMENT

5.1 Topography

The development is located in Blighty, in the Murray region of NSW. The Murray region spans more than 40,000 square kilometres across a range of environments, from the steep alpine slopes in the east to the vast native grasslands and riverine floodplains in the west. **Figure 5.1** presents ground contours of the site and surrounding areas.

Figure 5.1: Site Topography

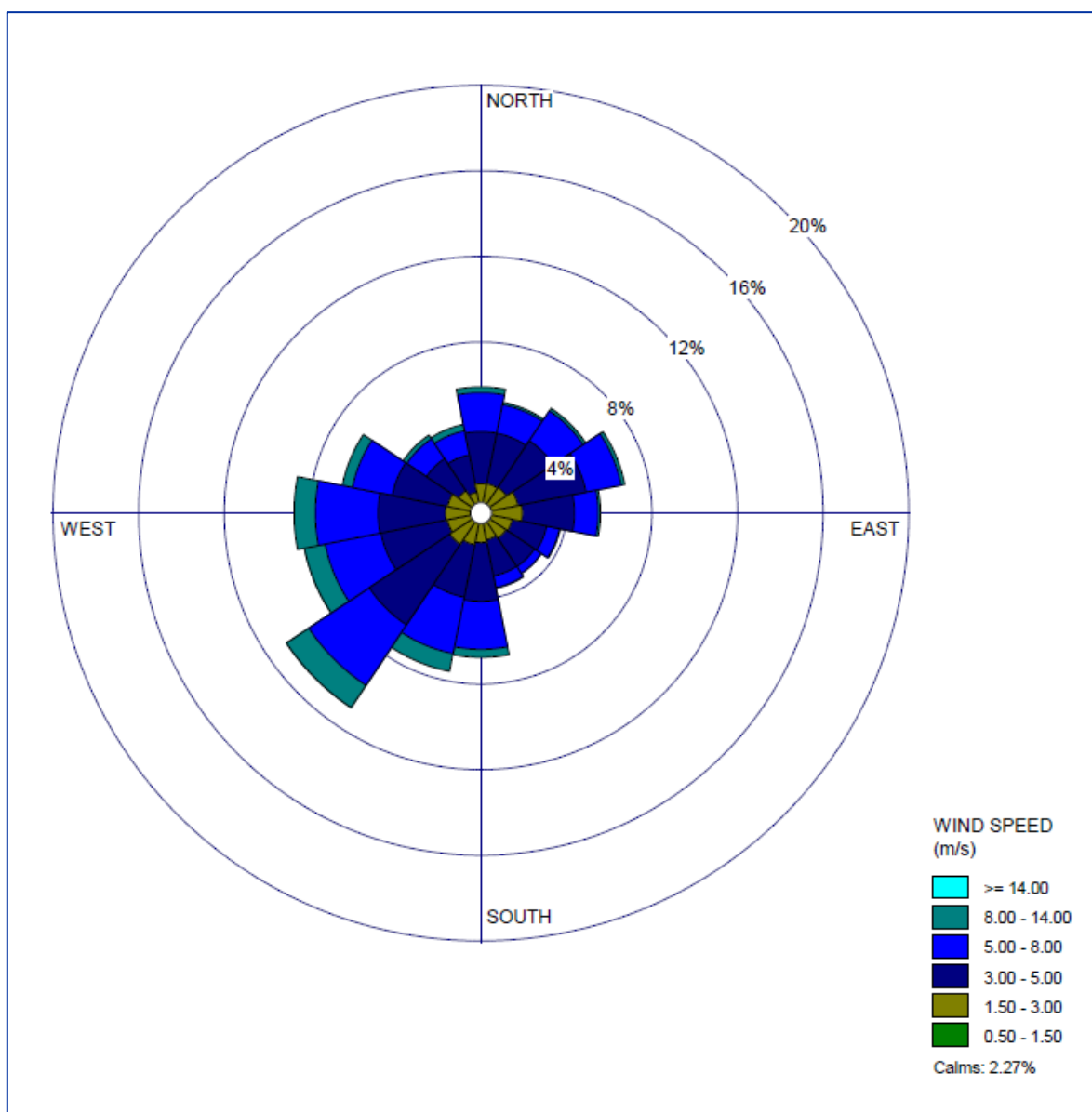


5.2 Meteorology

The Murray region of NSW is characterized as having a dry and semi-arid with hot summers and cool winters. Most rain falls in winter. Based on the nearest Bureau of Meteorology station (BoM) at Deniliquin Airport AWS station, the temperature ranges from 4.2 – 16.3 °C in winter to 14.3 – 32.1 °C in summer, and the mean annual rainfall is 376.7 mm.

With regards to wind conditions, the BoM station data shows that the area is dominated by westerly and south westerly winds. South easterly winds are noted to be minimal. Average wind speeds for the area are 4.3 m/s, with the occurrence of calm conditions at 2.8 % of the time. **Figure 5.2** shows the BoM Deniliquin Airport AWS Station AWS wind rose for 2019 – 2023.

Figure 5.2: 2019 – 2023 BoM Deniliquin Airport AWS Station Wind Rose



6. METEOROLOGICAL MODELLING

6.1 Overview

Atmospheric dispersion modelling involves the mathematical simulation of the dispersion of air contaminants in the environment. The modelling utilises a range of information to estimate the dispersion of pollutants released from a source, including:

- Meteorological data for surface and upper air winds, temperature and pressure profiles, as well as humidity, rainfall, cloud cover and ceiling height information;
- Emissions parameters, including source location and height, source dimensions and physical parameters (e.g. effective height and length of side) along with pollutant mass emission rates;
- Terrain elevations and land-use both at the source and throughout the surrounding region;
- The location, height, and width of any obstructions (such as buildings or other structures) that could significantly impact on the dispersion of the plume; and
- Sensitive receptor locations and heights.

Meteorological modelling has been undertaken using TAPM and CALMET. The following sections present the methodology and outcomes of the meteorological modelling.

6.2 Model Year

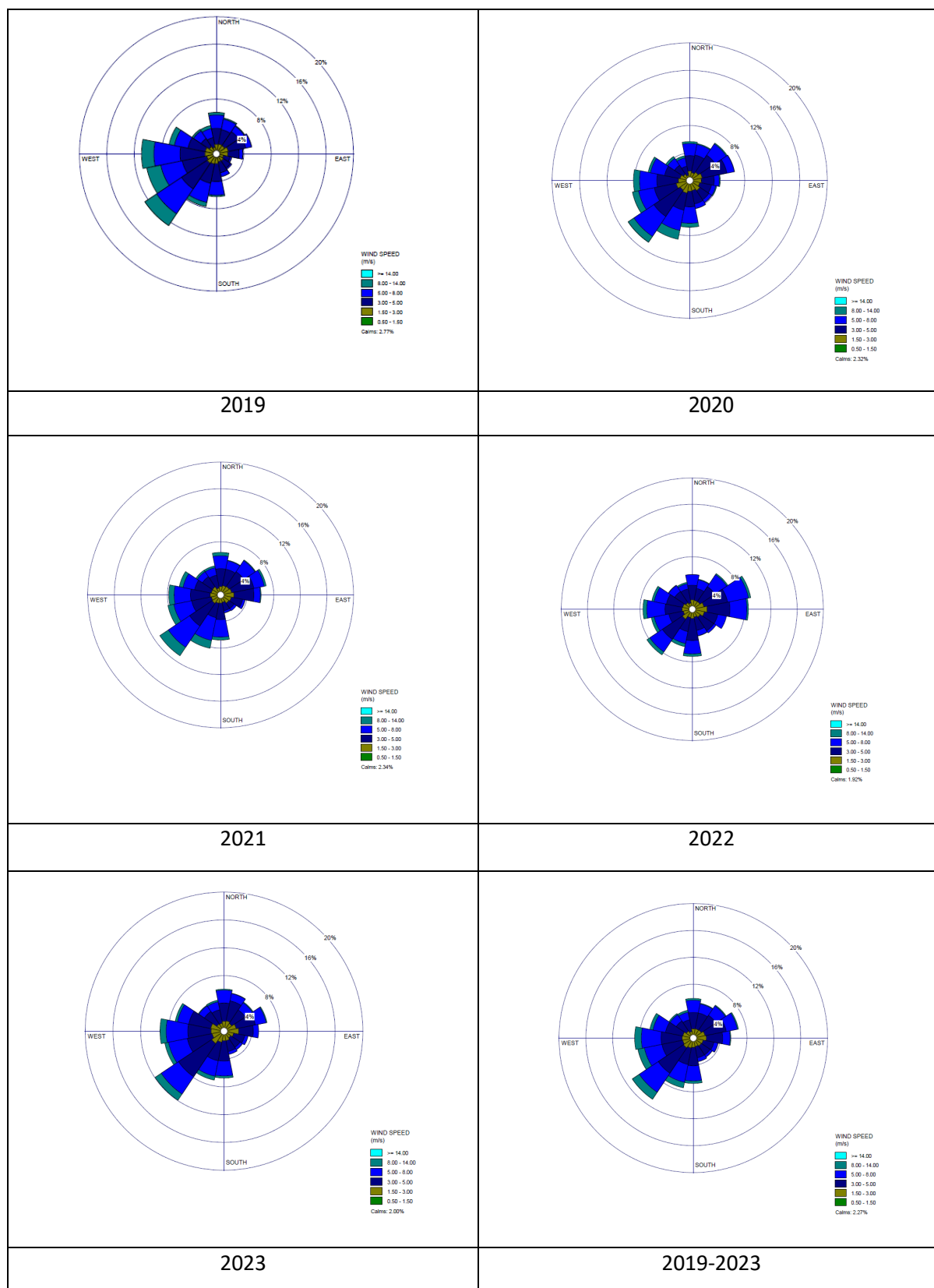
The model year 2019 has been adopted for the purpose of the assessment. **Table 6.1** presents the measured average wind speed, proportion of calm conditions and proportion of wind speeds less than 2.0 m/s for the BoM Deniliquin Airport meteorological station. The Deniliquin Airport meteorological AWS station is the nearest permanent monitoring station to the site (approximately 38 km away). The next closest station is the BoM Yarrawonga meteorological Station, approximately 76 km away.

Figure 6.1 presents annual wind roses for the years 2019 to 2023. The year 2019 has been adopted and may be considered representative of the long-term average in terms of proportion of calm conditions and average wind speed and likely conservative due to the higher than average occurrence of lower wind speeds.

Table 6.1: BoM Deniliquin Airport Meteorological AWS Station Data Comparison

Year	Calm Conditions (%)	Average Wind Speed (m/s)	Wind speeds <2.0 m/s (%)
2019	2.8	4.5	6.7
2020	2.3	4.4	6.0
2021	2.3	4.4	6.0
2022	1.9	4.3	5.8
2023	2.0	4.2	5.4
Average	2.3	4.4	6.0

Figure 6.1: 2019-2023 Annual Wind Roses for the BoM Deniliquin Airport Meteorological AWS Station



6.2.1 TAPM Fundamentals

The meteorological component of The Air Pollution Model (TAPM) was used to provide wind fields over the region. The databases required to run TAPM are provided by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and include global and Australian terrain height data, vegetation and soil type datasets, sea surface temperature datasets and synoptic-scale meteorological datasets. TAPM Configuration

TAPM was setup using four nested 25 x 25 grids centred on latitude 35°35.514' south, longitude 145°22.165' east. The four nested grids were as follows:

- 750 km x 750 km with 30 km resolution
- 250 km x 250 km with 10 km resolution
- 75 km x 75 km with 3 km resolution
- 22.5 km x 22.5 km with 0.9 km resolution

Twenty-five (25) vertical levels were used with lower-level steps at 10, 25, 50, 75 and 100 metres up to 8 kilometres in altitude. This is a greater than normal number of vertical layers in order to provide a better resolution of vertical layers. Boundary conditions on the outer grid were derived from the synoptic analysis. Non-hydrostatic pressures were ignored due to the gentle terrain and moderate resolution.

TAPM land use data was updated using the latest aerial photography available being July 2023 from Google Earth Pro.

6.3 CALMET

6.3.1 Overview

As discussed in the previous section, a three-dimensional prognostic dataset derived from the TAPM model was input to CALMET to predict meteorological conditions at the development and surrounding area. The following sections provide an overview of the data utilised in the CALMET modelling, along with details of some of the key parameters selected to establish calculation limits within CALMET.

6.3.2 Calmet Modelling Configuration

The CALMET configuration used is consistent with NSW OEH guidance (TRC, 2011). The model was run over the full year based on a 3-dimensional grid produced using the CALTAPM utility program to convert TAPM data to MM5 format suitable for CALMET to read. The CALMET grid was set to grid spacing of 100 metres and 100 by 100 grid points. Eleven vertical layers were modelled with cell face heights of 0, 20, 40, 80, 160, 320, 640, 1200, 2000, 3000, and 4000 metres. This is greater than normal number of vertical layers to provide better resolution of vertical layers.

Mixing height calculation parameters were set to default values except the Coriolis parameter which was set to -8.46×10^{-5} as calculated from the Coriolis parameter equation:

$$f = 2 \Omega \sin(\phi), \text{ where:}$$

F is the Coriolis parameter;

Ω is the Earth's rotation rate ($2\pi/86400$ or 7.29×10^{-5} rad·s⁻¹);

ϕ is the latitude which in this case is -35.592° .

6.3.3 Terrain and Land Use Data

Terrain data for the area surrounding the development was obtained from the Digital Elevation Model (DEM) 5 Metre Grid of Australia derived from LiDAR model, which represents a national 5 metre (bare earth) DEM

that has been derived from some 236 individual LiDAR surveys between 2001 and 2015. Data for a 10 km x 10 km area (0.1 km spacing) has been extracted for use in the modelling.

The TERRAD value in CALMET is used to determine the radius of influence for terrain features within the model domain. The TERRAD value has been calculated based on the rule 'ridge-to-ridge divided by 2, rounded up' recommended by the NSW Office of Environment and Heritage (TRC, 2011). Based on an average ridge to ridge distance a TERRAD value of 1 kilometre has been adopted.

Land use data was also created based on version 1.2 of the NSW 2017 Landuse Mapping published June 2020. Land use data for a 10 kilometre x 10 kilometre area surrounding the site was extracted and converted from a GeoTIFF to a Calmet ready DAT file using the Land Use Creator tool.

Figure 6.2 and **Figure 6.3** present the modelled terrain and land use in CALMET.

Figure 6.2: Modelled Terrain

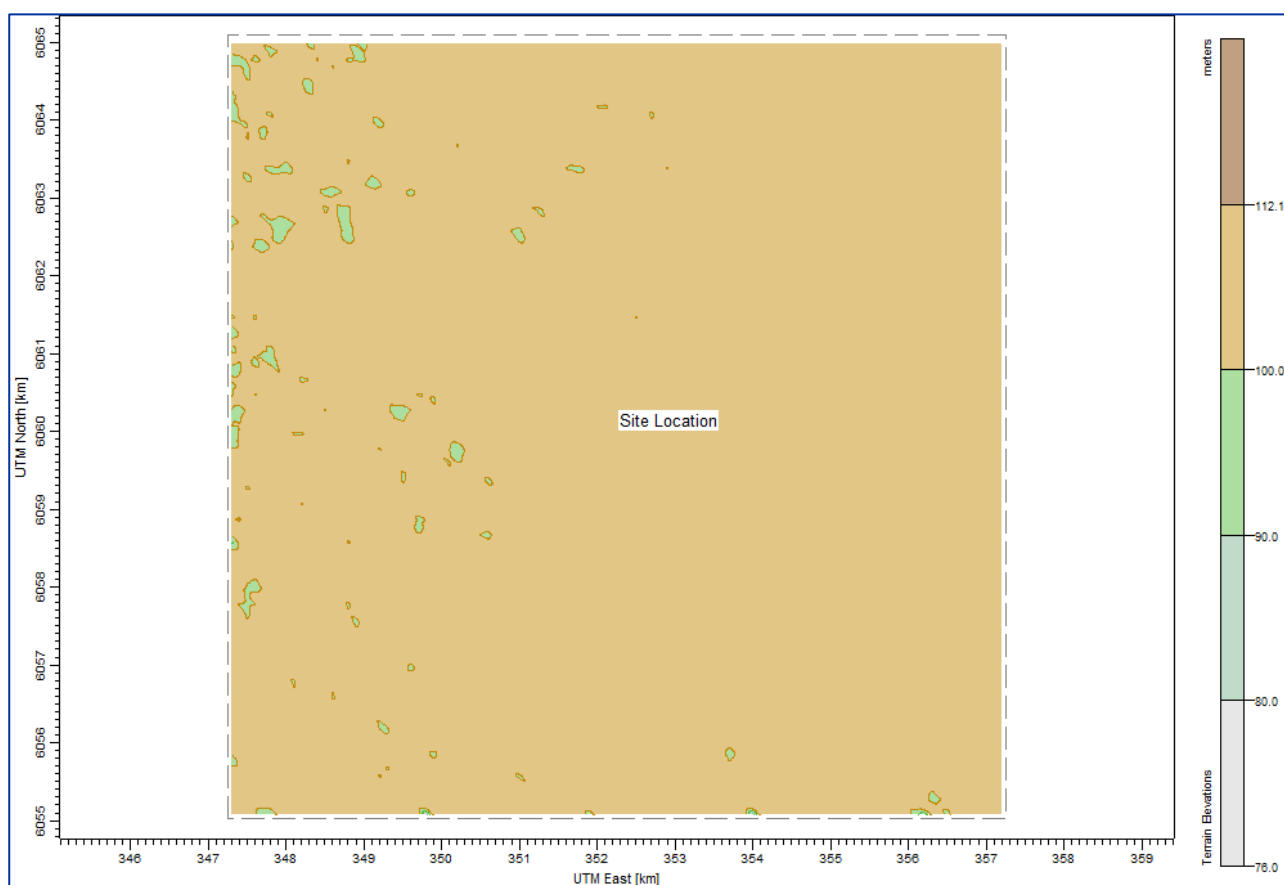
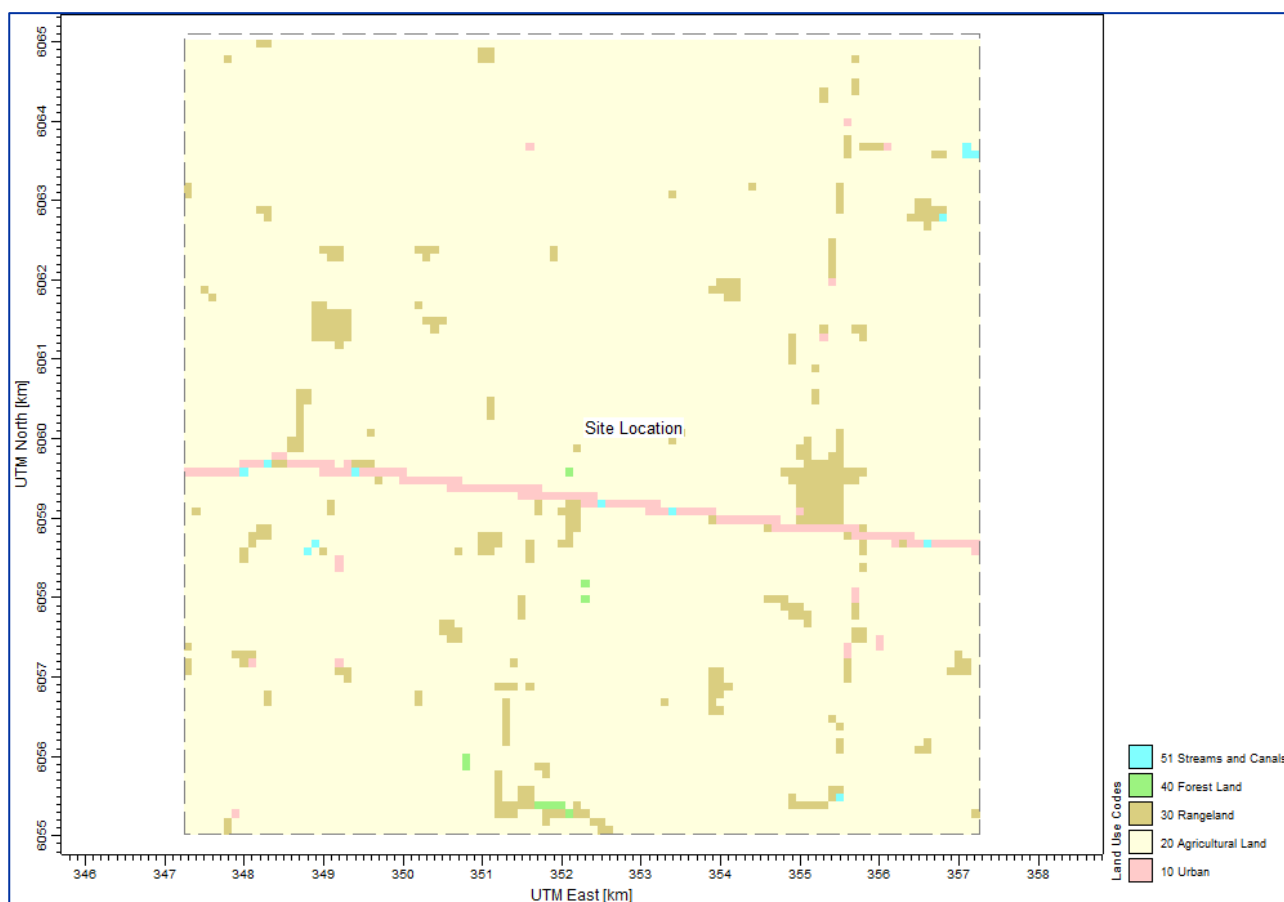


Figure 6.3: Modelled Land Use



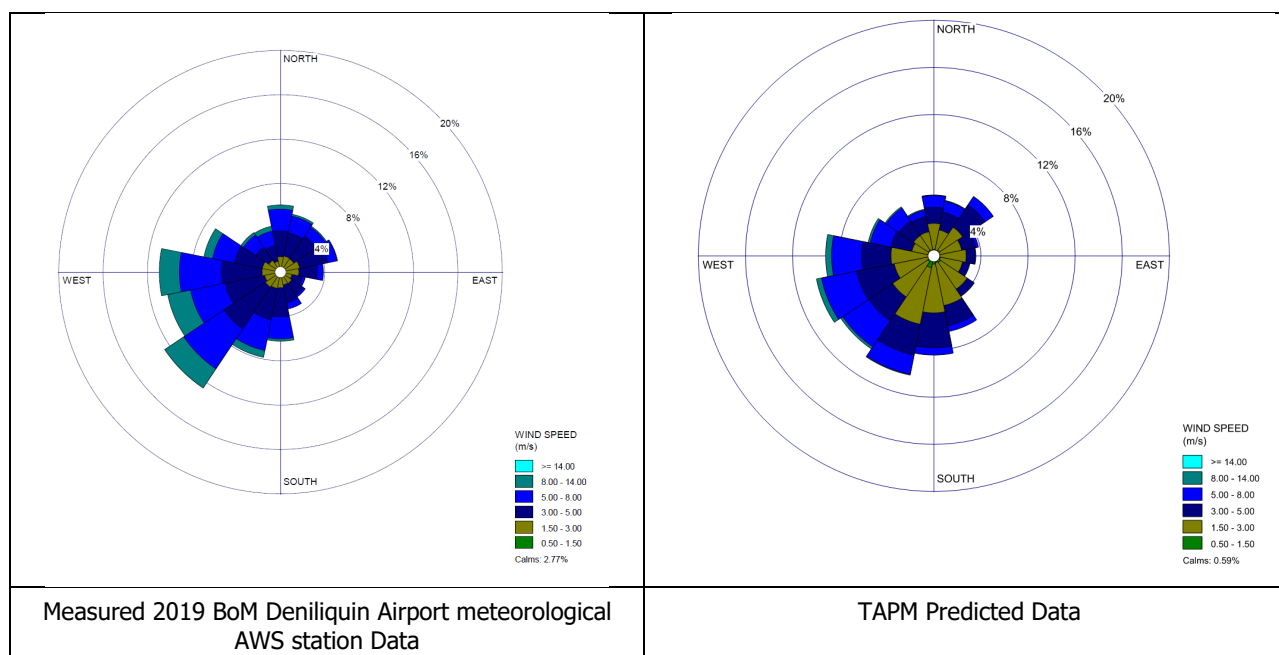
6.4 Meteorological Predictions

6.4.1 Wind Predictions

Predicted 2019 wind conditions (utilising TAPM data) have been compared to observed wind data (2019) at the BoM Deniliquin Airport meteorological AWS station, as shown in **Figure 6.4**. There are slight differences between the predicted and measured wind roses at the BoM Deniliquin Airport meteorological AWS station in terms of wind speed and wind directions, when using the TAPM only data. Key differences include an under-prediction of north-westerly winds and over-prediction of north-easterly winds. Nonetheless, the overall pattern of wind directions is generally consistent between the predicted and measured data sets.

In terms of calm conditions, TAPM is, as usual, under predicting the occurrence of calm conditions with calm conditions predicted to occur 0.6% of the time and measured 2.8% of the time. Low wind speeds (less than 2 m/s), which are associated with poorer dispersion of pollutants emitted near ground level, are noted to be overrepresented by TAPM with wind speeds less than 2.1 m/s measured 6.7% of the time and predicted 11.3% of the time. However, there are similarities in the predominant wind direction, which is south-westerly.

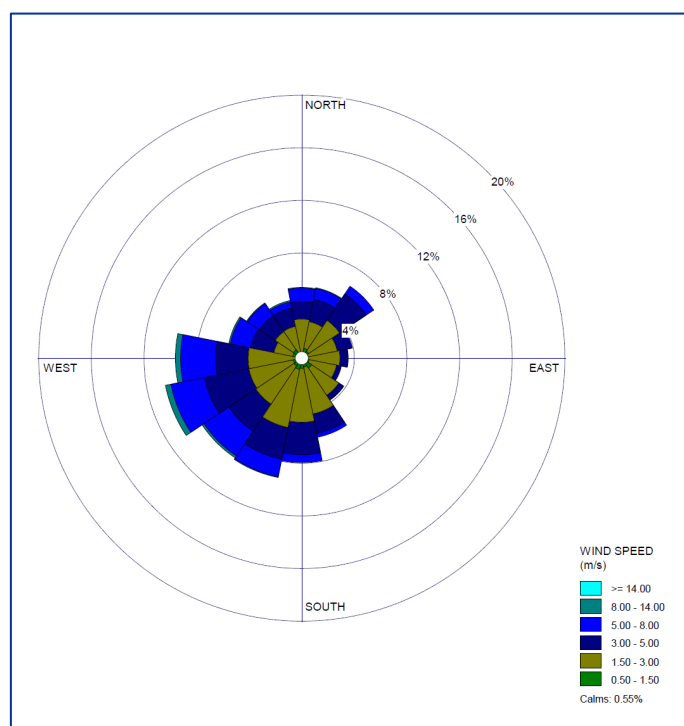
Figure 6.4: Measured 2019 Wind Rose & TAPM Predicted Wind Rose



CALMET was run in a no-observation mode (NOOBS=0), which relies solely on prognostic data sets to generate a site-specific wind field. This is necessary because the nearest Bureau of Meteorology (BoM) station is 38 km away, exceeding the maximum allowable distance of 10 km for including surface data. The NOOBS=0 setting also incorporates TAPM outputs for upper air data. For this assessment, only TAPM data was used in the CALMET run, as it is the best available data as the subject site is located in a regional area and it is predominantly a farming setting.

Figure 6.5 presents the predicted site wind rose with the TAPM data.

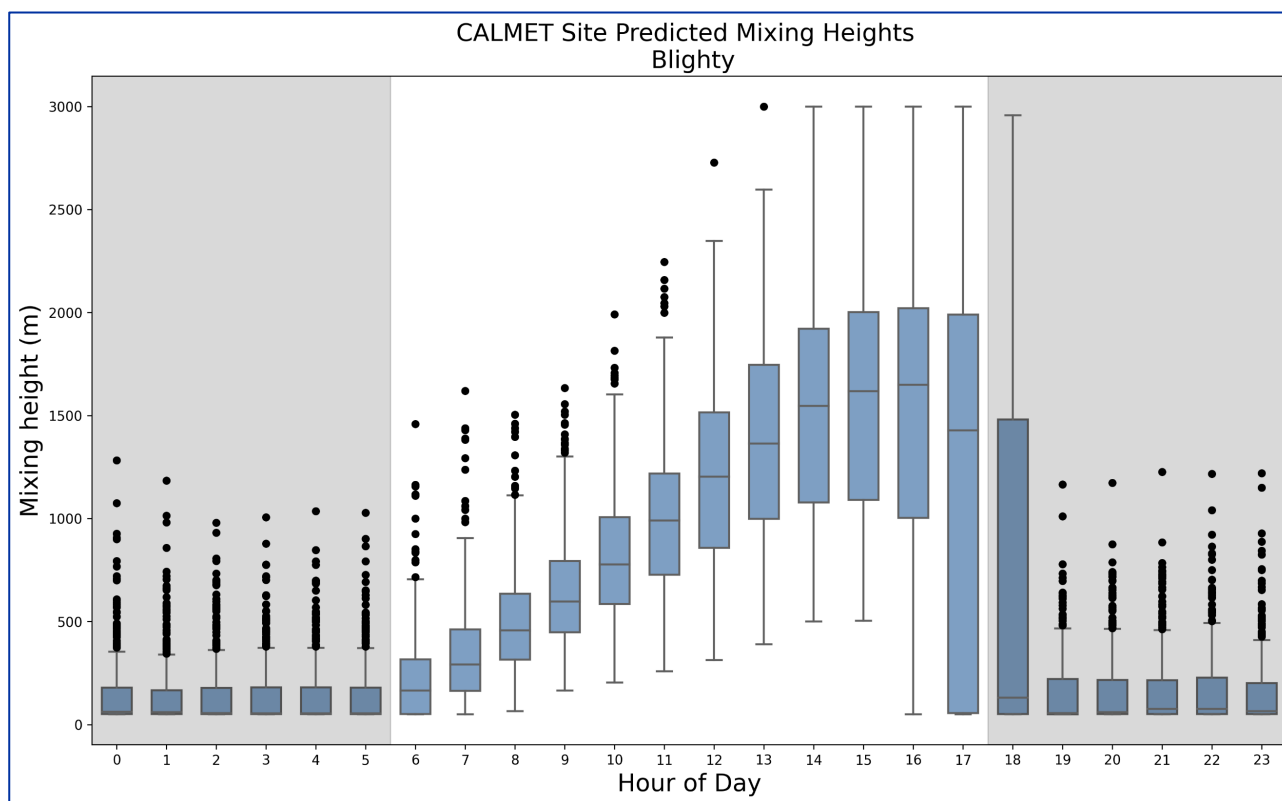
Figure 6.5: CALMET Site Predicted Wind Rose (with TAPM Data)



6.4.2 Mixing Heights

Figure 6.6 shows the variation of the mixing height throughout the day. In the morning, the mixing rises gradually, reaching an average of approximately 1.6 kilometres by the afternoon, then reforming near ground level again at nightfall.

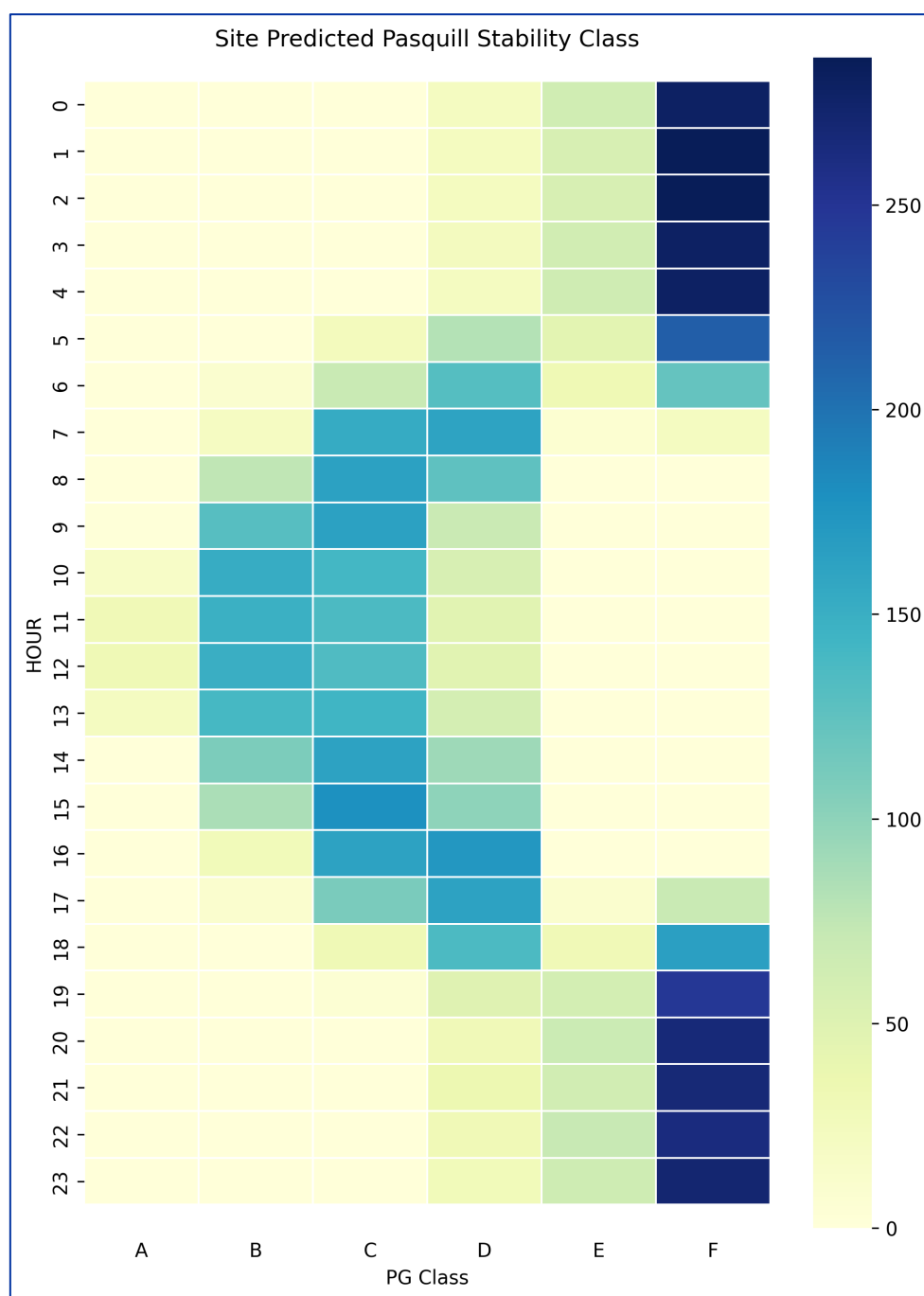
Figure 6.6: CALMET Site Predicted Mixing Heights



6.4.3 Stability Class

The frequency of stability classes throughout the day is presented in **Figure 6.7**. Daytime conditions are either neutral or unstable, whilst nighttime conditions are stable.

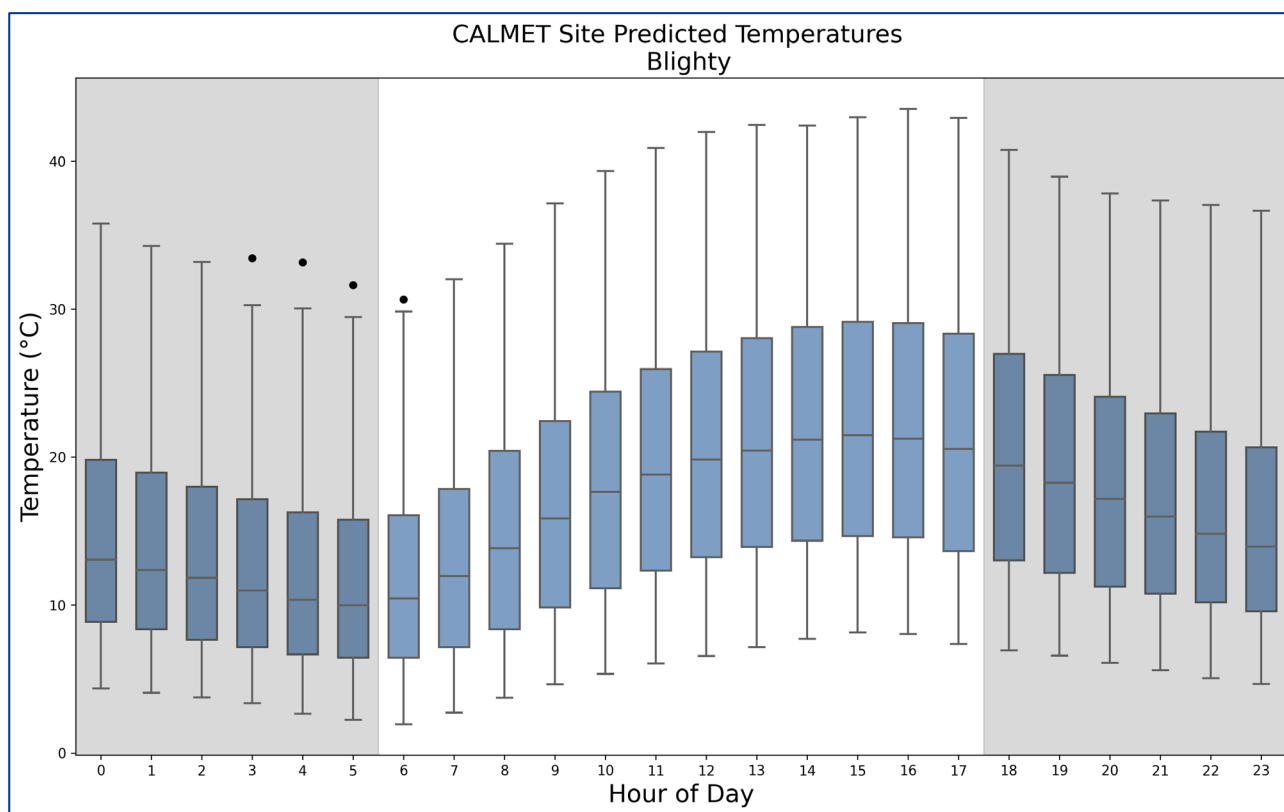
Figure 6.7: Diurnal Frequency of Stability Class



6.4.4 Temperature

Figure 6.8 shows the CALMET site predicted temperatures, indicating an average of 11°C to 21°C during the day and 10°C to 19°C during night time.

Figure 6.8: CALMET Site Predicted Temperature



6.5 Summary of Predictions

A review of the predicted data sets for the year 2019 indicates that the outcomes from the CALMET model (with TAPM) are suitable for predicting potential air quality impacts. Key meteorological parameters, including wind field, stability class, and temperature are considered to be suitable for the assessment of air quality impacts from the subject site.

7. EMISSION INVENTORY

7.1 Overview

The key odour emission sources included in the modelling relate to the feedlot pens, manure storage area, and wastewater treatment ponds (sediment ponds and holding ponds). A review of available literature has been undertaken to derive odour emission rates for the modelling. For this assessment, manure spreading and effluent irrigation has not been modelled – the occurrence of these activities are infrequent and potential odour emissions should be addressed through good odour management practices, as detailed in **Section 3.3**.

To quantitatively and cumulatively assess the potential impact of the identified odour emission, both the existing facility and proposed expansion have been modelled. Details of the modelled scenario are as follows:

- Existing facility
 - Feedlot Pen areas
 - Manure storage area
 - Wastewater treatment ponds (sediment pond (A) and holding ponds (A and B))
- Proposed Expansion
 - Feedlot Pen Areas (Feedlot for dry cows, hospital pen, milking cows, calves, heifers, close out and maternity cows)
 - Wastewater treatment ponds (sediment pond (B) and holding pond (C)).

The following sections present the emission rates for each of the modelled sources.

7.2 Feedlot Pens

Pen odour emission rates have been calculated based on the methods for calculating odour emission from cattle feedlots as developed by Ormerod et al. (2015)², for Meat and Livestock Australia. Ormerod et al. (2015) derived an odour emissions model for feedlot pens, sedimentation basins and holding ponds based on field sampling from August-September 2003 and January-March 2004. Relationships between variables were analysed, and the parameters that had a significant influence on odour concentrations were identified. A multiple regression equation was subsequently developed to estimate odour emissions from feedlot pens:

$$OER_t = -2.6 + 0.034 \times D + 0.014 \times M + 0.04 \times T_x$$

Where:

D: Average daily manure depth (mm)

M: Average daily top layer pad moisture (%)

T_x: Maximum daily temperature (°C)

Feedlot pens will undergo routine daily cleaning to manage manure accumulation, maintaining an average daily manure depth of no more than 15 mm.

The moisture content of the top layer of the manure pad is noted to vary significantly based on the stocking density, feed ration and rainfall. An average moisture level of 19.5% (dry basis) of manure from a number of

² Ormerod, R; Galvin, G; D'Aberton, P; Fitzmaurice, L and Watts, P. Development of Odour emissions model for Australian Feedlots – Part F Emissions Estimation and model application. Published by Meat & Livestock Australia. August, 2015. ISBN 9781741919752.

studies has been adopted^{3,4,5,6}. Rainfall data from the BoM Deniliquin station was used to calculate the moisture content of the pad's surface layer, as TAPM overpredicted the number of rainy days in 2019.

The maximum daily temperature of the feedlot pad is noted to relate to both the ambient air temperature and insolation levels⁷. The CALMET predicted hourly temperatures have been adopted to represent site-specific conditions.

To account for diurnal variability in emissions (resulting from varying air temperatures, wind speeds and solar radiation), an hourly scaling factor for pad emissions has been adopted, as developed by Ormerod et al. (2015). **Table 7.1** presents the adopted diurnal scaling factors.

Table 7.1: Ormerod et al. (2015) Feedlot Pen Diurnal Scaling Factor

Hour	Scaling Factor
1	1
2	1
3	1
4	1
5	1
6	1
7	1.3
8	1.7
9	2.3
10	3
11	3.8
12	4.1
13	3.9
14	3.2
15	2.5
16	2
17	1.5
18	2
19	1.5
20	1.5
21	1
22	1
23	1

³ ASAE (1999). "Manure Production and Characteristics". ASAE Standard, D384.1, American Society of Agricultural Engineers, St Joseph, Michigan, USA.

⁴ ASAE (2005). "Manure Production and Characteristics". ASAE Standard, D384.2, American Society of Agricultural Engineers, St Joseph Michigan, USA.

⁵ Sweeten, JM, Egg, RP & Reddell, DL 1985, 'Characteristics of cattle feedlot manure in relation to harvesting practices', in Agricultural Waste Utilisation and Management - Proceedings of the 5th International Symposium on Agricultural Wastes, Chicago, Illinois, 16-17 December American Society of Agricultural Engineers, pp. 329-337.

⁶ Kissinger, WF, Koelsch, RK, Erickson, GE, Klopfenstein, TJ 2007, 'Characteristics of Manure Harvested from Beef Cattle Feedlots', in Biological Systems Engineering: Papers and Publications, pp. 357-365.

⁷ Lunney C and Smith R. (1995). "An odour Emission Model for Feedlots". In proceedings of Feedlot Waste Management Conference, Royal Pines Resort, Gold Coast, Australia. June 12-14, 1995. 7 pp. Department of Primary Industries, Queensland.

Hour	Scaling Factor
24	1

Figure 7.1 presents the predicted odour emission rate (as odour emissions per m² per second) for each hour of the year for the feedlot pens. As expected, high odour emission rates occur after rainfall events, which leads to higher moisture concentrations in the feedlot pad. As the equation can return very low or negative emission rates, a minimum value of 0.5 OU/m²/s is set for the equation as per the Ormerod method.

Table 7.2 presents the adopted area source parameters for the proposed feedlot pens.

Figure 7.1: Feedlot Pen Predicted Odour Emissions

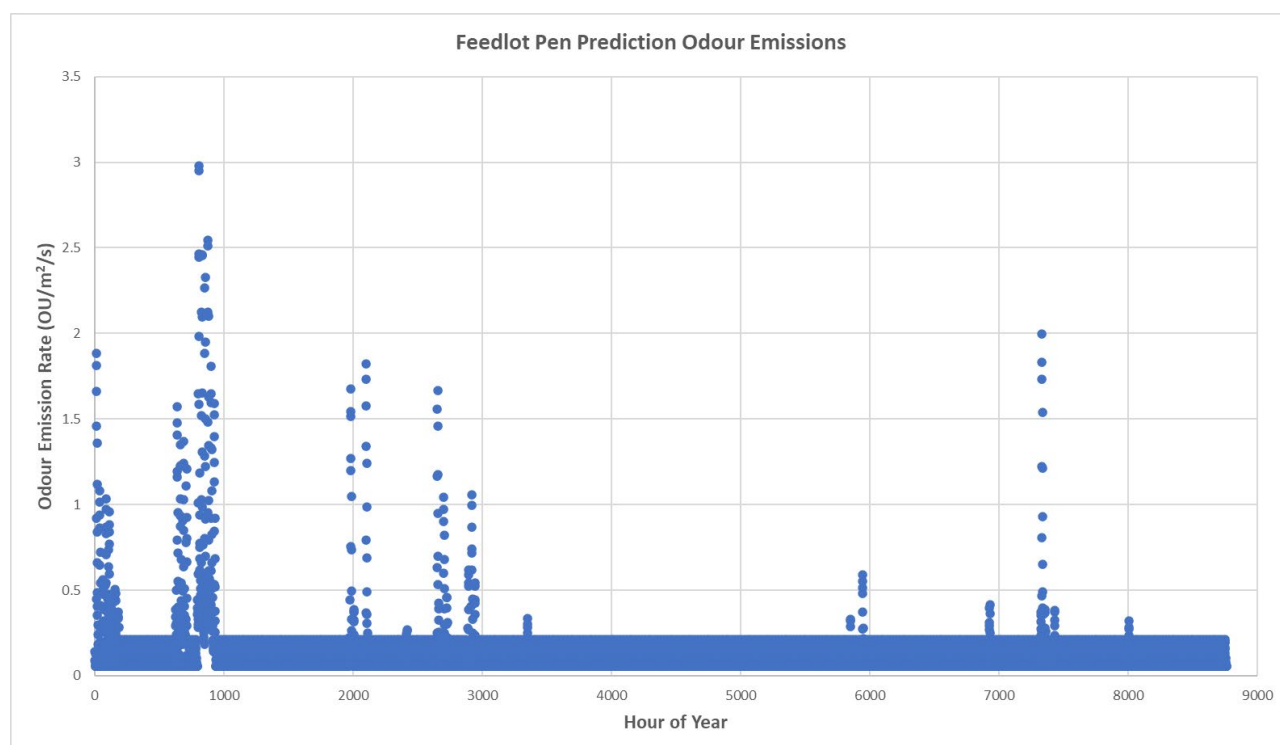


Table 7.2: Feedlot Pen Area Source Parameters

Source	Height (m)	Ground Elevation (m)	Initial Vertical Dispersion (m)	Total Modelled Area (m ²)
Feedlot Pen for Calves	0	103.8	1.0	63,310
Feedlot Pen for Heifers	0	103.8	1.0	37,018
Feedlot Pen for Close out and Maternity Cows	0	104.1	1.0	50,200
Feedlot Pen for Milking Cows	0	101.6	1.0	69,435
Hospital Pen	0	103.6	1.0	2,047
Feedlot Pen for Dry Cows	0	105.4	1.0	12,504

7.3 Manure Stockpile

Manure generated in the feedlot pens will be stored at the manure storage. A base odour emission rate of $0.048 \text{ OU.m}^3/\text{m}^2/\text{s}$ has been adopted from a sample taken by The Odour Unit from a cattle manure stockpile at the Central Tablelands Livestock Exchange⁸.

The following parameters have been adopted for the manure storage source:

- Height of 0 m;
- A total area of 1.72 ha.

7.4 Water Treatment Pond Emissions

Emissions for the water treatment ponds have been calculated based on the Ormerod et al. (2015) method. The method is based on the number of days since a rainfall event and the inflow ratio (ratio of inflow to initial volume in pond). The method is applicable to both holding ponds and sediment basins. Emissions rates have been calculated for each of the ponds depending on individual inflow ratios using the following equation:

If

$$x < peak_{day}$$

Then

$$y = a(1.25^x) + b$$

Else (until $x = 50$)

$$y = M \exp(-kx) + b$$

Where:

x : Days since last rain event

$$peak_{day} = -0.3 \times \text{First Day Daily Average Temperature} + 11.75$$

y : Odour emission rate ($\frac{\text{ou}}{\text{m}^2.\text{s}}$)

$$a = \frac{y_{peak} - b}{1.25^{x_{peak}}}$$

b : Baseline Odour Emission rate ($\frac{\text{ou}}{\text{m}^2.\text{s}}$) [0.07 for holding ponds and 0.60 for sediment basins]

$M = \text{Inflow ratio} \times 2.4$ (for holding ponds)

$M = \text{Inflow ratio} \times 1.4$ (for sediment basins)

$$k = \frac{\sqrt{\text{Inflow ratio}}}{15}$$

The same method adopted for the rainfall calculations for the pen moisture content has been applied for the days since last rain event variable in the Peak Day function. To determine the peak day, the CALMET predicted temperatures on-site were used.

The FSIM hydrological model results for 135 years provided by EnviroAg were used to calculate an annual average pond volume and inflow for the holding ponds and sediment ponds. Based on the hydrological modelling results, a maximum inflow ratio of 0.013 was estimated using the last 10 years results (2015-2024)

⁸ The Odour Unit (2014). Central Victoria Livestock Exchange Odour Impact Assessment

for both the sediment ponds and holding ponds. It is noted that a high inflow ratio results in higher odour emissions rates (due to the larger biological load relative to the amount of water in the pond).

The modelled treatment pond emission rates and parameters are presented in **Table 7.4**. **Figure 7.3** presents the adopted odour emission rates for the proposed holding pond and sediment basin, respectively.

Table 7.3: Modelled Treatment Emission Rates and Parameters

Pond	Odour Emission Rate Range (ou/m ² /s)	Height (m)	Initial Vertical Spread (m)	Area (m ²)
Holding Pond	0.168 – 0.252	0	1	5,975
Sediment Basin	0.601 – 0.618	0	1	2,478

Figure 7.2: Predicted Holding Pond Odour Emissions

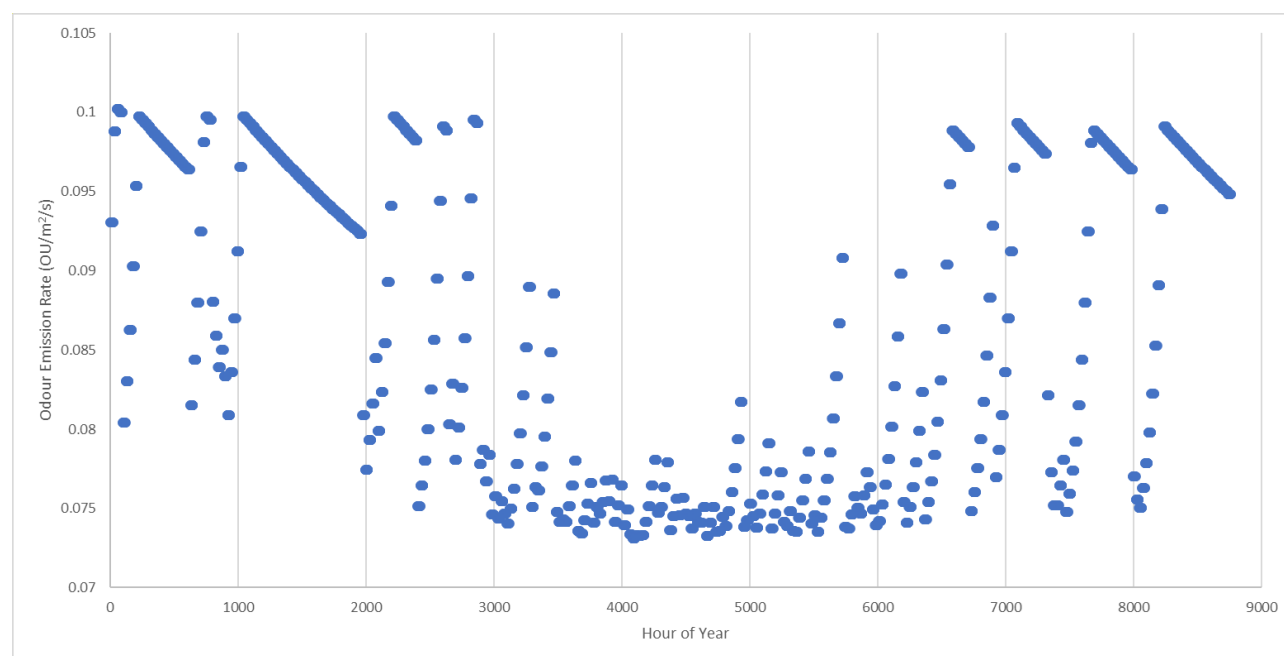
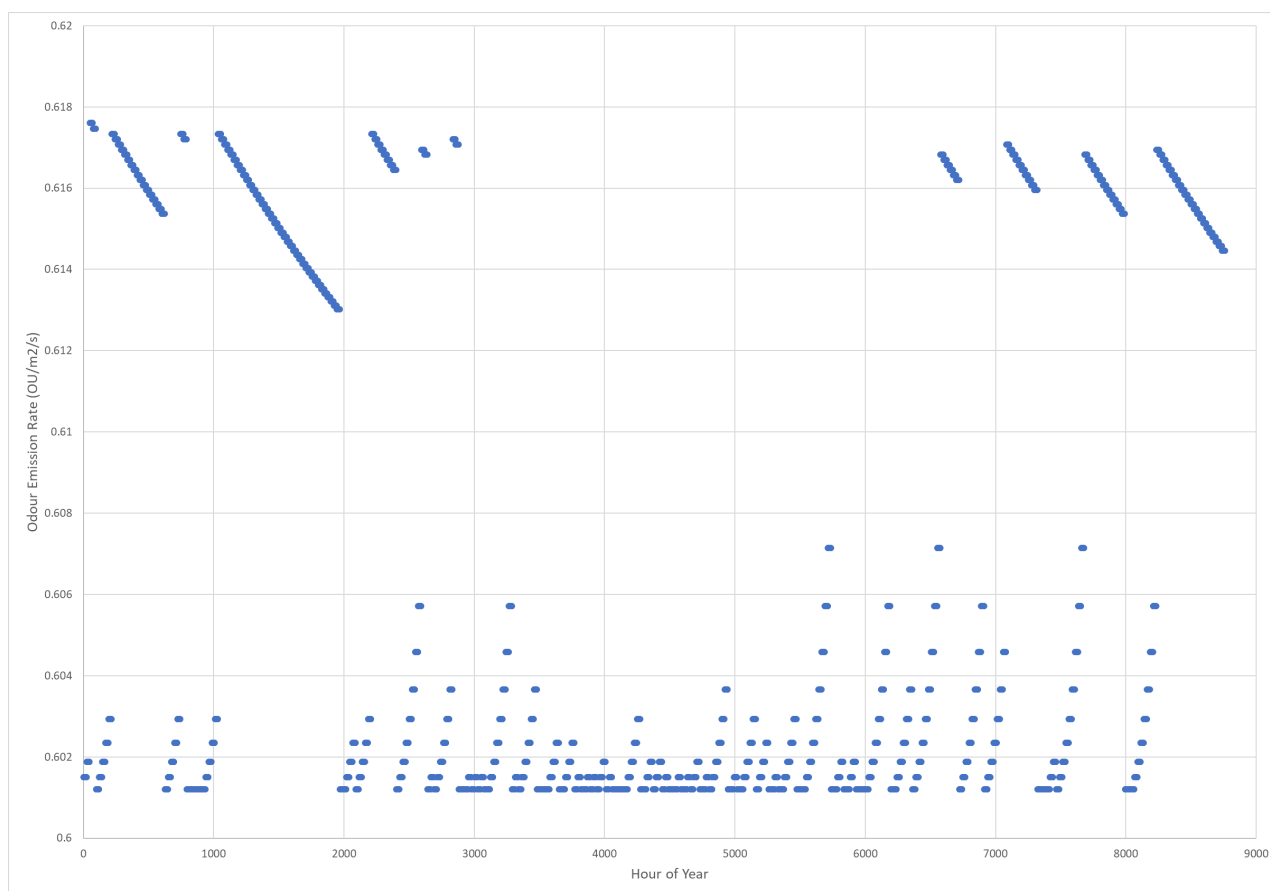


Figure 7.3: Predicted Sediment Basin Odour Emissions



8. DISPERSION MODELLING METHOD

8.1 Calpuff Configuration

The three-dimensional wind fields from Calmet were entered into Calpuff for the full year 2019. Calpuff was run over a computational grid (10 kilometres x 10 kilometres) with a spacing of 100 metres, the same as the Calmet grid, and the sampling grid with a nesting factor of 2.

Wind speed profile was set to the Industrial Source Complex (ISC) Rural exponents. Calm conditions were not invoked until the wind speed dropped below 0.5 m/s.

The emissions were modelled as puffs (not slugs). Puff-splitting was turned off.

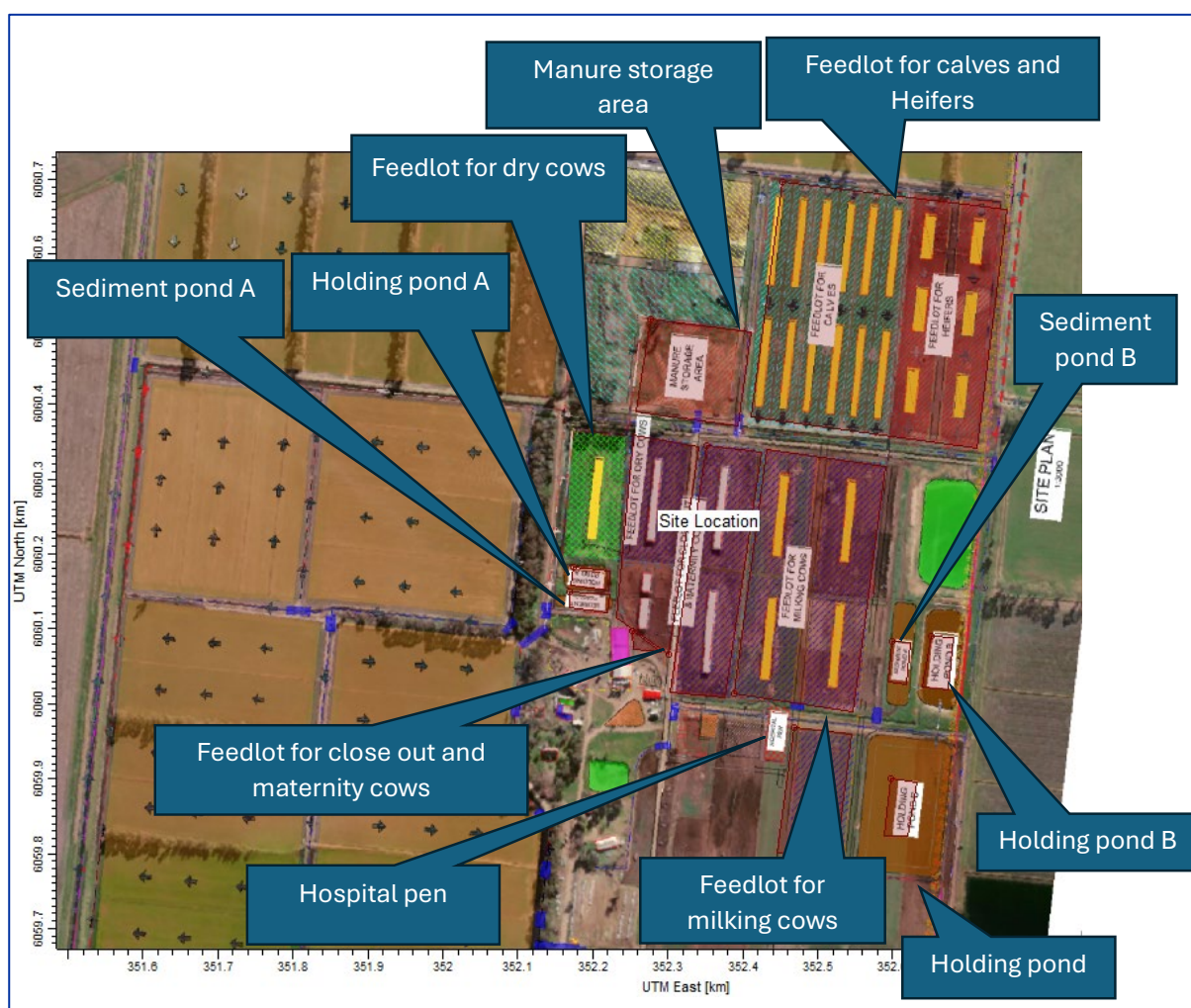
Dispersion coefficients were derived by the model using turbulence generated by micrometeorology. The Heffter curve was used to compute time-dependent dispersion beyond 550 metres. The partial plume height adjustment method was used to allow winds to approach hills as terrain increases.

The minimum turbulence velocity, sigma v, was set to 0.2 m/s.

8.2 Modelled Sources

Figure 8.1 presents the modelled source locations of the feedlot pen areas, manure storage area and wastewater treatment ponds.

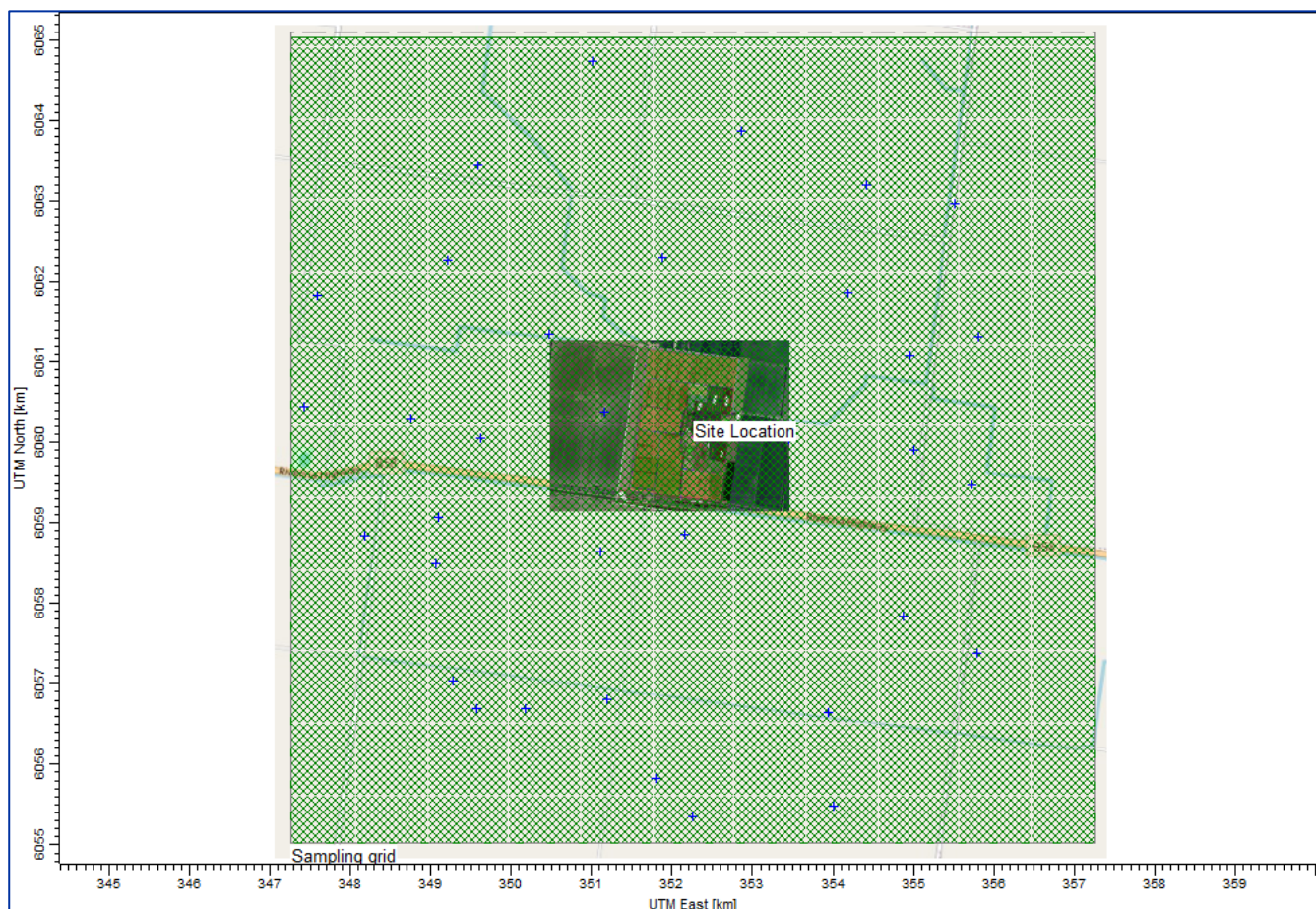
Figure 8.1: Modelled Source Locations



8.3 Modelled Receptors

A total of 34 receptors have been modelled at ground level and second storey to represent the nearby dwellings. Additionally, 10 x 10 km sampling grid with a spacing of 100 m has been used for the Calpuff output data to allow for the creation of concentration plots. **Figure 8.2** presents the location of the modelled receptors and grids.

Figure 8.2: Modelled Receptor Locations



9. DISPERSION MODELLING RESULTS

Table 9.1 presents the maximum 99th percentile odour concentrations at modelled receptors. **Figure 9.1** shows the predicted ground level odour concentration plots.

Table 9.1: Predicted Results

Receptor ID	99 th Percentile (OU)
Ground Level	2.8
Second Storey	2.4
Averaging Time	<i>Peak, 99th Percentile</i>
Criteria	4.2

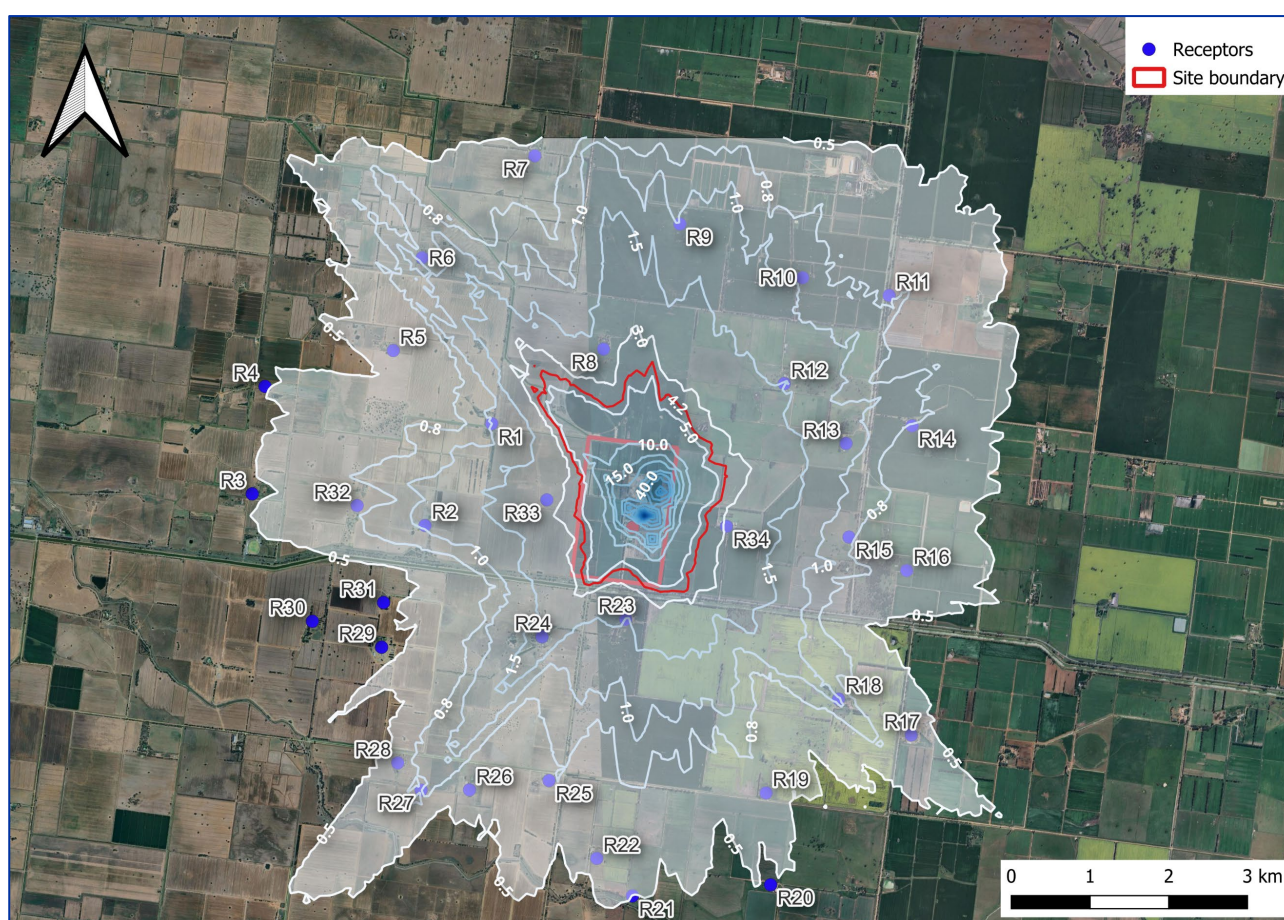
The results indicate compliance with the odour limit of 4.2 OU. The highest predictions occur at R33 and R34, which are the closest receptors to the west and east, respectively.

A more detailed analysis of source contributions reveals that the pens are the primary odour source on-site. Therefore, effective pen management is crucial to minimise the potential for odour impacts.

The modelling assumes a maximum average daily pad depth of 15.2 mm, representing a worst-case scenario for pen odour emissions, as cleaning is proposed to occur daily.

Overall, the results indicate that odour is unlikely to be an issue at all receptor locations. Recommendations to prevent odour impacts from the operation of the dairy farm are provided in **Section 10**.

Figure 9.1: Odour 1-Second 99th Percentile Concentration Plot



10. RECOMMENDATIONS

It should be noted that compliance is based on the following management measures (as considered in the modelling):

- Pens are cleaned so as the manure depth does not exceed a depth of 15 mm.

In addition to the above, the following measures are also recommended:

- Holding pens:
 - Maintain good drainage:
 - ensure a minimum slope of 2-4%
 - less than 1% cross-slope gradient to prevent pen-to-pen drainage
 - ensure drains are unblocked (removal of waste, sediment build-up and vegetation)
 - Maintain level surface with no areas for liquid pooling – backfill where necessary.
 - Regular cleaning of pens to avoid buildup of waste/material/liquids:
 - fence lines (waste build up can prevent proper drainage)
 - feeding systems and water troughs
 - Maintain water troughs to prevent leakage
 - Maintain all cleaning equipment (e.g. scrapers, front-end loaders)
 - Besides regular inspections, carry out additional inspections after rainfall event
- deceased cattle are to be removed from site immediately to avoid potential buildup of odour which can occur if stored on site;
- feed is to be kept in dry storage;
- visually observe dust from the site – utilise water sprays (where appropriate) on exposed surface if wind blown dust is observed (i.e. potentially under dry/windy conditions);
- make odour observations around the site on a daily basis – where unusual/atypical or elevated odours are identified, investigate further and take ameliorative action where necessary.
- manure application and effluent irrigation to be avoided during wet weather, when receptors are downwind the application area, early mornings or evenings, calm wind conditions.

11. CONCLUSIONS

An odour assessment of the existing dairy farm located at 18214 Riverina Highway, Blighty, NSW, 2713 has been undertaken. The conclusions of the odour assessment are summarised as follows:

- The nearest sensitive receptor is located approximately 800 metres east of the nearest operation.
- Key potential odour sources include the feedlot pens, manure stockpiles and wastewater treatment ponds. Other sources include manure application, effluent irrigation, deceased cattle and odour from feed storage, however, provided that appropriate management measures are adopted potential odour impacts from these sources are expected to be minimal.
- The relevant odour criterion is a 4.2 OU concentration as adopted in the relevant NSW EPA guidelines based on an affected population of 102 persons.
- The air dispersion modelling indicates compliance with the odour criteria provided pens are cleaned so as not to exceed a manure depth of 15 mm.
- Additional measures are provided in **Section 10**.

In conclusion, based on the expected operations of the feedlot and provided the above mitigation measures are in place, the proposed expansion is appropriate from an air quality perspective.

APPENDIX A GLOSSARY

Parameter or Term	Description
OER	Odour emission rate
Odour Unit	One odour unit (ou) is the number of dilutions required for a sample of odour to reach the odour intensity at which a panel of qualified people can just detect it. Refer to AS 4323.1:2001.
Peak to mean ratio	A conservation factor to adjust 1-hour average dispersion model predictions to peak concentrations as perceived by the human nose.
99 th percentile	The value exceeded for 1.0% of the time.



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Appendix I. Traffic Impact Assessment

Traffic Impact Assessment Report

18214 Riverina Highway, Blighty, NSW

Project Number 240237

Final Report 6/03/2025

Client EnviroAg Australia Pty Ltd

Document control record

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Document control

Report title	18214 Riverina Highway, Blighty, NSW
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Revision	Date issued	Revision details / status	Prepared by	Authorised by
Draft	8/10/2024	Preliminary draft	Said Diria	Kate Kennedy
Final	6/03/2025	Final	Stuart Redman	Kate Kennedy

Executive summary

EnviroAg Australia Pty Ltd engaged Trafficworks to undertake a traffic impact assessment (TIA) for the expansion of an existing dairy farm at **18214 Riverina Highway, Blighty, NSW**.

The table below summarises the subject site and the proposed development, and our conclusions and recommendations.

Address	18214 Riverina Highway
Zoning	Primary Production Zone (RU1)
Proposed development	Expansion of an existing dairy farm
Road network	Riverina Highway (B58)
Traffic generation	<p>Construction phase</p> <ul style="list-style-type: none"> — 18 vehicles per day (vpd) — 6 vehicles per hour (vph) during the AM and PM peaks <p>Operational phase</p> <ul style="list-style-type: none"> — 26 vpd — 1 vph during the PM peak only
Car parking	<p>Car parking demand of:</p> <ul style="list-style-type: none"> — 4 car parking spaces during the construction phase — 6 car parking spaces during the operational phase
Conclusion	<p>We conclude that, subject to the implementation of our recommendations, there are no traffic engineering reasons that would prevent the development from proceeding.</p> <ul style="list-style-type: none"> — the car parking demand for the subject site is likely to be up to 6 spaces across both the construction and operational phases, with no heavy vehicle parking spaces required — No casualty crashes have occurred near the subject site in the last five years of available data (2018 – 2022) — the subject site access to Riverina Highway satisfies the SISD requirement for light vehicles (285 m) and heavy vehicles (303 m) based on a design speed of 110 km/h and 100 km/h, respectively — turn lanes are not required due to the low volume of right and left turning entries to the subject site during both the temporary and operational phases of the development.

Recommendations

It is recommended that:

- **Recommendation 1:** provide a designated parking area for at least 6 passenger vehicles within the development.
 - **Recommendation 2:** the subject site access be constructed as represented in the concept plans in Appendix 1.
-

Referenced documents

References used in the preparation of this report include the following:

- Austroads Guide to Road Design
 - Part 4: Intersections and Crossings, for details of the access driveway
 - Part 4A – Unsignalised and Signalised Intersections, for sight distance criteria and provision for turning vehicles at intersections (AGRD4)
- Austroads Guide to Traffic Management
 - Part 6 – Intersections, Interchanges and Crossings Management, for sight distance criteria and provision for turning vehicles at intersections (AGTM6)
- Transport for NSW (TfNSW)
 - Guide to Transport Impact Assessments (2024)
 - Traffic Volume Viewer for the traffic volumes of freeways and arterial roads in the vicinity of the development
 - Centre for Road Safety website for the crash history of the road network in the vicinity of the development.
- Edward River Council
 - Local Environmental Plan (LEP) 2013
 - Development Control Plan (DCP) 2016

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Appendix 3 – Turn treatments

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A3.2 – Rural turn treatments

A3.3 – IDM rural access requirements

Appendix 4 – Acronyms and terms

1 Introduction

EnviroAg Australia Pty Ltd engaged Trafficworks to undertake a traffic impact assessment (TIA) for the expansion of an existing dairy farm at **18214 Riverina Highway, Blighty, NSW.**

For the detail about:

- existing site conditions – see section 2
- description of the proposed development – see section 3.1
- traffic impact of the proposed development – see section 3
- car parking assessment of the proposed development – see section 4
- assessment of the access to the proposed development – see section 5
- our conclusions and recommendations – see section 6.

2 Existing conditions

2.1 Subject site

The subject site is:

- located at 18214 Riverina Highway within Lot 87 of DP756251 in Blighty, approximately 20 km west of Finley and 38 km east of Deniliquin
- currently occupied by a dairy farm
- is surrounded by land currently used for farming and agricultural activities.

Vehicular access to the subject site is currently available from the Riverina Highway (B85).

Figure 1 shows the location of the subject site, surrounded predominantly by farm land property.



Figure 1: Location plan (reproduced with permission from Nearmap)

The subject site and the surrounding land is located within a Primary Production Zone (RU1), as per the Edward River Council (council) Local Environmental Plan 2013 (LEP).

Figure 3 and Figure 4 provide further information about the road.



Figure 3: Riverina Highway (B58) facing west



Figure 4: Riverina Highway (B58) facing east

2.3 Traffic volumes

TfNSW provided traffic counts along Riverina Highway, near Finley, for a two-week period from Saturday, November 2, 2019, to Friday, November 15, 2019.

A review of the survey results revealed that the highest traffic volumes were recorded during the second week of the surveys as follows:

- annual average daily travel (AADT) of volume 1,641 vehicles per day (vpd)
- average weekday AM commuter peak (8.00 to 9.00 am) of 170 vehicles per hour (vph)
 - 95 vph westbound
 - 75 vph eastbound
- average weekday PM commuter peak (3:00 pm – 4:00 pm) of 156 vph
 - 83 vph westbound
 - 73 vph eastbound.

2.4 Crash history

The TfNSW Centre for Road Safety website details all injury crashes throughout New South Wales and reports that no casualty crashes have occurred on the roads near the subject site in the last 5 years of available data (2018 – 2022).

Based on this, we conclude that no crash trend requires immediate investigation.

2.5 Existing operation

The existing dairy farm has the capacity to accommodate 1,000 milking cows. It operates 24 hours a day, 7 days a week, year-round.

The staffing requirements for the farm consist of:

- a managing director who oversees all dairy operations 7 days a week
- 17 additional staff members who work 5 days a week to complete 38 hours full-time employee requirements.

Table 2 represents the subject site's existing operation and staffing requirements.

Table 2: Site operation and existing staffing requirements

Period	Operations	Current Staffing
Across all operating hours	oversees all dairy operations	1 managing director
4:00 am - 10:00 am	milking / herd management	<ul style="list-style-type: none"> 1 herd manager 1 shift supervisor 3 milk harvesting operators
12:00 pm - 6:00 pm	milking / herd management	<ul style="list-style-type: none"> 1 herd manager 1 shift supervisor 3 milk harvesting operators
8:00 pm - 12:00 am	milking / herd management	<ul style="list-style-type: none"> 1 herd manager 1 shift supervisor 3 milk harvesting operators
5:30 am - 1:30 pm	feed mixing	1 feed mixer
7:30 pm - 7:30 am	general farm operations	1 farm operator
Total		18 staff

The maximum number of staff on site at any time is 8 people (5 shift, 1 MD, 1 feed mixer and 1 farm operator).

Vehicular access to the subject site is via the Riverina Highway driveway. The development facilitates presently access for the following heavy vehicles:

- an A double coming to/from Denilquin for the transportation of milk produced on site
- 3 trucks (19 m semi-trailers) arriving from Finley and Denilquin carrying stock feed to the subject site.

2.5.1 Existing traffic generation

Based on the current operation of the dairy farm, the following traffic generation has been estimated:

— **Light vehicles:**

- 4 staff vehicles (remaining 14 staff members are accommodated on site and will not generate additional traffic) generating a total of 8 trips daily
- 10-seater staff bus used weekly for staff necessities, generating 2 trips per day of use
- 1 van to deliver groceries for staff living on-site weekly, generating 2 trips per delivery day.

— **Heavy vehicles:**

- 1 A-double for milk deliveries enters / leaves site between 1:00 am – 2:00 am daily, generating 2 trips per day
- 3 trucks for the delivery of stock feed enter / leave site between 12:00 pm – 5:00 pm weekly, generating 6 vehicle trips per week.

3 Traffic assessment of the proposed development

3.1 The proposal

The proposal includes expanding the dairy farm to accommodate 2,000 milking cows. As part of this expansion, the dairy will upgrade the milking system from a conventional herringbone system to a rotary system.

The proposed upgrade is expected to cater for twice the number of cows and will only require an additional 3 staff (1 milk harvesting operator per shift) as represented in Table 3.

Table 3: Comparison of staff requirements between existing and proposed conditions

Period	Operations	Current Staffing	Proposed Staffing
Across all operating hours	oversees all dairy operations	1 managing director	1 managing director
4:00 am - 10:00 am	milking / herd management	<ul style="list-style-type: none"> 1 herd manager 1 shift supervisor 3 milk harvesting operators 	<ul style="list-style-type: none"> 1 herd manager 1 shift supervisor 4 milk harvesting operators
12:00 pm - 6:00 pm	milking / herd management	<ul style="list-style-type: none"> 1 herd manager 1 shift supervisor 3 milk harvesting operators 	<ul style="list-style-type: none"> 1 herd manager 1 shift supervisor 4 milk harvesting operators
8:00 pm - 12:00 am	milking / herd management	<ul style="list-style-type: none"> 1 herd manager 1 shift supervisor 3 milk harvesting operators 	<ul style="list-style-type: none"> 1 herd manager 1 shift supervisor 4 milk harvesting operators
5:30 am - 1:30 pm	feed mixing	1 feed mixer	1 feed mixer
7:30 pm - 3:30 pm	general farm operations	1 farm operator	1 farm operator
Total		18 staff	21 staff

Vehicular access to the development will continue via the subject site's existing driveway to Riverina Highway.

3.2 Traffic generation

Typically, traffic generation for new developments is estimated using the rates provided in the TfNSW Guide to Transport Impact Assessments (2024 – GTIA). However, the GTIA does not include traffic generation rates for dairy farms.

Therefore, the traffic generation to/from the proposed development was estimated empirically. A traffic generation analysis was undertaken for the development's construction and operational phases to establish the likely peak traffic generation.

3.2.1 Construction phase traffic generation

The construction period is estimated to last for 6 months (24 weeks). A breakdown of the anticipated construction traffic volumes and associated timelines are as follows:

- **earthworks and building contractors** – 24 weeks duration, 6 days per week, 4 light vehicles per day to enter/exit the subject site
- **earthworks** – 8 weeks duration, 6 days per week, 2 heavy vehicles to float machinery at start and 2 heavy vehicles to return machinery at end
- **delivery of building construction materials** – 8 weeks duration, 6 days per week, 2 heavy vehicles per week to enter/exit the subject site
- **delivery of concreting materials for building footings** – 8 weeks duration, 6 days per week, 1 heavy vehicle per week.

The vehicle movement estimates provided by the client are summarised in Table 4.

Table 4: Construction vehicles

Period (weeks)	Activity	Daily / per delivery day		Weekly / per delivery week		Construction period (24 weeks)	
		Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
1 – 8	Delivery of building construction materials		2		2		16
1 – 8	Delivering concreting materials for building footings		1		1		8
1 – 8	Earthworks		2		2		4
1 – 24	Earthworks and building contractors	4		24		576	
Total		4	5	24	5	576	28

Table 4 shows that the peak activity at the subject site is anticipated to occur during weeks 1 to 8, with the possibility of up to 9 vehicles accessing the subject site in a single day. Assuming all 9 vehicles arrive on the same day, this would consist of:

- 4 light vehicles associated with construction staff arriving in the morning and departing in the evening
- 5 heavy vehicle arrivals and departures spread throughout the day.

Based on these estimates, the proposed construction activities are anticipated to generate approximately:

- 18 vehicle trips per day (vpd), 9 entering and 9 departing the subject site
- morning and afternoon peaks of up to 6 vehicles per hour (vph), comprised of:
 - 4 light vehicles arriving in the morning and departing in the evening generating
 - 1 heavy vehicle arriving and departing in the morning and evening peaks.

3.2.2 Operational phase traffic generation

Upon the completion of the expansion, the dairy farm is expected to generate the following movements:

— **Light vehicles:**

- 4 staff vehicles (no change to existing conditions) generating a total of 8 trips daily (additional staff employed will be accommodated on-site)
- 10-seater staff bus used weekly for staff necessities, generating 2 trips per day of use
- 1 van to deliver groceries for staff living on-site weekly, generating 2 trips per delivery day.

— **Heavy vehicles:**

- 2 A-doubles for milk transport entering / leaving site between 1:00 am – 2:00 am daily, generating 4 trips per day
- 6 trucks (19 m semi-trailers) for the delivery of stock feed entering / leaving site between 12:00 pm – 5:00 pm weekly, generating 12 weekly trips. Assuming that the trips are evenly distributed throughout the week, this would equate to approximately 1 heavy vehicle per day, generating 2 trips per day.

Based on these estimates, the proposed development is anticipated to generate approximately:

- up to 18 vpd (conservatively based on the worst-case scenario where delivery vehicles, the staff bus, and stock feed trucks arrive / depart the subject site on the same day) - 9 entering and 9 departing.
- no development traffic during the morning peak (8:00 am – 9:00 am) due to:

- no light vehicles arriving / departing based on the shift schedule (refer to Table 3) as all shifts start before or after the AM commuter peak
- no heavy vehicles arriving / departing (A-doubles will arrive 1:00 am – 2:00 am, and the stock feed truck will arrive between 12:00 pm – 5:00 pm).
- afternoon peak (3:00 pm – 4:00 pm) of 1 vehicle per hour (vph), comprising:
 - 1 heavy vehicle arriving / departing in the afternoon generating 2 vph (conservatively assuming a heavy vehicle for the delivery of stock feed will arrive and depart during the PM commuter peak hour)
 - similar to the morning peak, no light vehicles arriving / departing in the afternoon peak based on the shift schedule.

3.2.3 Peak traffic generation

The most significant impact on the road network is anticipated to occur during the development's construction phase, which will generate 6 vph during the AM and PM commuter peaks.

3.2.4 Heavy vehicle access to the subject site

Heavy vehicles during both construction and operational phases are expected to arrive from Denilquin and Finley via the Riverina Highway (B58), with the proposed route to the subject site represented in Figure 5.

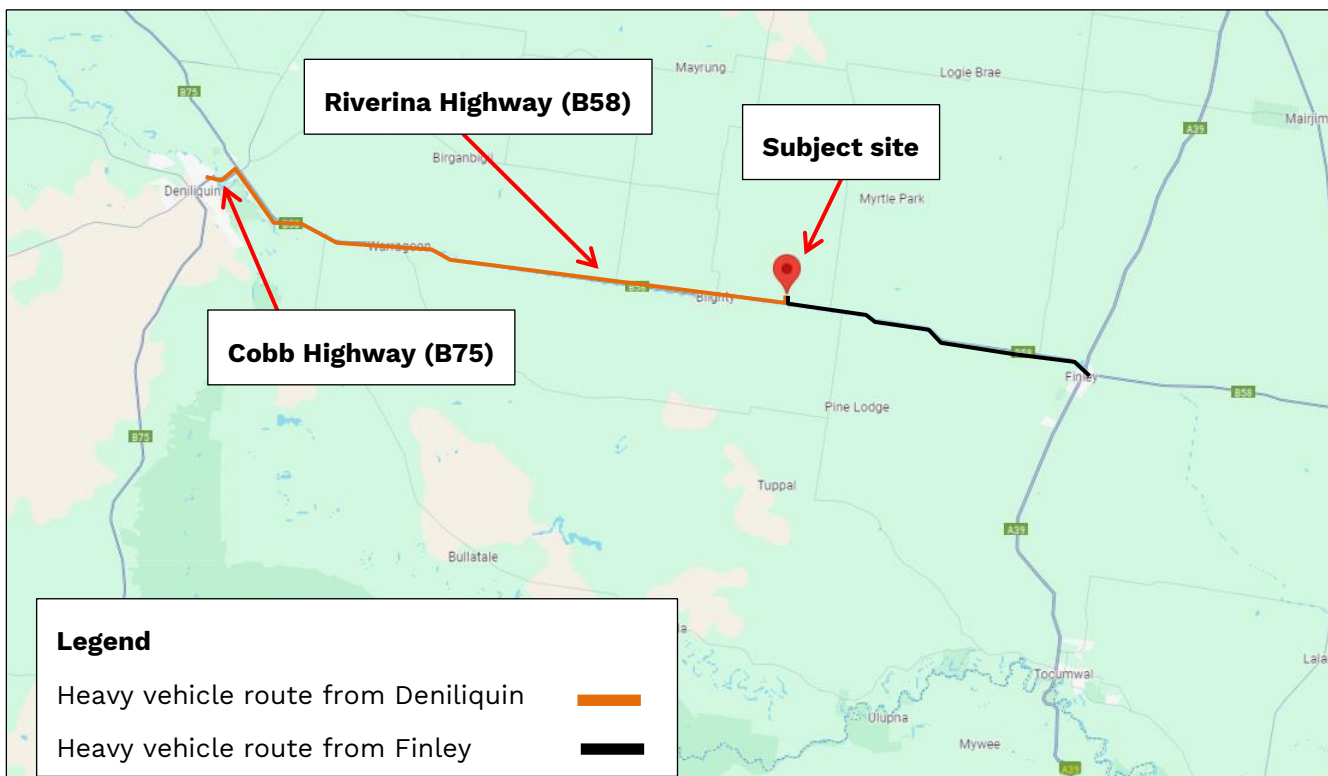


Figure 5: Recommended heavy vehicle routes to/from the subject site

3.3 Traffic distribution assumptions

Our construction traffic distribution assumptions are that:

- 70% to/from Finley to the east
- 30% to/from Deniliquin to the west.

3.4 Anticipated traffic volumes

It is assumed that the development will be fully constructed by 2025. Consequently, the existing traffic volumes along Riverina Highway (B58) were projected to 2025, adopting an annual compounded growth rate of 1 %. This rate was based on the increased surveyed traffic volumes along Riverina Highway between 2011 and 2019 (AADT of 1,509 vpd in 2011 and 1,641 vpd in 2019, sourced from the NSW Traffic Volume Viewer).

Figure 7 shows the anticipated overall peak hour traffic volumes.

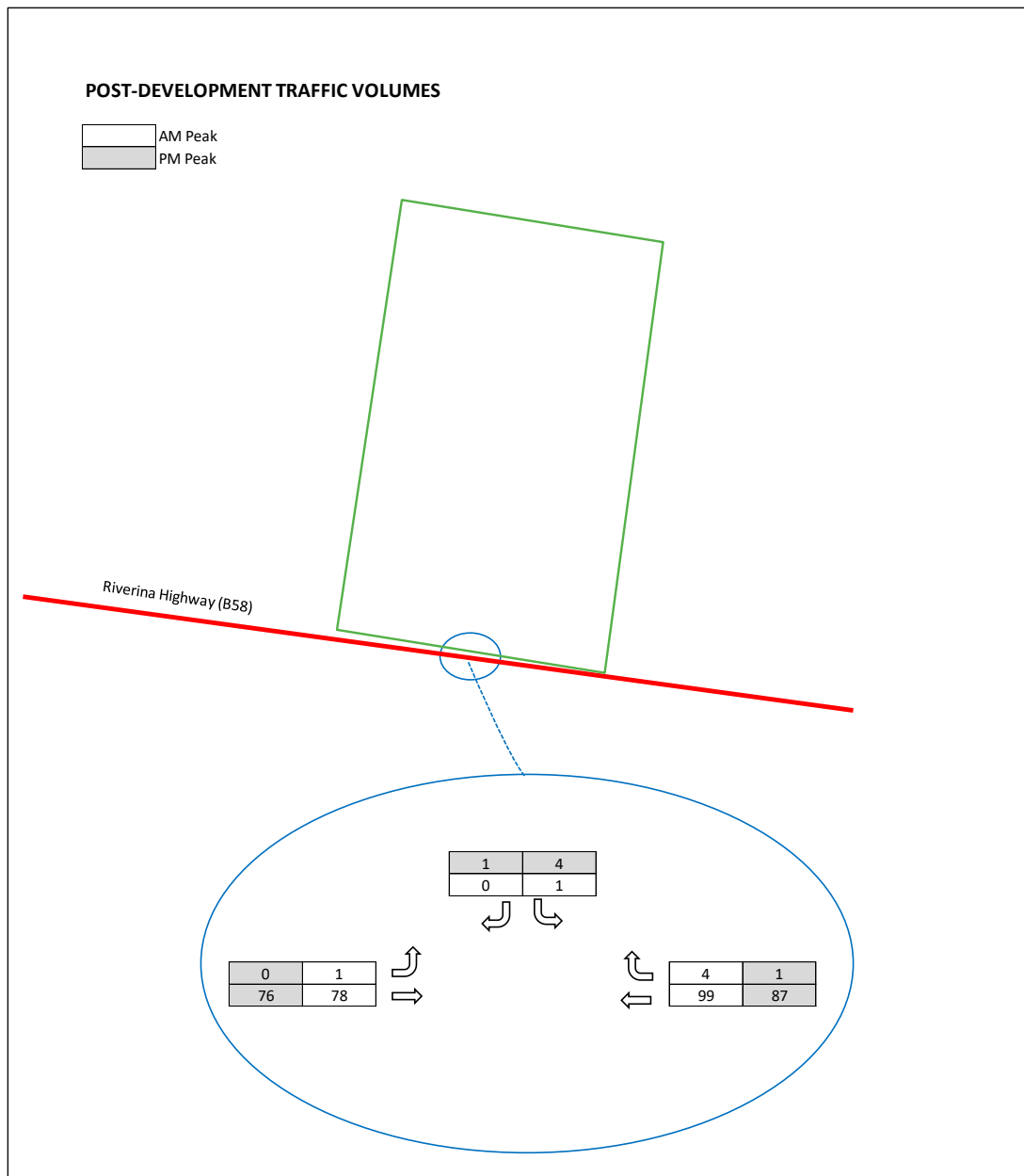


Figure 6: Anticipated overall peak hour traffic volumes

4 Car parking assessment of the proposed development

The Council's Development Control Plan (DCP) outlines the statutory requirements for providing and designing car parking spaces for new developments. However, the parking requirement for the proposal is not provided in the DCP or the GTIA. Therefore, an empirical assessment was undertaken to estimate the demand for car parking for the proposed development.

4.1 Empirical assessment of car parking demand

We understand that the proposed development will result in:

— **Construction phase:**

- 4 light (staff) vehicles at any one time. It has been assumed that the demand for light car parking for the proposed development will be 4 parking spaces.

— **Operational phase:**

- 6 light vehicles (4 staff vehicles, 10-seater bus and grocery van) at any time. It has been assumed that the demand for staff car parking for the proposed development will be 6 parking spaces.

It is recommended that 6 parking spaces be provided within the new development to accommodate parking demand during both the construction and operational phases of the development.

Recommendation 1: provide a designated parking area for at least 6 passenger vehicles within the development.

4.1.1 Truck parking requirements

There is no requirement for truck parking on the subject site as the vehicles will not be parked there.

There is sufficient space on the subject site for the trucks to store before loading.

5 Access to the site

5.1 Site access – Intersection SISD requirement

The visibility criterion typically applied to intersections is Safe Intersection Sight Distance (SISD). Figure 7 shows the SISD, which:

- is nominated in the Austroads Guide to Road Design, Part 4A (AGRD4) as the minimum distance that should be provided on a major road at any intersection (refer to Section 3.2.2 in AGRD4A)
- provides sufficient distance for the driver of a vehicle on the major road:
 - to observe a vehicle from the minor access approach moving into a collision situation, e.g., in the worst case, stalling across the traffic lanes
 - to decelerate to a stop before reaching the collision point.

The minimum SISD criterion for light vehicles, based on a general reaction time (RT) of 2 seconds and a design speed of 110 km/h (10 km/h + posted speed limit) requires clear visibility for a desirable minimum distance of 285 m, based on Table 3.2 of AGRD4A.

SISD for trucks should also be considered and is established from the SSD (stopping sight distance) for trucks, given in Table 5.6 in the *Austroads Guide to Road Design Part 3: Geometric Design*, plus 3 seconds of observation time. The 85th percentile operating speed for trucks is typically the posted speed limit. This equates to a SISD of 303 m for a 100 km/h approach speed.

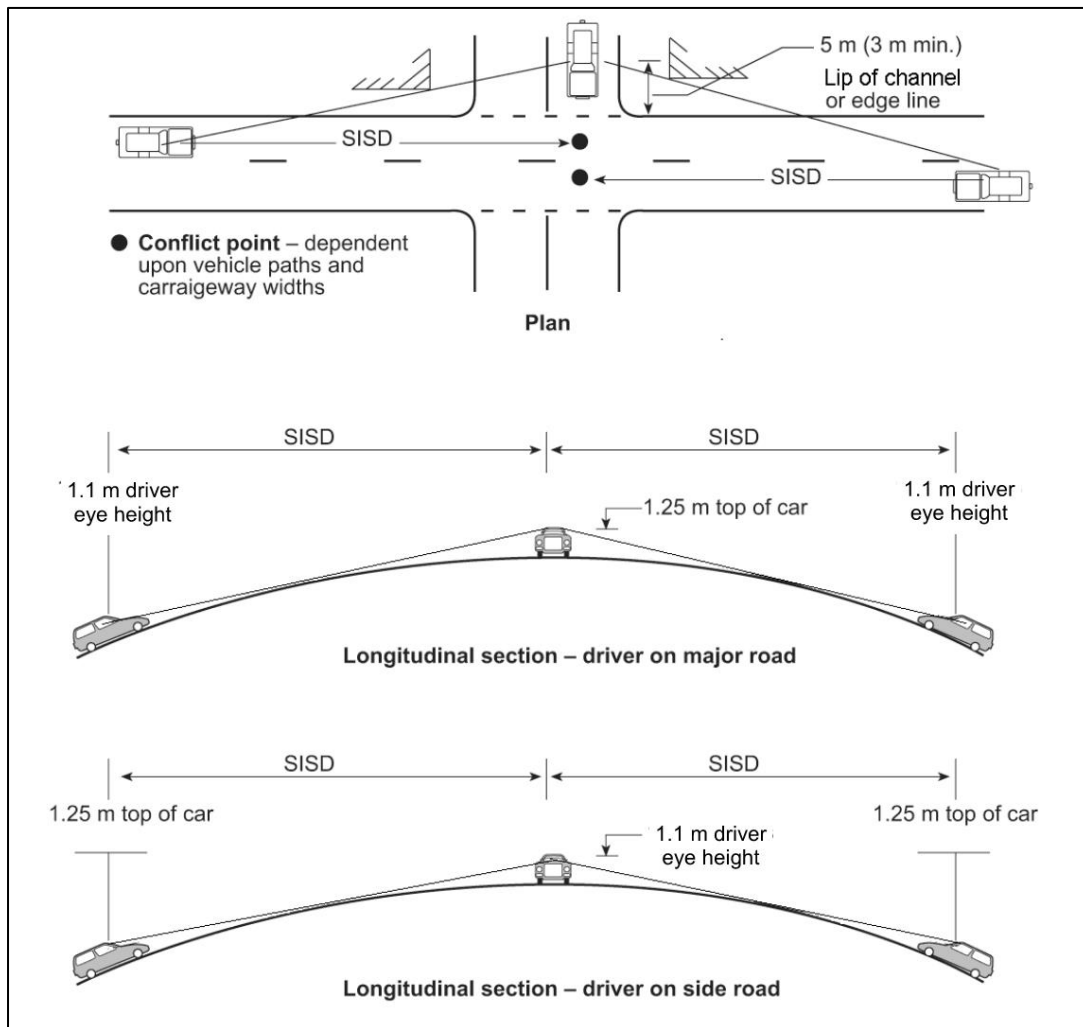


Figure 7: Safe Intersection Sight Distance (SISD) (Source: Figure 3.2 from AGRD4)

5.1.1 Impacts for this proposed development

The proposed site access to the development along Riverina Highway is subject to:

- a 110 km/h design speed for light vehicles, corresponding to a minimum SISD of 285 m
- a 100 km/h design speed for heavy vehicles, corresponding to a minimum SISD of 303 m.

This is achieved to the east and west of the existing access location, as demonstrated by Figure 8 and Figure 9.



Figure 8: Sight distance at the existing site access to Riverina Highway facing east



Figure 9: Sight distance at the existing site access to Riverina Highway facing west

5.2 Truck access location & operation

The existing access to Riverina Highway will need to be upgraded to accommodate A-Doubles (check vehicle) and 19-m semi-trailers (design vehicle). A concept plan and associated swept paths have been prepared for the proposed upgrades and can be found in Appendix 1 and 2 respectively.

The proposed upgrade to the existing access has been designed to cater for the swept paths and encompass the footprint for a rural property access per Figure 7.4 in Austroads Guide to Road Design Part 4: Intersections and Crossings (refer to Figure 10).

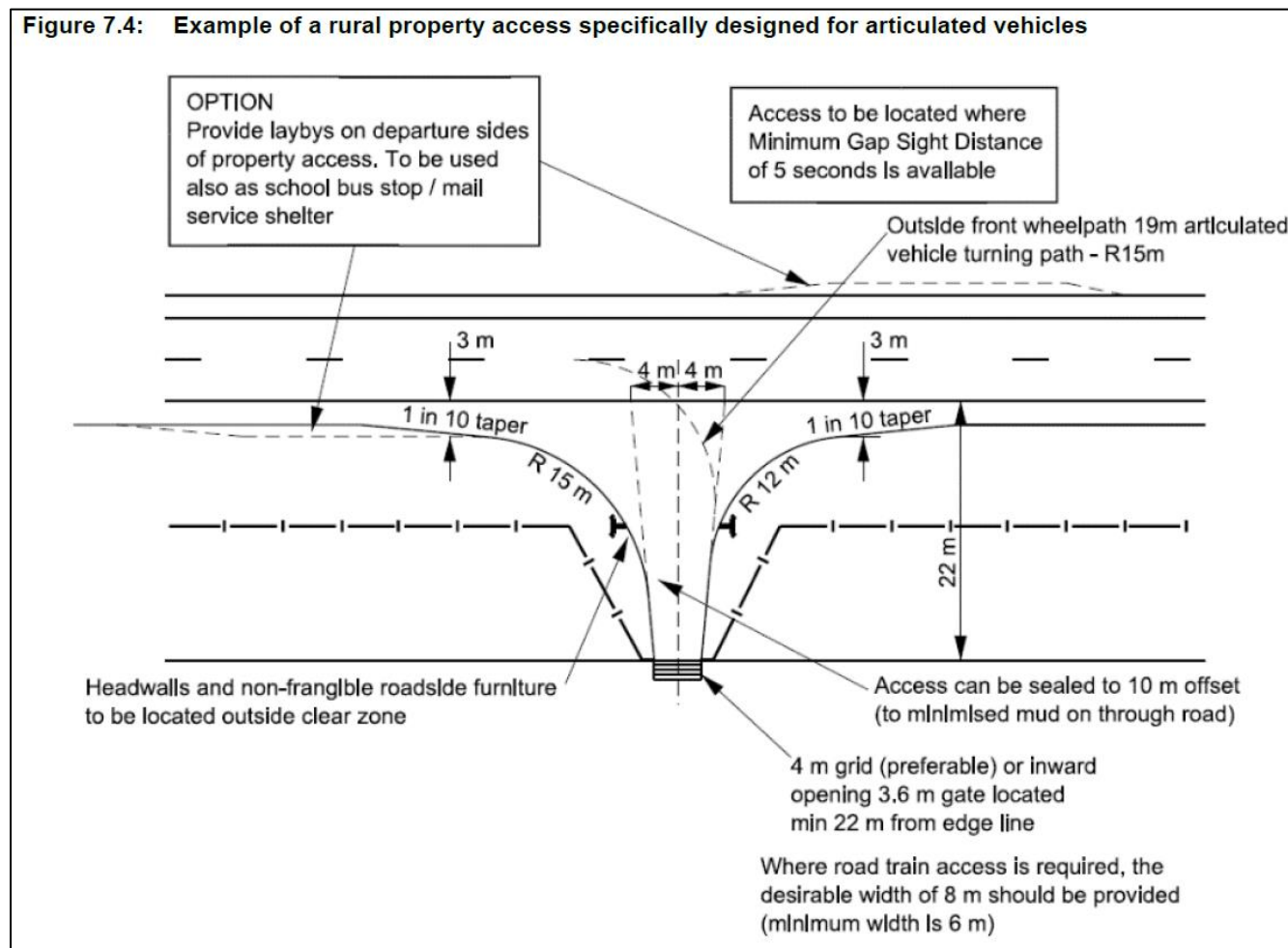


Figure 10: rural property access designed for an articulated vehicle

Recommendation 2: the subject site access be constructed as represented in the concept plans in Appendix 1.

5.3 Turn provisions impact

The traffic turning from major roads into minor roads should not delay through traffic.

Generally, turn treatments from major roads into minor roads at sign-controlled intersections are provided for safe and efficient operation of the intersection.

Figure 6 shows the anticipated traffic generated from the proposed development.

Figure 11 shows the formulas used to determine the major road volume (Q_M).

To determine the turning treatments for the intersections, the results were then applied to Figure 3.26, Austroads Guide to Traffic Management Part 6 (AGTM6).

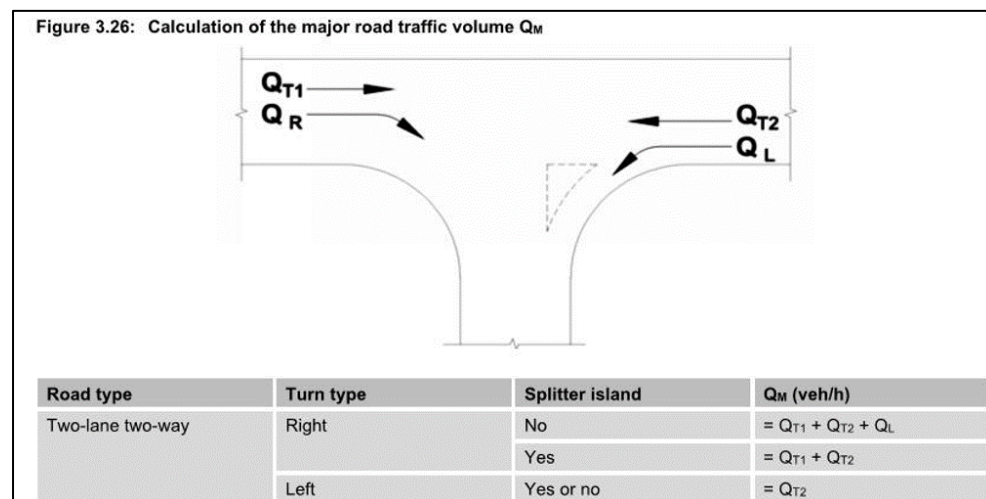


Figure 11: Formulas used to determine major road traffic (Source: Figure 3.26 from AGTM6)

5.3.1 Turn lane treatments

Traffic volumes are used to help determine appropriate turn lane treatments at access intersections to development sites.

Table 6 and Table 7 in Appendix 3 – Turn treatments summarises the various types of left and right turn treatments, as defined in the AGRD4.

5.3.2 Anticipated conditions for Riverina Highway (B58) / site access intersection

To determine anticipated conditions at the intersection, traffic volumes from Figure 6 were used to determine the warrants shown in Table 5 and were applied in Figure 12.

Table 5: Turn lane treatments on Riverina Highway at the subject site access intersection – anticipated conditions

Road	Peak period	Left turn Q_L (vph)	Right turn Q_R (vph)	Through Q_T (vph)	Q_M	
					Left turn	Right turn
AM		1	4	Q_{T1} 99	78	178
				Q_{T2} 78		
PM		0	1	Q_{T1} 87	0	163
				Q_{T2} 76		

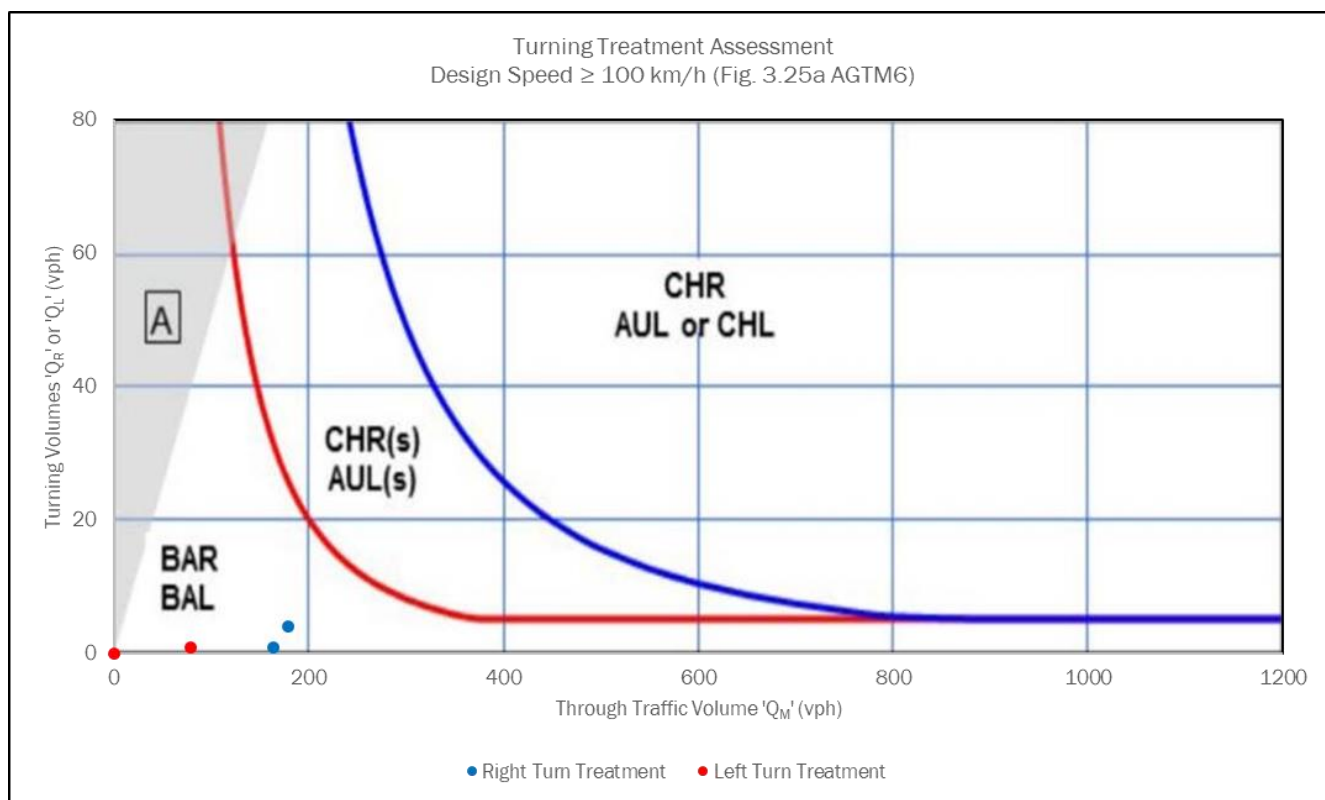


Figure 12: Graph used to determine the turn treatments on Riverina Highway, at the subject site access intersection – anticipated conditions

Based on the data gathered and reported in this section, our key observations are that the:

- right turn from Riverina Highway into the subject site access is likely to meet warrants for a basic right turn (BAR) treatment in the morning and afternoon peak periods.
- left turn from Riverina Highway into the subject site access is likely to meet warrants for a basic left turn (BAL) treatment in the morning and afternoon peak periods.

The additional turning movements into the subject site during the construction phase is low (1-4 vph) and will only occur for a short duration (six months). As a result, providing turn treatments would be unnecessary.

Similarly, the operational phase is also expected to have a negligible impact on the subject site access and the surrounding road network, with the traffic generated during this phase generally anticipated to arrive / depart outside the commuter peak hours, with the exception of a single heavy vehicle in the PM peak (refer Section 3.2.2).

6 Conclusions and recommendations

We conclude there are no traffic engineering reasons that would prevent the development from proceeding, as outlined below:

- the car parking demand for the subject site is likely to be up to 6 spaces across both the construction and operational phases, with no heavy vehicle parking spaces required
- No casualty crashes have occurred near the subject site in the last five years of available data (2018 – 2022)
- the subject site access to Riverina Highway satisfies the SISD requirement for light vehicles (285 m) and heavy vehicles (303 m) based on a design speed of 110 km/h and 100 km/h, respectively
- turn lanes are not required due to the low volume of right and left turning entries to the subject site during both the temporary and operational phases of the development.

However, this TIA has identified several recommendations that need to be addressed:

- **Recommendation 1:** provide a designated parking area for at least 6 passenger vehicles within the development.
- **Recommendation 2:** the subject site access be constructed as represented in the concept plans in Appendix 1.

Appendix 1 – Concept plan

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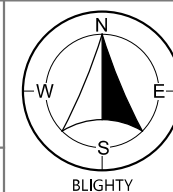
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Edward River Council

Concept Plan

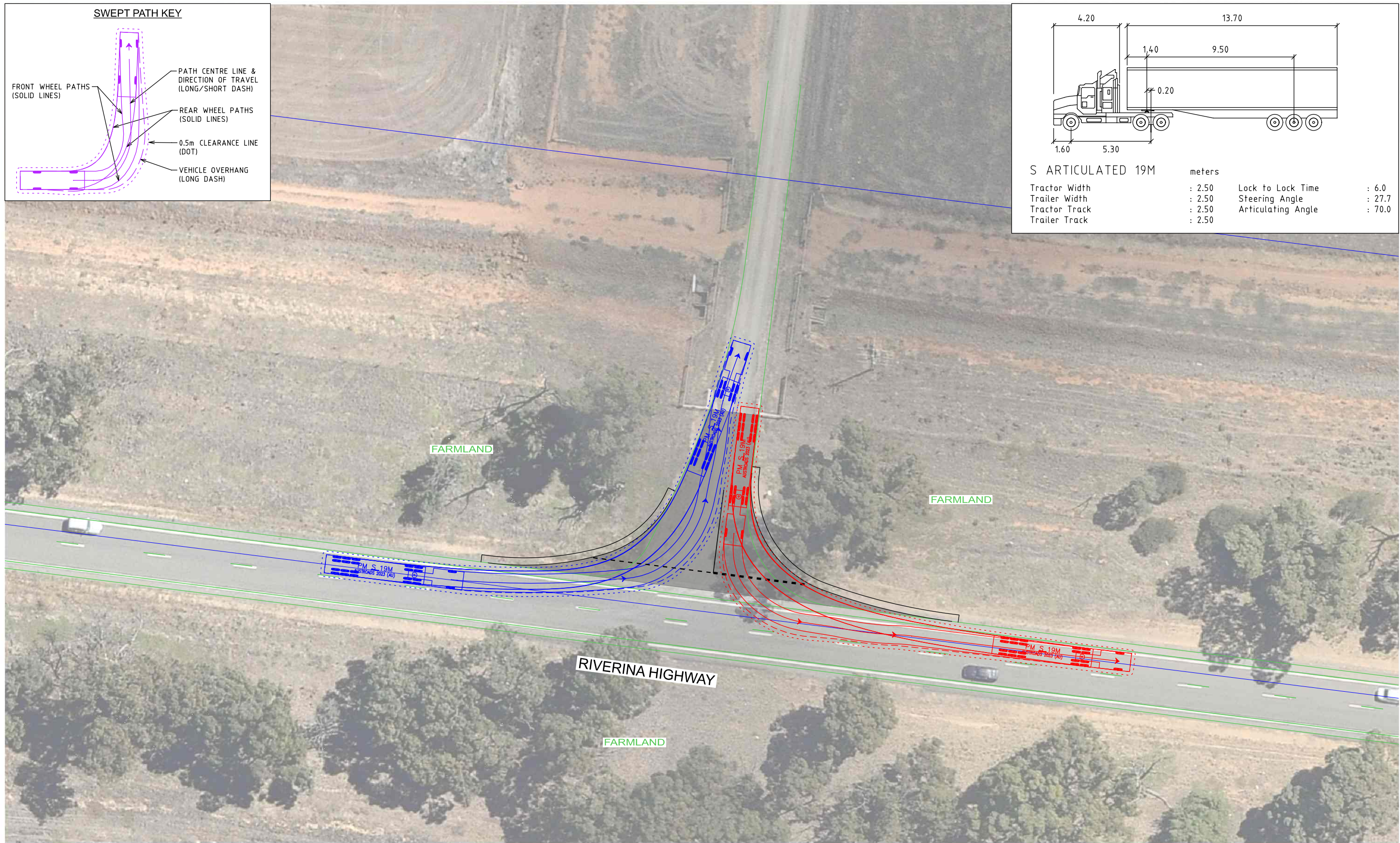
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Appendix 2 – Swept path assessment

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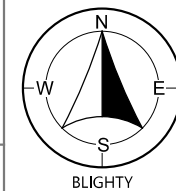
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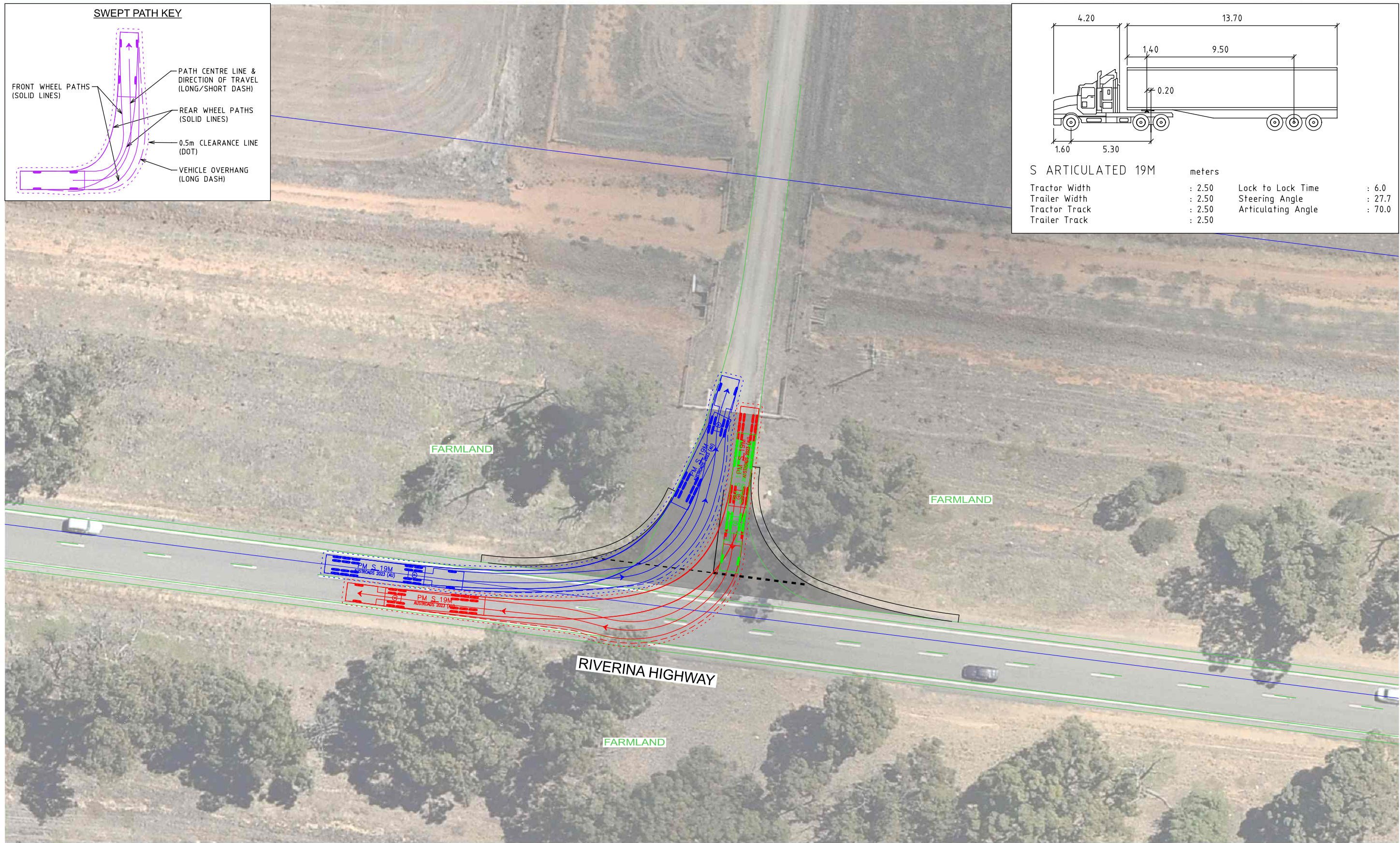
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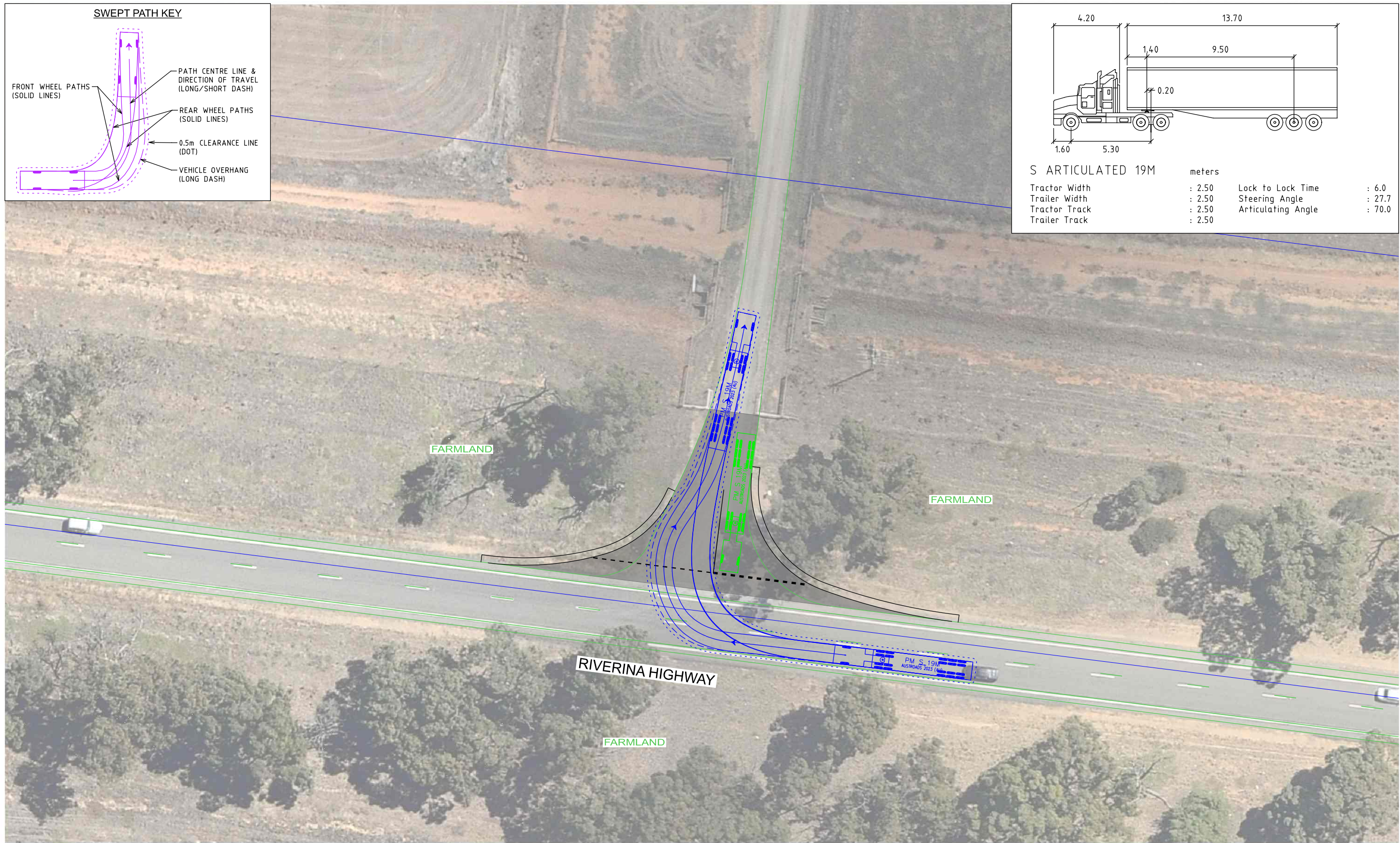
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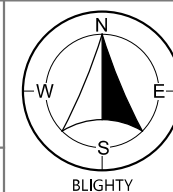
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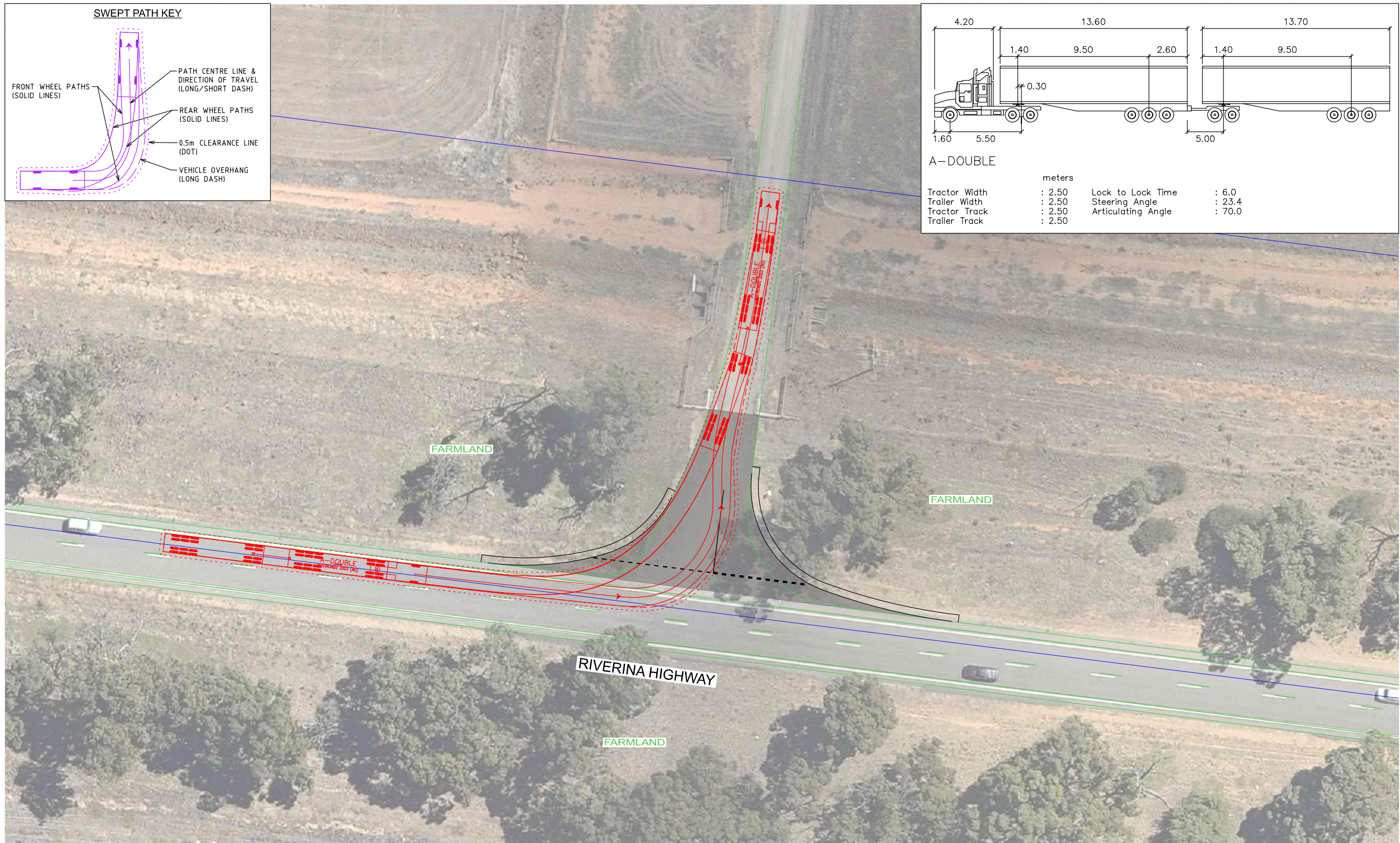
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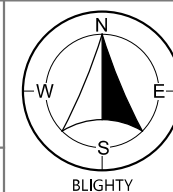
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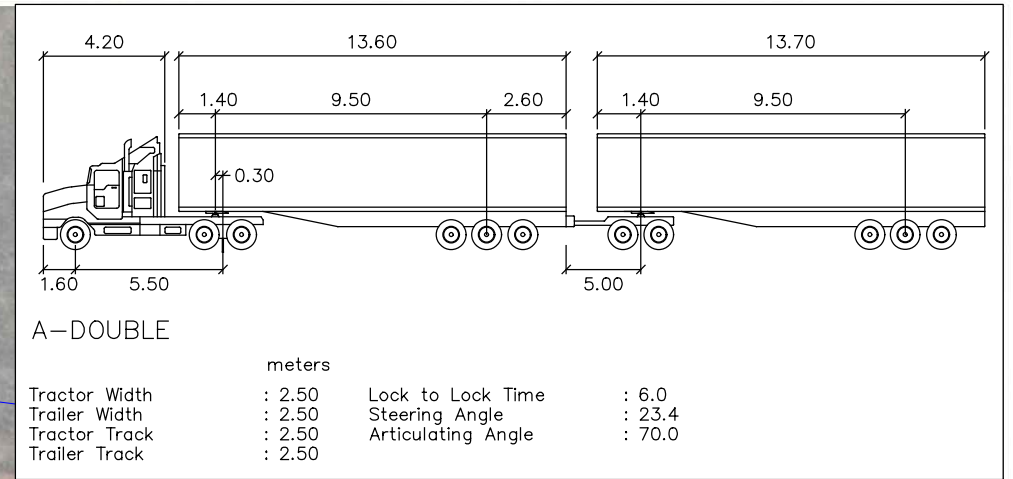
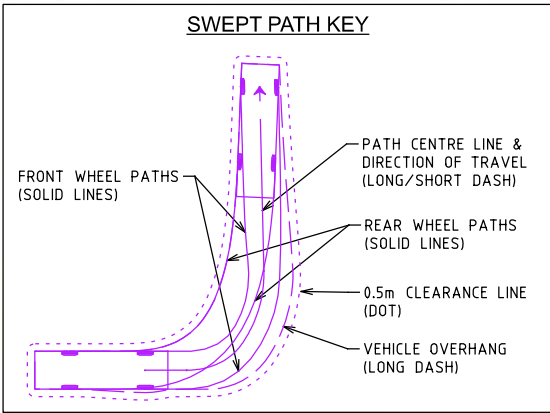
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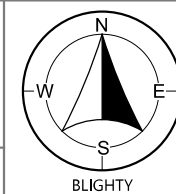
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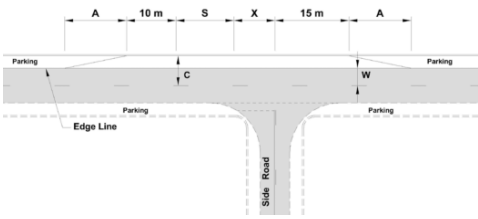
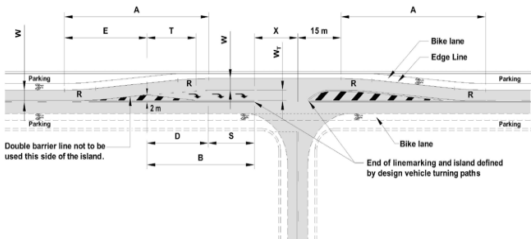
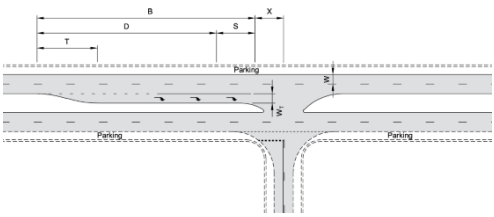
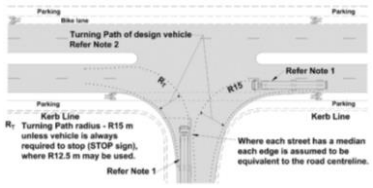
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Appendix 3 – Turn treatments

A3.1 – Urban turn treatments

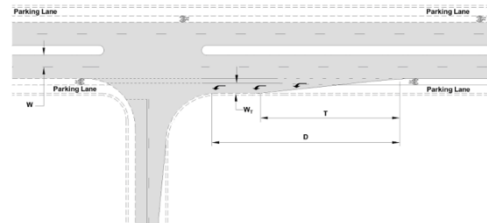
Table 6: Turn Treatment Descriptions (**Urban**) (Source: Section 7.7, 7.8 and 8.3 of Austroads Guide to Road Design Part 4A)

Turn treatment	Description	
BAR	Basic Right turn treatment on the major road, features a widened area (usually in place of parking) on the major road that allows through vehicles to pass to the left of turning vehicles (<i>Figure 7.6 of Austroads Guide to Road Design Part 4A</i>).	
CHR(S)	CHannelised Right (Short) turn is a shorter version of the Channelised Right turn treatment which is reduced by removing space provided for storage in the right lane. This treatment type can only be used with line marking (<i>Figure 7.7 of Austroads Guide to Road Design Part 4A</i>).	
CHR	CHannelised Right turn treatment has two vehicle travel paths (through and right turns) separated by physical or painted medians or islands (<i>Figure 7.8 of Austroads Guide to Road Design Part 4A</i>).	
BAL	BAasic Left turn treatment on the major road has a radius large enough to accommodate a design vehicle turning left into the minor road without crossing the centre line of the minor road (<i>Figure A15 of Austroads Guide to Road Design Part 4</i>).	

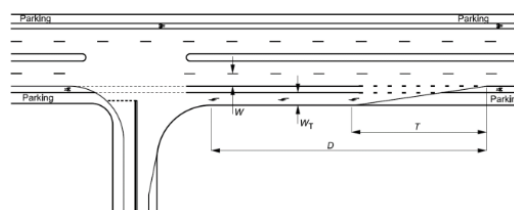
Turn treatment

Description

AUL(S) AUXiliary Left (**S**hort) turn treatment is a shorter version of the Auxiliary Left turn treatment which is reduced by allowing some deceleration to occur in the through lane on the major road. This turn treatment also allows through vehicles to pass to the right of turning vehicles (*Figure A17 of Austroads Guide to Road Design Part 4*).



AUL AUXiliary Left turn treatment is a left turn lane on the major road that allows through vehicles to pass to the right of turning vehicles (*Figure 8.6 of Austroads Guide to Road Design Part 4A*).



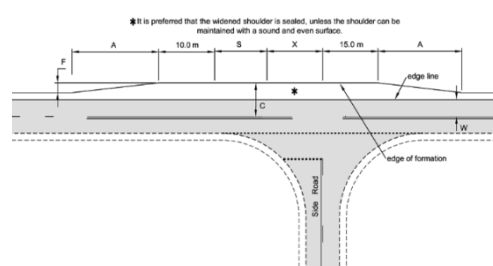
A3.2 – Rural turn treatments

Table 7: Turn Lane Treatment Descriptions (**Rural**) (Source: Section 7.5 and 8.2 of Austroads Guide to Road Design Part 4A)

Turn treatment

Description

BAR Basic Right turn treatment on the major road, features a widened area (usually in place of parking) on the major road that allows through vehicles to pass to the left of turning vehicles (*Figure A6 of Austroads Guide to Road Design Part 4*).

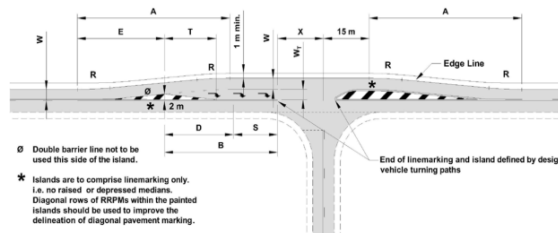


Turn treatment

Description

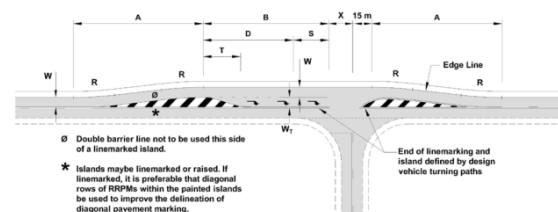
CHR(S)

CHannelised Right (**S**hort) turn is a shorter version of the Channelised Right turn treatment which is reduced by removing space provided for storage in the right lane. This treatment type can only be used with line marking (Figure A7 of Austroads Guide to Road Design Part 4).



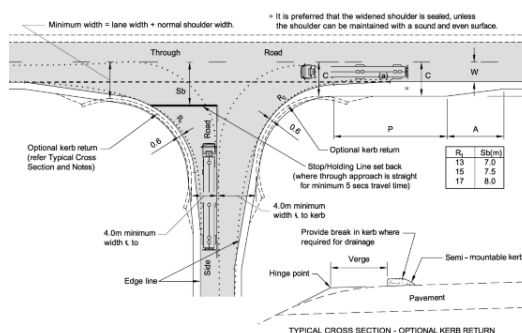
CHR

CHannelised Right turn treatment has two vehicle travel paths (through and right turns) separated by physical or painted medians or islands (Figure A8 of Austroads Guide to Road Design Part 4).



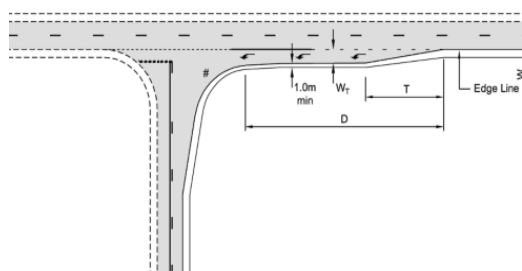
BAL

BAsic Left turn treatment on the major road has a radius large enough to accommodate a design vehicle turning left into the minor road without crossing the centre line of the minor road (Figure 8.2 of Austroads Guide to Road Design Part 4A).



AUL(S)

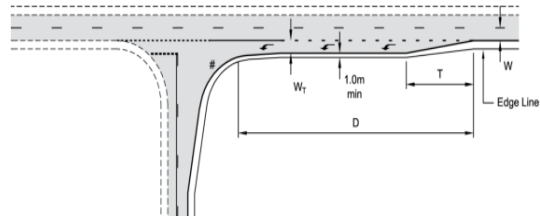
AUXiliary Left (**S**hort) turn treatment is a shorter version of the Auxiliary Left turn treatment which is reduced by allowing some deceleration to occur in the through lane on the major road. This turn treatment also allows through vehicles to pass to the right of turning vehicles (Figure 8.3 of Austroads Guide to Road Design Part 4A).



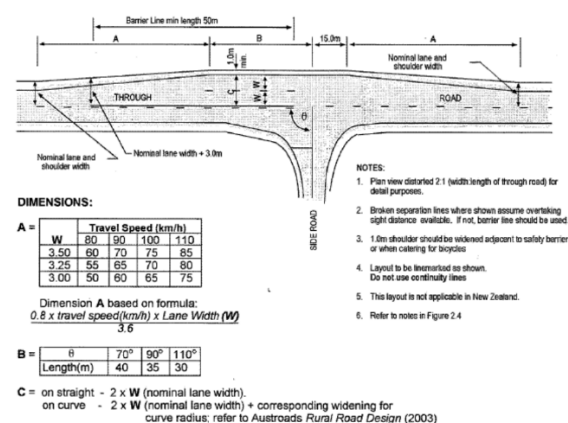
Turn treatment

Description

AUL AUXiliary Left turn treatment is a left turn lane on the major road that allows through vehicles to pass to the right of turning vehicles (*Figure 8.4 of Austroads Guide to Road Design Part 4A*).



AUR In addition to the above, DoT will allow the use of the rural **Auxiliary lane Right** turn treatment (from GTEP Part 5) in lieu of the CHR(s) treatment, (refer Sections 7.5.2 and 7.7.2 of *VicRoads Supplement to AGRD4A*)



A3.3 – IDM rural access requirements

Standard Drawing SD 265, which accompanies the Infrastructure Design Manual (IDM) used by most regional councils in Victoria, should be applied to local road accesses for developments that represent significant traffic generators, particularly those that attract semi-trailer and B-Double use. This layout is shown in Figure 17 below.

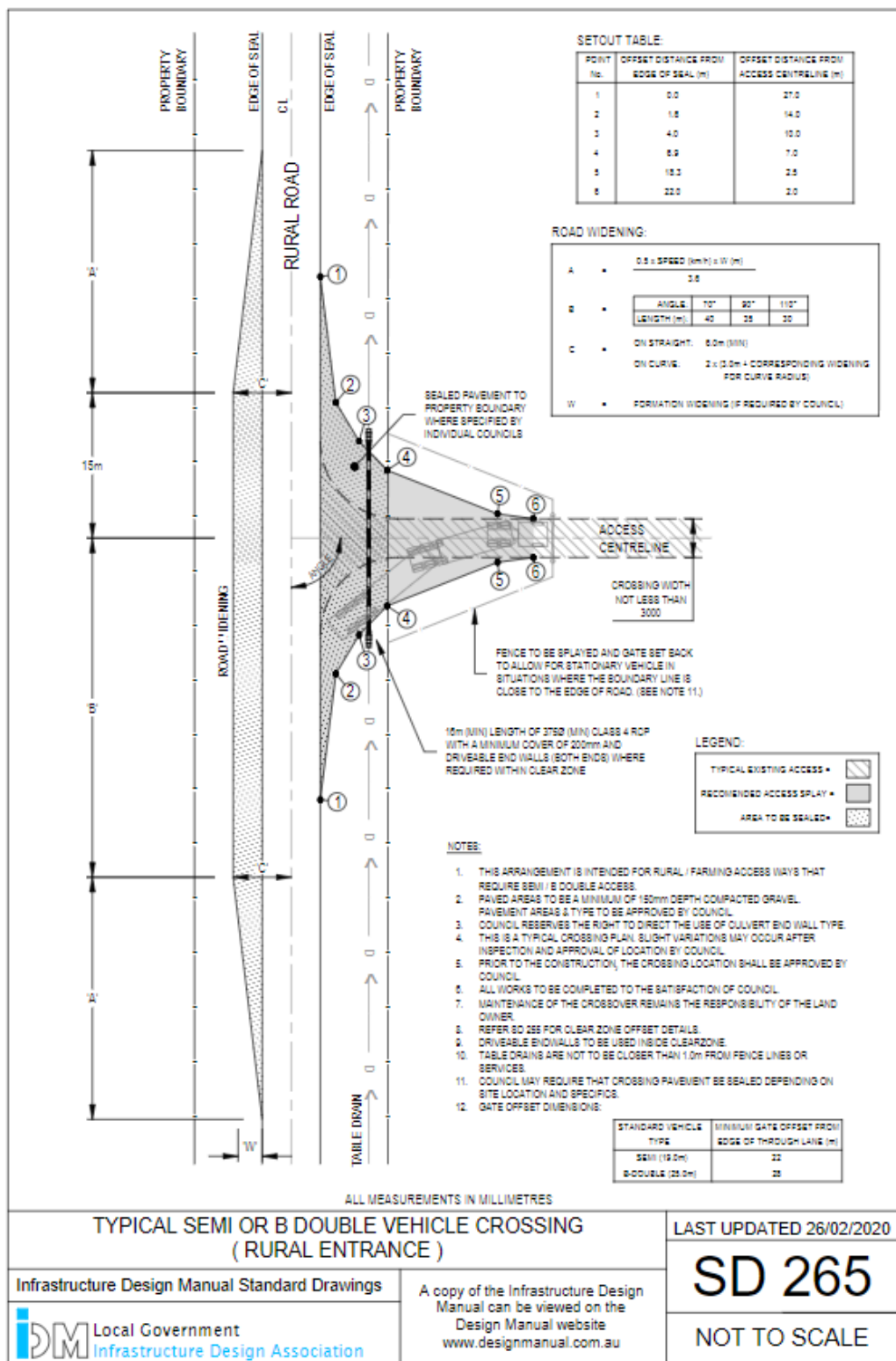


Figure 13: SD 265 from the IDM

Appendix 4 – Acronyms and terms

Acronyms / terms	Definition
AGRD4	Austroads Guide to Road Design Part 4 – Intersections and crossings
AGRD4A	Austroads Guide to Road Design Part 4A – Unsignalised and signalised intersections
AGTM6	Austroads Guide to Traffic Management Part 6 – Intersections, interchanges and crossings management
AGTM8	Austroads Guide to Traffic Management Part 8 – Local street management
AS/NZS2890.1	Australian Standard / New Zealand Standard 2890.1 Parking facilities Part 1: Off-street car parking
DTP	Department of Transport and Planning (formerly VicRoads)
ESD	Entering site distance
PSP	Precinct structure plan
SIDRA	SIDRA intersection – micro analytical traffic engineering software to model the performance of intersections
SISD	safe intersection sight distance
TIA	traffic impact assessment
vpd	vehicles per day
vph	vehicles per hour
VPA	Victorian Planning Authority

Appendix J. Dairy Effluent Assessment

~ Commercial-in-Confidence ~

Effluent Management and Reuse Assessment

Dairy Expansion, Gunyah Park, Blighty, NSW

Report Number 24675.114801.0



Prepared for

Yurunga Farms Partnership

18214 Riverina Highway
BLIGHTY, NSW 2713
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Client: Yurunga Farms Partnership

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		<div><div> Ian Johnston</div><div></div><div></div><div></div></div>			
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Executive Summary

Yurunga Farms Partnership (YFP) has operated a pasture based dairy at 'Gunyah Park' (18214 Riverina Highway, Blighty NSW) since 2005. The YFP business is seeking to expand their existing dairy milking capacity to 2,000 milking cows.

The proposed dairy expansion requires a new rotary dairy to support the increased milking production. The new milking centre operations will generate dairy effluent waste of approximately 30 ML/year.

A site assessment was undertaken by EnviroAg Australia Pty Limited (EnviroAg) from 28th October to 1st November 2024. All effluent from the current milking operations is being directed to the existing sediment pond.

Best practice effluent management is through the use of a solids separation and a two-pond system. The objectives of this type of systems are to:

- (i) Quickly remove as much sediment as possible from the waste stream. To not do so will result in rapid sedimentation of the primary pond;
- (ii) Have a settling system that uses gravity and that is easy to clean with machinery on site;
- (iii) Have a primary pond that is easy to clean; and,
- (iv) Have a two pond system so wastewater can be accumulated and stored in the secondary pond pending reuse by irrigation.

The most effective approach in managing effluent generation from the new milking centre is as follows;

- (i) Manage the milking parlour effluent in one catchment (Catchment A: System 1 – Milking Effluent). This will be separate the parlour waste stream from other rainfall-runoff catchments in the property, being:
 - a. wastewater to be generated from the dry lot areas;
 - b. tailwaters to be generated from effluent irrigation/reuse system; and,
 - c. clean stormwater.
- (ii) Include an appropriate solids separation system to reduce total solids (TS) loads from the dairy effluent;
- (iii) Include a concrete sump system to allow for collection of effluent to be recycled as organic fertiliser on pasture areas; and,
- (iv) Utilise existing effluent storage and reuse systems and expand according to the increased wastewater generation.

The proposed changes have the potential to significantly improve herd management, waste management, irrigation production, nutrient recovery and reuse at the site.

EnviroAg recommends the following for effluent management in Catchment A:

- (a) Install a trafficable solids trap so that solids can be captured easily and be reused beneficially, and to reduce the rate of solids build up in the primary pond; and,
- (b) Construct a drain that connects the concrete sump to the existing sediment pond.

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1. Introduction

Yurunga Farms Partnership (YFP) has operated a pasture based dairy at 'Gunyah Park' (18214 Riverina Highway, Blighty NSW) since 2005. The YFP business is seeking to expand their existing dairy milking capacity to 2,000 milking cows.

The proposed dairy expansion requires a new rotary dairy to support the increased milking production. The new milking centre operations will generate dairy effluent waste of approximately 30 ML/year.

This report aims to estimate effluent generation in the milking centre, and determine the appropriate effluent system design and management in accordance with appropriate Australian dairy guidelines.

The proponent details are outlined in Table 1.

Table 1 Dairy Farm Operation Details

Item	Details
Trading Name:	Yurunga Farms Partnership
Contact Name:	Lachlan Marshall
Phone:	0419667053
Address:	18214 Riverina Highway BLIGHTY NSW 2713
Dairy Lot and Plan:	'Gunyah Park' – 87 DP756251
Property Size (ha):	202 ha
Local Government Area:	Edward River Council
Annual Average Rainfall (mm):	409
Site Slope:	<2%
Nearest Watercourse:	MIL Irrigation Channels
Current Herd Size (Milking Cows):	1,000
Milk Yield (L):	12,000,000
Production System:	Rotary Dairy

2. Advisory Notes

2.1 Assessment Role

The role of this assessment is to provide preliminary advice to Yurunga Farms Partnership in regards to the appropriate management of effluent waste from the milking operations.

The assessment includes design calculations based on client supplied information and best practice management in Australian dairy.

The following guidelines were considered for the effluent system design:

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024); and,
- *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016).

It must be noted that the calculations in this report define a size of a potential workable system and not the final design of a system.

Engineering design of an agricultural waste system should follow a process of:

- (i) Initial site assessment (this assessment) that defines the issues and opportunities;
- (ii) Survey (measurement and quantification) of the site and systems;
- (iii) Government approvals (a check must be made to see if they are required; and an application made if required);
- (iv) Detailed engineering design; and,
- (v) Construction.

This document and its calculations do not fulfil the continuing requirements of the next steps of the process. It is recommended that with receipt of this assessment, the proponent of the dairy assesses the business benefits (cost and returns) and then proceeds with the next steps of the development process.

2.2 Quality Data

Data used in this report have been obtained through discussions with Yurunga Farms Partnership (YFP). Where information is not available, missing, or considered erroneous, default data have been used. Default data have been sought from referable publications.

2.3 Design and Construction

Wastewater systems contain high strength effluent wastes, and may have potential negative impacts to the environment in the event of failure. It is strongly recommended that the producer obtains a comprehensive design advice on their wastewater systems. It is recommended that geotechnical assessments are undertaken, including soil testing, for all the proposed wastewater storages.

Wastewater systems ought to be designed by a suitably qualified engineer. Construction must be undertaken by a company with appropriate accreditation for building effluent systems.

3. Site Assessment

3.1 Assessment Date

A site assessment was undertaken by EnviroAg Australia from 28th October to 1st November 2024.

3.2 Existing Milking Parlour

The existing milking parlour, effluent storage and effluent reuse systems are show in Figure 1.

The milking parlour is a single rotary system with sufficient capacity to accommodate 1,000 milking cows. The dairy is relatively old (built in the 1980's). The location is flat with less than 2% slope.

The holding yard area is concreted. Milking parlour drainage is towards the west, where the existing wastewater ponds are located.

Existing effluent management (storage and reuse) are discussed further in corresponding sub-sections.

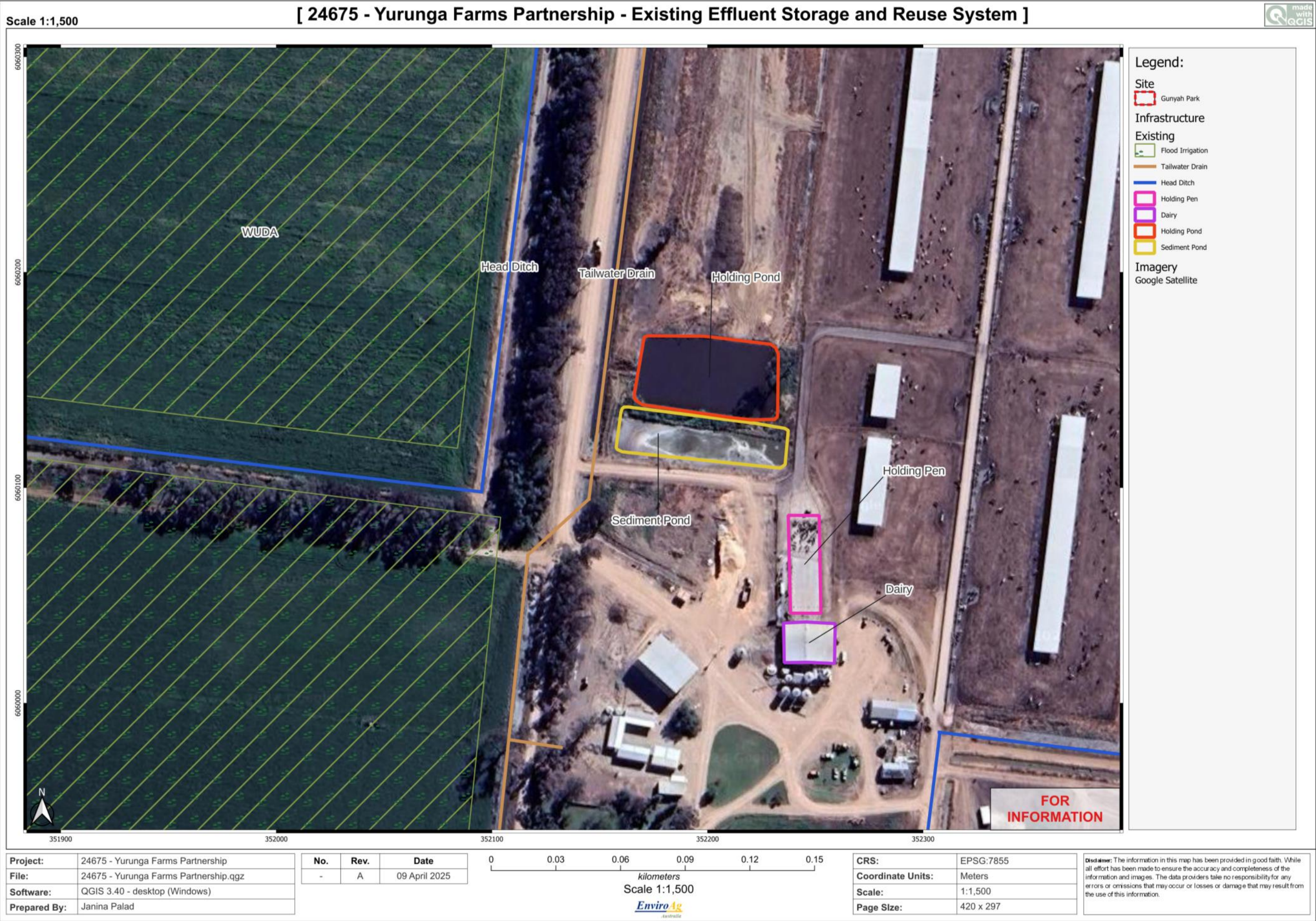


Figure 1 Existing Milking Parlour

3.2.1 Effluent Storage

The current dairy milking system is a traditional rotary system. The concreted handling yard is relatively sized to operate at a capacity of 1,000 milking cows.

The site manages effluent using a two-pond system – a sediment pond and a holding pond. The holding pond is connected to a tailwater drain which is the designated wastewater recycling system for the site.

All effluent from the current milking operations is being directed to the existing sediment pond. Desludging of the sediment pond is being conducted every 60 days using a vacuum tanker. Sludge is applied immediately to cropping areas.

A summary of existing effluent storage system is provided in Table 2.

Table 2 Existing Effluent Storage System

Item	Details
Milk Parlour Type:	Traditional single rotary
Parlour Cleaning System:	Hand wash using hose
Holding Yard Cleaning Method:	Hand wash using hose
Effluent System Inflow:	~30,000 L/Day
Solids Separation Systems	Nil
Primary Pond:	Sediment Pond (~2.6 ML)
Secondary Pond (Final):	Holding Pond (~4.0 ML)
Other:	Recycling System (Tailwater Drain, ~14 ML)

3.2.2 Effluent Reuse

The property is surrounded by Murray Irrigation Limited (MIL) water supply channels. It has existing flood irrigable areas of approximately 194 ha. Soils on the cropping areas are classified as Sodosols. They are reasonably structured and with adequate nutrient levels.

YFP has sufficient MIL water access entitlement to support its current crop irrigation requirements. The site has an existing irrigation and drainage system that allows effective stormwater management within the property.

The system includes water infrastructure, including head ditches, culverts, and recycling system (tailwater drains). The recycling system is connected to the holding pond to receive effluent when necessary. It is also connected to the head ditch for flood irrigation supply to the cropping areas (waste utilisation disposal areas). The recycling system manages the shandying of effluent with clean water prior to irrigation.

A summary of existing effluent reuse system is provided in Table 3.

Table 3 Existing Effluent Reuse System

Item	Details
Total Irrigation Area:	~194 ha
Effluent Reuse Area:	~194 ha
Pasture/Crop:	Improved pastures/fodder cropping
Soil Type:	Sodosols that are reasonably structured and maintained in productive form by minimisation of tillage and regular application of organic wastes
Irrigation Available:	Yes – significant clean irrigation water is available
Fertiliser Usage:	Yes
Effluent Applied:	Yes

3.3 Proposed Milking Centre

The proposed YFP dairy expansion includes development of a modern rotary dairy (automated) to accommodate an increased herd size of 2,000 cows, and to improve milking efficiency. The proposed location for the new milking centre is shown in Figure 2.

The new milking centre is to be situated southeast of the existing milking parlour. With the construction of a new milking facility as part of the expansion, the old milking parlour will be decommissioned and repurposed as a veterinary facility.

The floor plan has an L-shaped layout with the robotic milking parlour at the junction point. Holding pens are extending to the north, and the work area, consisting of equipment and employee areas, extends to the east of the rotary milking parlour.

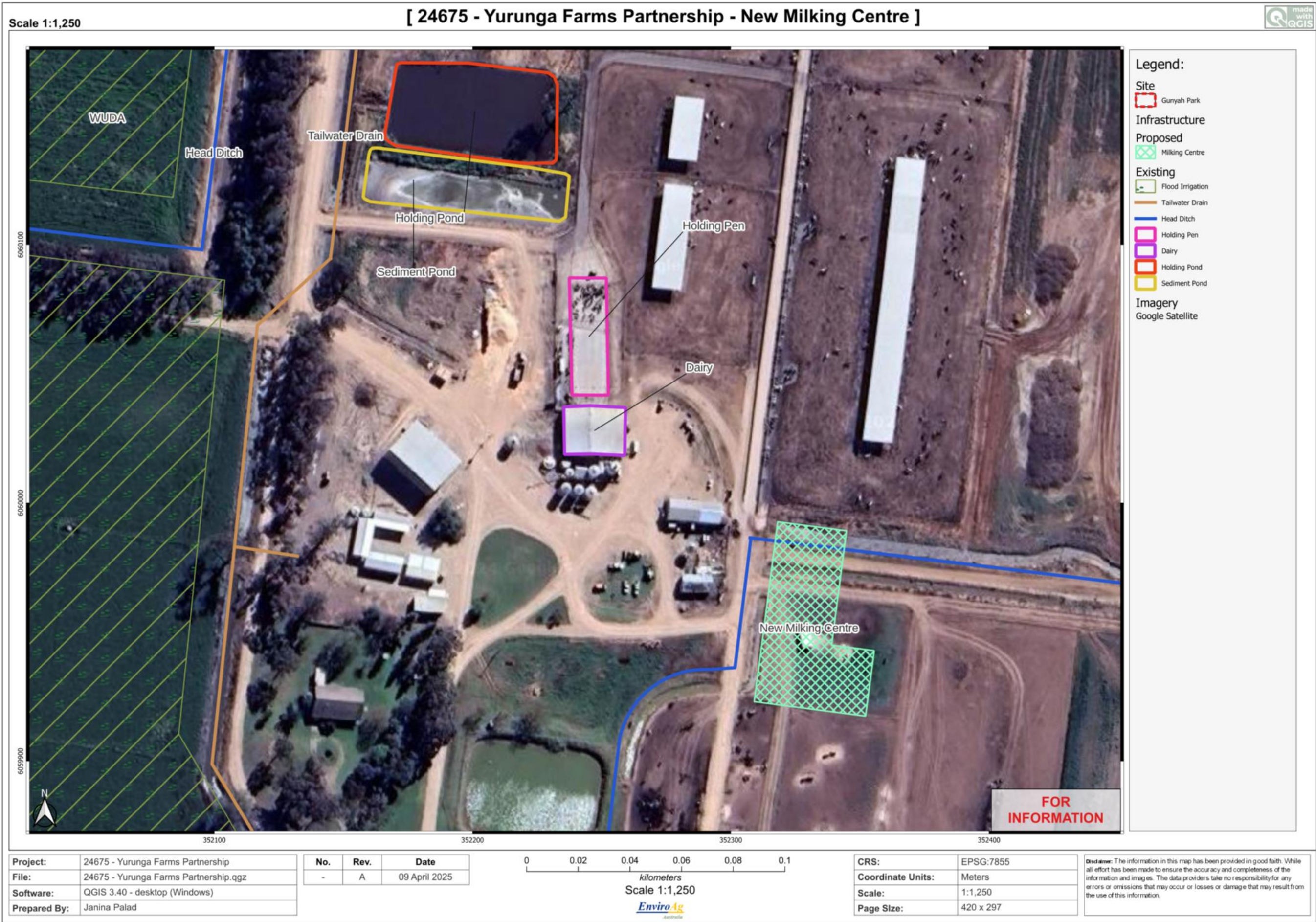


Figure 2 Proposed Milking Centre

4. New Effluent System Design

4.1 Best Practice Waste Management

Dairy wastewaters are a valuable source of nutrients and water. Wastewater is generated daily from:

- Wash down of the milking parlour; and,
- Inflow yard washing.

Generally, these wastewaters are defined by volume and solids content.

4.1.1 Objectives

The objectives of this type of systems are to:

- Quickly remove as much sediment as possible from the waste stream. To not do so will result in rapid sedimentation of the primary pond;
- Have a settling system that uses gravity and that is easy to clean with machinery on site;
- Have a primary pond that is easy to clean;
- Have a two pond system so wastewater can be accumulated and stored in the secondary pond pending reuse by irrigation.

4.1.2 Typical Design

A schematic layout for a wastewater system is shown in Figure 3. The size of each component is based on the size of the dairy herd, the area of each facility and the amount of wastewater generated. Rainfall and evaporation affects the water balance of the system.

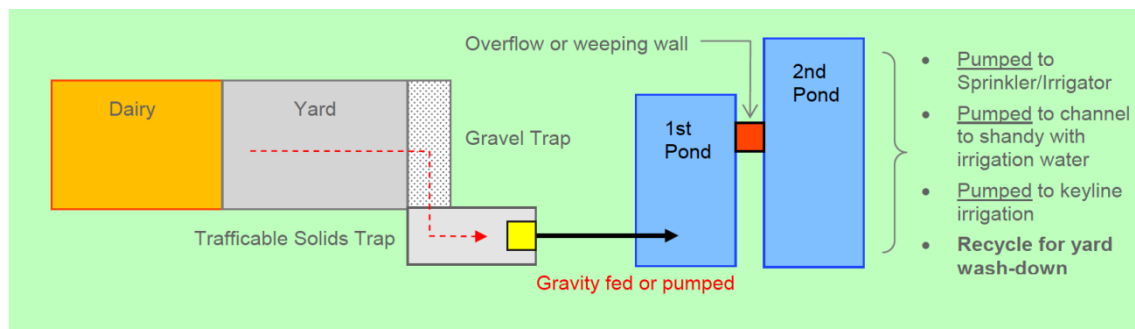


Figure 3 Typical Effluent System

Trafficable Solids Trap

The trafficable solids trap must be able to accept the peak flow of any flood wash or wash down and then slow the flow and allow solids to settle out. For this reason the storage must have a defined capacity and be reasonably shallow and wide.

Primary Pond

The primary pond should be designed to allow digestion of the organic matters contained in runoff leaving the settling systems. The pond must have a designed digestive capacity and allow for sludge build up. The pond should be designed so that it is easy to clean with an excavator.

Secondary Pond

The purpose of the secondary pond is to hold wastewaters pending their use for irrigation.

4.1.3 Wastewater Management

Intensive dairy operations can be designed so their entire catchment can be controlled and contained, with all wastewater and rainfall runoff water captured. This can be integrated into the two pond systems that would otherwise be designed for the dairy proper.

4.1.4 Wastewater Recycling

Effluent can be recycled and utilised for yard washing or irrigation.

Effluent reuse by irrigation is an accepted practice and is included in NSW EPA environmental guidelines as *Use of Effluent by Irrigation* (Department of Environment and Conservation (NSW), 2004).

Tailwater and stormwater runoff controls for the site must be in place to capture contaminated medium and high strength wastewater from flood irrigation areas. It is recommended that this runoff is reused to reduce nutrient loads entering clean water catchments, streams and rivers.

4.2 Proposed System

The most effective approaches in managing effluent generation from the new milking centre are as follows:

- (v) Manage the milking parlour effluent in one catchment (Catchment A: System 1 – Milking Effluent). This will be separate from other rainfall-runoff catchments in the property, being:
 - a. wastewater to be generated from the dry lot areas;
 - b. tailwaters to be generated from effluent irrigation/reuse system; and,
 - c. clean stormwater.
- (vi) Include an appropriate solids separation system to reduce total solids (TS) loads from the dairy effluent;
- (vii) Include a concrete sump system to allow for collection of effluent to be recycled for applicable usage in the milking centre operations; and,
- (viii) Utilise existing effluent storage and reuse systems and expand according to the increased wastewater generation.

Calculations to determine viable specifications for the proposed systems were undertaken using the *Effluent Toolkit* v11.6 (McDowell & Birchall, 2016). Details of key inputs and outputs from the toolkit are presented in Appendix A.

4.2.1 Solids Separation System

It is proposed that a solids separation system is installed to reduce TS loads from effluent, separate solids, and recollect liquids for yard washing.

4.2.2 Trafficable Solids Trap and Sump

A typical trafficable solids trap is shown in Figure 4. It is the preferred method to trap solids in operations that use flood washing of yards. It filters out the coarse solids and debris within the effluent (about 50% TS loads). The material collected in the trap can then be cleaned out with a front-end loader or rear scraper.

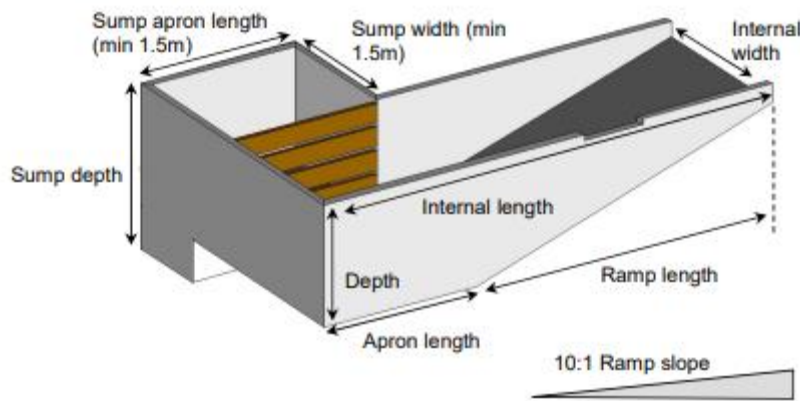


Figure 4 Trafficable Trap

The proposed trafficable solids trap and sump system design for YFP dairy is detailed in Appendix A. It is designed to contain an effective available volume of 87,750 L. This allows for:

- solids cleaning interval of 7 days; and,
- liquid storage sufficient for each yard washing inflow.

The trafficable system is connected to a circular sump, as detailed in Appendix A. It is a circular concrete sump designed to contain an effective available volume of 57,020 L. This allows for storing recycled effluent water that can support yard washing operations for 2 days.

Excess effluent is to be gravity fed into the existing ponding system.

4.2.3 Existing Effluent Ponds

Existing effluent ponds on site are to be utilised in order to manage the milking parlour effluent.

Per the calculations undertaken using the *Effluent Toolkit* v11.6 (McDowell & Birchall, 2016), and detailed in Appendix A, the minimum pond capacities required for a two pond system are:

- Sediment/Solids Pond = 1.70 ML
- Holding/2nd Pond = 8.65 ML

The site has an existing sediment pond and holding pond.

The sediment pond has a capacity of approximately 2 ML, which exceeds the minimum required capacity by 0.3 ML. Desludging must be done at every 2 to 3 months using a vacuum tanker.

The holding pond has a capacity of approximately 5 ML, which is less than the minimum required capacity by 8.65 ML. However, it also connects to the site's existing recycling system, which increases the holding capacity, and allows for easy effluent management and reuse.

4.2.4 Existing Recycling System

The site has an existing tailwater drain system, acting as a wastewater recycling system, capturing tailwater and moving it around the site for reuse. While not modelled, as a two pond approach was chosen, the tailwater drain is effectively a 3rd pond.

The tailwater drain recycling system has a total capacity of 42.0 ML.

Effluent is shandied with clean water to achieve sufficient irrigation water requirements and is fed into head ditches to flood irrigate the WUDA. The recycling system allows excess flood irrigation tailwaters to drain back into the system.

4.2.5 WUDA Expansion

Nutrient budget assessment for the application of both effluent and solids, and just solids was undertaken (EnviroAg Australia Pty Ltd, 2021). The resultant net position of each application method is summarised in Table 4 below.

Table 4 Waste Nutrient Budget

Type of Waste	Net Position of Nutrient (kg/ha/yr)			
	N	P	K	Na
Effluent and Solid Waste	93.5	81.5	524.5	547.6
Solid Waste	-154.8	20.8	-105.1	171.7

The nutrient budget for effluent and solid waste application shows that:

- Cropping areas are generally overloaded on annual basis with excess N, P, K. Na from application of solid and liquid wastes;
- Greater uptake of P and K is expected by plant luxuriant uptake; and,
- Due to high excess amount of K and Na, the health of the soil will be directly related to management of sodium (to prevent a salt build up) and potassium.

The nutrient budget for solid waste application shows that:

- Cropping system is N and K deficit. The irrigable area will require application of inorganic fertilisers to sustain maximum dry matter production; and,
- There is an excess of P and Na. Use of ameliorants is recommended to displace Na and then push it below the root zone (RZ) via leaching.

To address deficits and excess and in particular sodicity and salinity, in the medium to long term, it is recommended to:

- Expand the size of WUDA areas;
- Sell some manure and sludge off site; and,
- Use ameliorants to displace sodium to allow them to be mobilised downwards and below the root zone (RZ) (that is to an allowable leaching fraction and process).

5. Conclusion

5.1 Summary

Table 5 provides summary details of proposed effluent management and reuse system. Implementation of these changes, through amendments to the existing system, will work towards achieving dairy best practices.

Table 5 Summary of New Effluent System Design

Item	Details
Herd Size (Milking Cows):	2,000
Milk Yield (L):	24,000,000
Yard Cleaning Method:	Flood Wash System
Annual Effluent Generation (ML):	~30
Annual Recycled Effluent (for yard washing) (ML):	~10
Annual Recycled Effluent (for irrigation) (ML):	~20
Effluent Irrigation Area (ha):	~194
Pasture/Crop:	Improved pastures/fodder cropping
Soil Type:	Sodosols
Irrigation Available:	Yes
Fertiliser Usage:	Yes
Effluent Applied:	Yes, shandied as required with clean water

5.2 Benefits

The proposed changes have the potential to significantly improve herd management, waste management, irrigation production, nutrient recovery and reuse at the site.

Specifically, the proposed changes will deliver the following benefits:

- (a) The trafficable solids trap will:
 - Allow capture of solids close to their source and their reuse; and,
 - Reduce solids loads on downstream wastewater systems.
- (b) The use of existing sediment pond and holding pond will:
 - Allow effective capture of fine solids not caught by the solids trap;
 - Allow wastewaters to be held for irrigation;
 - Allow beneficial reuse of nutrient; and,
 - Reduce nutrient loads to clean water catchments, streams and rivers.
- (c) The existing flood irrigation system to the existing irrigable area will:
 - Allow utilisation of wastewaters and nutrients; and,
 - Return nutrients in crop and fodder beneficially.
- (d) The existing tailwater recycling system will:
 - Allow capture and reuse of contaminated agricultural runoff; and,
 - Reduce nutrients leaving the property and entering clean water catchments, streams and rivers.

5.3 Recommendation

EnviroAg recommends the following for effluent management in Catchment A:

- (c) Install a trafficable solids trap so that solids can be captured easily and be reused beneficially, and to reduce the rate of solids build up in the primary pond; and,
- (d) Construct a drain that connects the concrete sump to the existing sediment pond.

6. References

- Animal Health Australia. (2016). *Australian Animal Welfare Standards and Guidelines for Cattle* (Edition 1). Animal Health Council Australia.
- Dairy Australia. (2024). *National Guidelines for Dairy Feedpads and Contained Housing* (3rd ed.). Dairy Australia. <https://www.dairyaustralia.com.au/feeding-and-farm-systems/farm-systems/national-feedpad-contained-housing-guidelines>
- Department of Environment and Conservation (NSW). (2004). *Use of Effluent By Irrigation*. Department of Environment and Conservation (NSW). <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/epa/effguide.pdf>
- EnviroAg Australia Pty Ltd. (2021). *Dairy Expansion, Gunyah Park, Blighty, NSW* (Dry Lot Hydrological Assessment No. 24675.113196.0). EnviroAg Australia Pty Ltd, Armidale, NSW.
- McDowell, A., & Birchall, S. (2016). *Effluent Toolkit* (Version 11.6) [Microsoft Excel].

7. Appendices

Appendix A. Design Calculations

A-1

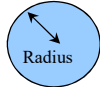
Appendix A. Design Calculations

Effluent Toolkit - Data Entry Sheet

04-April-2025

Fill in all sections before continuing (fill in yellow cells)

Name: **Yurunga**

Herd details <table border="1"> <tr><td>Current herd size</td><td>1000</td></tr> <tr><td>Proposed max herd size</td><td>2000</td></tr> <tr><td>Current annual milk sales (L)</td><td>13,320,000</td></tr> <tr><td>Average time on yards (hrs/day)</td><td>4</td></tr> <tr><td>Days herd dry during storage period</td><td></td></tr> <tr><td>Calving pattern</td><td>Year round</td></tr> <tr><td>Milkings per day</td><td>3 times a day</td></tr> <tr><td>Dairy type</td><td>rotary</td></tr> <tr><td>Estimated waste & calf milk (L)</td><td>199,800</td></tr> <tr><td>Production per cow</td><td>37 L/day</td></tr> </table>		Current herd size	1000	Proposed max herd size	2000	Current annual milk sales (L)	13,320,000	Average time on yards (hrs/day)	4	Days herd dry during storage period		Calving pattern	Year round	Milkings per day	3 times a day	Dairy type	rotary	Estimated waste & calf milk (L)	199,800	Production per cow	37 L/day	Location and Storage details <table border="1"> <tr><td>Region</td><td>NSW Sth of Sydney</td></tr> <tr><td>closest rainfall</td><td>Deniliquin</td></tr> <tr><td>closest evaporation</td><td>Deniliquin</td></tr> <tr><td>Storage period</td><td>Recommended</td></tr> </table> Recommended storage months <table border="1"> <tr><td>May</td><td>Jun</td><td>Jul</td></tr> </table>		Region	NSW Sth of Sydney	closest rainfall	Deniliquin	closest evaporation	Deniliquin	Storage period	Recommended	May	Jun	Jul																																															
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Median daily water use in Victorian dairy sheds (litres) <div style="float: right;">75th percentile water use for herd size and dairy type (L) 66,900</div> <table border="1"> <thead> <tr> <th rowspan="2">Dairy type</th> <th colspan="10">Herd size</th> </tr> <tr> <th>0-100</th> <th>101-200</th> <th>201-300</th> <th>301-400</th> <th>401-500</th> <th>501-600</th> <th>601-700</th> <th>701-800</th> <th>801-900</th> <th>>900</th> </tr> </thead> <tbody> <tr><td>double-up</td><td>3,530</td><td>4,430</td><td>8,000</td><td>10,000</td><td>22,800</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>swingover</td><td>2,400</td><td>5,400</td><td>8,232</td><td>12,720</td><td>12,200</td><td>30,560</td><td></td><td></td><td></td><td></td></tr> <tr><td>rotary</td><td></td><td>9,000</td><td>14,000</td><td>19,535</td><td>21,063</td><td>22,500</td><td>20,000</td><td>40,300</td><td>40,000</td><td>42,400</td></tr> </tbody> </table>				Dairy type	Herd size										0-100	101-200	201-300	301-400	401-500	501-600	601-700	701-800	801-900	>900	double-up	3,530	4,430	8,000	10,000	22,800						swingover	2,400	5,400	8,232	12,720	12,200	30,560					rotary		9,000	14,000	19,535	21,063	22,500	20,000	40,300	40,000	42,400																								
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Trafficable solids trap sizing

This section sizes the trafficable area of the solids trap only. To size the sump at the side of the trap, use the sump sizing section above.

Trafficable trap

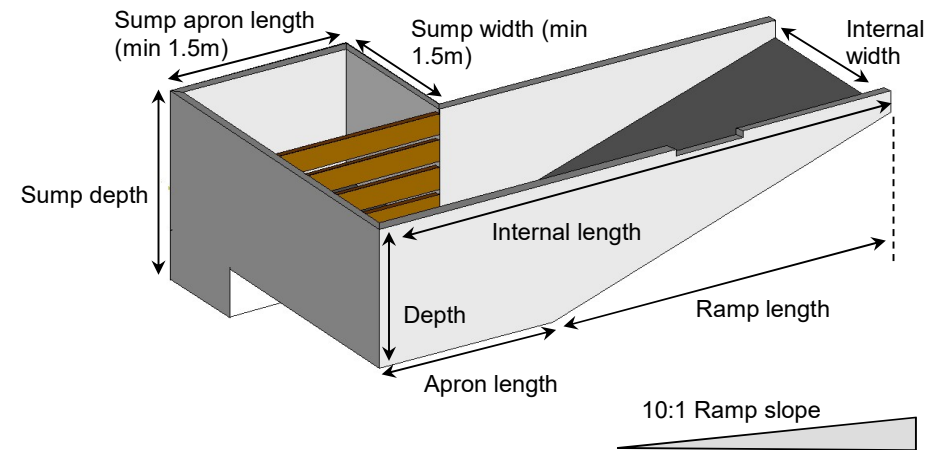
Average cleaning interval 7 days ▼

Effective volume required **82,435** L

Water depth (m)	1.5	Apron length (m)	12.0	m
Freeboard (m)	0.2 ▼	Total depth	1.7	m
Ramp slope	10:1 ▼	Ramp length	17.0	m
Internal width (m)	3 ▼	Internal Length	29.0	m

Effective volume available **87,750** L

All dimensions are internal



Yurunga

08-April-2025

Sump sizing

A sump is included in an effluent system to pump effluent either directly to the paddock or into ponds when it is not possible to gravity feed the ponds. A sump should preferably be sized to hold 2 to 3 days effluent to allow time for repairs when the pump breaks down.

Yurunga
04-April-2025

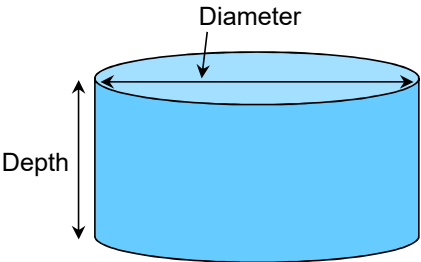
Days storage in sump 2 days

Effective sump volume required 54,800 L

Effective volume available in trafficable trap L

Effective volume needed in sump area 54,800 L

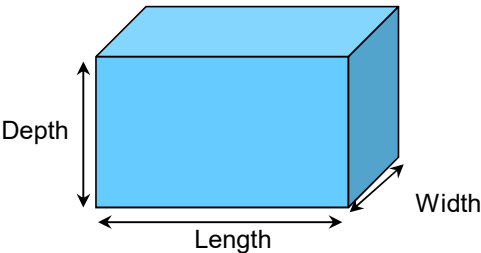
Circular sump



Inside diameter (m)	5.5
Total depth (m)	3
Freeboard (m)	0.3
Residual depth (m)	0.3
Water depth (m)	2.4

Effective volume available (L) 57,020

Rectangular sump



Inside length (m)	5
Inside width (m)	5
Total depth (m)	3
Freeboard (m)	0.3
Residual depth (m)	0.3
Water depth (m)	2.4

Effective volume available (L) 60,000

Pond Sizing

Yurunga

24-April-2025

Use this page to to size new ponds or to determine if your current system is adequate for your needs

Fill in all yellow cells, review all drop down box options, complete solids pond first

Total water use	33,460	L/day
Total catchment area	29861	m ²
Storage period	3	months
Location	Deniliquin	

Solids Pond

Type of solids pond Sedimentation pond

Desludge period 0.2 Years

Min. depth to sludge 0.3

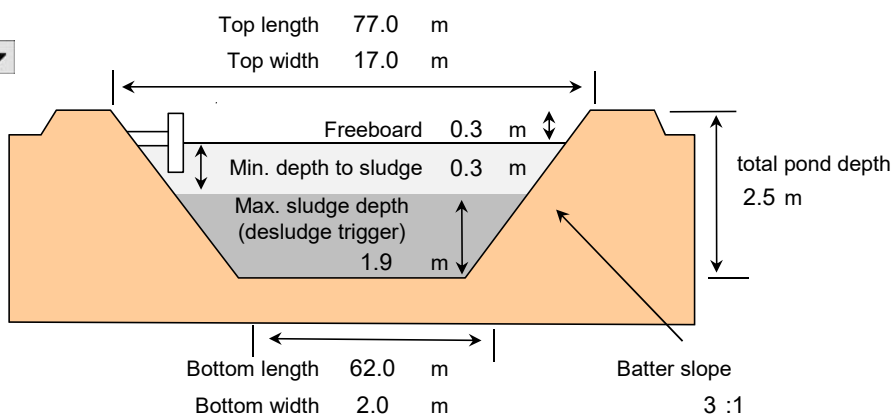
Freeboard (m) 0.3

Internal batter 3 :1

Top length (m) 77

Top width (m) 17

Total depth (m) 2.5



Effective volume (sludge accumulation) required 0.65 ML

Effective volume (sludge accumulation) available 1.01 ML

Total pond capacity 1.70 ML

2nd pond

Used for storage

Freeboard (m) 0.3

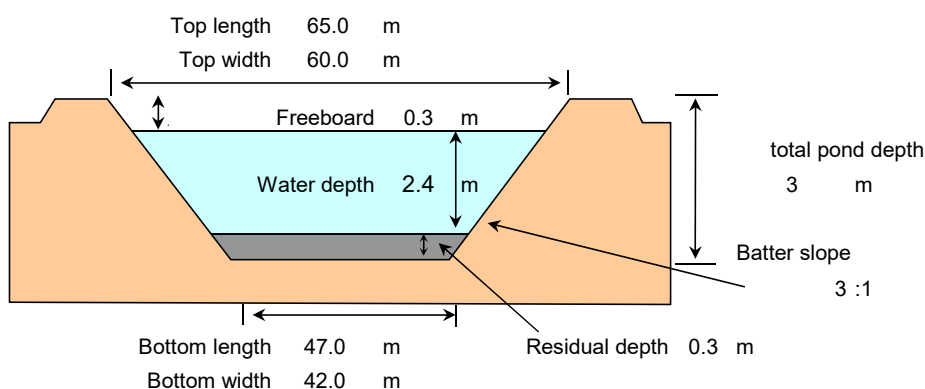
Internal batter 3 :1

Residual depth (m) 0.3

Top length (m) 65

Top width (m) 60

Total depth (m) 3



Effective storage required 6.50 ML

Effective storage available 6.90 ML

Total pond capacity 8.65 ML

Breakdown of storage requirements

Net rain on pond surfaces 0.240 ML

Rainfall catchment 2.265 ML

water use + urine 3.998 ML

total effective storage required 6.504 ML

Freeboard 1.137 ML

Residual volume 0.617 ML

total capacity required 8.257 ML

Appendix K. Dry Lot Hydrological Assessment

Dry Lot Hydrological Assessment

Dairy Expansion, Gunyah Park, Blighty, NSW

Report Number 24675.113196.1



Prepared for

Prepared by

Yurunga Farms Partnership

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Document Status Record



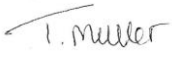


Report Type: Dry Lot Hydrological Assessment

Project Title: Dairy Expansion, Gunyah Park, Blighty, NSW

Client: Yurunga Farms Partnership

Project.Document Number: 24675.113196

File Name: 24675.113196_2500501_YFP_Gunyah Park_Hydrological Assessment_Rev1

Revision	Date of Issue	Author	Reviewed	Quality Assurance	Approved
A	11/04/2025	Reina Cabral Simon Lott	Tracy Muller	Jenni Lott	Simon Lott
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1	01/05/2025	Reina Cabral Simon Lott	Tracy Muller	Peter Pearson	Simon Lott
		 			
		Signatures			

Notes:

Rev 1: Final report

Client

Company

Distribution:**Recipient****No. Copies**

Yurunga Farms Partnership

1

EnviroAg Australia

1

This document provides information to address the intent of Project Number 24675 as agreed to by Yurunga Farms Partnership.

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Executive Summary

The proposed expansion of the ‘Yurunga’ Dairy will increase its milking herd from 1,000 to 2,000 cows.

As part of the dairy expansion, a new milking parlour will be constructed. The water supply and wastewater management system for the parlour and its holding areas is separate from those of the feeding areas.

Thus, two (2) distinct wastewater systems will be implemented:

1. Catchment A: System 1 - milking parlour and holding yard; and,
2. Catchment B: System 2 – open feedpad(s) (wet and dry lots).

Wastewaters are recycled back in the cleaning process as part of System 1.

The feedpads are sloped to shed rainfall runoff. Runoff passes down slope to a concrete apron adjacent to the feed manger and then longitudinally to the end of the row. A main drain then accumulates the pad runoff and directs it to a two-pond system (sediment and holding ponds) as part of System 2.

The NSW Environmental Protection Authority (EPA) guidelines (Department of Environment and Conservation (NSW), 2004) for wastewater irrigation specify that high-strength wastewater must be retained in wastewater ponds, with overflow or spill occurring no more frequently than once in 10 years (ARI design storm). The most relevant guidelines for designing runoff control systems for feed pad areas are the National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012).

Dairy Australia provides design tools and guidelines for water management systems for dairy parlour and yard systems. The System 1 has been designed using these tools with the following elements:

- Rotary milking system – 3 milking per day;
- Holding yard – flood washed each milking to sump;
- Agitator / chopper pump to recirculate waste waters for conveyance to screen;
- Run down / belt screen to remove solids;
- Sediment pond;
- Solids recovery from sediment pond (weekly) using vacuum tanker and spreader; and,
- “wastewater irrigation dam” (holding pond) which irrigates to the waste water disposal-utilisation area.

System 2 is defined by rainfall-runoff dynamics (climatic factors). Wastewater accumulated in the wastewater pond will be irrigated onto the designated wastewater utilisation and disposal area (WUDA). The system consists of two ponds, with the final pond serving as the “wastewater irrigation” dam. To ensure compliance with environmental obligations, this dam will be dewatered as soon as practicable after each rainfall event so that head space is available to capture large rainfall-runoff events.

The site has access to significant groundwater and surface water resources. The site formerly operated as an irrigation property and then transitioned to a pastured dairy. The expansion of the dairy operations has intensified land use, incorporating feed pads into the system.

The water balance assessment indicates that:

- (i) Sufficient clean water is available for drinking water for the herd;
- (ii) Surplus water exists to shandy wastewaters for irrigation or to supplement irrigation;
- (iii) Feed pad/dry lot rainfall runoff can be contained and the captured volumes reused on site; and,
- (iv) Tailwaters from the WUDA can be contained and reused on site.

The hydrological assessment shows the site is currently not flooded and is not likely to be flooded in the future. The existing escape channel to the south of the site is not affected by the development.

The hydraulic analysis shows that the drains and wastewater ponds are sufficiently sized to meet the ARI design storm for each catchment.

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1. Introduction

Yurunga Farms Partnership (YFP) has operated a pasture-based dairy at ‘Gunyah Park’ since 2005 (18214 Riverina Highway, Blighty NSW). The original operation supported a herd of 400 cows on irrigated pasture. The YFP business is seeking to expand their existing dairy herd to 4,000 head and transition from a pasture-based system to a fully fed system, where cattle are confined in feed pens.

Uncontrolled runoff from the development has the potential to become contaminated, posing a risk to surface and groundwater quality. Consequently, it is necessary to establish the proposed development within a controlled drainage area (CDA), where runoff from can be safely intercepted and stored in the first case.

While preventing environmental contamination is a priority, the CDA must also be designed to minimise the capture of clean stormwater beyond what is necessary for environmental protection. To this end any uncontaminated stormwater runoff must be diverted away from the CDA to maintain natural hydrological balance.

This report outlines the design principles of runoff control structures of the proposed development.

1.1 Proposed Infrastructure

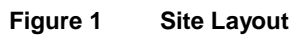
Figure 1 shows the outline of the aggregated property. It has overlays for key land uses.

The land uses can be defined in relation to the intensive operations and their waste reuse, or, general ongoing agricultural use.

Table 1 below shows the land uses and their designated catchments and related wastewater systems. The area of each land use is presented in the catchment plan in Figure 2.

Table 1 Summary of Infrastructure as Separable Catchments

Catchment	Description	Notation
A	Milking parlour and holding yard Feedmill and sheds Sediment Pond A Holding Pond A (Storage Pond)	Yard is flood washed (bound)
B	Milking cows dry lot Dry cows dry lot Calf dry lot Heifer dry lot Cattle yards, silage pit, manure storage area, hard stand Sediment Pond B Holding Pond B Holding Pond C	Stocking density - Hd/48.5 m ² Stocking density - Hd/30.3 m ² Stocking density – Hd/54.5 m ² Stocking density – Hd/50.3 m ²
C	Manure/Compost utilisation and disposal areas Sludge application areas Wastewater irrigation areas (dedicated)	Manure cleaned from pens is accumulated and spread (some manure is retained for bedding) Vacuum tanker takes sediments from sediment ponds direct to paddock Tailwater return to tailwater drain and terminal ponds. (brown water)
D	Fresh water storage dam, irrigation supply and drainage channels Roads, housing, buildings	blue waters





2. Catchment Hydrology

This section sets out the overall water infrastructure planned for the property. Table 1 provides a summary of the catchments and their associated wastewater systems.

Additionally, this section presents the hydrological analysis of the existing and proposed development including:

1. Catchment A: System 1 - milking parlour and holding yard; and,
2. Catchment B: System 2 – open feedpad(s) (wet and dry lots).

2.1 Existing Farm

2.1.1 Water Supply and Drainage Systems

The property is located within the Murray Catchment, which supports extensive floodplains and wetlands. The Murray Irrigation Limited (MIL) channels traverse the property, capturing and storing stormwater runoff.

The farm plan includes channels and drains that direct irrigation drainage into MIL drains (Figure 1). A large freshwater storage is placed at the termination of the main supply channel, allowing water to be lifted and stored for use during periods when MIL supply is curtailed.

Any water leaving the property complies with Murray irrigations drainage policy. There are two (2) discharge points to the Blighty Retreat channel.

2.2 Catchment A: System 1 – Milking Parlour and Yard

A modern rotary dairy system will be constructed to accommodate the increased herd size and enhanced milking efficiency.

Dairy wastewaters are a valuable source of nutrients and water. Wastewater is generated daily from the following practices:

- Wash down of the milking parlour; and,
- Wash down of the inflow yard.

These process-generated wastewaters are primarily defined by their volume and solids content. Heavy reliance is placed on mechanical means to remove solids, such as stirrers and choppers. This opens the system up unnecessarily to a reliance on machines and potential operational disruptions and high maintenance costs. Instead, a gravity-based system with a trafficable sediment basin is preferred. Solids then can be removed on a weekly basis using an existing front-end loader or excavator.

A sump is to be included and the effluent captured will be used for yard washing. Excess runoff from the sump will be gravity-fed into the sediment pond and subsequently into the holding pond. The development will utilise the existing ponds for wastewater storage, with the following capacities:

- Sediment Pond (~ 2.6 ML)
 - Captures and settles solid contaminants from catchment runoff.
- Holding (Storage) Pond (~ 4.0 ML)
 - Connected to the sediment pond and stores wastewater from milking operations and other activities from its catchment. Holds water for reuse.
- Tailwater Drain (~ 4.0 ML)
 - Captures excessive water from the holding pond for reuse.

The result of the hydraulic assessment using the Effluent Toolkit shows that the capacities of the existing water storages are sufficient to accommodate runoff from this catchment. Refer to Dairy Assessment Report (Report No. 24675.114801).

2.3 Catchment B: System 2 – Dry Lot

The confined feeding yards consist of wet lots (milking cows) and dry lots (dry cows, and heifer grow-out yards).

Based on the hazards and risks associated with the movement of potential surface water pollutants into the general environment, a dry lot catchment is normally considered to consist of four functional components:

1. Support land uses – includes access roads, hardstands and buildings.
2. Production pens – includes feeding and loafing areas.
3. Ancillary facilities – includes infrastructure and services supporting the dry lot.
4. Waste utilisation and disposal area – designed for effluent and manure application area.

The risk management measures implemented in each of these areas will be commensurate to site conditions and land-use practices. This ensures the hazard mitigation is appropriate to the level of risk associated with each component.

2.3.1 Runoff Control Structures

The design of runoff control structures for Catchment B is attached in Appendix A of this report.

2.3.2 Pen Drains

Runoff from the dry lot pen area is to be captured by a drain situated at the lower end of the pens. The pen drains are designed to contain runoff volume while maintaining flow velocities that prevent channel erosion. This is based on a design storm having an average recurrence interval (ARI) of 20 years (MLA, 2012). The maximum allowable flow velocity in channels is dependent on the characteristics of the material lining the channel.

2.3.3 Sediment Pond

The aim of sedimentation system design is to provide flow velocities in the system low enough to allow for the settling of a minimum of 50% of the solids entrained in the CDA runoff in a design storm also having an ARI of 20 years (MLA, 2012). This level of sedimentation typically occurs when flow velocities are less than 0.005 m/s (Lott & Skerman, 1995). A performance standard requiring the settling of more than 50% of the entrained solids would require an exponential increase in detention time within the sedimentation system (as well as a correspondingly lower flow velocity) and therefore is generally impracticable and inefficient.

The minimum required volume to comply with the storm design criteria is 7.5 ML.

2.3.4 Wastewater Storage Pond

The principal design function of storage ponds is to store dry lot runoff until such time (i.e. retention time) as the pond effluent can be safely used for irrigation on a designated WUDA.

The FSIM model was used to simulate the hydrological performance of the 'Gunyah' dry lot catchment including the holding pond and WUDA.

The optimum capacity for the holding pond required to meet the design criterion – limiting the overflow to a frequency of less than once in 10 years - is 60 ML.

The development will utilise the existing holding pond (Holding Pond B), as shown in Figure 1. Holding Pond B has a capacity of 10 ML. An additional holding pond C will be constructed to a capacity of 63 ML.

2.4 Catchment C: Waste Utilisation and Disposal Areas

2.4.1 Effluent Application Area

The runoff from the CDA captured in the holding pond is to be irrigated on a designated WUDA within the property, where the nutrients and water can be utilised in plant production. Irrigation areas are shown in Figure 1, above, and Table 2, below. There are two types of irrigators proposed: flood and centre pivot irrigators.

The sustainable use of the WUDAs directly relates to:

- the amount of nutrients applied;
- the amount of nutrients recovered in harvested or removed produce from the area; and,
- the amount of nutrients able to be safely stored in the soil.

Some loss of nutrients (and salts) from the system will occur by way of leachate moving below the root zone of the crops and through processes such as erosive soil loss. However, such losses of nutrients and salts should not impact on the environmental value of any associated surface or groundwater resources.

The use of a source of “fresh” or “clean” irrigation water to supplement the applied wastewater will be necessary to help maximise crop yields and nutrient removal from the WUDA. The amount and timing of both wastewater and fresh water applications will be largely determined by the irrigation requirement of the crops.

Table 2 Yurunga Wastewater Irrigation Areas

Irrigation	Area (ha)	Crop
Pivot 1	50.0	Maize, Barley, Wheat, Triticale, Lucerne
Pivot 2	27.4	Maize, Barley, Wheat, Triticale, Lucerne
Flood Irrigation	116.6	Maize, Barley, Wheat, Triticale, Lucerne
Total	194.0	

The water available to the irrigable areas is summarised below in Table 3. Sufficient water is available to support the effluent irrigation areas. The fresh water will provide a leaching fraction for management of salinity.

Table 3 Yurunga Irrigation Usage

Water Requirement		Effluent Application		Fresh Application	
Total (ML)	ML/ha	Total (ML)	ML/ha	Total (ML)	ML/ha
2270	11.70	187	1.5	873.10	10.2

2.4.2 Manure Application Area

Manure harvested from the pens and sedimentation pond will be stockpiled and composted on-site. Stockpiled manure is to be applied to cropping areas. The anticipated annual raw manure production is 24,797 tonnes. Manure will be applied to all irrigation areas.

2.4.3 Nutrient Budget

2.4.3.1. Effluent and Solid

A nutrient budget for effluent and/or solid manure application is provided in Table 4. It shows the inputs and outputs for the proposed irrigation area, given the proposed wastewater and manure application rate and estimated crop production.

Table 4 Nutrient Budget (Effluent and Solid)

Nutrient	Unit Rate	Amount	N (Kg/ha)	P (Kg/ha)	K (Kg/ha)	Na (Kg/ha)
Inputs						
Fertiliser	Kg/ha/yr	200	92	0	0	0
Manure, screenings, solids	T(DM)/ha/yr	22.4	381.4	121.1	358.9	188.4
Dairy (Parlour) - Catchment A	ML/ha/yr	1.5	103.5	34.5	165.0	240.0
Dry Lot Holding Pond – Catchment B	ML/ha/yr	1.5	144.3	24.0	450.0	112.5
Sludge	ML/ha/yr	0.5	1.5	2.3	3.0	1.5
Shandy water	ML/ha/yr	1	0.1	0.0	7.5	1.5
Rainfall	ML/ha/yr	4.08	0.4	0	4.1	20.4
Total			723.2	181.9	988.5	564.3
Outputs						
Crop Harvest	T/ha/yr	17	391	45.9	459	17
Leaching	mm/yr	10	1	0.001	5	15
Rainfall-runoff	mm/yr	20.4	.204	0	0	0
Volatilisation	%	50	237.4	0	0	0
Sorption	(kg/ha/yr)		0	54.5	0	0
Total			629.6	100.4	464.0	16.7
Net Position	(kg/ha/yr)		93.5	81.5	524.5	547.6

The leaching fraction is estimated to be approximately 10mm/year (average). It will take considerable time for the sodium to be removed from the profile due to the high clay content and relatively low rainfall. Salinity may pose an issue if the irrigation of waste water is not managed correctly. Freshwater will be required to flush the soil profile in order to manage the sodic soils and potential salinity issues.

Given the leaching fraction; ongoing careful management of potential loss of nitrogen and phosphorus is important. This is best achieved by:

- Frequent moderate applications of irrigation;
- Maintaining an active plant growth;
- Maximising organic matter content to maximise nutrient holding capacity;
- Management of soil meta-metal balances by application of gypsum/lime, and,
- Maximising nutrient recovery by crop harvest.

The nutrient budget in Table 4 shows that the WUDA:

- Is generally overloaded on an annual basis with excess N, P, K, Na from the application of both solid and liquid wastes;
- Greater uptake of P and K is expected, which will be supported by plant luxuriant uptake; and,
- Due to high excess levels of K and Na, soil health will be closely tied to the management of sodium (to prevent a salt build up) and potassium.

The sodium load to the soil on an annual basis is estimated to be 547 kg/ha/year. Excessive sodium loads and an “out of balance” ratio of sodium to other cations will result in sodification of soils and soil structural decline. Salt overloads will cause salinisation that causes reductions in crop productivity.

Importantly, salts are leached downward in the soil profile by fresh water additions (rainfall / irrigation). Generally wet years are responsible for the largest “flushing” events in a soil profile, in addition to the leaching fraction afforded by clean water irrigation. It is expected that the combined inputs of irrigation and rainfall at Yurunga will assist in management of gross salt load by leaching fraction.

To address sodicity and salinity, in the medium to long term, it is recommended to:

- Expand the size of WUDAs;
- Sell manures and sludge off site; and,
- Use ameliorants to displace sodium, then push it to below the root zone and leach it out.

2.4.3.2. Solids Only

The nutrient budget for manure solid application rate is set out in Table 5 below.

Table 5 Nutrient Budget (Solid only)

Nutrient	Unit Rate	Amount	N (Kg/ha)	P (Kg/ha)	K (Kg/ha)	Na (Kg/ha)
Inputs						
Fertiliser	Kg/ha/yr	200	92	0	0	0
Manure, screenings, solids	T(DM)/ha/yr	22.4	381.4	121.1	358.9	188.4
Total			474.9	121.1	358.9	188.4
Outputs						
Crop Harvest	T/ha/yr	17	391	45.9	459	17
Leaching	mm/yr	10	1	0.001	5	15
Rainfall-runoff	mm/yr	20.4	.204	0	0	0
Volatilisation	%	50	237.4	0	0	0
Sorption	(kg/ha/yr)		0	54.5	0	0
Total			629.6	100.4	464.0	16.7
Net Position	(kg/ha/yr)		-154.8	20.8	-105.1	171.7

The nutrient budget in Table 5 shows that:

1. The system is N and K deficit. The irrigable area will require application of inorganic fertilisers to sustain maximum dry matter production; and,
2. There is an excess of P and Na. Use of ameliorants is recommended to displace Na and then push it to below the root zone and leach it out.

3. Water Balance

The site has access to a significant clean water resource. It has water access licences for groundwater and surface water of 1,150 ML (WAL 13795 and 30478) and 1,396 ML (WAL 1009768), respectively. This clean water will primarily be used for livestock consumption. Surplus water will be used to shandy wastewaters for irrigation or to supplement irrigation.

The estimated recycled water (effluent) generation is 187 ML/year. This is sourced from both the milking parlour and dry lot. Effluent will be used for irrigation and yard washing.

The water balance in Table 6 shows that there is enough water to meet the demand of the proposed expansion.

Table 6 Water Balance

Water Supply	ML/yr	Type
<i>Clean water</i>		
Groundwater	1,150	
Surface Water	1,396	
<i>Effluent</i>	187	
Total Water Supply	2733	
Water Demand		
Stock Consumption	130	Clean
Irrigation	2,270	Clean and/or Effluent
Milking Parlour	12	Clean
Milking Yard Washing	10	Clean and/or Effluent
Feedpad and General Washdown Cleaning	146	Clean and/or Effluent
Feed Centre Operations	0.5	Clean
Total Water Demand	2,558	
Net	175	

4. Conclusion

Yurunga Farms is seeking to expand their existing dairy herd to a total of 4,000 dairy cattle. Two separate wastewater systems are to be used: System 1 for the milking parlour and holding yard and, System 2 for the open feed pad(s) (wet and dry).

All wastewater infrastructure have been adequately designed to capture runoff from their respective catchments. The wastewater will be used for irrigation and managed to ensure it is dewatered as soon as practicable. This is to ensure that adequate head space is maintained to capture large rainfall runoff events in compliance with environmental obligations.

The water balance assessment confirms that there is sufficient clean water available for stock consumption. Surplus water will be used to supplement irrigation and other site demands.

The generated effluent and solid waste, when applied to WUDAs, are expected to overload the soil with nutrients. To manage the excess sodium, it is recommended to use gypsum or lime, expand the WUDA areas and consider selling manure off-site.

5. References

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6. Appendices

Appendix A. Engineering Calculation Sheet (System 2 – Dry Lot)

A-1

Appendix A. Engineering Calculation Sheet (System 2 – Dry Lot)



Calculation No.: 24675_DryLotHydrology

Project No.: 24675

Document No.: 114511

Project Title: Yurunga Dairy Expansion, Blighty, NSW

Client: Yurunga Farms Partnership

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Accuracy Level

- | | | |
|---------|-------------------------------------|---|
| Level 1 | <input checked="" type="checkbox"/> | Approximate: Conceptual or order of magnitude |
| Level 2 | <input type="checkbox"/> | Non Critical: Preliminary sizing or budget estimate |
| Level 3 | <input type="checkbox"/> | Critical: For detail design, purchase or construction |

Revision Status

Revision	Date of Issue	Drafted by	Reviewed by	Approved by	Details of Revision
0	16/04/2025	Reina Cabral	Simon Lott	Simon Lott	Issued for DA application

Signatures

Drafted by	Reviewed by	Quality Assurance	Approved by
Reina Cabral	Simon Lott	Jenni Lott	Simon Lott

1. Introduction

Yurunga Farms Partnership (Yurunga) is seeking to expand the existing 'Gunyah Park' dairy located at 18214 Riverina Highway, Blighty, NSW. The proposed development involves an expansion of the milking cows from 1000 to 2000 heads.

The site is divided into four (4) catchments as presented in Figure 1. This engineering sheet details the hydrology for Catchment B. It describes the characteristics of the dry lot catchment and the design of proposed runoff control structures.

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2. Dry Lot Controlled Drainage Area

The controlled drainage area (CDA) is described as the area in which all wastewaters and runoff are to be controlled, captured and stored. In practical terms, it is the land area between any upslope clean water diversion banks (or in absence the top of the catchment) and the downslope wastewater holding ponds and typically is further delineated by the areal extent of drains catching and conveying dry lot runoff to a holding pond.

The relevant land use areas within the CDA (Catchment B) are shown in Figure 1. The CDA o comprises a catchment with a total area of approximately 38.4 ha.

The drainage structures or runoff control structures within the CDA include the following:

- Catch drains – to capture runoff from the pens. They are designed to carry, at non-scouring velocity, peak flow rates from a storm event with average recurrence interval (ARI) of 20 years;
- Sediment pond – to capture and detain rainfall runoff, allowing any entrained sediment to ‘settle out’ before the runoff enters the dry lot holding pond. It is designed to cater for the peak flow rate from 1 in 20 year ARI; and,
- Holding -pond – to store dry lot runoff until such time as the pond effluent can be safely used for irrigating the effluent utilisation area. Where evaporation is the sole or primary disposal mechanism for wastewater and where captured effluent is not normally applied to land, these ponds are typically referred to as evaporation ponds.

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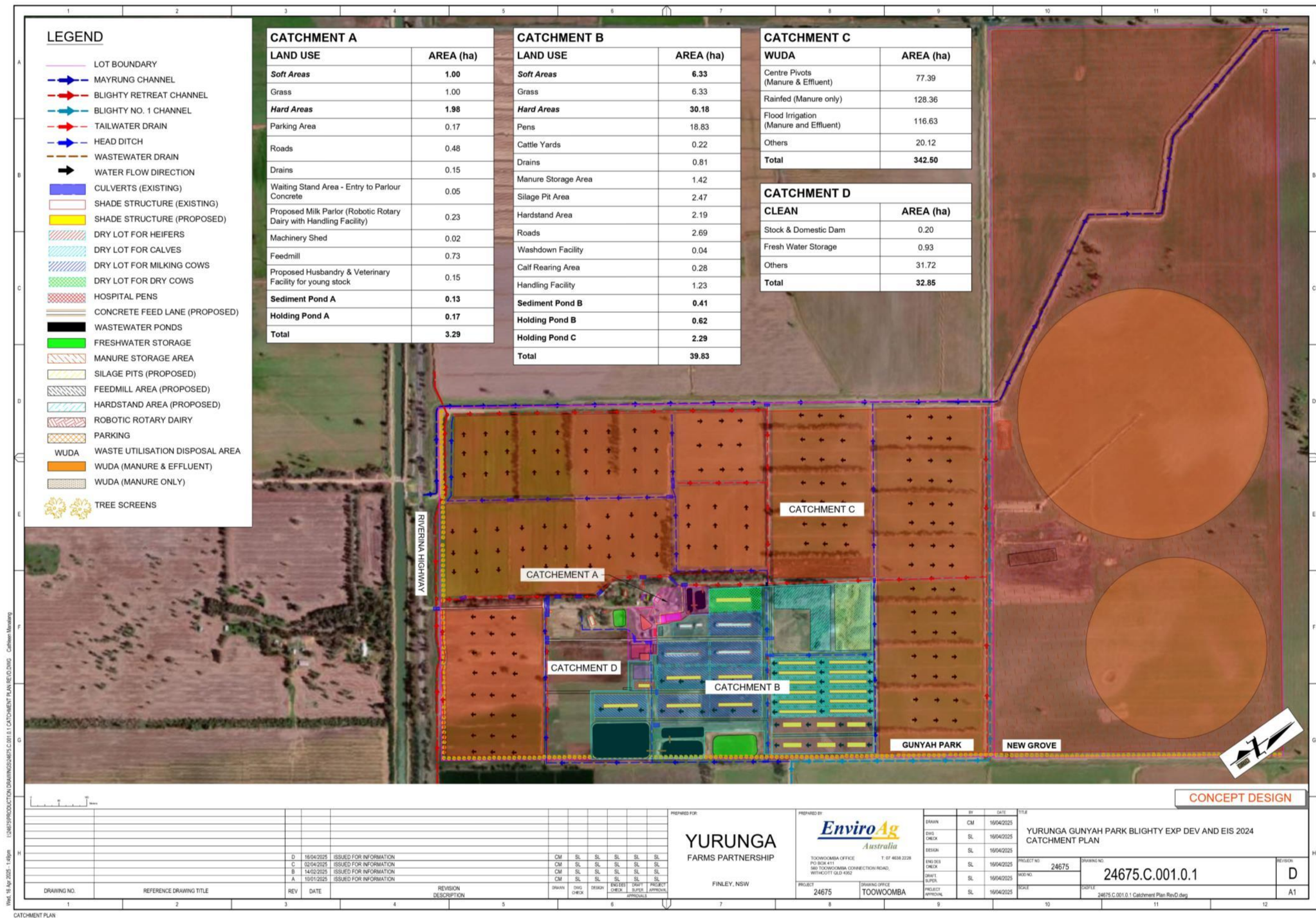


Figure 1 Catchment Plan

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2.1 Peak Flow Calculation

To estimate peak flow velocity, it is necessary to determine the peak flow of their respective catchments. The recommended method for calculating the flow is the Rational Method (MLA, 2012) which is expressed in Equation 1.

Equation 1 Rational Method Formula

$$Q_y = \frac{(C_y \times tI_y \times A)}{360}$$

Where:

- Q_y = peak flow rate (m^3/s) for average recurrence interval (ARI) of 1 in 't' years
 C_y = runoff coefficient (dimensionless)
 A = area of catchment (ha)
 tI_y = average rainfall intensity (mm/h) for design duration of 't' hours and an ARI of 1 in 't' years

2.1.1 Catchment Area

The relevant land use areas within the CDA are shown in Figure 1 above.

2.1.2 Runoff coefficient

A runoff coefficient value of 0.80 is applied to most dry lot complexes where there are only small areas of grass or other vegetation within the controlled drainage area (MLA, 2012).

2.1.3 Time of Concentration

The time of concentration is the amount of time it takes for the flow to move from the catchment's hydraulically most distant point to the outlet. The Rational Method assumes that the highest peak rate of runoff from the catchment will be driven by storm duration long enough for runoff from every area of the catchment to contribute simultaneously to the design point.

Bransby Williams Formula which is given in Equation 2, was used to calculate the time of concentration. The result is presented in Table 1.

Equation 2 Bransby-William

$$t = \frac{58 \times L}{A^{0.1} \times S^{0.2}}$$

Where:

- t = time of concentration (min)
 L = Length of the mainstream (km) from the outlet to the catchment divide
 A = Area of catchment (ha)
 S = Slope of the surface (%)

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Table 1 Time of concentration calculation

Factor	Units	Pen Drain 1	Pen Drain 2
L	km	1.0	0.6
A	ha	17.5	10.8
S _e	%	1.0	1.0
t _c	minutes	41.8	29.2

2.1.4 Average Rainfall Intensity

Average rainfall intensity for design duration equal to the calculated time of concentration of the catchments was determined from the IFD (intensity, frequency, duration) information from the Bureau of Meteorology (refer to Appendix A). The rainfall intensity was tabulated in Table 2.

2.1.5 Peak flow

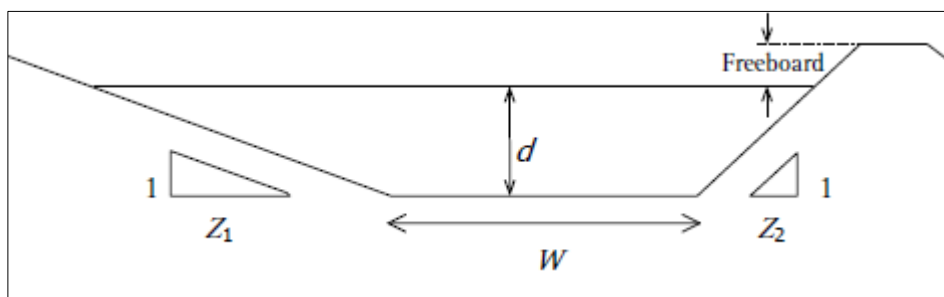
Utilising the Rational Method in Equation 1, the peak flow is shown in Table 2.

Table 2 Peak flow calculations

Factor	Units	Pen Drain 1	Pen Drain 2
A	ha	17.5	10.8
C _y	-	0.8	0.8
t	minutes	41.8	29.2
I _y	mm/h	48.5	60.2
Q _y	m ³ /s	1.9	1.4

2.2 Peak Flow Velocity

The channel formed by the catch drains is to be trapezoidal in cross-section. The typical cross section is shown in Figure 2. The bed width (*b*) of the channel is usually determined by factors such as the operating width of the machinery. Using the peak flow rate determined above, the design dimensions of catch drain can be determined using Manning Formula in Equation 3.

**Figure 2** Catch drain cross section**Equation 3** Q Manning's Formula

$$Q_y = \frac{(R)^{\frac{2}{3}} \times S^{\frac{1}{2}} \times A}{n}$$

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Where:

Q _y =	peak flow rate (m ³ /s) for average recurrence interval (ARI) of 1 in 't' years
R =	hydraulic radius
A =	cross sectional area (m ²)
S =	slope (m/m)
n =	Manning's roughness coefficient

2.2.1 Hydraulic Radius

Hydraulic radius is the ratio of the cross-sectional area of flow to the length of wetted perimeter. It is given in Equation 4.

Equation 4 Hydraulic Radius

$$R = \frac{A}{P}$$

$$R = \frac{bd + zd^2}{b + 2d\sqrt{1 + z^2}}$$

2.2.2 Manning coefficient

The drain will be lined with compacted gravel to provide a suitably durable surface for the dual purposes. Despite this form of lining, a conservative value for the Manning's roughness coefficient of 0.025 is applied to cater for any vegetative growth that might occur between cleaning operations in the drain.

2.2.3 Slope

The catch drain is to have a slope of 1%.

2.2.4 Flow velocity

Having established the drain dimension, it is then necessary to determine the flow velocity in the channel using the Manning Formula in Equation 5.

Equation 5 V Manning's Formula

$$V = \frac{(R)^{\frac{2}{3}} \times S^{\frac{1}{2}}}{n}$$

The velocity calculation is presented in Table 3. The calculated velocity (1.5 m/s) is within than the maximum permissible flow velocities for channel lined with gravel (1.3-1.80 m/s).

Table 3 Velocity calculation

Factor	Units	Pen Drain 1	Pen Drain 2
Q _y	m ³ /s	1.9	1.4
b	m	5	5
d	m	0.25	0.25
z	-	2	2
f	m	0.25	0.25
V	m/s	1.5	1.5

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2.3 Sedimentation System

Sedimentation systems may be designed in the form of terraces, basins or ponds. These system types differ in respect to their aspect ratios and depth. Sedimentation terraces are shallow, relatively elongated structures with aspect ratios (L/W) of between 8:1 and 10:1. Sedimentation basins and ponds typically have similar aspect ratios (L/W) of between 2:1 and 3:1 but basin is shallower (<1.5 m depth) than ponds (>1.5m in depth).

Both sedimentation terraces and basins are designed to drain freely after each runoff event so allowing the collected solids to be dried and removed at frequent intervals. Sedimentation ponds are designed to allow solids from a series of runoff events to accumulate with decanting of the captured solids typically occurring at intervals of one to five years. A scaling factor (λ) is applied to the design volume to account for the storage capacity required to store the solids captured in the various types of sedimentation system between decanting or cleaning operations. The required volumes of sedimentation systems can be estimated using the formula in Equation 6.

Equation 6 Sediment Pond Design Formula

$$V = Qp \times \frac{L}{W} \times \left(\frac{\lambda}{v}\right)$$

Where:

- V = required sedimentation system volume (m³)
- Qp = peak flow rate (m³/s)
- L/W = length to width or aspect ratio of the system
- λ = scale factor
- v = design flow velocity (m/s), recommended is 0.005m/s or less.

The choice of type of sedimentation system is dependent upon factors such as available land areas, site topography and climate as well as the proximity of sensitive receptors. In this case, the site will have a sediment pond. The aspect ratio (L/W) is 2 while the scaling factor (λ) is 6.0. The minimum operational freeboard is 0.9 m.

The required sediment pond volume is 7.5 ML, as shown in Table 4.

Table 4 Sediment Pond Volume Calculations

Parameter	Unit	Value
Qp	m ³ /s	3.11
L/W	-	2.0
λ	-	6.0
v	m/s	0.005
V	ML	7.5

2.4 Sediment Basin Outlet Weir

The sediment basin outlet weir regulates discharge from the sedimentation system to the holding pond. The required dimensions of the weir should be able to accommodate the peak flow rate of a 50 year ARI. The required width of the weir can be calculated using the broad crested formula in Equation 7.

Equation 7 Rectangular Weir Formula

$$b = \frac{Q_p}{C_d \times h^{3/2}}$$

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Where:

b =	Width of outlet weir (m)
Q_p =	peak flow rate (m ³ /s) for average recurrence interval (ARI) of 1 in 50 years
C_d =	Weir coefficient, 1.66
h =	Depth of water above the crest of outlet weir (m)

The design details for the weir are presented in Table 5. For the ease of construction, the width of the weir is 7.0 m.

Table 5 Design details for sedimentation weir

Parameter	Unit	Value
Q_p	m ³ /s	3.88
C_d	-	1.66
h	m	0.5
b	m	6.6

2.5 Holding Pond

The design function of holding pond is to store runoff until such time as the pond effluent can be safely used for irrigating the effluent utilisation area. Holding pond should have sufficient storage capacity so that it spill no more frequently than an average of one in 10 years.

2.5.1 Major-Storm Approach

Historically, holding pond volumes are designed on the basis of major storm event (1 in 20 year; 24 hour storm). The 24-hour design storm represents the largest amount of rainfall expected over a 24-hr period. The required storage volume using this approach can be determined by Equation 8.

Typically, runoff coefficients of 0.8 were used for “hard” areas (dry lot pens, laneways, roads, and other hard stand areas) and 0.4 for “soft” areas (grass) within the CDA.

Equation 8 Holding Pond Formula (Major Storm Approach)

$$V = ((A_h \times C_h) + (A_s \times C_s)) \times D$$

Where:

V =	Required storage volume
D =	Rainfall depth for 24-hr storm event, 1 in 20 year
A_h =	Area of “hard” catchment (ha)
C_h =	Hard catchment runoff coefficient
A_s =	Area of “soft” catchment (ha)
C_s =	Soft catchment runoff coefficient

The required holding pond volume using this approach is 24.2ML, as shown in Table 6.

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Table 6 Holding Pond Calculations (Major Storm Method)

Parameter	Unit	Value
D	mm	91.7
A _h	ha	32.3
C _h	-	0.8
A _s	ha	1.4
C _s	-	0.4
V	ML	24.2

The intent of this method was that the designed holding pond should overtop only at a frequency less than 1 in 10 years. Unfortunately, spilling events from holding ponds designed on this basis were found to occur at frequency greater than an average of 1 in 10 years (MLA, 2012).

This approach only accounts for a major storm event and fails to account the cumulative impact of series of wet weather events where overtopping is most likely to occur.

2.5.2 FSIM Modelling

The FSIM model (Lott, 1998) simulates the hydrological and mass balance of open cattle pens in a feedlot complex with particular emphasis on the water balance of the pen (manure) surface. The model uses physically based and distributed parameters to describe the various aspects of the hydrological balance and has been developed to incorporate variables for factors such as land use and feedlot management practices. The model has been calibrated and validated. It has been used to develop State and National Feedlot Guidelines in Australia. FSIM modelling is applicable in assessing the hydrology of dairy dry lots.

2.5.2.1 Climatic Data

The climate data required for a FSIM simulation are precipitation, temperature, humidity, radiation, and potential evaporation.

Evaporation can be demonstrated to be the most important climatic variable influencing the hydrological performance of the feedlot catchment, holding pond and wastewater utilisation area. To reliably model the hydrology of a feedlot, it is necessary to estimate, on a daily basis, the direct evaporation from the surface of the feedlot pen and the holding pond as well as the evapotranspiration from the wastewater utilisation area (Lott, 1998).

2.5.2.2 Input

The values used for the major input variables in the FSIM model are provided in Table 7. These include the details of physical characteristics of the facility and its operations.

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Table 7 Summary of FSIM parameters

Parameter	Units	Value
Capacity	head	3800
Mortality rate	%	0.3
Entry weight	kg	280
Exit weight	kg	450
Manure generation	%	2.8
Pen capacity	head	475
Stocking density	m ² /head	50
Pen slope	%	0.3
Maximum manure depth	mm	75
Cleaning frequency	times/yr	4
Catchment		
Area drains	m ²	8,500
Initial loss – drains	mm	7
Area roads	m ²	48,727
Initial loss – roads	mm	5
Area grass	m ²	6.45
Grassed and waterways areas Ks	-	35, 45, 60
Holding Pond SA	m ²	35,100
Holding Pond depth	m	4

2.5.2.3. Output

Using an iterative approach, numerous runs of the model were performed to derive an optimum design capacity for the holding pond that satisfies the design criteria of spilling at frequency less than once every 10 years.

Iterations using the 136 year dataset found that the optimum capacity for Gunyah dry lot requires 60 ML of storage. With this configuration of the holding pond and surface areas, 1 spill events were predicted to occur over the 136 period of 1889 through 2024.

The holding pond designed for the site has a capacity of 80 ML. An additional 20 ML was added for contingency.

2.6 Holding Pond Bywash

A by-wash is constructed in the holding pond to divert excess water during the following storm events which result in the pond filling to a level above the full supply level. It is designed to carry peak flow of 1 in 50 years ARI. The peak flow can be calculated using Equation 1 above.

The by-wash inlet width is designed to carry the peak flow discharge safely around the end of the embankment. It can be calculated using the broad-crested weir formula. The flow over a broad crested weir with horizontal crest and 2:1 batter, is given in Equation 9.

Equation 9 Trapezoidal broad-crested weir formula

$$Q_y = 1.55LH^{1.5} + 2.47H^{2.5}$$

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Where:

Q_y = peak flow rate (m^3/s) for average recurrence interval (ARI) of 1 in 50 years

L = By-wash inlet width (m)

H = Depth of flow (m)

Typically, by-wash is designed to carry a maximum flow depth of 0.5 m. The by-wash inlet width should be at least two-thirds the outlet width (L_o), to ensure that by-wash spread uniformly over the outlet (Watts et al., 2016).

The design details for the by-wash are outlined in Table 8. The calculated inlet width of the bywash is 5.6 m and the outlet width is 8.4 m. For ease of construction, by wash inlet width will be 6.0 m.

Table 8 Bywash Calculations

Parameter	Unit	Value
Q_y	m^3/s	3.5
H	m	0.5
L_i	m	5.6
L_o	m	8.4

3. Summary and Conclusion

Hydrological and hydraulic assessment for the proposed dairy dry lot development site (Catchment B) was completed.

In summary:

- The water velocity in the catch drain will not cause scouring;
- The capacity of the catch drain is larger than peak capacity;
- The minimum required sediment pond volume was determined to be 7.5 ML;
- The minimum width of the sediment outlet weir was calculated to be 6.6 m. For ease of construction the weir will be built with 7.0 m width;
- The required holding pond volume was determined using two methods.
 - Major Storm – 24.2 ML
 - FSIM – 60 ML
 - FSIM modelling spill frequency of 1 in 136 years based on 60 ML capacity
 - The designed holding pond is 80 ML
- The minimum bywash width is 5.6 m. For ease of construction, bywash width will be 6.0 m.

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Appendix A. IFD

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Rainfall IFD Data System: Water Information: Bureau of Meteorology



Location

Label: Yurunga Farm Partnership

Latitude: -35.5906 [Nearest grid cell: 35.5875 (S)]

Longitude: 145.3713 [Nearest grid cell: 145.3625 (E)]

IFD Design Rainfall Intensity (mm/h)

Issued: 04 March 2025

Rainfall intensity for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).
[FAQ for New AEP probability terminology](#)

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	92.0	106	152	185	220	268	307
2 min	78.2	90.0	129	158	189	233	268
3 min	70.9	81.6	117	143	170	209	241
4 min	65.2	75.1	108	132	156	191	220
5 min	60.6	69.8	100	122	145	177	203
10 min	45.6	52.5	75.3	91.8	109	132	151
15 min	37.1	42.7	61.3	74.8	88.6	108	123
20 min	31.5	36.3	52.2	63.7	75.5	91.9	105
25 min	27.6	31.8	45.7	55.8	66.2	80.7	92.4
30 min	24.7	28.4	40.8	49.8	59.1	72.2	82.8
45 min	19.0	21.9	31.4	38.4	45.6	55.7	64.0
47 min	18.4	21.2	30.5	37.3	44.3	54.1	62.2
1 hour	15.7	18.0	25.9	31.6	37.5	46.0	52.8
1.5 hour	11.9	13.7	19.6	23.9	28.4	34.7	39.9
2 hour	9.72	11.2	16.0	19.5	23.1	28.3	32.5
3 hour	7.32	8.41	12.0	14.6	17.3	21.1	24.2
4.5 hour	5.51	6.33	9.02	11.0	12.9	15.7	18.0
6 hour	4.50	5.16	7.35	8.92	10.5	12.7	14.5
9 hour	3.37	3.87	5.50	6.66	7.85	9.46	10.7
12 hour	2.74	3.14	4.46	5.41	6.37	7.65	8.68
18 hour	2.03	2.33	3.31	4.02	4.73	5.67	6.41
24 hour	1.63	1.87	2.67	3.24	3.82	4.57	5.17
30 hour	1.37	1.57	2.25	2.73	3.22	3.86	4.37
36 hour	1.18	1.36	1.95	2.37	2.80	3.36	3.80
48 hour	0.933	1.07	1.54	1.88	2.23	2.68	3.04
72 hour	0.661	0.761	1.10	1.34	1.59	1.93	2.19
96 hour	0.514	0.592	0.853	1.04	1.24	1.50	1.71
120 hour	0.422	0.486	0.698	0.853	1.01	1.23	1.40
144 hour	0.359	0.413	0.591	0.721	0.855	1.03	1.18
168 hour	0.314	0.360	0.513	0.623	0.736	0.886	1.01

Note:

The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.

* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.

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www.bom.gov.au/water/designRainfalls/revised-ifd/?coordinate_type=dd&latitude=-35.5905966164723&longitude=145.37126988237074&user_label=... 1/1

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Appendix L. Soils Assessment

~ Commercial-in-Confidence ~

Geotechnical Assessment, Piezometer Installation, Agronomic Sampling: Yurunga Dairy

Report Number 41397.113876

Prepared for

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Document Status Record


Report Type: Geotechnical Assessment, Piezo Install, Agronomic Sampling: Yurunga

Project Title: EnviroAg - Yurunga Dairy_Blighty_Survey Geotech_2024

Client: EnviroAg Australia Pty Limited

Project Document Number: 41397.113876

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Notes:

Rev: 0 (Final Report)

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This report provides information to address the intent of Project Number 41397 as agreed to by EnviroAg Australia Pty Limited.

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1 Introduction

GroundTruth Pty Limited (GroundTruth) was engaged by EnviroAg Australia Pty Limited (EnviroAg) to conduct a geotechnical investigation, piezometer install and agronomic sampling as part of the development plans for an expansion of the existing 'Yurunga Dairy', Blighty, NSW. This report documents the field investigation at the proposed location.

1.1 Site location

Site details are presented in Table 1. A site map is provided in Appendix D with geotechnical bore hole locations, agronomic soil sample sites and piezo locations.

Table 1 Site and Location Details

Site/Property Name:	'Yurunga Dairy'
Land Owner:	Yurunga Farms Partnership, Lachlan and Genevieve Marshall
Site/Property address:	18214 Riverina Highway Blighty NSW 2713
Lot and plans:	Lot 87 – D.P. 756251
Tenure:	Freehold
Land Use Zoning:	RU1 – Primary Production
Local Government Authority:	Edward River Council

2 Methodology

(in accordance with AS 1726)

2.1 Desktop

Desktop assessment of the site was undertaken. A GroundTruth team travelled to site in October 2024 over a five (5) day campaign. The site was assessed using standardised procedures for safety, site attributes, and soil characteristics.

A 'Before you dig Australia' (BYDA) request was undertaken for the site and the site was assessed for hazards.

2.2 Geotech Assessment

A drill rig was used to auger bore holes. Four (4) bore holes were drilled to about 5.0m (max). Each stratigraphic data were collected. Soil profiles were defined in field. No bore hole refused and all reached the target depth of 5.0m below ground level (bgl). Photos have been taken of every borehole site. These photos can be viewed at Appendix C. Table 2 shows a summary of the sub soil strata.

Several soil samples were collected for analysis. Table 3 shows the sample location, depth and testing parameters. Figure 1 shows the log at bore 03.

Soil was bulked together and sent for testing as one sample. Results can be viewed in full at Appendix B.



Figure 1 Photo of bore log 03

Table 2 Summary of Geotech Soil Strata

BH #	Eastings	Northings	0 - 1.0m	1.0 - 2.0m	2.0 – 3.5m	3.5 – 5.0m	Location
BH1	352614	6060013	Dark red heavy clay	Red brown silty clay	Brown medium clay	Grey heavy clay	G4 - Beside proposed holding pond
BH2	352618	6060165	Red silty clay	Brown silty clay	Yellow silty clay	Grey silty clay	G2 -Beside northern water storage
BH3	352616	6060086	Brown red sandy clay	Light brown sandy clay	Brown silty clay	Brown / red clay	G3 - Beside water storage
BH4	352655	6060283	Brown silty clay	Brown red silty clay	Brown silty clay	Brown silty clay	G1 - At the northern end of water storage

Table 3 Soil Sample Locations and Testing Parameters

BH #	Sample depth	Testing parameters – Physical	Testing parameters – Chemical
BH1	1.5 – 3.0m	Particle Size Distribution (PSD), Emerson Class, Plasticity Index, Linear Shrinkage	pH, CEC, ESP, EC, Exchangeable Cations
BH2	1.0 - 5.0m	Particle Size Distribution (PSD), Emerson Class, Plasticity Index, Linear Shrinkage	pH, CEC, ESP, EC, Exchangeable Cations
BH3	3.0 - 5.0m	Particle Size Distribution (PSD), Emerson Class, Plasticity Index, Linear Shrinkage	pH, CEC, ESP, EC, Exchangeable Cations
BH4	2.5 - 5.0m	Particle Size Distribution (PSD), Emerson Class, Plasticity Index, Linear Shrinkage	pH, CEC, ESP, EC, Exchangeable Cations

Table 4 Summary of Soil Chemical Test Results

Test	Unit	BS-1	BS-2
Conductivity	uS/cm	170	160
pH	pH Units	8.32	9.02
ESP	%	18	14
Mg	meq/100g	11	13
K	meq/100g	0.6	0.7
Na	meq/100g	4.4	4.8
Ca	meq/100g	8.4	16
CEC	meq/100g	16	16
Moisture	%	16	16

Table 5 Summary of Soil Physical Test Results – BH 1 - 4

Tests	Particle Size Distribution (PSD)	Emerson Class	Atterberg Limit			Linear Shrinkage	
Unit	% passed 0.075		Liquid Limit %	Plastic Limit %	Plasticity Index %	%	Cracking, curling, crumbling
Result	89	2	46	15	31	14.0	Curling

2.3 Agronomic Soil Sampling

Agronomic soil sampling was conducted in the assigned areas on the property that will be receiving waste.

Seventeen (17) pre-determined sites assigned by EnviroAg were sampled using 900mm agronomic push tubes. Three samples were taken at each site and samples composed from composite soil mixed from three (3) separate depths, 0 – 150mm, 400 – 700mm and 800 – 1000mm. Figure 2 shows the agronomic soil log 01.

GroundTruth collected and handled the samples and passed them over with the chain of custody over to EnviroAg for sending to the Laboratory for testing. EnviroAg is solely responsible for the testing analysis.



Figure 2 Agronomic Soil Log 01

Table 6 Agronomic Sampling and Testing Parameters

BH #	Sample depths in metres			Testing Parameters
	1	2	3	
BH1	0 – 0.15	0.4 – 0.7	0.8 – 1.0	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH2	0 – 0.15	0.4 – 0.6	0.8 – 1.0	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH3	0 – 0.1	0.25 - 0.6	0.8 – 1.0	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH4	0 – 0.1	0.4 – 0.6	0.8 – 1.0	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH5	0 – 0.15	0.4 – 0.7	0.8 – 1.0	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH6	0 – 0.1	0.4 – 0.55	0.8 – 1.0	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH7	0 – 0.15	0.4 – 0.6	0.75 – 0.9	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH8	0 – 0.1	0.4 – 0.6	0.8 – 1.0	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH9	0 – 0.15	0.4 – 0.6	0.7 – 0.9	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH10	0 - 0.005	0.15 – 0.3	0.6 – 0.7	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH11	0 – 0.15	0.15 – 0.5	0.5 – 0.8	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH12	0 – 0.15	0.4 – 0.7	0.75 – 0.9	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH13	0 – 0.15	0.4 – 0.75	0.75 – 0.9	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH14	0 – 0.2	0.35 – 0.6	0.8 – 1.0	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH15	0 – 0.15	0.4 - 0.6	0.75 – 0.9	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH16	0 – 0.15	0.4 – 0.7	0.8 – 1.0	Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC
BH17	0 – 0.1	0.2 – 0.3		Ion Exchange, CEC, %ESP, Exchangeable Cations, EC, Chloride, Nitrate, TOC, Available Phosphorous, PSC

2.4 Piezometer Installation

Four (4) piezometers (piezos) or groundwater monitoring wells were installed.

They were placed in locations pre-assigned by EnviroAg.

Figure 3, Figure 4, Figure 5 and Figure 6 show the completed piezometers. All bore logs can be viewed at Summary

The site is typified by;

- (i) A top soil variously of 100-150mm being a sandy silt with clay. The proportions of the constituents varies
- (ii) A brown subsoil variously a clayey sand or sandy clay that graduates to a red and red brown sandy clay.
- (iii) Deep soils are red-yellow mottle sandy clays.

Surface soils appear to be reasonably fertile and well drained. Deep clay soils are probable sodic and or saline soils.

Groundwaters are at depths of 5 to 12m with standing water levels of 4-6m.

Appendix A and photos of piezo logs can be viewed at Appendix C. Licencing of the 4 piezometers with WaterNSW is completed by GroundTruth.



Figure 3 **Completed Piezo 02**



Figure 4 **Completed Piezo 03**



Figure 5 **Completed Piezo 01**



Figure 6 **Completed Piezo 04**

Table 7 Piezo Construction Summary Table

PZ #	Eastings	Northings	Casing	Screen	Annulus Pack		Final Piezo Depth	GW #
					Bentonite	Pea Gravel		
PZ1	352650	6059961	0 – 6.0m	6.0 – 12.0m	0 – 3.5m	3.5 – 12.0m	12.0m	GW276214
PZ2	351689	6060448	0 – 6.5m	6.5 – 12.5m	0 – 3.5m	3.5 – 12.5m	12.5m	GW276215
PZ3	352733	6060646	0 – 5.5m	5.5 – 11.5m	0 – 3.0m	3.0 – 11.5m	11.5m	GW276216
PZ4	351365	6061559	0 – 7.0m	6.5 – 13.0m	0 – 3.5m	3.5 – 13.0m	13.0m	GW276217

Table 8 Piezo Bore Hole Summary of Strata

BH #	0.0 – 3.0m	3.0 – 6.0m	6.0 – 9.0m	9.0m – 13.0	Groundwater
BH1	Grey brown clay silty sand	Light brown clayey silt with sand	Course sand w/ traces of silt and clay	Course sand w/ traces of silt and clay	5.2m
BH2	Light brown clay silty sand	Brown sand with silt and clay	Yellow course sand	Yellow course sand	-
BH3	Yellow brown sandy clay	Brown sand with silt and clay	Light brown sandy silt with clay	Light brown sandy silt with clay	7.7m
BH4	Light brown clay silty sand	Brown sand with silt and clay	Red heavy clay	Brown clay	12.0m

3 Summary

The site is typified by;

- (iv) A top soil variously of 100-150mm being a sandy silt with clay. The proportions of the constituents varies
- (v) A brown subsoil variously a clayey sand or sandy clay that graduates to a red and red brown sandy clay.
- (vi) Deep soils are red-yellow mottle sandy clays.

Surface soils appear to be reasonably fertile and well drained. Deep clay soils are probable sodic and or saline soils.

Groundwaters are at depths of 5 to 12m with standing water levels of 4-6m.



Appendix A Bore Logs

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	352251.01
Property:	Gunyah	Paddock:		GPS Datum:	GDA2020	Northing:	6059612.08
Aspect:		Current land use:	Cropping	Vegetation:	Fallow	Core hole No:	BH01

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-150 mm	Brown	Sandy clay	Friable				Yes	
	A2	150-400 mm	Red brown	Medium clay	Massive			Yes	Yes	
2	B1	400-700 mm	Red brown	Medium clay	Massive			Yes	Yes	
	B2									
	B3									
3	C1	800-1000 mm	Red brown	Medium clay	Massive	Calcrete layer		Yes		

Photo 	Other comments: <ul style="list-style-type: none"> - DAP was put in – fertilizer (nitrogen) - Pre-watered site - Samples taken at: <ul style="list-style-type: none"> - 0-150 mm - 400-700 mm - 800-1000 mm 	Parent material:	
		Surface drainage:	Good
		Surface slope:	Flat
		Photos:	Yes
		Collector Name:	Janina Palad
		Signature:	
		Date:	29/10/2024


Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 1 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	351834.68
Property:	Gunyah	Paddock:		GPS Datum:	GDA2020	Northing:	6059566.10
Aspect:		Current land use:	Cropping	Vegetation:	Lucerne	Core hole No:	BH02

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-150 mm	Dark brown	Medium Clay	Massive				Yes	
	A2									
	B1	150-350 mm	Dark red	Heavy clay	Massive				Yes	
2	B2	350-600 mm	Light yellow	Heavy clay	Massive			Yes	Yes	
	B3	700-800 mm	Light yellow	Heavy clay	Massive	Calcrete		Yes	Yes	
3	C1	800-1000 mm	Light yellow	Heavy clay	Massive			Yes		

Photo:	Other comments: - Root zone - Samples taken at: - 0-150 mm - 400-600 mm - 800-1000 mm	Parent material:	
		Surface drainage:	Good
		Surface slope:	Flat
		Photos:	
		Collector Name:	Janina Palad
		Signature:	
		Date:	29/10/2024



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Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	351781.74
Property:	Gunyah	Paddock:		GPS Datum:	GDA2020	Northing:	6060173.40
Aspect:		Current land use:	Cropping	Vegetation:	Lucerne	Core hole No:	BH03

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-100 mm	Dark brown	Medium clay	Massive				Yes	
	A2									
	B1	250-400 mm	Dark brown	Medium clay	Massive				Yes	
2	B2	400-600 mm	Dark red	Medium clay	Massive				Yes	
	B3									
3	C1	800-1000 mm	Dark yellow	Medium clay	Massive	Calcrete				

Photo 	Other comments: - Very hard soil – Calcrete layer 100 mm - Root zone – 250-600 mm - Samples taken at: - 0-100 mm - 250-600 mm - 600-1000 mm	Parent material:
	Surface drainage:	Good
	Surface slope:	Flat
	Photos:	Yes
	Collector Name:	Janina Palad
	Signature:	
	Date:	29/10/2024


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Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	351990.70
Property:	Gunyah	Paddock:	Oats	GPS Datum:	GDA2020	Northing:	6060275.50
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH04

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-100 mm	Dark brown	Sandy clay	Friable				Yes	
	A2	100-200 mm	Dark red	Medium clay	Massive			Yes	Yes	
2	B1	200-550 mm	Dark red	Medium clay	Massive			Yes	Yes	
	B2	550-800 mm	Dark red	Medium clay	Massive			Yes	Yes	
	B3									
3	C1	800-1000 mm	Dark red	Medium clay	Massive			Yes		

Photo	Other comments: - Sludge have been applied on paddock - Sample taken at: - 0-100 mm - 400-600 mm - 800-1000 mm	Parent material:	
		Surface drainage:	Good
		Surface slope:	Flat
		Photos:	
		Collector Name:	Janina Palad
		Signature:	
		Date:	29/10/2024


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Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 4 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	352062.50
Property:	Gunyah	Paddock:	Oats/Hay	GPS Datum:	GDA2020	Northing:	6060553.13
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH05

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-150 mm	Dark red	Sandy clay	Friable				Yes	
	A2	150-300 mm	Dark red	Medium clay	Massive			Yes	Yes	
	B1	150-400 mm	Dark red	Medium clay	Massive			Yes	Yes	
2	B2	400-700 mm	Dark red	Medium clay	Massive			Yes	Yes	
	B3	700-800 mm	Red	Heavy clay	Massive			Yes	Yes	
3	C1	800-1000 mm	Red	Heavy clay	Massive	Calcrete		Yes		

Photo	Other comments: - Soil profile is very free draining - Samples taken at: - 0-150 mm - 400-700 mm - 800-1000 mm	Parent material:	
		Surface drainage:	Good
		Surface slope:	Flat
		Photos:	
		Collector Name:	Janina Palad
		Signature:	
		Date:	29/10/2024



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Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	352304.02
Property:	New Grove	Paddock:	Oats	GPS Datum:	GDA2020	Northing:	6061600.65
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH06

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-100 mm	Dark brown	Sandy clay	Friable			Yes	Yes	
	A2									
	B1	100-400 mm	Dark red	Sandy clay	Massive			Yes	Yes	
2	B2	400-550 mm	Dark red	Medium clay	Massive			Yes	Yes	
3	B3	550-1000 mm	Yellow	Medium clay	Massive	Red mottles, calcrete		Yes		
	C1									

Photo 	Other comments: - Refusal at 600 mm - Samples taken at: - 0-100 mm - 400-550 mm - 800-1000 mm	Parent material:
		Surface drainage: Good
		Surface slope: Flat
		Photos: Yes
		Collector Name: Janina Palad
		Signature: 
		Date: 30/10/2024


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Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	351820.28
Property:	Gunyah	Paddock:	Oats/Hays	GPS Datum:	GDA2020	Northing:	6060638.09
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH07

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-150 mm	Dark red	Light clay	Massive				Yes	
	A2									
	B1	150-400 mm	Dark red	Light clay	Massive				Yes	
2	B2	400-750 mm	Dark red	Light clay	Massive				Yes	
	B3									
3	C1	750-900 mm	Dark red	Light clay	Massive				Yes	

Photo 	Other comments: - Samples taken at: - 0-150 mm - 400-600 mm - 750-900 mm	Parent material:
		Surface drainage:
		Surface slope:
		Photos:
		Collector Name:
		Signature:
		Date:



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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	352458.62
Property:	New Grove	Paddock:	Oats	GPS Datum:	GDA2020	Northing:	6061187.63
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH08

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-100 mm	Grey	Light clay	Massive				Yes	
	A2									
2	B1	100-600 mm	Dark brown	Medium clay	Massive			Yes	Yes	
	B2	600-900 mm	Yellow brown	Heavy clay	Massive			Yes	Yes	
	B3									
3	C1	900-1000 mm	Yellow brown	Heavy clay	Massive	Calcrete		Yes		

Photo 	Other comments: - 3 rd core hard refusal at 700 mm - Samples taken at: - 0-100 mm - 400-600 mm - 800-1000 mm	Parent material:
		Surface drainage: Good
		Surface slope: Flat
		Photos: Yes
		Collector Name: Janina Palad
		Signature: 
		Date: 29/10/2024



Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 8 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	351265.93
Property:	New Grove	Paddock:	Barley	GPS Datum:	GDA2020	Northing:	6061263.52
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH09

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-150 mm	Brown	Sandy clay	Friable				Yes	
	A2	150-250 mm	Dark brown	Medium clay	Massive				Yes	
	B1	250-400 mm	Dark red	Medium clay	Massive				Yes	
2	B2	400-700 mm	Dark red	Medium clay	Massive	Calcrete		Yes	Yes	
	B3									
3	C1	700-900 mm	Dark red	Medium clay	Massive				Yes	



Photo 	Other comments: <ul style="list-style-type: none"> - Manure is being applied already - Hard layer – calcrete layer - Samples taken at: <ul style="list-style-type: none"> - 0-150 mm - 400-600 mm - 700-900 mm 	Parent material:
		Surface drainage: Good
		Surface slope: Flat
		Photos: Yes
		Collector Name: Janina Palad
		Signature: 
		Date: 29/10/2024

Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 9 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet						EA Alliance	
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	350607.44
Property:	New Grove	Paddock:	Barley	GPS Datum:	GDA2020	Northing:	6061361.87
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH10

Profile Description:										
Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-50 mm	Light brown	Silty clay	Friable				Yes	Yes
	A2	50-150 mm	Dark brown	Silty clay	Massive			Yes	Yes	
2	B1	150-300 mm	Brown	Silty clay	Massive			Yes	Yes	
	B2	300-600 mm	Red	Silty clay	Massive			Yes	Yes	
3	B3	600-750 mm	Red	Silty clay	Massive	Calcrete layer		Yes		
	C1									

Photo 	Other comments: <ul style="list-style-type: none"> - Refusal at 750 mm – 2nd core - 600 mm – calcrete layer - Samples taken at: <ul style="list-style-type: none"> - 0-50 mm - 150-300 mm - 600-750 mm 	Parent material:
		Surface drainage: Good
		Surface slope: Flat
		Photos: Yes
		Collector Name: Janina Palad
		Signature: 
		Date: 29/10/2024



Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 10 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	351690.42
Property:	New Grove	Paddock:	Oats	GPS Datum:	GDA2020	Northing:	6061335.63
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH11

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-150 mm	Dark brown	Heavy clay	Massive	Sample			Yes	
	A2									
2	B1	150-500 mm	Dark red	Heavy clay	Massive	Sample, mottles			Yes	
3	B2	500-800 mm	Red	Heavy clay	Massive	Sample, calcrete, mottles			Yes	
	B3									
	C1									

Photo 	Other comments: - Very soft - Samples taken at: - 0-150 mm - 150-500 mm - 500-800 mm	Parent material:
		Surface drainage: Good
		Surface slope: Flat
		Photos: Yes
		Collector Name: Janina Palad
		Signature: 
		Date: 29/10/2024



Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 11 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	352835.98
Property:	New Grove	Paddock:	Oats	GPS Datum:	GDA2020	Northing:	6061417.01
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH12

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-150 mm	Brown	Silty clay	Friable			Yes	Yes	
	A2									
	B1	150-450 mm	Brown	Medium clay	Massive			Yes	Yes	
2	B2	450-750 mm	Brown	Medium clay	Massive			Yes	Yes	
	B3									
3	C1	750-1000 mm	Yellow	Medium clay	Massive	Calcrete		Yes		

Photo 	Other comments: - Raw manure applied - Samples taken at: - 0-150 mm - 400-600 mm - 800-1000 mm – no roots	Parent material:
		Surface drainage: Good
		Surface slope: Flat
		Photos: Yes
		Collector Name: Janina Palad
		Signature: 
		Date: 29/10/2024



Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 12 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	351329.24
Property:	New Grove	Paddock:	Oats	GPS Datum:	GDA2020	Northing:	6061713.75
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH13

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
	A1	0-50 mm	Grey	Medium clay	Massive				Yes	
1	A2	50-250 mm	Grey	Medium clay	Massive				Yes	
2	B1	250-750 mm	Grey	Medium clay	Massive			Yes	Yes	
	B2									
	B3									
3	C1	750-900 mm	Dark grey	Medium clay	Massive			Yes		

Photo 	Other comments: - Samples taken at: - 0-150 mm - 400-750 mm - 750-900 mm	Parent material:
		Surface drainage: Good
		Surface slope: Flat
		Photos: Yes
		Collector Name: Janina Palad
		Signature: 
		Date: 29/10/2024


Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 13 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	350668.73
Property:	New Grove	Paddock:	Barley	GPS Datum:	GDA2020	Northing:	6061794.05
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH14

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-75 mm	Light brown	Sandy loam	Friable	Sample no. 1			Yes	
	A2	100-200 mm	Dark brown	Sandy loam	Friable	Sample no. 1			Yes	
2	B1	200-350 mm	Red brown	Light clay	Massive				Yes	
	B2	350-600 mm	Red brown	Heavy clay	Massive	Sample no. 2			Yes	
	B3	600-800 mm	Yellow	Heavy clay	Massive	Mottles, calcrete			Yes	
3	C1	800-1000 mm	Yellow	Heavy clay	Massive	Sample no. 3				

Photo 	Other comments: - Samples taken at: - 0-200 mm - 350-600 mm - 800-1000 mm	Parent material:
		Surface drainage:
		Surface slope:
		Photos:
		Collector Name:
		Signature:
		Date:

Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 14 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	352058.90
Property:	New Grove	Paddock:	Oats	GPS Datum:	GDA2020	Northing:	6061862.87
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH15

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-150 mm	Grey	Silty clay	Friable			Yes	Yes	
	A2	150-250 mm	Brown	Medium clay	Friable			Yes	Yes	
2	B1	250-550 mm	Brown	Medium clay	Massive			Yes	Yes	
	B2	550-750 mm	Red	Medium clay	Massive			Yes	Yes	
	B3									
3	C1	750-900 mm	Yellow	Medium clay	Massive	Calcrete		Yes		

Photo 	Other comments: - Samples taken at: - 0-150 mm - 400-600 mm - 750-900 mm	Parent material:
		Surface drainage: Good
		Surface slope: Flat
		Photos: Yes
		Collector Name: Janina Palad
		Signature:
		Date: 29/10/2024



Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 15 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	351108.49
Property:	New Grove	Paddock:	Oats	GPS Datum:	GDA2020	Northing:	6061919.12
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH16

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-200 mm	Brown	Medium clay	Friable				Yes	
	A2									
2	B1	200-600 mm	Brown red	Medium clay	Massive			Yes	Yes	
	B2	600-800 mm	Red	Medium clay	Massive			Yes	Yes	
	B3									
3	C1	800-1000 mm	Red	Medium clay	Massive	Calcrete		Yes		

Photo 	Other comments: - Samples taken at: - 0-150 mm - 400-700 mm - 800-1000 mm	Parent material: 	
		Surface drainage: 	Good
		Surface slope: 	Flat
		Photos: 	Yes
		Collector Name: 	Janina Palad
		Signature: 	
		Date: 	29/10/2024



Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 16 of 17

Form_06026_A	Agronomic Soil Sampling Report Sheet	EA Alliance
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Client:	Yurunga	Project No:	24675	GPS Zone	55	Easting:	352688.76
Property:	New Grove	Paddock:	Oats	GPS Datum:	GDA2020	Northing:	6061908.76
Aspect:		Current land use:	Cropping	Vegetation:		Core hole No:	BH17

Profile Description:

Sample No	Horizon	Horizon depth	Munsell Colour	Texture	Structure	Comments	pH	Mottles	Roots	Cracks
1	A1	0-100 mm	Red	Sandy	Friable				Yes	
	A2									
2	B1	200-350 mm	Red	Sandy	Friable	Refusal after				
	B2									
	B3									
	C1									

Photo 	Other comments: - Refusal at 300 mm - At different coring locations within the grid	Parent material:
		Surface drainage: Good
		Surface slope: Flat
		Photos: Yes
		Collector Name: Janina Palad
		Signature: 
		Date: 29/10/2024

Document Owner:	EA Alliance	Author:	G. Chase / S.C. Lott	Status:	Approved	Form_06026_A
Revision:	1.4	Authorised:	S.C. Lott	Issue Date:	22/01/2015	Page 17 of 17

Form_06027_A

Geotechnical Soil Profile Log

GroundTruth

Project Number

41397

Date Started

30/10/2024

Hole/Pit #

BH1

Client

Yurunga

Date Finished

30/10/2024

Sheet

1

of

1

Project Manager

J.Palad

Logged By

J.Palad

Checked By

S.Lott

Zone:

55S

Vegetation:

Oats

Weather (current):

Easting:

352614

Current Land Use:

Fallow

Weather (recent):

Northing:

6060013

Surface Drainage:

Location Description:

G4 - Beside proposed holding pond

Error:

Slope Aspect:

Datum:

Slope Angle:

Comments:

Currently stormwater surge storage

R.L. at Surface:

Field Site Classification (AS2870)

DRILLING

MATERIAL SUBSTANCE & SAMPLING

Method ¹	Penetration ²	Support ³	Groundwater ⁴	depth (m)	Graphic log ⁵	Field Classification ⁶	Material	Plasticity ⁸	Moisture Content ⁹	Consistency / Density Index ¹⁰	Pocket Penetrometer	From (mm)	To (mm)	Blows (test 1)	Blows (test 2)	Method	Sampling ¹¹	Observations
							soil type: plasticity or particle characteristics, colour, secondary or minor components ⁷										(notes, samples, tests, Sample No.)	structure and additional observations (i.e. odour, mottles, presence of roots, fragments.)
AD	1	N		0.5			Light red silty clay	L	D	Fb								
AD	1	N					Dark red heavy clay	H	M	F								Ribboning
AD	1	N		1			Dark red sandy clay		M	Fb								With gravel 3-5mm
AD	1	N		1.5			Red brown silty clay	H		S								
AD	1	N		2			Brown silty clay	H										
AD	1	N		2.5			brown medium clay	H	M	S								Ribboning
AD	1	N		3			Brown heavy clay	H	M	S								Ribboning
AD	2			3.5			Grey heavy clay	H	W	VS								Very wet. Very plastic
AD	2			4			Grey heavy clay	H	W	VS								Assumed - very few cuttings
AD	2			4.5			Grey heavy clay	H	W									Very wet - very plastic
AD	2						Grey heavy clay	H	W									

1 - Method

2 - Penetration

3 - Support

4 - Groundwater

5 - Graphic Log

6 - Classification

7 - Soil and Particle Sizes

8 - Plasticity

9 - Moisture Condition

10 - Consistency/Density Index

11 - Sampling

AS auger screwing

AD auger drilling

EX excavator

BH backhoe

RR roller/tricone

W washbore

CT cable tool

HA hand auger

PT pushtube

B blank bit

V V bit

T TC bit

*bit shown by suffix

e.g. ADT

1 no resist.

2 ranging to

3 refusal

SWL Standing Water Level

Water noted

water inflow

water outflow

NP Non - plastic

L Low

M Medium

H High

D dry

M moist

W wet

W_p plastic limit

W_L liquid limit

GW Well graded gravels

GP Poorly graded gravels

GM Silty gravels

GC Clayey gravels

SW Well graded sands

SP Poorly graded sands

SM Silty sands

SC Clayey sands

ML Inorganic silts of slight plasticity

CL Inorganic clays of low plasticity

OL Inorganic clays of medium plasticity

OH Inorganic clays of high plasticity

PI Organic clays of medium/high plasticity

peat and other highly organic soils

B Boulders

CB Cobbles

G Gravels

S Sands

M Silts

C Clays

O Organic

>200mm

63-200mm

20-63mm

6-20mm

2.36-6mm

0.6-2.36mm

0.2-0.6mm

75µm-0.2mm

<0.75µm

VS very soft

S soft

F firm

St stiff

VSt very stiff

H hard

U₁₀ undisturbed sample 50mm dia

U₆₃ undisturbed sample 63mm dia

N standard penetration test

N_r SPT - sample recovered

N₆₀ SPT with solid cone

P vane shear (kPa)

B_s pressuremeter

E bulk sample

environmental sample

Fb friable

VL very loose

MD medium dense

VD very dense

Document Owner:

EnviroAg Australia

Author:

GT

Status:

Approved

Form.06027_A_Geotech Soil Profile

Revision:

2.0

Authorised:

S.C.Lott

Issue Date:

18/09/2009

Form Page 1 of 1

Form_06027_A

Geotechnical Soil Profile Log

Ground Truth

The best in the field

Project Number	41397	Date Started	30/10/2024	Hole/Pit #	BH2		
Client	Yurunga	Date Finished	30/10/2024	Sheet	1	of	1
Project Manager	J.Palad	Logged By	J.Palad	Checked By	S.Lott		

Zone: 55S

Vegetation: None

Weather (current): Sunny

Easting: 352618

Current Land Use: Fallow

Weather (recent): Sunny

Northing: 6060165

Surface Drainage:

Location Description: G2 -Beside northern water storage

Error:

Slope Aspect:

Datum:

Slope Angle:

Comments:

R.L. at Surface:

Field Site Classification (AS2870)

DRILLING				MATERIAL SUBSTANCE & SAMPLING														
Method ¹	Penetration ²	Support ³	Groundwater ⁴	depth (m)	Graphic log ⁵	Field Classification ⁶	Material soil type: plasticity or particle characteristics, colour, secondary or minor components ⁷	Plasticity ⁸	Moisture Content ⁹	Consistency / Density Index ¹⁰	Pocket Penetrometer (kPa)	From (mm)	To (mm)	Blows (test 1)	Blows (test 2)	Method	Sampling ¹¹ (notes, samples, tests, Sample No.)	Observations structure and additional observations (i.e. odour, mottles, presence of roots, fragments.)
AD																		
AD	1			0.5			Red silty clay	L	M	S								Some gravel
AD																		
AD				1			Dark red silty clay	H	M	S								Ribboning
AD																		
AD	2			1.5			Brown silty clay	H	W	VS								Ribboning
AD																		
AD				2			Yellow silty clay	H	W	VS								
AD																		
AD				2.5				M	M									
AD																		
AD				3				M	M									
AD																		
AD				3.5			Grey silty clay	M	M	F								
AD																		
AD	3			4				M	M	F								Limited cuttings coming up
AD																		
AD				4.5														
AD							Grey silty clay											
AD							EoH at 5.0m	H	M									High silt content

1 - Method

AS auger screwing*
AD auger drilling*
EX excavator
BH backhoe
RR roller/tricone
W washbore
CT cable tool
HA hand auger
PT pushtube
B blank bit
V V bit
T TC bit
*bit shown by suffix
e.g. ADT

2 - Penetration

1 2 3 4
no resist.
ranging to refusal

3 - Support

M casing
C casing
N nil
PT pushtube
SWL Standing Water Level
Water noted
water inflow
water outflow

4 - Groundwater

5 - Graphic Log

Topsoil
Light Clay
Medium Clay
Heavy Clay
Fine Sand
Coarse Sand
Silty Clay
Silt
Sandy Silt
loam
sandy loam
Gravel
XW Rock
DW Rock
SW Rock
Fresh Rock
Organic Layer
Fill

8 - Plasticity

NP Non - plastic
L Low
M Medium
H High

9 - Moisture Condition

D dry
M moist
W wet
W_p plastic limit
W_L liquid limit

6 - Classification

GW Well graded gravels
GP Poorly graded gravels
GM Silty gravels
GC Clayey gravels
SW Well graded sands
SP Poorly graded sands
SM Silty sands
SC Clayey sands
ML Inorganic silts of slight plasticity
CL Inorganic clays of low plasticity
CI Inorganic clays of medium plasticity
OL Organic silts of low plasticity
MH Inorganic silts of high plasticity
CH Inorganic clays of high plasticity
OH Organic clays of medium/high plasticity
PI peat and other highly organic soils

7 - Soil and Particle Sizes

B Boulders >200mm
CB Cobbles 63-200mm
G Gravels 20-63mm
coarse medium 6-20mm
fine 2.36-6mm
coarse 0.6-2.36mm
medium 0.2-0.6mm
fine 75µm-0.2mm
<0.75µm
M Silts
C Clays
O Organic
coarse soils fine soils
≤5% 'trace' ≤15% 'trace'
5-12% 'with' 15-30% 'with'
>12% prefix soil >30% prefix soil

10 - Consistency/Density Index

VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
U₁₀ undisturbed sample 50mm dia
U₁₀ undisturbed sample 63mm dia
D disturbed sample
N standard penetration test
N* SPT - sample recovered
N_c SPT with solid cone
V vane shear (kPa)
P pressuremeter
B_s bulk sample
E environmental sample

11 - Sampling

Document Owner: EnviroAg Australia

Revision: 2.0

Author: GT

Authorised: S.C.Lott

Status: Approved

Issue Date: 18/09/2009

Form 06027_A_Geotech Soil Profile

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Form_06027_A		Geotechnical Soil Profile Log				<div>GroundTruth</div> <div>The best in the field</div>																																																																																																																													
Project Number		41397		Date Started		30/10/2024		Hole/Pit #		BH3																																																																																																																									
Client		Yurunga		Date Finished		30/10/2024		Sheet		1 of 1																																																																																																																									
Project Manager		J.Palad		Logged By		J.Palad		Checked By		S.Lott																																																																																																																									
Zone:		55S		Vegetation:		Oats		Weather (current):		Sunny																																																																																																																									
Easting:		352616		Current Land Use:				Weather (recent):		Sunny																																																																																																																									
Northing:		6060086		Surface Drainage:				Location Description:		G3 - Beside water storage																																																																																																																									
Error:				Slope Aspect:																																																																																																																															
Datum:				Slope Angle:				Comments:		Proposed holding pond																																																																																																																									
R.L. at Surface:				Field Site Classification (AS2870)																																																																																																																															
DRILLING																																																																																																																																			
MATERIAL SUBSTANCE & SAMPLING																																																																																																																																			
<table><tr><td colspan="2">Method¹</td><td colspan="2">Penetration²</td><td colspan="2">Support³</td><td colspan="2">Groundwater⁴</td><td colspan="2">depth (m)</td><td colspan="2">Graphic log⁵</td><td colspan="2">Field Classification⁶</td><td colspan="2">Material</td><td colspan="2">Plasticity⁸</td><td colspan="2">Moisture Content⁹</td><td colspan="2">Consistency / Density Index¹⁰</td><td colspan="2">Pocket Penetrometer</td><td colspan="2">SPT</td><td colspan="2">Sampling¹¹</td><td colspan="2">Observations</td></tr><tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">soil type: plasticity or particle characteristics, colour, secondary or minor components⁷</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2">From (mm)</td><td colspan="2">To (mm)</td><td colspan="2">Blows (test 1)</td><td colspan="2">Blows (test 2)</td><td colspan="2">Method</td><td colspan="2">(notes, samples, tests, Sample No.)</td><td colspan="2">structure and additional observations (i.e. odour, mottles, presence of roots, fragments.)</td></tr></table>												Method ¹		Penetration ²		Support ³		Groundwater ⁴		depth (m)		Graphic log ⁵		Field Classification ⁶		Material		Plasticity ⁸		Moisture Content ⁹		Consistency / Density Index ¹⁰		Pocket Penetrometer		SPT		Sampling ¹¹		Observations																soil type: plasticity or particle characteristics, colour, secondary or minor components ⁷										From (mm)		To (mm)		Blows (test 1)		Blows (test 2)		Method		(notes, samples, tests, Sample No.)		structure and additional observations (i.e. odour, mottles, presence of roots, fragments.)																																																					
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AD								0.5				Brown sandy clay		L		D		Fb																gravel																																																																																																	
AD								1				Brown red sandy clay		L		D		Fb																with gravel																																																																																																	
AD								1.5				Light red sandy clay		L		D		Fb																With gravel																																																																																																	
AD								2				Light brown sandy clay		L		D		Fb																																																																																																																	
AD								2.5				Light brown sandy clay		L		D		Fb																																																																																																																	
AD								3				Yellow sandy clay		L		D		Fb																Clay mottles																																																																																																	
AD								3.5				Brown silty clay		M		M		L																With clay - moderate Very plastic / ribboning																																																																																																	
AD								4				Brown / red clay		M		W		F																																																																																																																	
AD								4.5				Brown / red clay																																																																																																																							
AD												Brown / red clay																																																																																																																							
AD												Brown silty clay		H		W		VS																																																																																																																	
AD												EoH at 5.0m																																																																																																																							
1 - Method												2 - Penetration												3 - Support												4 - Groundwater												5 - Graphic Log												6 - Classification												7 - Soil and Particle Sizes												8 - Plasticity												9 - Moisture Condition												10 - Consistency/Density Index												11 - Sampling											
AS auger screwing* AD auger drilling* EX excavator BH backhoe RR roller/tricone W washbore CT cable tool HA hand auger PT pushtube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT												1 2 3 4 no resist. ranging to refusal												M mud C casing N nil S silt F fill Sandy Silt												SWL Standing Water Level Water noted water inflow water outflow												NP Non - plastic L Low M Medium H High												NP Non - plastic L Low M Medium H High												GW Well graded gravels GP Poorly graded gravels GM Silty gravels GC Clayey gravels SW Well graded sands SP Poorly graded sands SM Silty sands SC Clayey sands ML Inorganic silts of slight plasticity CL Inorganic clays of low plasticity CI Inorganic clays of medium plasticity OL Organic silts of low plasticity MH Inorganic silts of high plasticity CH Inorganic clays of high plasticity OH Organic clays of medium/high plasticity PI peat and other highly organic soils												B Boulders >200mm CB Cobbles 63-200mm G Gravels 20-63mm S Sands coarse 6-20mm fine 2.36-6mm coarse 0.6-2.36mm medium 0.2-0.6mm fine 75µm-0.2mm <0.75µm M Silts C Clays O Organic												VS very soft S soft F firm St stiff VSt very stiff H hard VD very dense U ₁₀ undisturbed sample 50mm dia U ₁₅ undisturbed sample 63mm dia N standard penetration test N* SPT - sample recovered N _c SPT with solid cone V vane shear (kPa) P pressuremeter B _s bulk sample E environmental sample												VS very soft S soft F firm St stiff VSt very stiff H hard VD very dense U ₁₀ undisturbed sample 50mm dia U ₁₅ undisturbed sample 63mm dia N standard penetration test N* SPT - sample recovered N _c SPT with solid cone V vane shear (kPa) P pressuremeter B _s bulk sample E environmental sample																							
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Revision:												2.0												Authorised:												S.C.Lott												Issue Date:												18/09/2009												Form Page 1 of 1																																																											

Form_06027_A

Geotechnical Soil Profile Log

Ground Truth

The best in the field

Project Number	41397	Date Started	30/10/2024	Hole/Pit #	BH4		
Client	Yurunga	Date Finished	30/10/2024	Sheet	1	of	1
Project Manager	J.Palad	Logged By	J.Palad	Checked By	S.Lott		

Zone: 55S

Vegetation: Grass

Weather (current): Sunny

Easting: 352655

Current Land Use:

Weather (recent): Sunny

Northing: 6060283

Surface Drainage:

Location Description: G1 - At the northern end of water storage

Error:

Slope Aspect:

Datum:

Slope Angle:

Comments:

R.L. at Surface:

Field Site Classification (AS2870)

DRILLING				MATERIAL SUBSTANCE & SAMPLING													
Method ¹	Penetration ²	Support ³	Groundwater ⁴	depth (m)	Graphic log ⁵	Material	Plasticity ⁸	Moisture Content ⁹	Consistency / Density Index ¹⁰	Pocket Penetrometer	From (mm)	To (mm)	Blows (test 1)	Blows (test 2)	Method	Sampling ¹¹	Observations
						soil type: plasticity or particle characteristics, colour, secondary or minor components ⁷										(notes, samples, tests, Sample No.)	structure and additional observations (i.e. odour, mottles, presence of roots, fragments.)
AD						Brown sandy silty clay											
AD				0.5		brown silty clay	L	D	F								
AD				1		Brown red silty clay	L	D	F								
AD				1.5		Brown red silty clay	M	M	S								
AD				2		Brown red silty clay	H	M	VS								Ribboning
AD				2.5		Brown silty clay	H	W	VS								Ribboning at 2.6m
AD				3		Brown silty clay	H	W	VS								No cuttings at 3.1m
AD				3.5		Brown silty clay	H	W	VS								
AD				4		Brown silty clay											
AD				4.5		Brown silty clay	M	W	F								
AD						EoH at 5.0m	M	W	S								Higher clay content

1 - Method

AS auger screwing*

AD auger drilling*

EX excavator

BH backhoe

RR roller/tricone

W washbore

CT cable tool

HA hand auger

PT pushtube

B blank bit

V V bit

T TC bit

*bit shown by suffix e.g. ADT

2 - Penetration

1 2 3 4

no resist. ranging to refusal

3 - Support

M casing

C nil

4 - Groundwater

SWL Standing Water Level

Water noted

water inflow

water outflow

5 - Graphic Log

Topsoil

Light Clay

Medium Clay

Heavy Clay

Fine Sand

Coarse Sand

Silty Clay

Silt

Sandy Silt

loam

sandy loam

Gravel

XW Rock

DW Rock

SW Rock

Fresh Rock

Organic Layer

Fill

8 - Plasticity

NP Non - plastic

L Low

M Medium

H High

9 - Moisture Condition

D dry

M moist

W wet

W_p plastic limit

W_L liquid limit

6 - Classification

GW Well graded gravels

GP Poorly graded gravels

GM Silty gravels

GC Clayey gravels

SW Well graded sands

SP Poorly graded sands

SM Silty sands

SC Clayey sands

ML Inorganic silts of slight plasticity

CL Inorganic clays of low plasticity

CI Inorganic clays of medium plasticity

OL Organic silts of low plasticity

MH Inorganic silts of high plasticity

CH Inorganic clays of high plasticity

OH Organic clays of medium/high plasticity

PI peat and other highly organic soils

7 - Soil and Particle Sizes

B Boulders >200mm

CB Cobbles 63-200mm

G Gravels 20-63mm

coarse 6-20mm

medium 2.36-6mm

coarse 0.6-2.36mm

medium 0.2-0.6mm

fine 75µm-0.2mm

<0.75µm

M Silts

C Clays

O Organic

coarse soils

fine soils

≤5% 'trace'

≤15% 'trace'

5-12% 'with'

15-30% 'with'

>12% prefix soil

>30% prefix soil

10 - Consistency/Density Index

VS very soft

S soft

F firm

St stiff

VSt very stiff

H hard

U₁₀ undisturbed sample 50mm dia

U₁₀ undisturbed sample 63mm dia

N standard penetration test

N* SPT - sample recovered

N_L SPT with solid cone

V vane shear (kPa)

P pressuremeter

B_S bulk sample

E environmental sample

Fb friable

VL very loose

L loose

MD medium dense

D dense

VD very dense

Document Owner: EnviroAg Australia

Author: GT

Status: Approved



Form:06027_A_Geotech Soil Profile



Revision: 2.0

Authorised: S.C.Lott

Issue Date: 18/09/2009

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Form_06022_A										Bore Construction Log										EA Alliance																											
Office Project No.: 41397										Borehole No: 1										Sheet: of																											
Client: Yurunga										Date started: 31/10/2024																																					
Project Manager: S.Lott										Date completed: 31/10/2024																																					
Project: Yurunga										Logged by: M.Lott																																					
Bore Location: Geotech										Checked by: S.Lott																																					
Easting: 352649.775										R.L. at Surface:										Drilling Method: Auger																											
Northing: 6059961.09										Surface Drainage:										Hole Size: 115mm																											
Datum:										Current Land Use:																																					
drilling information										material substance																																					
method		penetration				support		water		notes, samples, tests, etc.		R.L.		depth (m)		graphic log		class. symbol		material - soil type: plasticity or particle characteristics, colour, secondary or minor components						moisture condition		consistency / density index		Plasticity		pocket penetrometer (kPa)				Piezometer Construction											
		1 2 3 4																																		Annulus Pack		Casing		Water/development							
														.5						Red brown silty clay - Ribboning						D		Fb		L						Bentonite Powder		Casing									
												1												M		F		VH																			
												1.5						Light red silty clay - Some ribboning						M		F		VH																			
												2						Light brown clay with sand increasing 3.5						M		F		VH																			
														2.5						Grey brown clay silty sand - Ribboning						M		VS		M						Bentonite Chips						Casing					
												3												W		VS		M																			
												3.5						Silt increasing																													
Method										support		notes, samples, tests, etc.										classification symbols and soil descriptions based on the unified classification system (ref: AS1726, table A1)										consistency / density index						Plasticity									
AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger PT pushtube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT										M mud C casing N nil		U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test N* SPT - sample recovered N _C SPT with solid cone V vane shear (kPa) P pressuremeter B _S bulk sample E environmental sample R refusal										VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense										NP Non - plastic T Trace VL Very Low L Low M Medium H High VH Very High EH Extra High															
Document Owner: EA Alliance										penetration 1 2 3 4  no resist. ranging to refusal		Author: GT										Status: Approved										Form_06022_A_Bore Construction Log															
Revision: 2.0										water  water inflow water outflow		Authorised: S.C.Lott										Issue Date: 27/11/2008										Form Page 1 of 1															

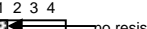
Form_06022_A										Bore Construction Log										EA Alliance																			
Office Project No.: 41397										Borehole No:																													
Client: Yurunga										Sheet:										of																			
Project Manager: S.Lott										Date started: 31/10/2024																													
Project: Yurunga										Date completed: 31/10/2024																													
Bore Location: Geotech										Logged by: M.Lott																													
										Checked by: S.Lott																													
Easting:										R.L. at Surface:										Drilling Method: Auger																			
Northing:										Surface Drainage:										Hole Size: 115mm																			
Datum:										Current Land Use:																													
drilling information										material substance																													
method	penetration				support	water	notes, samples, tests, etc.	R.L.	depth (m)	graphic log	class. symbol	material - soil type: plasticity or particle characteristics, colour, secondary or minor components	moisture condition	consistency / density index	Plasticity	pocket penetrometer (kPa)				Piezometer Construction																			
	1	2	3	4												100	200	300	400	Annulus Pack	Casing	Water/ development																	
								7.5				Clay band																											
								8																															
								8.5																															
								9																															
								9.5																															
								10																															
								10.5																															
Method AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger PT pushtube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT						support M mud C casing N nil penetration 1 2 3 4  no resist. ranging to refusal water  water inflow water outflow		notes, samples, tests, etc. U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test N* SPT - sample recovered N _C SPT with solid cone V vane shear (kPa) P pressuremeter B _S bulk sample E environmental sample R refusal						classification symbols and soil descriptions based on the unified classification system (ref: AS1726, table A1) moisture D dry M moist W wet W _p plastic limit W _L liquid limit						consistency / density index VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense		Plasticity NP Non - plastic T Trace VL Very Low L Low M Medium H High VH Very High EH Extra High																	
Document Owner: EA Alliance										Author: GT										Status: Approved										Form_06022_A_Bore Construction Log									
Revision: 2.0										Authorised: S.C.Lott										Issue Date: 27/11/2008										Form Page 1 of 1									

Form_06022_A										Bore Construction Log										EA Alliance																																	
Office Project No.: 41397										Borehole No: 2										Sheet: of																																	
Client: Yurunga										Date started: 31/10/2024																																											
Project Manager: S.Lott										Date completed: 31/10/2024																																											
Project: Yurunga										Logged by: M.Lott																																											
Bore Location: Geotech										Checked by: S.Lott																																											
Easting: 351688.726										R.L. at Surface:										Drilling Method: Auger																																	
Northing: 6060448.287										Surface Drainage:										Hole Size: 115mm																																	
Datum:										Current Land Use:																																											
drilling information										material substance																																											
method		penetration				support		water		notes, samples, tests, etc.		R.L.		depth (m)		graphic log		class. symbol		material - soil type: plasticity or particle characteristics, colour, secondary or minor components										moisture condition		consistency / density index		Plasticity		pocket penetrometer (kPa)		Piezometer Construction															
		1 2 3 4																																				Annulus Pack Casing Water/development															
														.5						Red brown silty clay - Ribboning										D		Fb		L						Bentonite Powder													
														1																M		F		VH																			
														1.5						Light red silty clay - Some ribboning										M		F		VH																			
														2						Light brown clay silty sand - Ribboning										M		F		VH																			
														2.5																		M		VS		M						Bentonite Chips											
														3																		W		VS		M																	
														3.5								Silt increasing																															
Method										support				notes, samples, tests, etc.										classification symbols and soil descriptions based on the unified classification system (ref: AS1726, table A1)										consistency / density index										Plasticity									
AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger PT pushtube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT										M mud C casing N nil penetration 1 2 3 4 no resist. ranging to refusal water water inflow water outflow				U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test N* SPT - sample recovered N _C SPT with solid cone V vane shear (kPa) P pressuremeter B _S bulk sample E environmental sample R refusal										VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense										NP Non - plastic T Trace VL Very Low L Low M Medium H High VH Very High EH Extra High																			
Document Owner: EA Alliance										Author: GT										Status: Approved										Form_06022_A_Bore Construction Log																							
Revision: 2.0										Authorised: S.C.Lott										Issue Date: 27/11/2008										Form Page 1 of 1																							

Easting:	R.L. at Surface:	Drilling Method:	Auger
Northing:	Surface Drainage:	Hole Size:	115mm
Datum:	Current Land Use:		

Method		support		notes, samples, tests, etc.	classification symbols and soil descriptions based on the unified classification system (ref: AS1726, table A1)	consistency / density index	Plasticity
AS	auger screwing*	M	mud	U ₅₀	undisturbed sample 50mm diameter	VS	NP Non - plastic
AD	auger drilling*	C	casing	U ₆₃	undisturbed sample 63mm diameter	S	T Trace
RR	roller/tricone	N	nil	D	disturbed sample	F	VL Very Low
W	washbore	penetration			standard penetration test	St	L Low
CT	cable tool	1 2 3 4		N*	SPT - sample recovered	VSt	M Medium
HA	hand auger			N _C	SPT with solid cone	H	H High
PT	pushtube			V	vane shear (kPa)	Fb	VH Very High
B	blank bit			P	pressuremeter	VL	EH Extra High
V	V bit			B _S	bulk sample	L	
T	TC bit			R	environmental sample	MD	
*bit shown by suffix		water			refusal	D	
e.g. ADT						VD	
					moisture		
					D dry		
					M moist		
					W wet		
					W _p plastic limit		
					W _L liquid limit		

Easting:	_____	R.L. at Surface:	_____	Drilling Method:	_____	Auger
Northing:	_____	Surface Drainage:	_____	Hole Size:	_____	115mm
Datum:	Current Land Use: _____					

Method		support	notes, samples, tests, etc.	classification symbols and soil descriptions based on the unified classification system (ref: AS1726, table A1)	consistency / density index	Plasticity
AS	auger screwing*	M mud	U ₅₀ undisturbed sample 50mm diameter	moisture D dry M moist W wet W _p plastic limit W _L liquid limit	VS very soft	NP Non - plastic
AD	auger drilling*	C casing	U ₆₃ undisturbed sample 63mm diameter		S soft	T Trace
RR	roller/tricone	N nil	D disturbed sample		F firm	VL Very Low
W	washbore	<div>penetration</div> <div>1 2 3 4</div> <div></div>	N standard penetration test		St stiff	L Low
CT	cable tool		N* SPT - sample recovered		VSt very stiff	M Medium
HA	hand auger	N _C SPT with solid cone	SPT with solid cone	H hard	H High	
PT	pushtube	V ranging to	vane shear (kPa)	Fb friable	VH Very High	
B	blank bit	P refusal	pressuremeter	VL very loose	EH Extra High	
V	V bit	B _S bulk sample	bulk sample	L loose		
T	TC bit	E environmental sample	environmental sample	MD medium dense		
*bit shown by suffix		R refusal	refusal	D dense		
e.g. ADT		<div><div>water inflow</div><div>water outflow</div></div>		VD very dense		

Form_06022_A						Bore Construction Log								EA Alliance													
									Borehole No:				<div>3</div>														
Office Project No.: <div>41397</div>									Sheet:				<div>of</div>														
Client: <div>Yurunga</div>									Date started:				<div>31/10/2024</div>														
Project Manager: <div>S.Lott</div>									Date completed:				<div>31/10/2024</div>														
Project: <div>Yurunga</div>									Logged by:				<div>M.Lott</div>														
Bore Location: <div>Geotech</div>									Checked by:				<div>S.Lott</div>														
Easting: <div>352732.617</div>				R.L. at Surface:				Drilling Method:				<div>Auger</div>															
Northing: <div>6060645.858</div>				Surface Drainage:				Hole Size:				<div>115mm</div>															
Datum:				Current Land Use:																							
drilling information									material substance																		
method		penetration				support	water	notes, samples, tests, etc.	R.L.	depth (m)	graphic log	class. symbol	material - soil type: plasticity or particle characteristics, colour, secondary or minor components	moisture condition	consistency / density index	Plasticity	pocket penetrometer (kPa)				Piezometer Construction						
		1	2	3	4												100	200	300	400	Annulus Pack	Casing	Water/ development				
									.5				Red brown silty clay - Ribboning	D	Fb	L											
									1					M	F	VH											
									1.5				Red clay w / sand & silt	M	F	VH											
									2				Yellow brown sandy clay w / silt	M	F	VH											
									2.5					M	VS	M											
									3				Yellow brown sandy clay w / silt	W	VS	M											
									3.5				Grey mottles increasing														
Method <div>AS auger screwing*</div> <div>AD auger drilling*</div> <div>RR roller/tricone</div> <div>W washbore</div> <div>CT cable tool</div> <div>HA hand auger</div> <div>PT pushtube</div> <div>B blank bit</div> <div>V V bit</div> <div>T TC bit</div> <div>*bit shown by suffix e.g. ADT</div>								support <div>M mud</div> <div>C casing</div> <div>N nil</div>		penetration <div>1 2 3 4</div> <div><div></div><div></div><div></div><div></div></div> <div>no resist. ranging to refusal</div>		water <div><div></div> water inflow</div> <div><div></div> water outflow</div>		notes, samples, tests, etc. <div>U₅₀ undisturbed sample 50mm diameter</div> <div>U₆₃ undisturbed sample 63mm diameter</div> <div>D disturbed sample</div> <div>N standard penetration test</div> <div>N* SPT - sample recovered</div> <div>N_c SPT with solid cone</div> <div>V vane shear (kPa)</div> <div>P pressuremeter</div> <div>B_s bulk sample</div> <div>E environmental sample</div> <div>R refusal</div>				classification symbols and soil descriptions based on the unified classification system (ref: AS1726, table A1) <div>moisture<div>D dry</div><div>M moist</div><div>W wet</div><div>W_p plastic limit</div><div>W_L liquid limit</div></div>				consistency / density index <div>VS very soft</div> <div>S soft</div> <div>F firm</div> <div>St stiff</div> <div>VSt very stiff</div> <div>H hard</div> <div>Fb friable</div> <div>VL very loose</div> <div>L loose</div> <div>MD medium dense</div> <div>D dense</div> <div>VD very dense</div>				Plasticity <div>NP Non - plastic</div> <div>T Trace</div> <div>VL Very Low</div> <div>L Low</div> <div>M Medium</div> <div>H High</div> <div>VH Very High</div> <div>EH Extra High</div>	
Document Owner: <div>EA Alliance</div>						Author: <div>GT</div>				Status: <div>Approved</div>				Form_06022_A_Bore Construction Log													
Revision: <div>2.0</div>						Authorised: <div>S.C.Lott</div>				Issue Date: <div>27/11/2008</div>				Form Page 1 of 1													



Easting:	_____	R.L. at Surface:	_____	Drilling Method:	_____
Northing:	_____	Surface Drainage:	_____	Hole Size:	_____
Datum:	_____	Current Land Use:	_____		_____

Document Owner:	EA Alliance	Author:	GT	Status:	Approved	Form_06022_A_Bore Construction Log
Revision:	2.0	Authorised:	S.C.Lott	Issue Date:	27/11/2008	Form Page 1 of 1

[illegible]

Form_06022_A										Bore Construction Log										EA Alliance																									
Office Project No.: 41397										Borehole No: 4										Sheet: of																									
Client: Yurunga										Date started: 31/10/2024																																			
Project Manager: S.Lott										Date completed: 31/10/2024																																			
Project: Yurunga										Logged by: M.Lott																																			
Bore Location: Geotech										Checked by: S.Lott																																			
Easting: 351364.757										R.L. at Surface:										Drilling Method: Auger																									
Northing: 6061558.717										Surface Drainage:										Hole Size: 115mm																									
Datum:										Current Land Use:																																			
drilling information										material substance																																			
method		penetration				support		water		notes, samples, tests, etc.		R.L.		depth (m)		graphic log		class. symbol		material - soil type: plasticity or particle characteristics, colour, secondary or minor components						moisture condition		consistency / density index		Plasticity		pocket penetrometer (kPa)				Piezometer Construction									
		1 2 3 4																																		Annulus Pack		Casing		Water/development					
														.5						Red brown silty clay - Ribboning						D		Fb		L						Bentonite Powder		Casing							
												1												M		F		VH																	
												1.5						Light red silty clay - Some ribboning						M		F		VH																	
												2						Light brown clay silty sand - Ribboning						M		F		VH																	
														2.5												M		VS		M						Bentonite Chips		Casing							
												3												W		VS		M																	
												3.5						Silt increasing																											
Method										support				notes, samples, tests, etc.										classification symbols and soil descriptions based on the unified classification system (ref: AS1726, table A1)										consistency / density index						Plasticity					
AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger PT pushtube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT										M mud C casing N nil penetration 1 2 3 4 no resist. ranging to refusal water water inflow water outflow				U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test N* SPT - sample recovered N _C SPT with solid cone V vane shear (kPa) P pressuremeter B _S bulk sample E environmental sample R refusal										VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense										NP Non - plastic T Trace VL Very Low L Low M Medium H High VH Very High EH Extra High											
Document Owner: EA Alliance										Author: GT										Status: Approved										Form_06022_A_Bore Construction Log															
Revision: 2.0										Authorised: S.C.Lott										Issue Date: 27/11/2008										Form Page 1 of 1															

Form_06022_A										Bore Construction Log										EA Alliance									
Office Project No.: 41397										Borehole No: 4																			
Client: Yurunga										Sheet: of																			
Project Manager: S.Lott										Date started: 31/10/2024																			
Project: Yurunga										Date completed: 31/10/2024																			
Bore Location: Geotech										Logged by: M.Lott																			
										Checked by: S.Lott																			
Easting:										R.L. at Surface:										Drilling Method: Auger									
Northing:										Surface Drainage:										Hole Size: 115mm									
Datum:										Current Land Use:																			
drilling information										material substance																			
method	penetration				support	water	notes, samples, tests, etc.	R.L.	depth (m)	graphic log	class. symbol	material - soil type: plasticity or particle characteristics, colour, secondary or minor components	moisture condition	consistency / density index	Plasticity	Piezometer Construction													
	1	2	3	4												Annulus Pack	Casing	Water/ development											
								4				Brown sand with silt and clay																	
								4.5				no sample																	
								5				Clay band / gravel. Course 3-5mm sand																	
								5.5				No sample																	
								6				Course sand with traces of silt and clay																	
								6.5				no sample																	
								7				Course sand w/ traces of silt and clay																	
Method					support		notes, samples, tests, etc.					classification symbols and soil descriptions based on the unified classification system (ref: AS1726, table A1)					consistency / density index		Plasticity										
AS	auger screwing*				M	mud	U ₅₀	undisturbed sample 50mm diameter					VS	very soft		NP	Non - plastic												
AD	auger drilling*				C	casing	U ₆₃	undisturbed sample 63mm diameter					S	soft		T	Trace												
RR	roller/tricone				N	nil	D	disturbed sample					F	firm		VL	Very Low												
W	washbore						N	standard penetration test					St	stiff		L	Low												
CT	cable tool						N*	SPT - sample recovered					VSt	very stiff		M	Medium												
HA	hand auger						N _c	SPT with solid cone					H	hard		H	High												
PT	pushtube						V	vane shear (kPa)					Fb	friable		VH	Very High												
B	blank bit						P	pressuremeter					VL	very loose		EH	Extra High												
V	V bit						B _s	bulk sample					L	loose															
T	TC bit						E	environmental sample					MD	medium dense															
*bit shown by suffix e.g. ADT							R	refusal					D	dense															
													VD	very dense															
Document Owner: EA Alliance										Author: GT										Status: Approved									
Revision: 2.0										Authorised: S.C.Lott										Issue Date: 27/11/2008									
																				Form_06022_A_Bore Construction Log									
																				Form Page 1 of 1									

Form_06022_A										Bore Construction Log										EA Alliance																													
Office Project No.: 41397															Borehole No:																																		
															Sheet: of																																		
Client: Yurunga															Date started: 31/10/2024																																		
Project Manager: S.Lott															Date completed: 31/10/2024																																		
Project: Yurunga															Logged by: M.Lott																																		
Bore Location: Geotech															Checked by: S.Lott																																		
Easting:															R.L. at Surface:															Drilling Method: Auger																			
Northing:															Surface Drainage:															Hole Size: 115mm																			
Datum:															Current Land Use:																																		
drilling information															material substance																																		
method		penetration				support		water		notes, samples, tests, etc.		R.L.		depth (m)		graphic log		class. symbol		material - soil type: plasticity or particle characteristics, colour, secondary or minor components										moisture condition		consistency / density index		Plasticity		pocket penetrometer (kPa)				Piezometer Construction									
		1 2 3 4																																						Annulus Pack		Casing		Water/development					
														11						Yellow clay with sandstone silt																													
																				Yellow clay with sandstone silt																													
														11.5						Yellow clay with sand and silt																													
																				Hard material																													
														12						Brown clay																													
																				Sand with silt and some clay																													
														12.5																														SIGNIFICANT WATER					
														13						Eoh at 13.0m																								Significant silts / sands. Had to push in the last 0.5m					
Method										support					notes, samples, tests, etc.										classification symbols and soil descriptions based on the unified classification system (ref: AS1726, table A1)										consistency / density index					Plasticity									
AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger PT pushtube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT										M mud C casing N nil penetration 1 2 3 4  no resist. ranging to refusal water  water inflow water outflow					U ₅₀ undisturbed sample 50mm diameter U ₆₃ undisturbed sample 63mm diameter D disturbed sample N standard penetration test N* SPT - sample recovered N _c SPT with solid cone V vane shear (kPa) P pressuremeter B _s bulk sample E environmental sample R refusal										VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense										NP Non - plastic T Trace VL Very Low L Low M Medium H High VH Very High EH Extra High														
Document Owner: EA Alliance										Author: GT					Status: Approved										Form_06022_A_Bore Construction Log																								
Revision: 2.0										Authorised: S.C.Lott					Issue Date: 27/11/2008										Form Page 1 of 1																								

Form 3005

Appendix B Soil Test Results

Yurunga Farms Partnership
18214 Riverina Highway
Blighy
NSW 2713



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
 NATA is a signatory to the ILAC Mutual Recognition
 Arrangement for the mutual recognition of the
 equivalence of testing, medical testing, calibration,
 inspection, proficiency testing scheme providers and
 reference materials producers reports and certificates.

Attention: **Admin**

Report **1163371-S**
 Project name **YURUNGA GUNYAH PARK EIS**
 Project ID **24675**
 Received Date **Nov 22, 2024**

Client Sample ID			BS-1	BS-2
Sample Matrix			Soil	Soil
Eurofins Sample No.			B24- No0062866	B24- No0062867
Date Sampled			Nov 20, 2024	Nov 20, 2024
Test/Reference	LOR	Unit		
Conductivity (1:5 aqueous extract at 25 °C as rec.)	10	uS/cm	170	160
pH (1:5 Aqueous extract at 25 °C as rec.)	0.1	pH Units	8.32	9.02
Exchangeable Sodium Percentage (ESP)*	0.1	%	18	14
Magnesium (exchangeable)*	0.1	meq/100g	11	13
Potassium (exchangeable)*	0.1	meq/100g	0.6	0.7
Sodium (exchangeable)*	0.1	meq/100g	4.4	4.8
Cation Exchange Capacity				
Calcium (exchangeable)*	0.1	meq/100g	8.4	16
Cation Exchange Capacity	0.5	meq/100g	25	34
Sample Properties				
% Moisture	1	%	16	16

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Conductivity (1:5 aqueous extract at 25 °C as rec.) - Method: LTM-INO-4030 Conductivity	Melbourne	Nov 25, 2024	7 Days
Magnesium (exchangeable) - Method: LTM-MET-3060 Cation Exchange Capacity and ESP	Melbourne	Nov 25, 2024	180 Days
Potassium (exchangeable) - Method: LTM-MET-3060 Cation Exchange Capacity and ESP	Melbourne	Nov 25, 2024	180 Days
Sodium (exchangeable) - Method: LTM-MET-3060 Cation Exchange Capacity and ESP	Melbourne	Nov 25, 2024	180 Days
Cation Exchange Capacity - Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage	Melbourne	Nov 25, 2024	28 Days
pH (1:5 Aqueous extract at 25 °C as rec.) - Method: LTM-GEN-7090 pH in water by ISE	Brisbane	Nov 22, 2024	7 Days
Exchangeable Sodium Percentage (ESP) - Method: LTM-MET-3060 - Cation Exchange Capacity (CEC) & Exchangeable Sodium Percentage (ESP)	Melbourne	Nov 25, 2024	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Brisbane	Nov 22, 2024	14 Days



web: www.eurofins.com.au
email: EnviroSales@eurofins.com

ABN: 50 005 085 521

ABN: 91 05 0159 898

NZBN: 9429046024954

Melbourne 6 Monterey Road Dandenong South VIC 3175 +61 3 8564 5000 NATA# 1261 Site# 1254	Geelong 19/8 Lewalan Street Grovedale VIC 3216 +61 3 8564 5000 NATA# 1261 Site# 25403	Sydney 179 Magowar Road Girraween NSW 2145 +61 2 9900 8400 NATA# 1261 Site# 18217	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 +61 2 6113 8091 NATA# 1261 Site# 25466	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 T: +61 7 3902 4600 NATA# 1261 Site# 20794 & 2780	Newcastle 1/2 Frost Drive Mayfield West NSW 2304 +61 2 4968 8448 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool WA 6106 +61 8 6253 4444 NATA# 2377 Site# 2370 & 2554	Auckland 35 O'Rorke Road Penrose, Auckland 1061 +64 9 526 4551 IANZ# 1327	Auckland (Focus) Unit C1/4 Pacific Rise, Mount Wellington, Auckland 1061 +64 9 525 0568 IANZ# 1308	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 +64 3 343 5201 IANZ# 1290	Tauranga 1277 Cameron Road, Gate Pa, Tauranga 3112 +64 9 525 0568 IANZ# 1402
---	--	--	--	---	--	--	---	--	--	--

Company Name: Yurunga Farms Partnership
Address: 18214 Riverina Highway
Blighty
NSW 2713

Project Name: YURUNGA GUNYAH PARK EIS
Project ID: 24675

Order No.:
Report #: 1163371
Phone:
Fax:

Received: Nov 22, 2024 2:41 PM
Due: Nov 29, 2024
Priority: 5 Day
Contact Name: Admin

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						pH (1:5 Aqueous extract at 25 °C as rec.)	Eurofins Suite B20	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254							X	
Brisbane Laboratory - NATA # 1261 Site # 20794 & 2780						X		X
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	BS-1	Nov 20, 2024		Soil	B24-No0062866	X	X	X
2	BS-2	Nov 20, 2024		Soil	B24-No0062867	X	X	X
Test Counts						2	2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ppm: parts per million
µg/L: micrograms per litre	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	Colour: Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Conductivity (1:5 aqueous extract at 25 °C as rec.)				uS/cm	< 10			10	Pass	
Exchangeable Sodium Percentage (ESP)*				%	< 0.1			0.1	Pass	
Magnesium (exchangeable)*				meq/100g	< 0.1			0.1	Pass	
Potassium (exchangeable)*				meq/100g	< 0.1			0.1	Pass	
Sodium (exchangeable)*				meq/100g	< 0.1			0.1	Pass	
Method Blank										
Cation Exchange Capacity										
Calcium (exchangeable)*				meq/100g	< 0.1			0.1	Pass	
Cation Exchange Capacity				meq/100g	< 0.5			0.5	Pass	
LCS - % Recovery										
Conductivity (1:5 aqueous extract at 25 °C as rec.)				%	101			70-130	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
					Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25 °C as rec.)	M24-No0068693	NCP		uS/cm	64	62	2.5	30%	Pass	
Exchangeable Sodium Percentage (ESP)*	B24-No0049387	NCP		%	3.3	3.4	2.0	30%	Pass	
Magnesium (exchangeable)*	B24-No0049387	NCP		meq/100g	9.6	9.6	1.0	30%	Pass	
Potassium (exchangeable)*	B24-No0049387	NCP		meq/100g	< 0.1	< 0.1	<1	30%	Pass	
Sodium (exchangeable)*	B24-No0049387	NCP		meq/100g	0.7	0.7	1.0	30%	Pass	
Duplicate										
Cation Exchange Capacity					Result 1	Result 2	RPD			
Calcium (exchangeable)*	B24-No0049387	NCP		meq/100g	11	11	2.0	30%	Pass	
Cation Exchange Capacity	B24-No0049387	NCP		meq/100g	22	22	1.0	30%	Pass	
Duplicate										
Sample Properties					Result 1	Result 2	RPD			
% Moisture	B24-No0062866	CP		%	16	16	1.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Nileshni Goundar	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Metal
Jonathon Angell	Senior Analyst-Sample Properties
Luke Holt	Senior Analyst-Inorganic



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Material Test Report

Report Number: 233212.00-1
Issue Number: 1
Date Issued: 04/12/2024
Client: EnviroAg Australia Pty Limited
82 Glen Innes Road, Armidale NSW
Contact: Caylan Siddell
Project Number: 233212.00
Project Name: 24675 Yurunga Farms
Project Location: Yurunga Farms, Blighty NSW
Work Request: 17715
Sample Number: BN-17715A
Date Sampled: 22/11/2024
Dates Tested: 25/11/2024 - 28/11/2024
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: Pit 1-4, Depth: 1.5 - 5.0m
Material: CLAY, trace sand



Douglas Partners Pty Ltd

Brisbane Laboratory

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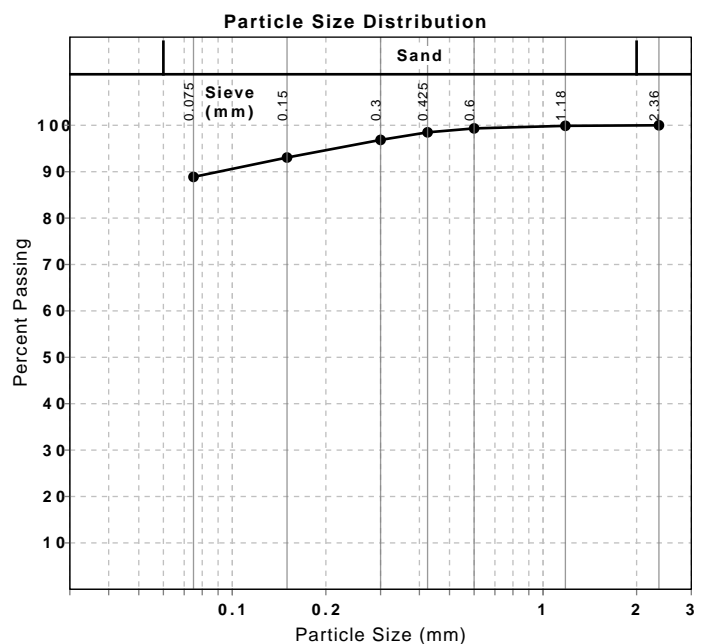
Laboratory Accreditation Number: 828

Particle Size Distribution (AS1289 3.6.1)		
Sieve	Passed %	Passing Limits
2.36 mm	100	
1.18 mm	100	
0.6 mm	99	
0.425 mm	98	
0.3 mm	97	
0.15 mm	93	
0.075 mm	89	

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	2		
Soil Description	As per material description		
Nature of Water	Demineralised water		
Temperature of Water (°C)	24		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	46		
Plastic Limit (%)	15		
Plasticity Index (%)	31		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.2		
Linear Shrinkage (%)	14.0		
Cracking Crumbling Curling	Curling		



Appendix C Bore Log Photos



Geotech BH01



Geotech BH02



Geotech BH04



Agronomic SS03



Agronomic SS06



Agronomic SS07



Agronomic SS08



Agronomic SS09



Agronomic SS10



Agronomic SS11



Agronomic SS12



Agronomic SS13



Agronomic SS14



Agronomic SS15



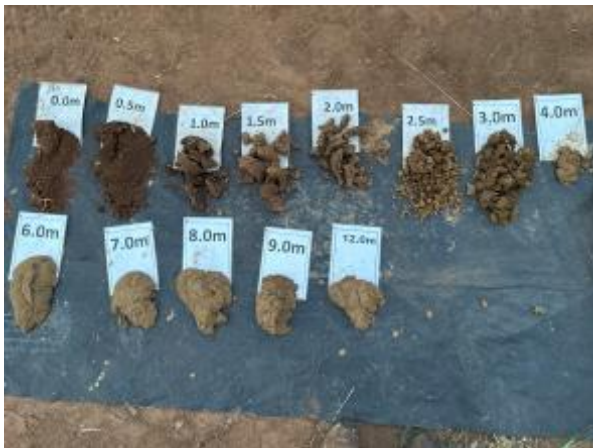
Agronomic SS16



Agronomic SS17



Piezo PZ01



Piezo PZ02



Piezo PZ03

Appendix D Geotechnical and Agronomic Sample Locations and Piezometer Locations



Legend:

Site

- New Grove
- Gunyah Park

Field Work

- Boreholes
- Piezometers
- Agronomic Samples

Infrastructure

Road Network

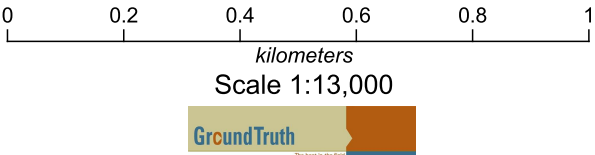
- Highway
- Road
- Unclassified

Imagery

Google Satellite

Project:	41397 - Yurunga Farms Partnership
File:	41397 - Yurunga Farms Partnership.qgz
Software:	QGIS 3.40 - desktop (Windows)
Prepared By:	Janina Palad

No.	Rev.	Date
-	B	11 April 2025



CRS:	EPSG:7855
Coordinate Units:	Meters
Scale:	1:13,000
Page Size:	420 x 297

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Appendix M. Crop Irrigation Management Plan

Crop and Irrigation Management Plan

Gunyah Park Dairy Feedlot, Blighty NSW

Report Number 24675.113201.0



Prepared for

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1. Introduction

This Crop and Irrigation Management Plan (CIMP) has been prepared to assist Yurunga Farms Partnership (YFP) in minimising environmental impacts arising from the expansion of the 'Gunyah Park' Dairy.

1.1 Objectives

The objective of this CIMP is to provide best practice environmental outcomes to minimise any adverse impacts of effluent irrigation on the environment, both on and off site.

Key environmental objectives for the site are;

- (i) To provide best practice outcomes in terms of protection of:
 - surface water; and,
 - groundwater.
- (ii) To limit:
 - soil salinity issues;
 - odour and dust emissions;
 - nutrient accumulation in the soil; and,
 - degradation of soil structure.

The objective of this plan is to:

- prevent excessive surface runoff;
- prevent excessive subsurface infiltration and acceleration of leaching of nutrients to the environment;
- prevent nutrient accumulation in the soil;
- prevent salinity issues from inadequate leaching;
- prevent soil structural damage; and,
- maximise crop production to maximise crop uptake and removal of applied nutrients and water.

The expected outcomes of the plan are that:

- applied irrigation water must remain in the root zone for plant utilisation;
- sufficient irrigation be applied to fill the root zone and to meet deep drainage targets (10 mm/yr as deep drainage);
- application rate is to be low enough to avoid surface runoff;
- soils moisture contents are kept within the range of optimum moisture content for crop growth;
- soils are allowed to dry to the refill point to desiccate pathogens;
- a wetting and drying cycle is promoted to allow soil aeration and maximise the rooting depth, nutrient and organic matter cycling through the soil; and,
- plant production is maximised at all times.

1.2 Guidelines

The following Guidelines have been considered in the CIMP:

- *NSW Dairy Development and Environment Guidelines* (Department of Primary Industries and Regional Development, 2024);
- *Use of Effluent by Irrigation* (Department of Environment and Conservation (NSW), 2004);
- *Fertcare® Technical Standards for Nutrient Management Planning on Australian Dairy Farms* (Gourley, 2020); and,
- *Irrigation Guide – Efficient Water Use for Dairy* (Department of Agriculture, Water and the Environment & Dairy Australia, 2021).

2. Site Cropping and Irrigation

2.1 Cropping Layout and Infrastructure

Cropping areas for the site are divided into: irrigated and dryland cropping, as shown in Figure 1.

Table 1 provides dedicated area for each cropping method and the corresponding crops being planted.

Table 1 Cropping Areas

Method	Area (ha)	Crop
Dryland Cropping	128.4	Maize, Barley, Wheat, Triticale, Lucerne
Centre Pivot Irrigation	77.4	Maize, Barley, Wheat, Triticale, Lucerne
Flood Irrigation	116.6	Maize, Barley, Wheat, Triticale, Lucerne
Total	322.4	

2.1.1 Waste Utilisation Disposal Area

The available Waste Utilisation Disposal Area (WUDA) is 322.4 ha.

The total wastewater (effluent) application WUDA is 194 ha.

Table 2 WUDA Areas

Method	Area (ha)	Waste Type
Dryland Cropping	128.4	Manure only
Centre Pivot Irrigation	77.4	Manure and effluent
Flood Irrigation	116.6	Manure and effluent
Total	322.4	

Wastewaters generated by the dairy operations are irrigated on the effluent WUDA, where the nutrients and water can be utilised in plant production.

The sustainable use of the WUDAs directly relates to;

- the amount of nutrients applied;
- the amount of nutrients recovered in harvested or removed produce from the area; and,
- the amount of nutrients able to be safely stored in the soil.

Some loss of nutrients (and salts) from the system will occur by way of leachate moving below the root zone of the crops and through processes such as erosive soil loss. However, such losses of nutrients and salts should not impact on the environmental value of any associated surface or groundwater resources.

The use of a source of “fresh” or “clean” irrigation water to supplement the applied wastewater will be necessary to help maximise crop yields and nutrient removal from the WUDA. The amount and timing of both wastewater and fresh water applications will be largely determined by the irrigation requirement of the crops.

2.1.2 Flood Irrigation

The site has existing head ditches to supply water for flood irrigation.

Effluent is shandied with clean water to achieve sufficient irrigation water requirements and is fed into head ditches to flood irrigate the WUDA.

Existing tailwater drains (recycling system) allows excess flood irrigation tailwaters to be captured. These are connected to head ditches to allow reuse by irrigation back on the WUDA.

2.1.3 Centre Pivot Irrigation

Centre pivot irrigation is a low pressure system capable of applying variable rates of 5-25 mm per irrigation. This is an average application rate of 1.04 mm/hr. The pressure-compensation will apply water evenly across the field, avoiding any localised high or low application rates and thus avoiding associated localised deep drainage.

Centre pivot irrigation systems can be designed with manifolds in order to supply both effluent and clean water (shandyng). The combination rates will generally be 50:50/40:60/25:75 percent ratios of wastewater to clean water.

2.2 Irrigation Requirements

The annual crop water requirement for the site is estimated to be 2,270 ML/yr.

The estimated annual wastewater generation from the dairy operations is 187 ML/yr.

The total annual licensed water opportunity for the site is 2,496 ML/yr and is summarised in Table 3.

Table 3 Water Opportunity

Source	Licence No.	Entitlement (ML/yr)
Lower Murray Shallow Groundwater	13795	1,100
Murray Irrigation Channel	1009768	1,396
TOTAL		2,496

The water available to the irrigable areas is summarised below in Table 4. Sufficient water is available to support the irrigation areas. The fresh water will provide a leaching fraction for management of salinity.

Table 4 Irrigation Usage

Water Requirement		Effluent Application		Fresh Application	
Total (ML)	ML/ha	Total (ML)	ML/ha	Total (ML)	ML/ha
2270	11.70	187	1.5	873.10	10.2

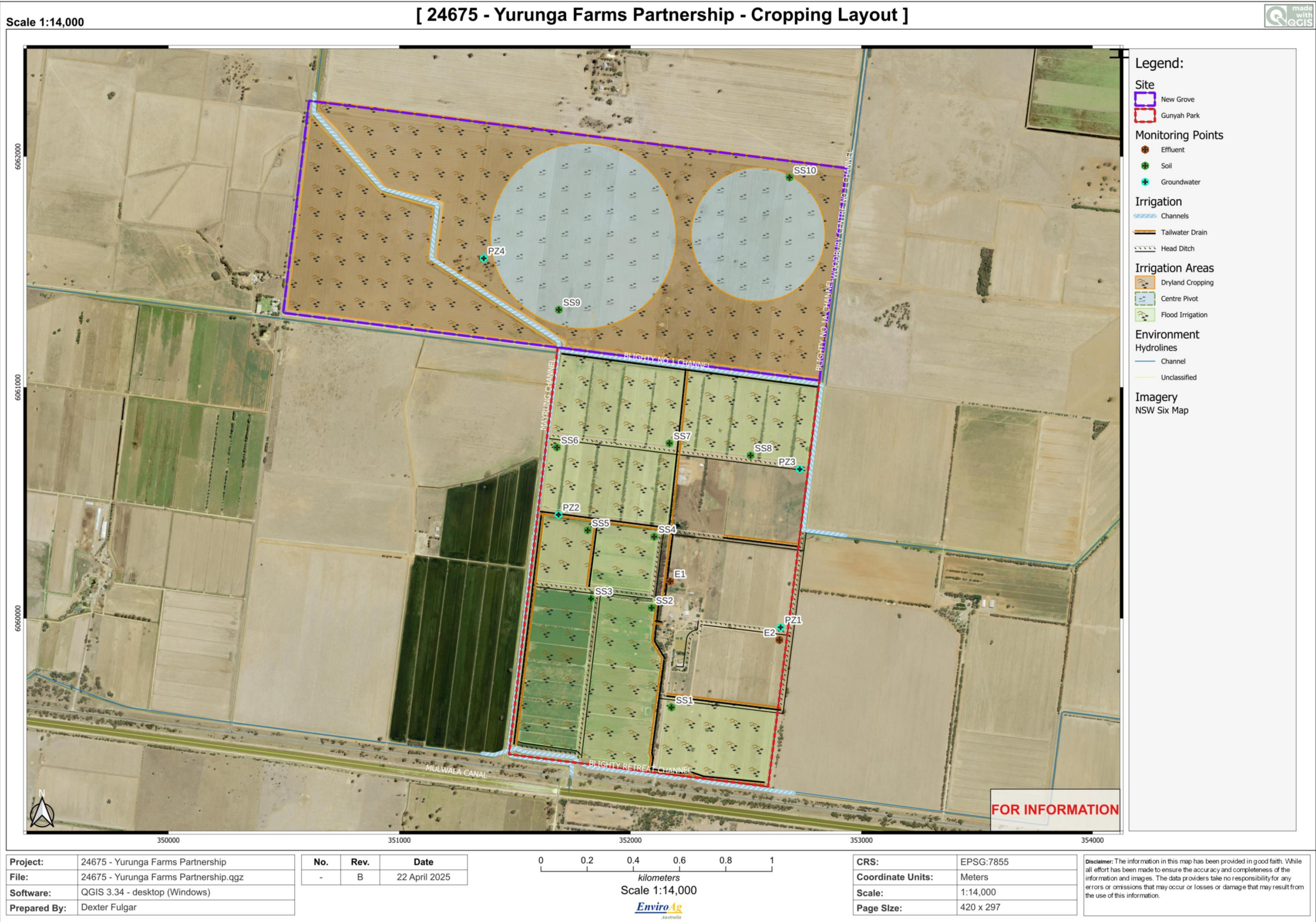


Figure 1 Cropping Area Layout (with monitoring points)

3. Site Description

3.1 Climate

Rainfall is highest in this area over the winter periods, generally around June (40.9 mm) and lowest in summer periods around February (26.4 mm) (refer to Figure 2). Temperature varies with averages of 14.7 °C to 31.1 °C in summer and 3.9 °C to 15.3 °C in winter (refer to Figure 3).

Based on an annual average evaporation of 1682.0 mm and an annual average rainfall of 408.8 mm, the site has a moisture deficit for every month except June (Figure 2) and on an annualised basis experiences a deficit of approximately 1273.2 mm.

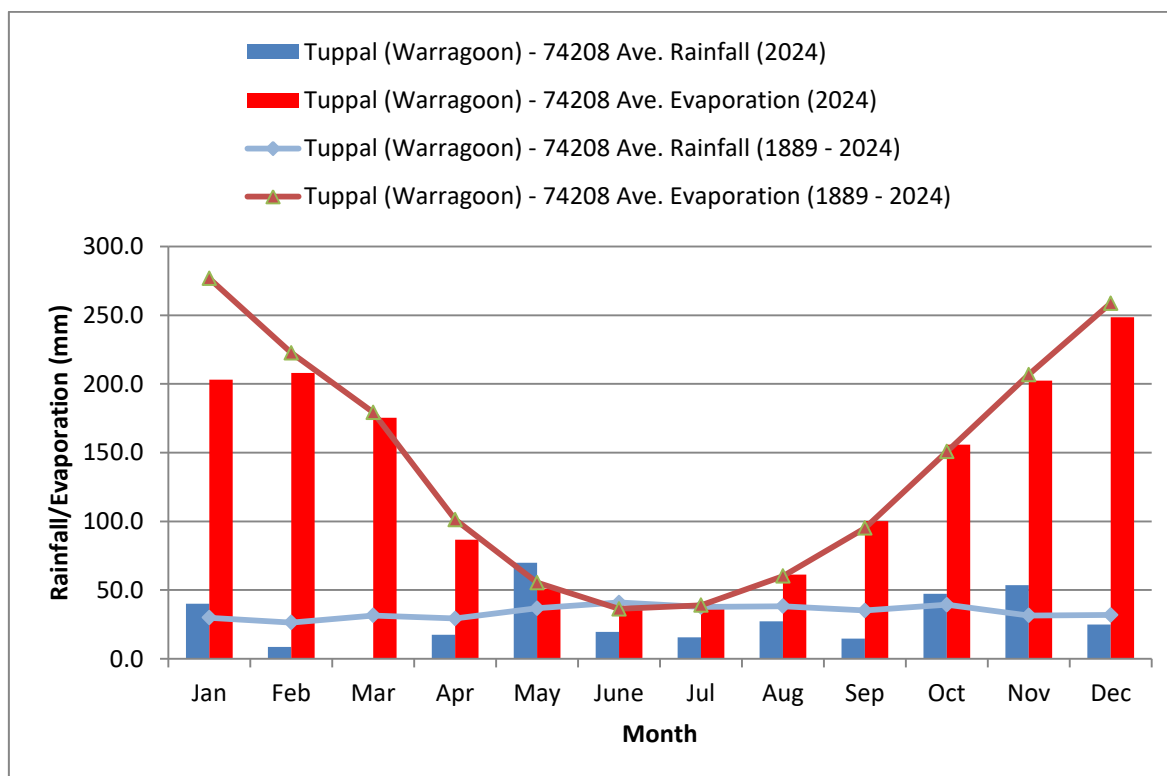


Figure 2 Mean monthly rainfall and evaporation.

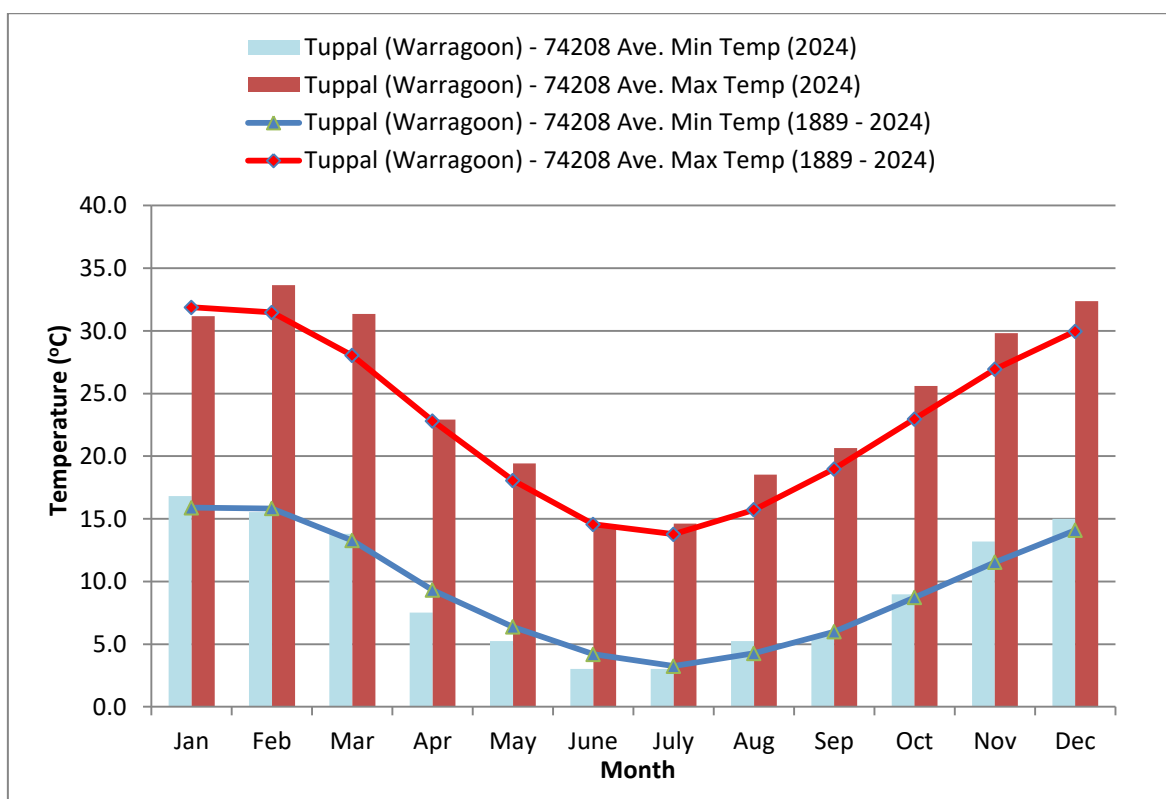


Figure 3 Mean minimum and maximum monthly temperatures.

3.2 Topography and Drainage

The site is generally flat with an average slope of less than 2%. Flat areas are easier to manage for cropping. Machinery can easily operate and soil erosion is minimal.

Flat areas are also easier to manage for irrigation. The only risk is waterlogging and excess runoff from irrigation. The site has existing drainage systems for managing excessive WUDA runoff.

3.3 Soil Characteristics

The following information on soil characteristics were based on a soil survey conducted on site. The soil survey was in accordance with Australian Guidelines (National Committee on Soil and Terrain, 2009).

3.3.1 Soil Type

Sodosol covers the entire site. The surface horizons of Sodosol soils are generally weak in structure with a firm to hard-setting surface condition (Isbell & National Committee on Soil and Terrain, 2021). Subsoil horizons are known to be dispersive, alkaline, and quite saline at depth (Isbell, 2002).

The site soils are reasonably structured and maintained in productive form by minimisation of tillage and regular application of organic wastes. Baseline measurements show that;

- The soils are reasonably structured;
- The soils have adequate to good nutrient levels;
- No shallow groundwater is present; and,
- The root zone is about 0.7-1.0m deep.

3.3.2 Soil Chemistry

Soil samples were collected from 17 borehole locations. The samples were analysed at three depths: surface (0-40 cm), subsurface (40-70 cm), and root zone base (70-100 cm).

A soil test provides the baseline soil health to manage cropping inputs. Table 5 shows average concentrations for the entire soil profile on site.

The reference limit pertains to “preferred levels” for productive cropping purposes (NSW Department of Primary Industries and Regional Development, n.d.). Exceedances must be managed using appropriate measures.

Table 5 Average concentrations of soil nutrients

Parameters	Reference Limit ¹	Unit	Average
Phosphorus (Colwell)	20-100	mg/kg	54.5
Cation Exchange Capacity	> 10	meq/100g	24.4
Chloride	-	mg/kg	169.3
Conductivity	< 150	µS/cm	205.4
Exchangeable Calcium	> 5.0	meq/100g	13.4
Exchangeable Magnesium	> 1.6	meq/100g	8.1
Exchangeable Potassium	> 0.5	meq/100g	1.0
Exchangeable Sodium	< 1.0	meq/100g	1.8
Exchangeable Sodium Percentage	-	%	6.9
Nitrate (as N)	-	mg/kg	11.7
Total Organic Carbon	> 2.0	%	1.0
pH	5.0-5.5	pH unit	7.8
Phosphorus Sorption Capacity	-	mg/kg	388.7

¹ Soil Health Result Interpretation (NSW Department of Primary Industries and Regional Development, n.d.).

3.3.3 Soil Hydraulic Properties

Infiltration of water into soil at different moisture conditions was measured using drainpipe test.

Soil infiltration rates for the site is summarised in Table 6.

Table 6 Soil Infiltration

Soil Condition	Infiltration (mm/hr)
Saturated	1.68
Dry	79.05
Moist	23.65

3.3.4 Soil Stratigraphy

The soil stratigraphy is shown in Figure 4 and is summarised in Table 7.

Table 7 Soil Stratigraphy

Soil Order	Horizon	Soil Type	Upper Depth (m)	Lower Depth (m)
Sodosol	A	Sandy Clay	0.00	0.13
	B	Medium Clay	0.39	0.63
	C	Medium Clay	0.77	0.97



Figure 4 Soil Profile

The A-horizon consists of sandy clay. It supports good drainage and healthy plant growth.

The B-horizon is made up of medium clay. It retains more water and drains more slowly.

The C-horizon consists of medium clay. It has similar properties such as increased water retention and slower drainage. Because of their poor drainage and increased moisture retention, these lower layers might hinder water circulation and root growth.

3.4 Water Quality

3.4.1 Surface Water

Surface water quality targets have been set out as part of The Basin Plan. The catchment area for the site is located in the Murray-Lower Darling zone (Department of Planning, Industry and Environment, 2020), the specific water quality targets are detailed in Table 8.

Table 8 Water Quality Targets for Water Dependent Ecosystems

Water Quality Zone	Ecosystem Type	Turbidity (NTU)	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)	Dissolved Oxygen (mg/L)	pH
Murray-Lower Darling	Streams, rivers, lakes and wetlands	35	0.08	0.70	>8	6.8-8.0

3.4.2 Groundwater

Baseline groundwater quality information are summarised in Table 9.

Table 9 Groundwater quality

Parameters	Reference Limit	Unit	Average
Electrical conductivity	< 650 ¹	µS/cm	11,100
Nitrogen (ammonia)	-	mg/L	0.21
Nitrogen (nitrate)	45 ¹	mg/L	16.60
Nitrogen (nitrite)	-	mg/L	0.51
Nitrogen (total)	10 ¹	mg/L	23.33
pH	5.5-8.5 ²	pH unit	8.30
Phosphorus	0.8-12 ¹	mg/L	1.37
Potassium	-	mg/L	19.13

¹Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000)

²Interpreting water quality test results (NSW Department of Primary Industries, 2017)

The measured electrical conductivity values are higher than the reference limit. High groundwater salinity has been recognised as an issue in the entire region.

The average total nitrogen is above the reference limit. This is likely caused by the seepage of wastewater from the head ditch into some piezometers i.e. PZ1 and PZ3 (Refer to Figure 1). A high concentration indicates potential nutrient enrichment, which can lead to eutrophication if not managed properly.

The average phosphorus level is within the reference limit. Lower phosphorus concentrations in specific areas may contribute to localised nutrient imbalances across the site.

Other than the two potentially contaminated piezometers, all other waters are relatively “clean”.

4. Risks Assessment

Key risks related to cropping and irrigation on the property are outlined below.

4.1 Surface water

If wastewater is not managed properly, these wastes could cause significant environmental contamination to sensitive receiving waterways. The following must be addressed:

- poor drainage (due to poor surface water management, poor drainage of low lying areas or due to water logging of difficult soils);
- excess rainfall-runoff; and,
- release of excess nutrient in spills to the channels (i.e., Blighty No. 1, Blighty No. 1A, Blighty Retreat, and Mayrung) surrounding the property boundary.

Intervention and Mitigations

Site assessments (Refer to Section 3.2 and Section 3.3) show that the surface is generally well drained. The site has an existing tailwater system to manage drainage of excessive runoff on the flood irrigation areas.

Centre pivot irrigation application rate will be kept lower than 1.68 mm/hr, which is the saturated hydraulic conductivity of the irrigated soils. For this reason, there is no anticipated surface runoff from applied irrigation water on the pivot areas.

4.2 Groundwater

Excessive nutrients from waste application on the WUDA can reach groundwater by leaching through the soil. Improper management of waste materials (i.e., manure and effluent) could potentially result in contamination of groundwater, particularly during the wet season when groundwater levels are closer to the surface.

Intervention and Mitigations

Site assessment showed no shallow groundwater is present on site. Monitoring bores (piezometers) were installed for future and ongoing groundwater quality monitoring.

It is recommended to remediate and line the channels and drains with clay. This is to minimise leakage and keep wastewater from directly contaminating groundwater.

The strategic development of piped spray irrigation systems should be continued. It will eliminate the possibility of wastewater connections to groundwater by removing open channels. These recommendations are critical to maintaining groundwater quality.

4.3 Pathogens

It is possible, though remote, that pathogens will pass to the irrigable area and then survive in the system to cause impact to humans and stock thereafter.

Intervention and Mitigations

Wastewater and/or compost are applied directly to the soil surface where sunlight will destroy pathogens. This CIMP supports using a wet-dry cycle across the irrigable, which will allow desiccation (destruction) of pathogens.

4.4 Odour

It is possible that a puff of odour can be emitted from the irrigation of wastewater.

Intervention and Mitigations

Wastewaters will be shandied, which will reduce likely odorants. Shandied water will be used for irrigation. The low-pressure irrigation that will be used generates little aerosol. An application of lime or gypsum will be used should odour become excessive.

4.5 Nutrient Accumulation

Waste application on the WUDA may result in excessive nutrients to accumulate.

Nutrient excess can cause:

- induced deficiencies in other elements compromising crop production;
- plant toxicities; and,
- soils structural collapse.

Intervention and Mitigations

Nutrient accumulation is managed by having an actively growing crop to maximise uptake of any excess of applied nutrients. The crop can be harvested and removed, thus removing the nutrients from the soil.

There is a risk of excess amounts of sodium and potassium on the effluent and manure WUDA. Ameliorants (lime/gypsum) will be used to displace sodium below the root zone.

Leaching fraction is approximately 10mm/year. Due to high clay content and relatively low rainfall in the area, sodium removal from the profile will take considerable time. Ongoing careful management of potential nitrogen and phosphorus must be implemented.

4.6 Soil Salinity

Excess salts can build up in the root zone causing:

- salinization and a reduction in crop production; and,
- reduction of the root zone with a consequent reduction in plant growth and reduction in the necessary deep drainage.

Intervention and Mitigations

Soil salinity can naturally rise up the soil profile under capillary action. Rainfall, particularly wet season rainfall, will wash these salts back down the profile so long as the soil allows deep drainage.

To address salinisation risk, in the medium to long term, manure and sludge must be taken off-site and/or, WUDA areas must be expanded.

4.7 Soil Structure

Soil structural decline can be caused by:

- excess potassium (K);
- excess sodium (Na);
- compaction; and,
- water logging.

Soil structural decline includes reduced infiltration and soil water holding capacity and reductions in nutrient holding capacities and consequent reduction in crop performance.

Intervention and Mitigations

Soil organic matter will be increased by waste application on the WUDA. Soil disturbance will be reduced through reduced tillage frequency and depth during land preparations. Sodic soil structure will be targeted with organic matter, gypsum and irrigation.

5. Land Management

5.1 Potential Impacts

Over irrigation of lands can lead to waterlogging and degradation of the soils and irrigable area. Equally overloading lands with salts can cause soil structural decline and a loss of production. Excess nutrient application to land can lead to escape of nutrient to surface and ground waters causing harm. Poor cultural practices can lead to soil compaction, soil loss and other physical harm to the soil system resulting in a loss of production and loss of sediment to receiving waters.

5.2 Environmental Values

Key environmental values are to:

- Improve the WUDA lands so they have healthy soils and are highly productive;
- Minimise sediment and nutrient losses from the soils within the WUDA, and,
- Manage the water balance of the lands to prevent waterlogging, perched water tables and excessive losses of nutrient to ground waters.

5.3 Summary of Key Risks

The large risk to the land area is a failure to maintain (and improve) soil health in each management area. Key indicator parameters of soil health are; organic matter, saturated hydraulic conductivity, porosity, structure and stored water capacity, salinity and sodicity.

5.4 Objectives

The objectives for sustainable land management are:

- Improving and then maintaining soil health in each management area;
- To maintain a high level of soil cover to prevent soil (sediment) loss.

5.5 Design Considerations

Detailed design has allowed an increase in the irrigable area to 194 ha.

The flood irrigable areas are per existing. They are split into irrigation bays for easier management. Tailwater drains exist downslope each bay to manage excessive runoff.

The centre pivot irrigable areas are designed to apply water through low pressure sprays or drag hoses at an optimal application rate (below the saturated soil hydraulic conductivity of 1.68 mm/hr).

5.6 Management Measures

Land management measures for this facility are detailed in Table 10.

Table 10 Land Management Measures

Element	Management Measure
Soil Fertility	Effluent, manure and sludge application on the WUDA to increase soil organic matter.
Soil Monitoring	Soil monitoring should be performed annually as a minimum. Soil monitoring should be completed according to Section 8.
Soil Cation Imbalances	<p>Excess sodium in soils is to be managed with gypsum application at a minimum rate of 5 t/ha or an equivalent amount based on agronomic advice and soil tests.</p> <p>Excess potassium in soils is to be managed with increased dilution of effluent waters prior to application in WUDA. Other crops capable of removing potassium levels may be considered to assist in reducing potassium loadings in the soil.</p> <p>Gypsum, dolomite, and/or lime may be applied to soils receiving holding pond effluent to avoid acidification and toxicity (e.g., A1).</p>
Soil Quality	<p>Maintain active plant growth and dominance of improved pastures.</p> <p>Maximise organic matter content to maximise soil moisture and nutrient holding capacity.</p> <p>Maximise nutrient recovery by crop harvest.</p> <p>Irrigate the waste utilisation areas when it is not saturated.</p> <p>Apply composted manure, gypsum, and lime to improve soil conditions.</p>
Soil Loss	<p>Any overburden stockpiles from construction or site improvement activities are located in areas away from drainage lines or windy areas in order to minimise the risk of soil and wind erosion.</p> <p>Any overburden stockpiles from construction activities or site improvement activities should have sediment control measures installed until they are stabilised.</p> <p>Any overburden stockpiles from construction activities or site improvement activities are to be seeded using a non-persistent cover crop to reduce erosion potential and assist in the maintenance of the biological viability of the soil resource.</p> <p>Disturbed areas onsite are to be limited as much as practical. Vehicles should be restricted to designated access tracks on site.</p>

6. Crop Management

The primary outcome is to maximise crop production, thereby removing nutrients and other by-products and minimising losses to the environment. A professionally qualified agronomist will oversee crop management to maximise production.

6.1 Cropping Systems

The transition from corn to lucerne increases phosphorus demand given lucerne's deeper root system and higher phosphorus requirements. Over a 5-10-year period, this increased demand may deplete soil phosphorus levels, requiring the use of break crops to allow for nutrient restoration and soil recovery.

While break crops are important for reducing soil degradation, they can damage irrigation systems if not maintained properly. Regular soil monitoring is important for evaluating nutrient concentrations and protecting soil health.

6.2 Constraints to Crop Production

6.2.1 Crop Water Requirements

The estimated crop water requirement is 2,270 ML/yr. This will be met by:

- (a) Approximately 220 ML/yr dairy wastewater and irrigation tailwater returns;
- (b) MIL WAL of 1,396 ML/yr; and,
- (c) Groundwater WAL of 1,150 ML/yr.

6.2.2 Nutrient Requirements

A 25T/ha crop will require a minimum;

- (i) 500-600 kg/ha of N (elemental)
- (ii) 70-100 kg/ha of P
- (iii) 600-700 kg of K
- (iv) 50-80 kg of S

The nutrient requirements are significant.

Samples of effluent from holding pond and dairy manure were collected and tested to determine their nutrient composition.

6.2.2.1. Effluent

The nutrient composition of effluent is shown in Table 11.

Table 11 Effluent Quality

Parameters	Values (mg/L)
Nitrogen (total)	69
Phosphorus	23
Potassium	110
Sodium	160

6.2.2.2. Manure

The nutrient composition of manure is shown in Table 12.

Table 12 Manure Quality

Parameters	Values (%)
Nitrogen (total)	1.7
Phosphorus	0.5
Potassium	1.6
Sodium	0.8

6.2.2.3. Compost

Lower rates of compost can be applied using a low axle load spreader. Very high rates of compost are best applied at establishment and when the crop is being re-established using a high capacity spreader.

Application of compost will add nutrients to the soil profile per Table 13, below.

Table 13 Nutrient Contribution of Compost Additions

Application Rate	TN (kg)	TP (kg)	TK (kg)	TS (kg)
1T/Ha	8	1	10	1.2
10T/Ha	80	10	100	12
50T/Ha	400	150	500	60

6.2.2.4. Inorganic Fertilisers

Fertiliser inputs required are primarily, N, Ca, S and micro nutrients (Zn). The use of inorganic fertilizers can include;

- Urea (N) about 200 kg+/ha/yr
- Granam (N, S)
- Superphosphate (P,S) - 20+ kg/ha/yr (as required)
- CAN (Ca, N)
- Other fertilisers that may be used include;
 - DAP (N,P)
 - CAN (Ca,N)
 - Lime, Gypsum, Dolomite

6.2.3 Nutrient Budgeting

6.2.3.1. Effluent and Solid

A nutrient budget for effluent and/or solid manure application is provided in Table 14, based on the waste quality outlined in Section 6.2.2.1.

The irrigable area is overloaded on an annual basis with excess N, P, K and Na from the application of both solid and liquid wastes.

Table 14 Nutrient Budget (Effluent and Solid)

Nutrient	Unit Rate	Amount	N (Kg/ha)	P (Kg/ha)	K (Kg/ha)	Na (Kg/ha)
Inputs						
Fertiliser	Kg/ha/yr	200	92	0	0	0
Manure, screenings, solids	T(DM)/ha/yr	22.4	381.4	121.1	358.9	188.4
Dairy (Parlour) - Catchment A	ML/ha/yr	1.5	103.5	34.5	165.0	240.0
Dry Lot Holding Pond – Catchment B	ML/ha/yr	1.5	144.3	24.0	450.0	112.5
Sludge	ML/ha/yr	0.5	1.5	2.3	3.0	1.5
Shandy water	ML/ha/yr	1	0.1	0.0	7.5	1.5
Rainfall	ML/ha/yr	4.08	0.4	0	4.1	20.4
Total			723.2	181.9	988.5	564.3
Outputs						
Crop Harvest	T/ha/yr	17	391	45.9	459	17
Leaching	mm/yr	10	1	0.001	5	15
Rainfall-runoff	mm/yr	20.4	.204	0	0	0
Volatilisation	%	50	237.4	0	0	0
Sorption	(kg/ha/yr)		0	54.5	0	0
Total			629.6	100.4	464.0	16.7
Net Position	(kg/ha/yr)		93.5	81.5	524.5	547.6

6.2.3.2. Solids Only

The nutrient budget for manure solid application rate is set out in Table 15, based on the waste quality outlined in Section 6.2.2.1.

The dryland area and its crop are deficient in nitrogen and potassium. This cropping area will require inorganic fertilizer inputs.

Table 15 Nutrient Budget (Solid only)

Nutrient	Unit Rate	Amount	N (Kg/ha)	P (Kg/ha)	K (Kg/ha)	Na (Kg/ha)
Inputs						
Fertiliser	Kg/ha/yr	200	92	0	0	0
Manure, screenings, solids	T(DM)/ha/yr	22.4	381.4	121.1	358.9	188.4
Total			474.9	121.1	358.9	188.4
Outputs						
Crop Harvest	T/ha/yr	17	391	45.9	459	17
Leaching	mm/yr	10	1	0.001	5	15
Rainfall-runoff	mm/yr	20.4	.204	0	0	0
Volatilisation	%	50	237.4	0	0	0
Sorption	(kg/ha/yr)		0	54.5	0	0
Total			629.6	100.4	464.0	16.7
Net Position	(kg/ha/yr)		-154.8	20.8	-105.1	171.7

6.3 Weed and Pest Control

This development will have the potential to introduce weeds to the site and surrounds in several ways. They may be introduced to the site or spread to other sites via vehicle traffic in and out of the site, construction and operation vehicles, or by vertebrate pests. Additionally, weeds can be transported downstream if stormwater retention is found to be inadequate (Animal Health Australia, 2013a).

The crop will be monitored for weeds and pests and treated accordingly based on agronomic advice. Key factors are that:

- selective herbicides that do not impact legume production will be used;
- if legume production is to be adversely impacted the legume plant stand will be replanted or otherwise rejuvenated;
- all withholding periods must be adhered to;
- all ChemCert requirements must be met; and,
- if broad spectrum herbicides are required then the pasture will be over-sown with legume species.

6.4 Management of Soil Constraints

Critical constraints identified by the land and soil survey include:

- low levels of organic matter and nutrients;
- localised soil acidity; and,
- localised soil sodicity.

Soil surveys show root depths are between 0.7 m to 1.0 m indicating an active, productive, deep profile; this must be maintained or improved.

The following sections outline key constraints to the management of soil that affect crop production outcomes.

6.4.1 Soil Compaction

Controlled traffic practices are critical to minimising compactions. They are to be employed in the irrigation area because the high moisture content and high bulk density of the soils (which is related to soil properties). Permanent controlled traffic lanes must be established and adhered to by all equipment.

It is recommended that swathing be used to maximise the distance between traffic lanes.

Wet soils must not be trafficked.

Sowing on moist soils is permissible provided that controlled traffic principles are used. However, the aim is to sow on moderately moist to dryer soils and use the irrigation capacity to increase soil moisture after sowing.

Spreading may occur prior to an irrigation to minimise compaction and to allow the applied product to be watered into the soil. It is recommended that if a spreader is used to apply fertilizer, it is a small, low axle load spreader. Controlled traffic principles must be used.

Harvesting must occur on dry soils.

When collecting hay bales it may be necessary to traffic outside of the traffic lanes (and this is a primary reason why harvesting must occur on dry soils). The following considerations must be addressed:

- Traffic outside of the traffic lane is to be minimised with the collection vehicle generally staying on the GPS-controlled A-B line.
- Axle loads of this vehicle must be minimised – carrying one bale front and one rear is preferred.

- Bales are to be loaded onto transport outside of the irrigation areas and in defined loading areas (see below).

All equipment must have low ground pressure 'tractor-type' tyres with flexible sides or have tracks.

Any equipment with rigid-sided tyre, such as those on trucks and on construction machinery, must not be used in the irrigation area at any time.

Permanent haul roads, including turning and loading areas, are to be defined outside of the irrigation areas where trucks may be used.

Irrigation areas must not be directly grazed at any time.

Controlled traffic, crop root growth and the addition of organic matter and lime and other measures listed herein will repair soil compaction over time.

Deep ripping and high-compaction operations

Land levelling and high-capacity spreaders will be used during establishment and when pastures are being re-established. This equipment has very high axle loads and will cause significant compaction if soils are moist.

These operations are to only occur on soils that are as dry as possible and must be followed by a deep ripping operation.

It is critical that soils are as dry as possible when deep ripping. Any secondary and tertiary tillage operations will also occur on dry soils. This tillage will incorporate ameliorants and compost.

6.4.2 Soil pH

Soil pH testing will be used at least twice annually to monitor the soil pH in each soil type and determine application rates and frequencies of lime/gypsum applied generally across the entire cropping area.

6.4.3 Acidic soils

Very high rates of lime may need to be applied to acidic soils prior to any deep ripping operation.

6.4.4 Soil Management: Sodic soils (Sodosols)

Sodosols will be actively managed by:

- improved drainage - land forming if necessary;
- applications of compost; and,
- applications of gypsum as required.

Sodosols typically have a low saturated infiltration rates (1.68 mm/hr), which means that surface runoff may be higher. Irrigation and the application of gypsum and organics will repair sodic soils over time.

6.5 Crop Management of Non-irrigated Areas

To reduce weed and pest incursions and to increase yield, non-irrigated areas that are contained within the irrigation catchment may also be cropped. If so, traditional dryland cropping practices will be used and the principles laid out in this CIMP will apply to this area.

Specific considerations for this area are:

- Crop type will be the sub-set of the irrigated species with varieties that are suited to dryland production.
- Controlled traffic principles will be used.

- Fertilizer applications will be similarly calculated using soils tests and projected crop production (which will result in a lower rate).

Application of lime/gypsum would occur on a soil type basis. Dryland areas would receive the same application rate as irrigated areas.

7. Irrigation Management

A professional, qualified, agronomist will assist in establishing irrigation application and timing to maximise crop production.

This CIMP sets out management principles for Irrigation based on the risk assessment, and risk management and system constraints.

Generally, small amounts of irrigation will be applied more frequently. Application rate and volume is limited to avoid surface runoff and deep drainage.

7.1 Irrigation Water Supply and Management

Pasture water requirements are defined in Section 6.2.1.

Removal of wastewater from the holding pond is the first priority. Water is applied in the following priority:

- (i) Waste water;
- (ii) WUA tailwaters;
- (iii) MIL (surface water) and,
- (iv) Bore water.

The total available water supply 2,733 ML/annum. This is a total of 14.1 ML/ha/yr, which is greater than the entire crop requirements (11.70 ML/ha/yr). Bore water will be used to meet any shortfall in the first three sources.

7.2 Application Rate and Volume

To meet the above objectives, irrigation water will be applied at a maximum depth of 25 mm to ensure that applied water remains in the root zone, as discussed in Section 4.2 Groundwater.

Spray irrigation water will be applied at a maximum rate of 1.04 mm/hr. This will ensure that surface runoff of applied irrigation water is avoided, as discussed in Section 4.1 Surface water.

Wastewater (WW) is of high strength and can be applied directly to the irrigation area. It can be applied at depth of 25 mm and be immediately followed by a second irrigation depth of 5 to 10 mm of fresh or CAR water to wash the plant leaf.

7.3 Irrigation scheduling

The irrigation schedule will be based on a soil moisture deficit, which will be determined using a tensiometer.

Soil moisture will be measured near the bottom of the root zone (0.7 to 1.0 m) and will trigger irrigation. A second probe at 0.4 m can be set up to assist in predicting subsequent irrigation dates by monitoring soil moisture as it depletes down the profile.

Irrigation is applied as soon as the soils have dried to the refill point (RP). This will be based on the field capacity (FC) of the soils to be irrigated (e.g. if the soil has a FC of 160 mm, irrigation depth of 25 mm will be subtracted and the refill point will be at 135 mm).

This will ensure that:

- soils are sufficiently dry to hold the applied water within the root zone;
- irrigation cannot be applied to wet soils; rather, the soil must be allowed to dry sufficiently before irrigation is applied; and,
- soil moisture is maintained at an ideal level for plant growth in all soil types.

7.3.1 Measurement of soil moisture

Soil moisture in the root zone can be measured using tensiometers, C-Probes, or other industry accepted method (direct sampling and gravimetric determinations).

Should specific measurement be implemented, soil moisture would be measured near the bottom of the root zone (0.7 to 1.0 m). This will be used to trigger irrigation. Optionally, a second probe at 0.4 m could assist in predicting next irrigation date by monitoring soil moisture as it depletes down the profile. Excessive irrigation and or water logging must be observed, and, if it occurs irrigations must be reduced.

7.4 Wet weather

Wet weather will be managed by keeping water storages generally empty, particularly when heavy rainfall is predicted.

7.5 Fertiliser and Compost Application

Fields are to be irrigated within 24 hours of the application of any composted waste or other fertilizers. Avoid spreading under windy conditions. Variable rate fertiliser application via the irrigators may be considered.

7.6 Maximising Infiltration Rate, Stored water, and Hydraulic Conductivity (leaching) through Cultural Practices

The irrigation area I_R , SW, and K_{sat} will be pro-actively managed and improved through use of;

- (i) Land planning,
- (ii) Deep ripping,
- (iii) Gypsum (and or lime application,
- (iv) Composted manure applications, and,
- (v) Zero tillage.

These practices all contribute to improved soil health.

8. Monitoring and Record Keeping

The following monitoring is required.

Soils

- (i) Annual soil sampling of the full profile – at the end of the wet season so that agronomic / nutrient management for the dry season can be proactively undertaken:
 - a. Full nutrient analysis of each profile – once per year by horizon A1,A2, B1 and B2 (to below the RZ)
 - b. Gravimetric, tensiometers or capacitance measurements of soil moisture for the RZ and 0.5 m below the RZ – ongoing
 - c. Annual measurement of k_{sat} through the profile using ring infiltrometers or similar.
- (ii) Diary records (by irrigator) of:
 - a. Waste water application;
 - b. Fertiliser Application;
 - c. Compost application; and,
 - d. Herbicide / pesticide applications.

Wastes

- (i) Annual sampling of waste waters (full agricultural suite); and,
- (ii) Annual sampling of compost.

Pasture / Pasture (by irrigator)

- (i) Leaf tissue testing – end of wet season and mid dry season; and,
- (ii) Harvest (dry matter T/ha/cut).

Irrigation

- (i) Irrigation applications (wastewater, bore water); and,
- (ii) Production bore SWL.

Groundwater

- (i) Piezometer SWL – quarterly; and,
- (ii) Piezometer – sampling for chemical analyses (6 monthly).

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Appendix N. Environmental Management Plan

Environmental Management Plan

Gunyah Park Dairy, Blighty, NSW

Report Number 24675.113416.1



Prepared for

Prepared by

Yurunga Farms Partnership

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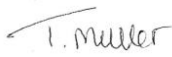

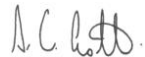
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1. Introduction

This Environmental Management Plan (EMP) has been prepared to assist Yurunga Farms Partnership (Yurunga) to minimise environmental impacts arising from the expansion of the Gunyah Park Dairy.

1.1 Purpose and Objectives

The main objective of this EMP is to provide an easily interpreted reference document that ensures Yurunga's environmental commitments, safeguards, and mitigation measures are collectively being implemented, monitored, audited, reviewed, and improved during the course of operational activities which meets the approach of **plan, do, check and act** with continual improvement (DPI NSW, 2008).

Specifically, it aims to:

- Document the process of identifying and managing environmental hazards and risks for operational activities, as well as the controls put in place to reduce the environmental impact of dairy operations;
- Develop a 'flexible' plan to facilitate dairy operational activities; and,
- Promote innovation while maintaining stringent requirements to protect the surrounding environment.

The key performance objectives are to ensure compliance with environmental legislation and approvals, avoid potential environmental impact, and maintain that environmental quality during the dairy operations.

1.2 Scope of Plan

This EMP addresses operational issues for the Gunyah Park Dairy and is not designed to cover any construction-related activity. The document includes the following components:

- Preventing or minimising environmental harm or nuisance;
- Monitoring the environmental impact of contaminants, including record keeping and notification of results;
- Waste minimisation, treatment, and disposal;
- Communicating procedures, plan, incidents, and potential environmental problems to staff and regulatory authorities;
- Managing environmental complaints;
- Creating and maintaining all environmental records and reports; and,
- Conducting audits of the environmental conditions and the protocols put in place to ensure adequate performance while minimising environmental risk.

1.3 Site Details

The dairy site is located at 18214 Riverina Highway, Blighty, NSW, 2713 (refer to Figure 1). The site sits within the Edward River Council (ERC) local government area.

Site details are summarised in Table 1. The site layout is in Appendix A.

Table 1 Site Details

Land owner:	Lachlan Marshall and Adam Marshall
Applicant:	Yurunga Farms Partnership
ABN:	45 370 667 469
Site Address:	18214 Riverina Highway Blighty NSW 2713
Lot and plan details of total holdings:	‘Gunyah Park’ 87 DP756251
Total Area of Property:	202 ha
Local Government Area:	Edward River Council
Land Use Zoning:	RU1
Tenure:	Freehold

1.4 Environmental Policy Statement

Yurunga is committed to protecting the environment and strives to minimise the environmental impact of its dairy activities by:

- Preventing environmental harm;
- Responsibly managing waste generated through operational activities; and,
- Managing the site to prevent environmental degradation through erosion of land and sedimentation of waterways or soil quality degradation from wastewater application.

Yurunga aims to provide maximum practicable protection to the environment, by meeting and attempting to exceed legal obligations.

This EMP incorporates environmental controls for all areas of operation, consistent with legislation. The EMP is aimed at minimizing the impact that the site operational activities have on the environment.

According to the NSW DPI, an EMP needs to specify standards and practices for the operation, strategies and measures for minimising environmental risk and contingency plans for managing environmental problems (DPI NSW, 2008). This EMP exceeds these specifications; the following objectives have been established:

- Ensuring Compliance
 - Adhering to all relevant environmental legislation, codes of practice, external standards and other requirements; and,
 - Maintaining compliance with environmental management procedures implemented on site.
- Providing Training and Establishing Effective Controls
 - Identification and control of any potential environmental issues on site;
 - Ensure all site workers, including subcontractors, are aware of significant environmental aspects and controls relevant to the site as well as the consequences of departing from the required controls;
 - Avoid, reduce, or control the creation, emission or discharge of pollutants to reduce environmental impacts; and,
 - Take all reasonable and practicable measures to prevent or minimise environmental harm.
- Effective Reporting and Investigation
 - Investigate and report environmental incidents that may be a contravention of the Environmental Protection License (EPL) conditions or cause environmental harm, and instigate corrective and preventive actions as necessary; and,
 - Ensure all environmental complaints are documented and addressed in an efficient manner.

- Consistent Monitoring and Improvement
 - Establish and monitor environmental performance indicators and targets;
 - Maintain the frequency and scope of environmental performance monitoring by senior management;
 - Regularly monitor and audit the implementation and effects of procedures and controls and report non-conformances; and,
 - Monitor and continually improve environmental performance.

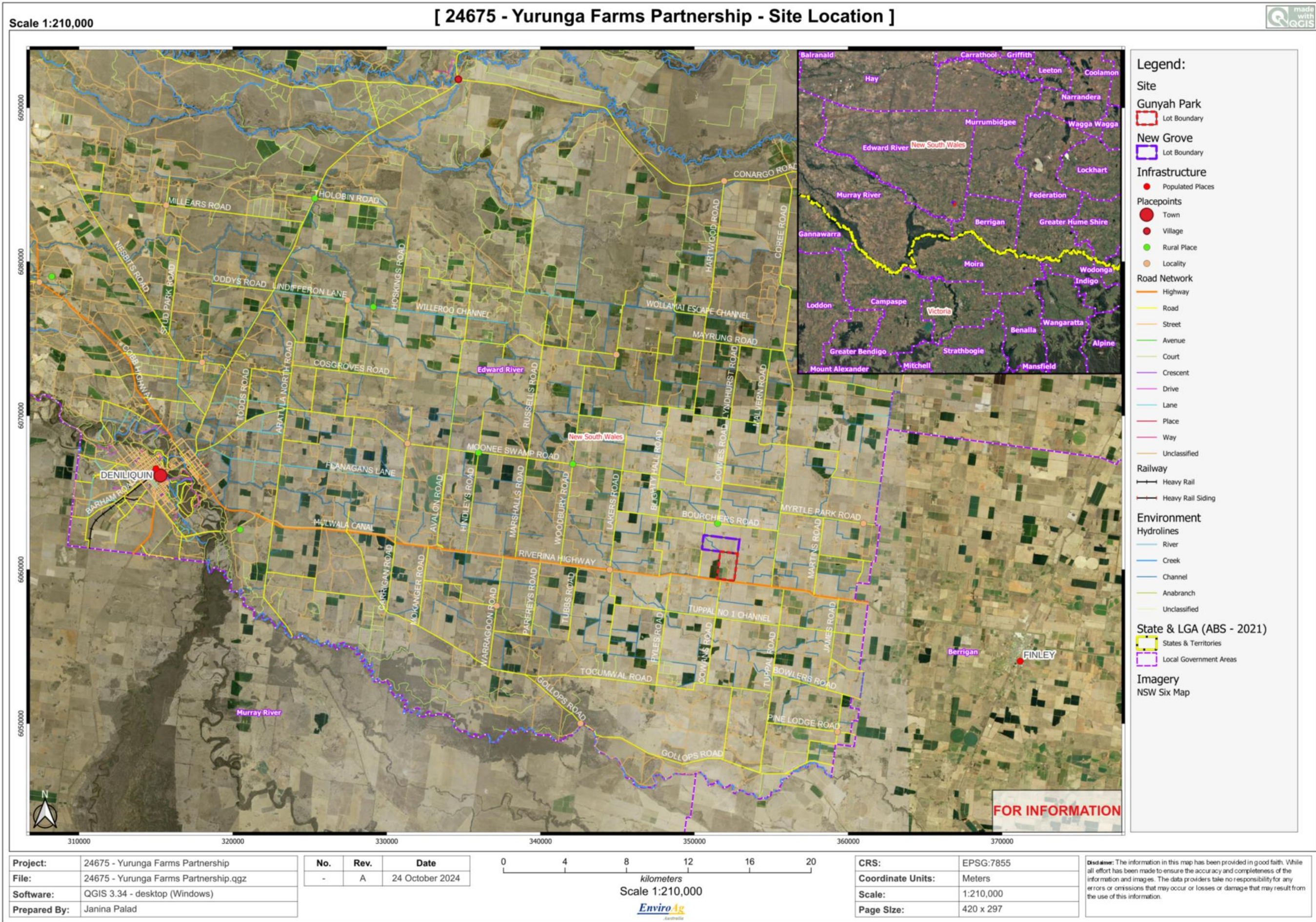


Figure 1 Site Location

2. Roles, Responsibilities, and Training

2.1 Responsibilities

The decisive responsibility for the adoption of this plan will lie with the director(s) of Yurunga.

Dairy staff will consist of:

- Dairy Operations Manager; and,
- Farm Hands.

The responsibilities of workers involved in the project are outlined in Table 2.

Table 2 Responsibilities associated with the EMP

Position	Responsibilities
Dairy Operations Manager	<ul style="list-style-type: none"> • Ensure that all activities associated with the dairy operations are undertaken in accordance with relevant legislation • Keep records and monitoring data pertaining for minimum of five (5) years • Overall responsibility for implementation of EMP • Assesses the efficacy of the EMP and where improvements are needed • Ensures EMP is maintained and reviewed • Provides induction and training on the EMP to all workers and contractors • Ensures that resources and equipment are available to carry out tasks as required by EMP • Undertakes internal site audits • Ensures all records and monitoring data pertaining to the plan are kept and maintained (including training records) • Carries out annual review of EMP. • Ensure that all workers and contractors are aware of and adhere to EMP procedures • Ensures all records of complaints and incidents regarding safety and environmental issues are kept and maintained • Conducts required regular compliance checks for safety and environmental issues. • Provides induction and training on the EMP to all workers and contractors • Ensures all records and monitoring data pertaining to the plan are kept and maintained (including training records)
All farm hands and contractors	<ul style="list-style-type: none"> • Comply with EMP • Report any new environmental impacts that may arise to the Dairy Operations Manager.

2.2 Training and Inductions

All farm hands and contractors will receive the training they need to complete any duties assigned to them under this management plan in a safe and professional manner. Confirmation of the required competencies should be part of the site induction process for new employees and contractors. Any deficiencies in required competencies shall be addressed before entering the site. All training offered or completed in accordance with this management plan shall be documented.

2.3 Inspections and Compliance

During operation of the dairy, the Dairy Operations Manager will undertake regular reviews of the monitoring requirements. The Dairy Operations Manager will be responsible for undertaking and overseeing regular inspections of the site to ensure that it is compliant with the EMP.

Any non-conformances and corrective action undertaken will be recorded on file for annual review purposes. Any site investigations and audit reports should be incorporated in the annual EMP review to ensure that improvements in environmental management are reflected for the upcoming year.

3. Regulatory Requirements

Yurunga dairy operations are to be undertaken in compliance with all applicable Acts and Regulations relevant to the activities conducted on site.

The Environmental Risk Assessment for the site identifies the legislation applicable to the site by referencing the relevant piece of legislation the risk is applicable to.

3.1 Relevant NSW Legislation

- Dairy Industry Act 1992;
- Environmental Planning and Assessment Act 1979;
- Biodiversity Conservation Act 2016;
- Water Management Act 2000;
- Food Safety Standards;
- Environmental Protection Act 1997;
- Biosecurity Act 2015;
- Contaminated Land Management Act 1997;
- Environmentally Hazardous Chemicals Act 1985;
- Dangerous Goods (Road and Rail Transport) Act 2008;
- Forestry Act 2012;
- National Environment Protection Council (New South Wales) Act 1995;
- Ozone Protection Act 1989;
- Pesticides Act 1999;
- Protection of the Environment Administration Act 1991;
- Protection of the Environment Operations Act 1997; and,
- Waste Avoidance and Resource Recovery Act 2001.

3.2 Licenses, Approvals, and Permits

Yurunga dairy will need to operate under the following permits and approvals:

- Development consent from Edward River Council under NSW EP&A Act;
- Environmental Protection Licence (EPL) with Environmental Protection Agency (EPA); and,
- Water Access Licence/Water Supply Works with Water NSW.

4. Site Operations

Yurunga currently operates a dairy on the 'Gunyah Park' property, which is located at 18214 Riverina Highway Blighty, NSW 2713.

Table 3 Production parameters of the dairy

Parameter	Value
Milking Parlour Type:	Modern Rotary
Milking Herd Size:	2,000 heads
Milk Yield:	24,000,000 L
Feeding and Housing System:	Feedpads with shade in dry lot
Dry Lot Stocking density:	Lactating cow: 48.5 m ² per stock
	Dry cow: 30.3 m ² per stock
	Heifer: 50.3 m ² per stock
	Calf: 54.5 m ² per stock
Fodder Crops:	Maize, barley, wheat, triticale, lucerne
Cropping Area:	322.4 ha
Cropping System:	Dryland, flood irrigation, pivot irrigation
Effluent Management:	Solids separation and storage ponds
Waste Management:	Land application of effluent and solid waste

5. Environmental Impacts and Risks

5.1 Risk Assessment Methodology

A risk analysis was undertaken in accordance with ISO 31000:2009 Risk Management - Principles and Guidelines to ensure that the identified risks were addressed in the design of the dairy.

5.1.1 Risk Management Framework

The framework outlined in ISO 31000:2009 was used in the assessment process for this development:

- 1) Establishment of context;
- 2) Risk identification;
- 3) Risk analysis;
- 4) Risk evaluation;
- 5) Risk treatment;
- 6) Monitoring and review; and,
- 7) Communication and consultation.

5.1.2 Definition

Risk management definitions as adopted by standard ISO 31000:2009 Risk Management – Principles and Guidelines are:

- Risk source (hazard) – refers to an element, which alone or in combination has the intrinsic potential to give rise to risk.
- Risk – refers to the effect of uncertainty on objectives. It is often characterised by reference to potential events and consequences, or a combination of these.
- Consequence – refers to the outcome of an event affecting objectives.
- Impact – refers to the marked effect or influence.

5.1.3 Context

A qualified registered engineer designed this facility in accordance with best practices. The site is conducive to development within the confines of its physical surroundings. It is a rural type development carried out in Rural Zoning.

Yurunga aims to build and operate this facility in compliance with industry standards outlined in;

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024b);
- *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016);
- *Effluent System Design* (Dairy Australia, 2024a); and,
- *Effluent and Manure Management Database for the Australian Dairy Industry* (Dairy Australia, 2008).

The goal of this risk assessment is to identify and evaluate significant environmental risks so that suitable risk management measures can be adopted to mitigate them.

5.1.4 Risk Identification

Risk identification involves identifying sources of risk, areas of impact, events, their causes, and probable consequences. The following summarizes the risks identified in this assessment:

- Dust generation and nuisance on air quality;
- Noise impacts;
- Traffic impact;

- Odour generation and nuisance;
- Soil contamination;
- Soil erosion;
- Contamination of ground and surface water;
- Biosecurity (e.g., increase in weeds, pest and insects);
- Amenity; and,
- Fire.

Table 6 provides the details of the identified events, impacts, and the management measures to be implemented to mitigate these risks.

5.1.5 Risk Analysis

Each identified risk shall be rated in terms of its likelihood and consequences (refer to Table 4). Table 5 can be used to classify whether it is low, medium, high, or severe. This can serve as a guide to assess the resources required to address each risk. Low risks require substantially less management than the higher levels (Department of Climate Change, Energy, the Environment and Water, 2024).

Table 4 Risk Ratings

Likelihood		Consequence	
5 Highly likely	Event is expected to occur in most circumstances	1 Minor	• Minor incident of environmental damage that can be reversed
4 Likely	Event will probably occur during the life of the project	2 Moderate	• Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
3 Possible	Event might occur during the life of the project	3 High	• Substantial instances of environmental damage that could be reversed with intensive efforts
2 Unlikely	Event could occur but considered unlikely or doubtful	4 Major	• Major loss of environmental amenity and real danger of continuing
1 Very unlikely	Event may occur in exceptional circumstances	5 Critical	• Severe widespread loss of environmental amenity and irrecoverable environmental damage

Table 5 Risk matrix

Consequence Likelihood		1	2	3	4	5
		<i>Minor</i>	<i>Moderate</i>	<i>High</i>	<i>Major</i>	<i>Critical</i>
5	<i>Highly likely</i>	Medium	High	High	Severe	Severe
4	<i>Likely</i>	Low	Medium	High	High	Severe
3	<i>Possible</i>	Low	Medium	Medium	High	Severe
2	<i>Unlikely</i>	Low	Low	Medium	High	High
1	<i>Rare</i>	Low	Low	Low	Medium	High

5.2 Treatment and Mitigation Measures

Mitigation measures are applied by reviewing the risk treatment, determining whether the remaining risk levels are tolerable, developing a new risk treatment, and evaluating its success.

The following options were considered when assessing the risks:

- 1) Avoidance of the risk (not undertaking the activity that gives rise to the risk);
- 2) Taking or increasing the risk in order to pursue the opportunity;
- 3) Removing the risk source;
- 4) Changing the likelihood;
- 5) Changing the consequence;
- 6) Sharing the risk with another party or parties; and,
- 7) Retaining the risk by informed decision.

5.3 Risk Management

5.3.1 Design Level

The design level incorporates best practice management and design principles in line with industry standards and guidelines, refer to *NSW Dairy Development and Environment Guidelines* (Department of Primary Industries and Regional Development, 2024).

5.3.2 Operation Level

The operation level includes running of the facility in compliance with industry standards and ensuring all employees are properly trained in operation procedures and have a comprehensive understanding of the management plans that are in place for each of the risks.

5.3.3 Management Level

The management level is the use of management plans to ensure that the tasks and activities are completed in a specific manner to reduce the risks associated with that activity. This also includes the responsibility of individuals in charge of risk management, as well as ensuring that all employees doing a task are aware of the risk reduction measures that must be performed.

5.4 Monitoring and Review

Regular monitoring and evaluation are required to verify that a risk is appropriately addressed or minimised. The key risk will have monitoring requirements, which are outlined in Section 7. As part of the monitoring and evaluation, each procedure will undergo a review process to determine whether the risk level is still significant or the risk management framework needs to be changed.

5.5 Risk Assessment and Mitigation

Based on the initial literature, site visit, and design of the updated facility, a risk assessment for the site has been conducted using the methodology discussed above (See Table 6).

Table 6 Risk assessment of the Yurunga Dairy

		Before Management Measures				After Management Measures		
Activity/Aspect/Hazard	Potential impacts	L	C	R	Management measures	L	C	R
Construction Activities								
Earthworks causing irreversible damage to Cultural and European Heritage.	Financial impacts to Yurunga through fines, legal costs, etc. Damage to Yurunga company profile and social licence. Loss of cultural values, knowledge and history.	2	2	L	Searches of government databases to determine if there if any recorded sites, items or places of significance. No known cultural or European heritage sites have been found on government databases.	1	2	L
Earthworks causing fauna deaths.	Financial impacts to Yurunga through fines legal costs, etc. Damage to Yurunga company profile and social licence. Loss of biodiversity value, species, etc.	3	1	L	Searches of government databases to determine if there if any recorded significant flora, fauna habitats in the proposed works area. No known significant flora, fauna habitats have been found on government databases.	1	1	L
Construction and clearing works causing nuisance noise.	Public nuisance, complaints. Negative impacts to fauna roosting, feeding, sleeping etc.	2	3	M	Construction will only be carried out between 6:30am-6:30pm Monday to Saturday. Residents will be notified of the construction timetable via letterbox drop prior to commencement of works and kept up to date as work progresses in quarterly periods, particularly as work changes from one set of machines and processes to another. All equipment utilised on site is to meet the relevant Australian Standard for sound power levels. Maintenance of equipment will be completed in accordance with the manufacturers' requirements.	1	1	L
Construction and clearing works causing dust.	Public nuisance, complaints. Negative impacts to flora and fauna	4	2	M	Dust management practices to be implemented on site.	2	2	L

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Construction and clearing causing sediment runoff and erosion.	Sedimentation in streams, loss of stream habitats, damage to flora and fauna habitat due to erosion and sediment contamination. Damage to neighbouring properties.	4	2	M	Erosion and Sediment Control Plan will be implemented for construction and operational phases.	2	2	L
Construction activities increasing traffic on local roads.	Public nuisance, complaints.	4	2	M	Traffic will access the site via Riverina Highway. Additional traffic is considered low volumes per traffic impact assessment. All loads hauled on the public road network will be made to comply with road regulations. Any excavated material to remain on site where possible.	2	2	L
Earthworks and construction of infrastructure causing light pollution.	Public nuisance, complaints and hold ups. Negative impacts to fauna roosting, feeding, sleeping etc.	3	1	L	Construction will only be carried out between 6:30am-6:30pm Monday to Saturday. Residents will be notified of the construction timetable and kept up to date as work progresses, particularly as work changes from one set of machines and processes to another.	1	1	L
Construction and operational activities causing the spread of weeds and pests.	Loss of native species, loss of habitat damage to waterways, spread of nationally significant weeds, damage to surrounding agriculture.	2	3	M	Vehicles and machinery will be cleaned prior to entering the site and before entering their next site.	1	3	L

		Before Management Measures				After Management Measures		
Activity/Aspect/Hazard	Potential impacts	L	C	R	Management measures	L	C	R
Earthworks and construction of infrastructure increasing waste creation and uncontrolled waste leaving site.	<p>Damage to waterways through waste moving off site, decrease in aesthetic values and public complaints.</p> <p>Financial impacts to Yurunga through fines, legal costs, etc.</p> <p>Damage to Yurunga company profile and social licence.</p> <p>Health issues with employees, public, visitors, wildlife and surrounding livestock.</p>	4	2	M	Maintain a clean construction site in accordance with the management measures detailed in this EMP.	2	2	LOW
Transport								
<p>Light and heavy vehicles entering and leaving site increasing traffic risk of safety.</p> <p>Light vehicles contribution relates to transport of employees.</p> <p>Heavy vehicles contribution relates to milk collection and feed deliveries.</p>	<p>Create safety risks at highway entry and exit points.</p> <p>Potential conflicts with other road users, reduced visibility during peak traffic times.</p>	5	5	S	<p>Design and construct entry and exit points to meet local and state road authority standards, including sufficient width, turning lanes, and signage to accommodate heavy vehicles safely.</p> <p>Conduct a traffic impact assessment to determine peak operational times and implement measures to minimize site vehicle movements during high-traffic periods.</p> <p>Install clear signage warning other road users of truck activity near access points and ensure line markings enhance visibility and traffic flow.</p> <p>Where necessary, upgrade intersections to include deceleration and acceleration lanes for trucks to merge safely with highway traffic.</p> <p>Maintain the access roads and entry/exit points to prevent wear and tear that could increase safety risks over time.</p>	1	5	H

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Light and heavy vehicles entering and leaving site increasing traffic on local roads.	Public nuisance, complaints.	5	5	S	All loads hauled on the public road network will be made to comply with road regulations and any requirements stipulated in the issued development approval conditions. Trucks will use the roads outside of high volume school traffic hours.	1	5	H
Light and heavy vehicles entering and leaving site generating dust.	Public nuisance and complaints.	4	5	S	All loads hauled on the public road network will be made to comply with road regulations and any requirements stipulated in the issued development approval conditions. Dust management measures to be implemented during the construction and operational phases, as stipulated in this EMP.	1	5	H
Light and heavy vehicles entering and leaving site generating noise.	Public nuisance and complaints. Negative impacts to fauna roosting, feeding, sleeping etc.	5	2	H	Trucks and machinery will not be left idling when not in use. Where required, all equipment will be fitted with efficient silencers. All equipment will be maintained to reduce noise emissions. High noise activities will be undertaken in the late morning and early afternoon when most people are at work. Works in the evening and night periods will be limited where possible.	1	2	L
Light and heavy vehicles entering and leaving site generating greenhouse gas emissions.	Emissions impacting on flora and fauna. Meteorological impacts. Financial impacts to Yurunga. Damage to company profile.	5	1	M	Trucks and machinery will not be left idling when not in use. All equipment will be maintained to reduce emissions.	3	1	L

		Before Management Measures				After Management Measures		
Activity/Aspect/Hazard	Potential impacts	L	C	R	Management measures	L	C	R
Milking and Dry Lot Management								
Keeping livestock onsite causing loss of amenity.	Public complaints. Damage to company profile.	2	5	H	Ensuring Livestock numbers do not exceed licence conditions and proper management and regular maintenance of pens. Current vegetation buffers to be maintained. Visual tree screens between highway and site will be kept manicured and aesthetically pleasing.	1	5	H
Keeping livestock onsite causing odour.	Public nuisance and complaints.	5	4	S	Current vegetation buffers to be maintained. Weather, including wind speed and direction, will be monitored. In the event that odour complaints are received about the site operations, records will be assessed and, where necessary, a suitable odour management action plan will be developed and implemented. Pen cleaning maintenance to be implemented in accordance with this EIS. Waste management and utilisation to be carried out in accordance with this EIS. Including sedimentation basin will be rapidly dewatered following every heavy rainfall event. In the parlour, the sedimentation systems will be cleaned to reduce sediment loads. The sedimentation basins and holding ponds will be adequately sized to support treatment and regular desludging to manage recycling of nutrient loads.	1	4	M

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Keeping livestock onsite causing dust.	Public nuisance and complaints. Negative impacts to surrounding environment.	4	5	S	Management of pen stocking densities so that pens are not too wet, nor dry. Dust suppression sprays in the parlour can be turned on in the event of a fire or dry, dusty pens. Monitoring program is carried out to identify whether dust is an issue and where it comes from. Waste management and utilisation to be carried out in accordance with this EIS. Manure will not be spread in high wind conditions.	1	5	H
Keeping livestock onsite causing noise.	Public nuisance and complaints. Negative impacts to fauna roosting, feeding, sleeping etc.	5	2	H	Trucks will not be left idling when not in use. All equipment will be maintained to reduce noise emissions. Works to be carried out during daylight hours where possible. Works for evening and night periods to be limited where possible. Animal welfare to be managed in accordance with this EMP and Australian Animal Welfare Guidelines.	3	2	M
Dust from very dry pens caused by very low stocking rates in extreme droughts.	Public nuisance and complaints. Negative impacts to surrounding environment.	4	5	S	Completion of air quality assessment. Dust management measures to be implemented during the operational phase.	1	5	H
Offensive odour from continuously wet pens causing anaerobic conditions.	Public nuisance and complaints.	5	4	S	Completion of air quality assessment. Odour generating infrastructure located with appropriate setbacks from sensitive receptors. Odour management measures to be implemented.	1	4	M

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
<p>Keeping livestock onsite spreading pests, weeds and vermin.</p> <p>Improper/irregular pen cleaning causing an increase in weeds, pests and vermin.</p>	<p>Loss of native species, loss of habitat damage to waterways, spread of nationally significant weeds, damage to surrounding agriculture.</p> <p>Health issues with employees, public, visitors, flora and fauna and surrounding livestock.</p>	4	3	H	<p>Implement biosecurity management measures.</p> <p>Staff trained on proper cleaning practices.</p> <p>Pen maintenance routines and registers kept.</p> <p>Trucks entering and leaving the property will be checked for potential pest species (can be undertaken as part of the wash-down procedure).</p> <p>Livestock isolation and quarantine pens for disease.</p> <p>Compost piles will be monitored for presence of vermin, temperature and moisture.</p> <p>Bait stations will be placed out, checked on a weekly basis and replaced as required.</p>	3	3	M
<p>Keeping livestock onsite increasing Greenhouse gas emissions.</p>	<p>Emissions impacting on flora and fauna.</p> <p>Meteorological impacts.</p> <p>Financial impacts to Yurunga.</p> <p>Damage to company profile.</p>	5	1	M	<p>Maintain appropriate feed diet for livestock.</p> <p>Waste management and utilisation to be carried out in accordance with this EMP.</p>	4	1	L
<p>Keeping livestock onsite creating biohazardous waste.</p>	<p>Health issues with employees, public, visitors, wildlife and surrounding livestock.</p>	4	5	S	<p>Identification of waste types and appropriate waste management systems.</p> <p>Proper design of waste management systems.</p> <p>Implementation of waste management measures.</p> <p>Clinical and biohazardous waste to be contained and removed from site by certified agent.</p> <p>Maintain pen hygiene and isolate ill animals.</p> <p>Follow solid and liquid waste management plan.</p>	1	5	H

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Mass death causing and disposal by fire pyre causing odour and smoke.	Public nuisance and complaints.	4	4	H	<p>Animal welfare and biosecurity mitigation and management measures to be implemented on site.</p> <p>All carcasses will be disposed of offsite (if possible); alternatively the manure storage areas will be used as a potential pyre area (managed in accordance with the Australian Farm Biosecurity Plan) to prevent contamination of groundwater from a burial pit.</p> <p>Carcasses to be composted will be covered with composting bedding materials.</p>	1	4	M
Mass death increasing pest and vermin population.	Spread of pests, spread of disease, loss of native species, loss of habitat damage to waterways, spread of nationally significant weeds, damage to surrounding agriculture.	4	3	H	<p>Animal welfare and biosecurity mitigation and management measures to be implemented on site.</p> <p>Dead stock to be managed in accordance with the National Guidelines (Animal Health Australia, 2016).</p> <p>Pyre area to be monitored for pests and vermin daily.</p> <p>Biosecurity management measures to be implemented.</p>	1	3	L
Mass death causing a spread of disease.	Health issues with employees, public, visitors, flora and fauna and surrounding livestock.	3	4	H	Animal welfare and biosecurity mitigation and management measures to be implemented on site.	1	4	M

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Surface runoff/spills of effluent to surface water causing contamination.	Contamination of surface water, loss of stream habitats, damage to vegetation and fauna habitat. Fauna kills due to poor water quality.	4	4	H	<p>Bunding of chemical, compost manure pad and pens will prevent nutrient runoff.</p> <p>Earthen mound and drainage channels along boundaries will catch any extra runoff.</p> <p>Murray Channels on the southern boundary will be monitored where required by the Environmental Protection Licence or Development Consent.</p> <p>Sediment and holding ponds to be constructed in accordance with best practice management measures to ensure bank stability.</p>	1	4	M
Leaching of effluent to groundwater causing contamination.	Contamination of ground water, surrounding landholders lose water supply, negative impacts on groundwater dependent ecosystems.	4	5	S	<p>Pens, compost manure pad, wastewater ponds and drainage areas are lined with compacted clay (in accordance with National Guidelines) to reduce leaching into the groundwater system.</p> <p>The irrigation area will be closely monitored to ensure it is not irrigated while saturated.</p> <p>Tree lines will be retained in irrigation bays to mitigate shallow groundwater and trees acting as a groundwater pump.</p> <p>Irrigation area will be planted with species that have high nutrient uptake rates.</p> <p>Groundwater monitoring to occur where required by an Environmental Protection Licence or Development Consent.</p>	1	5	H

		Before Management Measures				After Management Measures		
Activity/Aspect/Hazard	Potential impacts	L	C	R	Management measures	L	C	R
Solid waste management								
Collecting and stockpiling manure for compost causing pests, odour, dust and noise.	Public nuisance and complaints.	5	2	H	Compost pile must be turned regularly. All compost will be removed off site or utilised as soon as possible. Compost manure pad will be monitored for fires, pests and vermin. Wind conditions will be monitored prior to compost turning and pen cleaning to reduce offsite impacts. In the event that wind direction will impact nearby sensitive receptors then compost turning and pen cleaning will be rescheduled to occur at an alternate time. Compost, pens and internal roads will be watered to reduce dust. All equipment will be maintained to reduce noise emissions. High noise activities will be undertaken in the late morning and early afternoon when most people are at work. Trucks and machinery will not left idling when not in use.	3	2	M
Collecting and stockpiling manure for compost causing spontaneous combustion and fire.	Damage to infrastructure, increase in greenhouse gas emissions. Public nuisance and complaints.	3	4	H	Monitoring of compost moisture and temperature levels to reduce odour and dust. Application of water to compost heap if moisture levels are low. All compost will be removed off site or utilised on site as soon as practical. Compost manure pad will be monitored for fires, pests and vermin.	1	4	M

		Before Management Measures				After Management Measures		
Activity/Aspect/Hazard	Potential impacts	L	C	R	Management measures	L	C	R
Turning compost causing odour, dust and noise impacts.	Public nuisance and complaints.	4	2	M	Compost moisture and temperature levels are monitored and kept at optimal levels to reduce dust and odour. Buffer zone and tree line will protect nearest sensitive receptor. Compost manure pad will be watered when moisture levels are low to reduce dust and maintain optimal composting conditions. Wind conditions will be monitored and turning will not be carried out when windy.	2	2	L
Turning compost causing dust.	Public nuisance and complaints. Negative impacts to vegetation.	5	1	M	Compost moisture and temperature levels are monitored and kept at optimal levels to reduce dust and odour. Compost manure pad will be watered when moisture levels are low to reduce dust and maintain optimal composting conditions. Wind conditions will be monitored and turning will not be carried out when windy. High noise activities will be undertaken in the late morning and early afternoon when most people are at work. Trucks and machinery will not be left idling when not in use.	2	1	L

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Application of raw and/or composted manure to waste utilisation area causing dust and noise.	Public nuisance and complaints. Negative impacts to surrounding environment.	4	2	M	Compost moisture and temperature levels are monitored and kept at optimal levels to reduce dust and odour. Buffer zone and tree line will protect nearest sensitive receptor from noise. All equipment will be maintained to reduce noise emissions. High noise activities will be undertaken in the late morning and early afternoon when most people are at work. Trucks and machinery will not be left idling when not in use. Wind conditions will be monitored and compost will not be moved when windy.	2	2	L
Application of raw and/or composted manure to waste utilisation area causing soil and water contamination from excessive nutrients.	Contamination of surface water, loss of stream habitats, damage to vegetation and fauna habitat. Fauna kills due to poor water quality. Impacts to ground water. Over nitrification of soil, destruction of soil properties.	4	3	H	Soil monitoring and testing to be carried out in accordance with any requirements stipulated by an Environmental Authority. Waste utilisation area established in accordance with National Guidelines.	3	3	M
Wastewater management								
Offensive odour from holding ponds that are overloaded with organic matter. Offensive odour from holding ponds that have not been desludged or dewatered and maintained in a dewatered state.	Public nuisance and complaints.	3	4	H	Odour assessment showed dispersion rates are within standards. Waters can be transferred between sediment pond and holding pond if any pond requires maintenance in order to reduce odours. Lime can be added to wastewater to reduce odours and make it uninhabitable for mosquito breeding.	1	4	M

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
<p>Escape of tailwaters/spills of wastewater to Murray Irrigation due to overloaded irrigation areas, failure to return tailwaters for reuse, insufficient land areas.</p> <p>Spills from holding ponds caused by the failure to dewater by irrigation.</p>	<p>Contamination of surface water, loss of stream habitats, damage to vegetation and fauna habitat.</p> <p>Fauna kills due to poor water quality.</p>	4	5	S	<p>Wastewater holding ponds are adequate in size and are able to be dewatered quickly to irrigation area should they become too full.</p> <p>Facilities are located above the 1 in 100 year flooding levels.</p> <p>Earthen mound and drainage channels along boundaries will catch any extra runoff.</p> <p><i>Note: The inclusion of terminal ponds is also recommended.</i></p> <p>Appropriate cropping and irrigation management measures will be implemented.</p> <p>Water monitoring to be performed where required by an Environmental Protection Licence or Development Consent.</p>	1	5	H
Increase in biting insect population.	Health issues associated with biting insects to humans and fauna.	4	2	M	<p>Vegetation around pond will be slashed regularly to reduce mosquito food source.</p> <p>Lime can be added to wastewater to reduce odours and make it uninhabitable for mosquito breeding.</p> <p>Ponds will be monitored weekly for biting insects.</p>	2	2	L

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Leaching of effluent to groundwater causing contamination.	Contamination of ground water, surrounding landholders lose water supply, negative impacts on groundwater dependent ecosystems.	4	5	S	Dams are lined with compacted clay or HDPE and then covered. The irrigation area will be closely monitored to ensure it is not irrigated while saturated. Irrigation block will be planted with species that have high nutrient uptake rates.	2	5	H
Hazardous Materials								
Diesel spill contaminating surface water, ground water or soil.	Contamination of surface water, groundwater or soil, loss of stream habitats, damage to vegetation and fauna habitat. Fauna kills due to poor water quality. Financial impacts to remediate.	3	3	M	Dangerous goods to be stored and handled in accordance with Australian Standards and best practice management. Loading of containers will be undertaken by experienced individuals. Spill kits will be available within easy access of all diesel storage areas.	1	3	L
Lime spill contaminating surface water, ground water or soil.	Contamination of surface water, ground water or soil, loss of stream habitats, damage to vegetation and fauna habitat. Fauna kills due to poor water quality. Financial impacts to remediate.	3	3	M	Dangerous goods and hazardous chemicals to be stored and handled in accordance with Australian Standards and best practice management. Loading of container will be undertaken by experienced individuals. Spill kits will be available within easy access of all diesel storage areas.	1	3	L

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Cleaning of ponds with front end loader causing noise.	Public nuisance and complaints. Negative impacts to fauna roosting, feeding, sleeping etc.	4	1	L	Trucks and machinery will not be left idling when not in use. All equipment will be maintained to reduce noise emissions. High noise activities will be undertaken in the late morning and early afternoon when most people are at work.	1	1	L
Applying effluent to cropping areas causing accumulation of nutrients in soils.	Loss of vegetation, fauna deaths. Financial impacts to remediate.	4	2	M	Suitable crop selection and crop rotation. Effluent application at sustainable nutrient loading rates. Effluent application will be based upon appropriate hydraulic loading rates and an irrigation management plan will be enacted. Irrigation rates and timing will need to be managed to ensure that runoff during irrigation does not occur. Effluent will be applied using a low pressure spray method, so that no runoff or waterlogging should occur. Biannual monitoring of nutrients status of effluent and solids reuse areas, where required by an Environmental Protection Licence or Development Consent. Monitor irrigation application especially periodically check direction of irrigator. Monitoring of groundwater bores where required by an Environmental Protection Licence or Development Consent. Stubble retention and suitable tillage practices for erosion.	2	2	L

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Applying effluent to cropping areas causing soil waterlogging.	Loss of vegetation, fauna deaths, Financial impacts to remediate, erosion.	4	2	M	As above	2	2	L
Applying effluent to cropping areas causing soil erosion.	Sedimentation in streams, loss of stream habitats, damage to vegetation and fauna habitat due to erosion. Damage to neighbouring properties.	4	2	M	As above	2	2	L
Cropping and feedmill management								
Harvesting crops by baling causing dust and noise impacts.	Public nuisance and complaints. Negative impacts to vegetation.	4	2	M	Hay baling activities will be consistent with industry practice as occurs in all rural zones undertaking this type of activity. Baling will not be undertaken when wind speed is high. All equipment will be maintained to reduce noise emissions. High noise activities will be undertaken in the late morning and early afternoon when most people are at work.	1	2	L
Harvesting crops by baling causing fire.	Damage to infrastructure, loss of habitat, increase in greenhouse gas emissions. Public nuisance and complaints.	2	3	M	Suitably water supply is available for firefighting purposes. Machinery available to create a fire break, to slow/stop the spread of fire is available onsite. Dust suppression sprays in the pens can be turned on in the event of a fire. In addition, if there are nearby bushfires or planned burn offs fuel load on the property can be reduced.	1	3	L

		Before Management Measures				After Management Measures		
Activity/Aspect/Hazard	Potential impacts	L	C	R	Management measures	L	C	R
Processing feed causing dust and noise impacts.	Public nuisance and complaints. Negative impacts to vegetation.	4	2	M	Buffer zone will protect nearest sensitive receptors All equipment will be maintained to reduce noise emissions. High noise activities will be undertaken in the late morning and early afternoon when most people are at work.	1	2	L
Feed wastage/spoilage increasing pests and vermin.	Spread of pests, spread of disease, loss of native species, loss of habitat damage to waterways, spread of nationally significant weeds, damage to surrounding agriculture.	4	2	M	Good hygiene practices – regular cleaning. Ensure that any conveyors, silos and bins are sealed. Implement biosecurity management plan.	1	2	L
Feed wastage/spoilage increasing odour.	Public nuisance and complaints.	3	1	L	As above.	1	1	L
Weed and pest management								
Preparing herbicide (e.g. mixing herbicide and water/surfactants) contaminating surface water or soil.	Contamination of surface water or soil, loss of stream habitats, damage to vegetation and fauna habitat. Fauna kills due to poor water quality. Financial impacts to remediate.	3	3	M	Herbicide preparation will take place in a concreted area with bunding to ensure that spills do not contaminate porous and sensitive areas. Only staff trained on chemical handling or accredited contractors will carry this out. Chemicals stored away in a bunded lockable storage area. Spill kits will be available onsite.	1	3	L

		Before Management Measures				After Management Measures		
Activity/Aspect/Hazard	Potential impacts	L	C	R	Management measures	L	C	R
Applying herbicide to weeds causing contaminated surface water.	Contamination of surface water, loss of stream habitats, damage to vegetation and fauna habitat. Fauna kills due to poor water quality.	2	2	L	Use of a buffer zone alongside crops. Use of herbicide application nozzles with larger droplet sizes should reduce off target damage/contamination. Weather conditions also need to be taken into account when spraying – herbicide will not be applied on windy or rainy days. Restricted to staff trained in herbicide application or accredited contractors. Herbicide will be applied as described on the label. Spill kits will be available onsite.	1	2	L
Applying herbicide to weeds causing damage to off target plants.	Loss of vegetation, fauna deaths.	2	2	L	Use of a buffer zone alongside crops. Use of herbicide application nozzles with larger droplet sizes should reduce off target damage/contamination. Weather conditions also need to be taken into account when spraying – herbicide will not be applied on windy or rainy days. Restricted to staff trained in herbicide application or accredited contractors.	1	2	L
Emergency management								

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Livestock disease resulting livestock deaths.	<p>Decrease in aesthetic values and public complaints.</p> <p>Financial impacts to Yurunga through fines, legal costs, etc.</p> <p>Damage to Yurunga company profile and social licence.</p> <p>Increase in landfill space required, indirect impacts due to larger landfill.</p> <p>Health issues with employees, public, visitors, wildlife and surrounding livestock.</p>	3	3	M	<p>Regular pen cleaning.</p> <p>Ill livestock are kept in isolation pens to reduce spread of disease or transmissible infections.</p> <p>Implement biosecurity management measures.</p>	1	3	L

		Before Management Measures				After Management Measures		
Activity/Aspect/Hazard	Potential impacts	L	C	R	Management measures	L	C	R
Fire and/or Flooding resulting in livestock deaths or loss of infrastructure.	<p>Damage to waterways through waste moving off site, decrease in aesthetic values and public complaints.</p> <p>Financial impacts to Yurunga.</p> <p>Mass death implications (burial pit requirements, etc.).</p>	3	3	M	<p>For flooding:</p> <p>All storage and drainage facilities are built to withstand a 1 in 100 year flood event.</p> <p>The tail-water dam and CDA infrastructure surrounding the dairy will assist in reducing any flood potential.</p> <p>The dairy is developed well outside of any potentially flood impacted areas.</p> <p>Drainage lines will be cleaned regularly.</p> <p>A check of weather warnings from the Bureau of Meteorology should be carried out every morning.</p> <p>There should be enough food supplies for the duration of the flood.</p> <p>Implement biosecurity management plan.</p> <p>For fire:</p> <p>All dairy infrastructure is outside of potential bushfire prone areas.</p> <p>Adequate water kept available on site for emergency use (i.e. firefighting purposes).</p> <p>Machinery available to create a fire break, to slow/stop the spread of fire is available onsite.</p> <p>Dust suppression sprays in the pens can be turned on in the event of a fire.</p> <p>In addition, if there are nearby bushfires or planned burn offs fuel load on the property can be reduced.</p>	1	3	L
Cumulative effects								
Vegetation clearance impacting on flora and fauna communities.	Cumulative fauna/flora population decline.	2	1	L	Desktop ecological assessment performed before clearing works.	1	1	L

Activity/Aspect/Hazard	Potential impacts	Before Management Measures			Management measures	After Management Measures		
		L	C	R		L	C	R
Groundwater water use.	Surrounding landholders lose water supply, negative impacts on groundwater dependent ecosystems.	2	3	M	No bore water to be utilised for intensive livestock purposes without appropriate licenses in place from WaterNSW. Should bore water be used, it will be monitored via a meter, and recorded weekly. Water quality and standing water levels will be monitored onsite and downstream to determine effects on water table and whether further action is required.	1	3	L
Wastewater treatment and application.	Contamination of surface water, loss of stream habitats, damage to vegetation and fauna habitat. Fauna kills due to poor water quality. Long term soil degradation. Groundwater contamination.	4	5	S	Implement wastewater management plan / wastewater irrigation management plan. Expansion of waste utilisation disposal areas. Environmental monitoring as required by EPL and Development Consent.	1	5	H

(L = Likelihood; C = Consequence, R= Risk)

6. Environmental Mitigation and Management Measures

6.1 Air Quality

The primary causes of negatively impacting air quality in a dairy include vehicle and machinery movement, feed preparation and animal movements.

The air quality objectives of this EMP are to:

- Define the potential sources of odour and dust associated with the dairy operations;
- Define the factors that contribute to dust and odour generation, emission, dispersion, and impact;
- Describe best practices in environmental management of dust and odours;
- Assess impacts on receptors; and
- Define mitigation measures and described required monitoring.

The air quality management measures are outlined in Table 7.

Table 7 Air Quality Mitigation and Management Measures

Element	Management Measure
Pen Stocking	<p>Management of pen stocking densities so that they are not too wet, nor dry.</p> <p>Pens to be stocked at a maximum capacity which allows 15m²/SCU.</p>
Cleaning & Maintenance	<p>Frequent, scheduled cleaning will ensure the depth of (dry) manure is suitable.</p> <p>Pens and feed pads will be cleaned daily.</p> <p>Pens and feed pads will be cleaned prior to the wet season to remove the manure load.</p> <p>Lime will be applied to surfaces should odour become excessive.</p> <p>Drain lines to be cleaned of deposited sediment / manure after each rain event.</p>
Manure Management	<p>All manure is to be stockpiled in the designated stockpile area.</p> <p>Where possible, stockpiling excessively wet manure should be avoided.</p> <p>Compost turning will be undertaken with a tractor and mechanical windrower.</p> <p>Compost turning will be done in the middle of the day when maximum air/odour dispersion occurs.</p> <p>Monitoring of compost moisture and temperature levels as per the National Guidelines (Watts et al., 2016) and (Meat and Livestock Australia Limited, 2012).</p> <p>All compost will be utilised in the designated irrigation area prior to the wet season.</p> <p>Lime will be applied to pen compost windrows should odour become excessive.</p>

Element	Management Measure
	<p>Weather monitoring is to occur prior to manure application to waste utilisation areas. Application is not to occur if the wind is not favourable or if rain or extreme overcast weather is expected.</p> <p>Manure application to waste utilisation areas should be undertaken frequently to reduce mass odour production.</p> <p>Manure application should be followed with harrow, disc or chisel ploughing to incorporate manure into the soil.</p>
Holding Pond Management	<p>Recirculation of holding water with an input of lime to adjust the pH and remove odorants.</p> <p>Pond desludging should occur in winter period; however, on a warm sunny day (for odour dispersion purposes).</p> <p>Irrigation of holding pond waters should be restricted after rainfall inflow events until odour generation from the pond has diminished.</p>
Effluent Application	<p>Irrigation not to occur on excessively windy days. Wind conditions to be monitored and recorded before application commences.</p> <p>Direct placement of wastewater onto irrigation grounds to negate aerosol generation. (low pressure irrigation systems that will not create aerosols.)</p> <p>In the event that any obvious odours being generated from the irrigation area, all irrigation activities are to cease and the holding pond is to be dosed with lime/gypsum prior to irrigation activities re-commencing.</p>
Sediment Pond Management	<p>Solids recovered from the pond will be placed on the compost manure pad for composting.</p> <p>Decanting of the captured solids should occur at a maximum of five year intervals; however, in the event of excessive odour generation then solids should be removed more frequently.</p> <p>Sedimentation ponds require desludging and cleaning before sludge takes up 60% of total design capacity.</p>
Dead Stock	Per section 6.3.4 of this plan.
Dust Management	<p>Use dust suppression systems to “lay” dust as soon as it is noticed. The dust suppression systems will be used early in the morning and late in the afternoon to minimise humidity and impact on livestock. Application rates will not exceed 6mm at one time.</p> <p>Dust-generating areas, such as unsealed roadways, are sprayed with water if significant vehicle or stock movements are expected to minimise dust.</p> <p>Loads of feed / trucks will be securely covered during transport and suitable driving speeds maintained on unsealed roads.</p>
Greenhouse Gas Emissions	<p>Regular maintenance of vehicles, machinery and pumps is carried out.</p> <p>Fuel use is monitored for the life of the dairy operation.</p>

6.2 Noise

Then primary sources of noise on a dairy include the milking machine and associated equipment (e.g. compressors), machinery and vehicles. Noise levels generated will not exceed the requirements of the NSW Industrial Noise Policy (NSW Environmental Protection Authority, 2017).

The noise performance objectives of this EMP are:

- Operation of the facility does not have unacceptable noise impacts on nearby sensitive land uses;
- Control noise levels generated by the farm and related activities do not exceed the requirements of the NSW Industrial Noise Policy;
- Set and achieve management and monitoring goals; and,
- Report progress to local and state governments, if required.

Noise impacts from the dairy are expected to be limited, with major of the high-noise activities taking place during the day. Mitigation and management measures for noise impacts are addressed in Table 8.

Table 8 Noise Impacts Mitigation and Management Measures

Element	Management Measure
Stock Handling	<p>Ensure design of facility meets appropriate buffer distances between activities and nearby receptors.</p> <p>Maintain vegetated buffers between the facility and nearby receptors.</p> <p>Laneways, races, entrances, and exits should be designed to take advantage of the social behaviour and movement patterns of livestock.</p>
Traffic (e.g. feed trucks, milk collection)	<p>Trucks will not be kept idling when not in use.</p> <p>Truck gates and ramps should be handled gently to minimise noise impacts.</p> <p>The use of reverse beepers and horns should be stopped where possible between 6pm and 7am. The need for a heavy vehicle to be reversed will be minimised.</p>
Feed Milling	<p>Feed milling activities will be done between 7am and 6pm, where possible.</p> <p>Feed milling activities should be avoided between 10pm and 7am.</p>
Plant and Equipment	<p>All equipment will be fitted with efficient silencers and sited away from sensitive land uses, where practical.</p> <p>Pumps and other noise producing equipment should be enclosed inside a sound insulated casing.</p> <p>All equipment will be maintained to reduce noise emissions and situated away from sensitive land uses.</p> <p>High noise activities (e.g., pump operation, manure application) will be undertaken in the late morning and early afternoon, where possible, when most people are at work.</p> <p>All operators of noisy equipment should use suitable hearing protection.</p> <p>All employees and contractors will report any vehicle or machine that generates excessive noise.</p>

6.3 Waste Management

The waste management objectives of this EMP is to ensure Yurunga minimises waste related impacts, protects the environment and health and safety of personnel and the community. This will be achieved through responsible handling and disposal of any waste that may be generated during activities, to minimise impacts on local infrastructure:

- To ensure that all waste material generated on site is handled in a responsible manner, and in accordance with legislative requirements whilst promoting sustainable resource use.
- To establish procedures and management actions consistent with the waste minimisation hierarchy principles of avoid, reduce, reuse, recycle and dispose.
- To increase employee and subcontractor awareness and their obligations to waste management.
- To maximise the reuse of materials during the project such as spoil reuse in backfilling, establishment of earthen bunds, pad and road construction and rehabilitation works.

In all cases, the employee and contractors responsible for the construction and operation on the site will be expected to adhere to the *Protection of the Environmental Operations Act 1997*, *Protection of the Environment Operations (Waste) Regulation 2014*, and *Waste Avoidance and Resource Recovery Act 2001* to minimise the amount of waste generated on site, and consequently, achieve the best environmental outcomes.

The waste management hierarchy nominates a preferred order of waste management as follows (Environment Protection Authority, 2022):

- a) Avoid unnecessary resource consumption;
- b) Reduce waste generation and disposal;
- c) Re-use waste resources without further manufacturing;
- d) Recycle waste resources to make the same or different products;
- e) Recover waste resources, including the recovery of energy;
- f) Treat waste before disposal, including reducing the hazardous nature of waste; and,
- g) Dispose of waste only if there is no viable alternative.

Figure 2 presents the waste management hierarchy that should be followed.

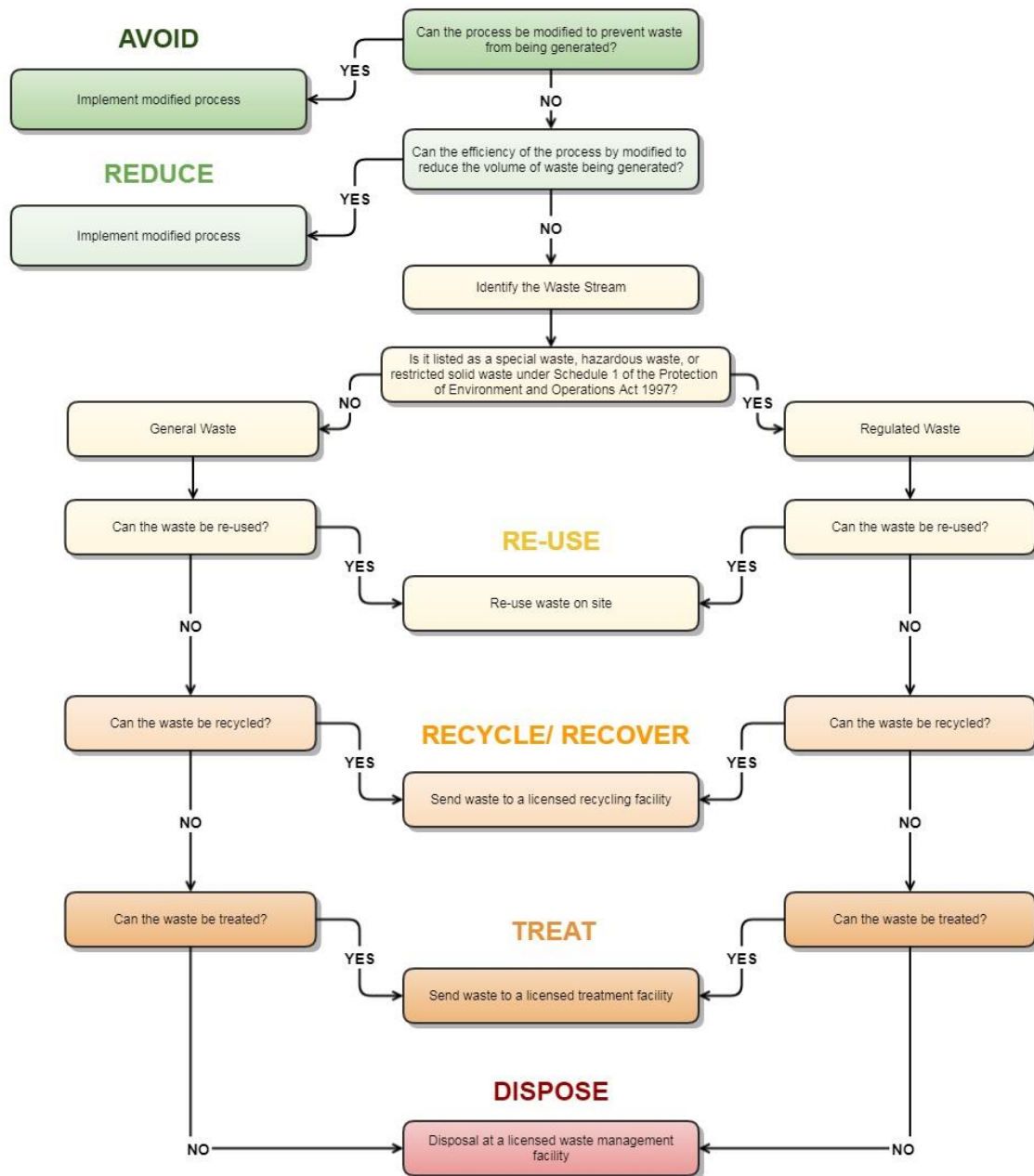


Figure 2 Waste Management Hierarchy Flow Chart

Waste management measures to be implemented at this site are detailed in Table 9, Table 10, Table 11, and Table 13.

6.3.1 General Waste

General waste mitigation and management measures are presented in Table 9.

Table 9 General Waste Mitigation and Management Measures

Element	Management Measure
Reuse and Recycling	<p>All non-compostable waste will, to the extent that it is practicable, be recycled or reused.</p> <p>Any solid wastes unable to be recycled or reused will be disposed of off-site in an appropriate manner at licensed waste management facilities (particular emphasis will be given to the appropriate disposal of veterinary sharps and any empty or disused chemical, vaccine, drug and antibiotic containers and packaging).</p> <p>Construction waste is to be separated and stockpiled, where possible, into waste type (e.g. Steel, plastic, timber, organic) to be reused or recycled, otherwise transported to a licenced waste management facility for disposal.</p> <p>General waste from the site is to be placed in the skip bin, which will be taken to a licenced waste management facility and emptied on a regular basis.</p>
Hazardous Waste	<p>Any wastes arising from spills, such as contaminated runoff and contaminated soil will be collected and remediated on site, or transported to a suitable facility for disposal.</p> <p>Biohazardous waste is to be contained to one area of the site, and then removed from the site by a certified agent.</p> <p>All regulated waste is to be stored securely on site (covered bunded area) until such time it can be transported to an appropriately licensed facility for disposal.</p>
Spoilt Feed	<p>All care is taken to minimise feed spillage during feed delivery.</p> <p>Feed residues are removed from feed bunks on a daily basis to minimise odour generation and/or vermin breeding.</p>
Emergency	<p>In the event of a severe weather warning solid waste material should be covered or secured or removed from the site.</p>

6.3.2 Effluent

Effluent waste mitigation and management measures are presented in Table 10.

Table 10 Effluent Waste Mitigation and Management Measures

Element	Management Measure
Effluent Management	<p>Water should not be pumped from the bottom of the holding pond.</p> <p>Holding pond water should be diluted, if possible, prior to application to land.</p> <p>Effluent is only applied on the land areas specified on the development approval and in compliance with the requirements noted on the development approval and/or environmental authority.</p> <p>Environmental Data Record should include details on effluent spreading activities.</p> <p>Drains, sedimentation traps, and ponds are cleaned and maintained as necessary.</p> <p>Sediment pond and holding pond to have sediment marker levels installed.</p> <p>Sedimentation ponds require desludging and cleaning before sludge takes up 60% of total design capacity.</p> <p>Cleaning and maintenance activities are documented in the Environmental Data Record.</p> <p>Spoilt or wet feed is removed from the bunks using a shovel or brush.</p> <p>The material is either thrown into the pen area for removal during pen cleaning operations or is taken straight to the manure stockpiling/composting area.</p> <p>Spoilt feed deposited in the manure stockpile area is subsequently mixed with the manure stored in stockpiles.</p>

6.3.3 Manure

The manure waste mitigation and management measures are presented Table 11, while recommended compost conditions are presented in Table 12.

Table 11 Manure Waste Mitigation and Management Measures

Element	Management Measure
Manure Management	<p>Pens are cleaned daily. Open areas to be cleaned at least every 14 days.</p> <p>Pens are best cleaned when the manure is moist but not wet. However, they have to be cleaned regularly regardless of the manure moisture content.</p> <p>Manure is first removed from under fence lines, around water troughs, shade posts and along and behind the aprons using a bobcat, under-fence pusher, slider blade or other equipment. Very wet manure is not harvested.</p> <p>Manure is then scraped from the pen surface into a mound. If an interface layer is to be retained, great care is taken with depth control.</p> <p>Pen cleaning activities are noted in the Environmental Data Record.</p> <p>Manure will be removed promptly either to the manure stockpiling/composting area or off-site (if required).</p> <p>Compost manure will be maintained at conditions as shown in Table 12.</p> <p>Compost windrows will be turned to reduce pest occupancy and moisture levels, at a rate dependant on moisture content and wind speed.</p> <p>Harvested manure can be stored prior to sale or spreading on designated areas.</p> <p>Manure is only spread on the land areas specified on the development approval and in compliance with the requirements noted on the development approval and/or environmental authority.</p> <p>Spread manure is incorporated where possible so that the impact on neighbours is minimal.</p> <p>Manure spreading activities are detailed in the Environmental Data Record.</p> <p>Drains, the sedimentation trap and the ponds are cleaned and maintained as required.</p> <p>Cleaning and maintenance activities are noted in the Environmental Data Record.</p> <p>Lime will be added to anaerobic manures in compost windrows to provide for alkaline stabilisation whilst the anaerobic conditions are being reversed via mechanical aeration.</p>

Table 12 Compost Conditions Recommended by MLA

Parameter	Acceptable range	Optimum range
Carbon:Nitrogen	15:1 – 40:1	25:1 – 30:1
Moisture levels (%)	45-65	50-60
Oxygen levels (%)	>5	>5
pH	5.5 – 8.0	5.5 – 8.0
Temperature (°C)	40 – 65	55 – 60
Particle size diameter (mm)	5 – 50	5 – 25

6.3.4 Carcasses

Manure waste mitigation and management measures are presented in Table 13.

Table 13 Manure Waste Mitigation and Management Measures

Element	Management Measure
General	<p>Dead stock are disposed of in the manure stockpile which is located within the controlled drainage area. Disposal of dead stock is conducted as soon as possible to minimise odour generation.</p> <p>Should there be limited room in the manure stockpile area for processing carcasses then they will be buried on site at a location approved by the EPA.</p> <p>Mortalities are only handled with equipment that is not used in feed processing.</p> <p>Prior to burial, details of the dead animal are recorded including</p> <ul style="list-style-type: none"> • Date; • Lot number/owner; • Individual number; • Cause of death; and, • All tags are removed (NLIS, management and dairy). <p>A necropsy is conducted on all animals that have died at the dairy. Consultation with the local vet is sought if there are any unfamiliar or suspicious signs surrounding the death.</p> <p>The animal is placed in the manure stockpile and covered with a minimum of 0.6m of hay/sawdust and manure to aid in the decomposition of the animal and prevent odour generation and fly/ vermin breeding. When an animal is placed in the manure stockpile, the location is marked for future reference.</p> <p>The carcass is kept covered at all times and is left in the stockpile for 12 months. This allows for the total active composting plus curing.</p> <p>In the event of mass mortalities at the dairy, a burial pit would be constructed in accordance with the AUSVETPLAN Enterprise Manual – Dairy (Cattle) Industry.</p>
Mass Death	<p>In an event a mass death occurs at the site then the National AUSVET management plan for the same will be invoked:</p> <ul style="list-style-type: none"> • A pit would be dug in a suitable section of the property; • The pit would be lined where possible, with clay prior to the placement of carcasses; • The carcasses would be covered with composted manure; and, • Following decomposition, the mortalities would be exhumed and introduced back into specially sized compost windrows to be further composting within the composting

	area and allowing for the pit to be re-instated and brought back on line for ongoing composting operations.
Burial Pits	<p>Burial pits must be constructed in accordance with the AUSVETPLAN Operational Manual Disposal, Version 3.1, 2015 (or updated versions).</p> <p>The base of the burial pit must be at least 2m above the water table.</p> <p>At least 2m of soil is required to cover carcasses.</p> <p>All burial pits must be lined to protect against significant leachate into soils and groundwater.</p> <p>A monitoring well (piezo) must be established down gradient of the burial pit to monitor groundwater quality.</p> <p>Soils and ground water monitoring must be completed near the burial pit(s) in accordance with section 7 of this EMP.</p>

6.3.5 Waste Milk

Waste milk mitigation and management measures are presented in Table 14.

Table 14 Waste Milk Mitigation and Management Measures

Element	Management Measure
Possible uses	<p>Waste milk can be diluted 1:10 with water and spread on cropping areas. It should be applied in a method that is appropriate for the soil and plants.</p> <p>Milk can be fed to milk-fed calves if appropriate storage facilities are available to avoid spoiling. This may be the best alternative for colostrum and milk abandoned during the colostrum withholding period.</p> <p>The milk can be delivered off-site to be used in pet food manufacturing.</p>
Disposal	<p>Milk's high BOD and organic loading can have an impact on the function of an effluent pond. It is not recommended to dispose of milk in an effluent pond. However, if other methods of milk disposal are not possible, a maximum of two days' milking product can be fed to a well-functioning pond with little negative impact.</p> <p>Always ensure that there is no waste milk-runoff to waterways.</p>

6.4 Water Quality

The NSW Water Management Act (Water Management Act, 2000) provides the framework for sustainable management and allocation of water resources, incorporating provisions for environmental management.

The water quality objectives for the site are to:

- Minimise the potential for sediment loss from the site and contamination of downstream waters;
- Establish a strategy for effective management of dairy activities, including wastewater drainage and storage, wastewater utilisation, manure storage and processing, and manure application;
- Implement erosion and sediment control measures as per IECA Best Practice Erosion & Sediment Control guidelines (International Erosion Control Association, 2008); and,
- Ensure that all dairy activities do not cause environmental harm with respect to water quality and aquatic ecology of nearby receiving waters and ground waters.

The management measures for water quality are detailed in Table 15.

Table 15 Water Quality Mitigation and Management Measures

Element	Management Measure
Effluent Management	As per Section 6.3.2 of this report.
Surface Water Quality Monitoring	<p>Where required by an Environmental Protection Licence or Development Consent, surface water monitoring should be conducted in accordance with any specified requirements.</p> <p>Surrounding channels, if required, is to be visually monitored weekly and after rain events for the presence of algal presence, anaerobic conditions forming (i.e. stagnant water pools that may be odorous), excess sediment (high turbidity), and oil sheens.</p>
Groundwater Quality Monitoring	<p>Where required by an Environmental Protection Licence or Development Consent, groundwater monitoring should be conducted in accordance with any specified requirements.</p> <p>In the event groundwater monitoring is required it is recommended to be conducted on a monthly basis in the first year, and then an assessment for further analysis should be undertaken based on the initial results; however, quarterly sampling is generally considered sufficient.</p> <p>Groundwater monitoring is recommended to be completed in accordance with Section 7 of this EMP.</p>
Erosion and Sediment Control	<p>A suitable construction erosion and sediment control plan should be developed and implemented prior to construction activities commencing.</p> <p>Retain stubble and undertake suitable tillage practices for erosion control and preventing soil runoff.</p> <p>Traffic across the waste utilisation paddocks is to be reduced as much as practical to minimise/ reduce soil compaction which encourages sheeting of runoff waters.</p> <p>Paddocks should only be trafficked when soils are as dry as possible to reduce soil compaction and spread of loose soil materials.</p> <p>Low bearing pressure equipment should be utilised on cropping and irrigation areas to reduce soil compaction.</p> <p>Soil compaction may be alleviated by aeration and ripping; if required.</p>

Element	Management Measure
	<p>Gypsum should be applied to waste utilisation areas to improve soil conditions and assist in flocculation of water in catchment ponds.</p> <p>Erosion and sediment controls installed on the site should be checked daily by the site operators.</p> <p>A detailed site inspection should occur after rain events to ensure that erosion and sediment control measures are adequate for the site.</p>

6.5 Land Management

Best practices are applied to the planning and development stage to minimise risk of contamination to surface water, groundwater and soils. An erosion and sediment control plan will be meet the requirements of Department of Climate Change, Energy, the Environment and Water (DCCEEW) for controlling erosion and preventing sediment from being washed into waters.

The land management objectives of the dairy are to:

- Avoid soil degradation of the site with waste utilisation activities;
- Ensure that any construction or operational-related activities do not cause contamination of the site or the surrounding environment (e.g. ground waters); and,
- Carry out construction and operational activities in a manner that minimises any potential impacts on surrounding land uses.

The dairy land management methods are detailed in Table 16.

Table 16 Nutrient Management Measures

Element	Management Measure
Effluent Management	As per Section 6.3.2 of this report.
Manure Management	As per Section 6.3.3 of this report.
Soil Quality	<p>Maintain active plant growth and appropriate cropping systems.</p> <p>Maximise organic matter content to maximise soil moisture and nutrient holding capacity.</p> <p>Maximise nutrient recovery by crop harvest.</p> <p>Irrigate the waste utilisation area only when it isn't saturated.</p> <p>Lime may be applied to soils receiving holding pond effluent so as to avoid acidification and aluminium toxicity.</p> <p>Apply composted manure and gypsum and lime to improve soil conditions.</p>
Soil Monitoring	<p>Where required by an Environmental Protection Licence or Development Consent, soil monitoring should be conducted in accordance with any specified requirements.</p> <p>It is recommended that soil monitoring of cropping areas (waste utilisation areas) be performed annually as a minimum. Soil monitoring is recommended to be completed in accordance with Section 7 of this EMP.</p>

Element	Management Measure
Soil Loss	<p>Any overburden stockpiles from construction activities are located in areas away from drainage lines or windy areas in order to minimise the risk of soil and wind erosion.</p> <p>Any overburden stockpiles from construction activities should have sediment control measures installed until they are stabilised.</p> <p>Any overburden stockpiles from construction activities are to be seeded using a non-persistent cover crop to reduce erosion potential and assist in the maintenance of the biological viability of the soil resource.</p> <p>Disturbed areas on site are to be limited as much as practical. Vehicles should be restricted to designated access tracks on site.</p>

6.6 Hazardous Substances and Dangerous Goods

Hazardous materials can pose serious risks if released to the environment. Hazardous materials must be appropriately handled and stored with specific management practices put in place to avoid the presence of chemical residues in meat and milk.

Site operations have the potential to contaminate land and water in and surrounding the site by the release of various chemicals used and/or stored on site. These chemicals could include:

- distillate (e.g. fuel for stationary and mobile engines);
- oils and greases (e.g. lubricants and hydraulic oils for stationary and mobile equipment); and,
- miscellaneous chemicals (e.g. herbicides, insecticides, paint, solvents).

The dangerous goods and hazardous chemicals mitigation and management methods are detailed in Table 17.

Table 17 Dangerous Goods & Hazardous Chemicals Mitigation and Management Measures

DG & HC Issue	Management/Mitigation Method
Surface runoff/spills of dangerous goods or hazardous chemicals to surface water causing contamination.	<p>Bunding of chemical storage areas.</p> <p>All waters from the dairy complex are maintained on site in the controlled drainage area.</p>
Leaching of dangerous goods or hazardous chemicals to groundwater causing contamination.	<p>All machinery, equipment and vehicles to be stored in designated areas outside the waste utilisation area when not required to be used..</p> <p>Spill kits to be kept in the machinery to contain and clean up any spills as soon as practical after they have occurred.</p>
Chemical spills	<p>Contain all spills to the localised area as soon as possible after the spill has occurred.</p> <p>Clean up any spilled material as soon as possible after spill has occurred.</p> <p>Appropriately store or dispose of contaminated materials to ensure that any contaminants do not result in contaminated runoff into the stormwater management system.</p>

DG & HC Issue	Management/Mitigation Method
Storing dangerous goods and hazardous chemicals	<p>All chemical storage facilities on site must meet specifications of Australian Standard AS 1940 - <i>The storage and handling of flammable and combustible liquids</i>.</p> <p>Bunding will be constructed of material which is impervious to the material stored and transferred therein.</p> <p>Bunds will be kept in good condition (e.g. no cracks, gaps or leaks).</p> <p>Roofed storage facilities will be provided where practicable.</p> <p>Stormwater captured within bunding is to be removed as soon as practicable and disposed of as contaminated water. Prior to removal, the water is to be free from contaminants.</p> <p>Empty hydrocarbon and chemical containers are to be stored with closures in place on a concrete hardstand or within a bunded area.</p> <p>Where vehicle access to the bunded area is required, access must be by way of a rollover bund.</p> <p>Maintain all Safety Data Sheets (SDSs) and information relating to the storage, use and handling of chemicals at the site office.</p> <p>Hazardous chemicals and dangerous goods to be suitably stored in contained areas away from vegetated areas.</p>
Using dangerous goods and hazardous chemicals on site.	<p>Chemicals with the lowest potential for natural environment toxicity and water contamination are chosen.</p> <p>Undertake refuelling and equipment maintenance within designated hardstand or paved areas where practicable.</p> <p>Ensure workers are familiar with proper fuelling and spill clean-up procedures.</p> <p>Induct all new workers on the use of handling of chemicals used on site.</p> <p>Use drip pans during refuelling and equipment maintenance.</p> <p>Maintain appropriate spill kits at locations known to all workers (e.g. refuelling locations, chemical storage facilities, mobile equipment).</p>
Collecting and storing regulated wastes.	As per Section 6.3.1 of this EMP.

6.7 Biosecurity Management

Biosecurity relates to preventive measures designed to reduce the risk of introduction and transmission of infectious diseases, invasive pests, or weeds.

Good biosecurity practices prevent the spread of infectious disease and invasive pests or weeds between farms as well as protecting Australia from diseases and weeds that occur overseas. Biosecurity procedures address the containment of disease outbreaks when they occur (Animal Health Australia, 2020).

It is in the best interests of the landowner to implement an on-farm biosecurity systems to minimise both the risk of infectious diseases being introduced to dairy and the subsequent spread of any such diseases, this includes:

- Having a documented Farm Biosecurity Plan;
- Ensuring all livestock movements onto the different properties have a known health status (e.g., Livestock Health Statement/Declaration or equivalent);
- Inspecting all introduced livestock for signs of ill health or disease on arrival and keep in isolation for a minimum period of time;
- Regularly inspecting livestock for ill health and disease and undertake appropriate action where necessary;
- Minimising the risk of livestock straying onto or from the property;
- Keeping records of livestock movements, as well as vehicle and visitor movements where reasonable and practical; and,
- Implementing other procedures or practices that contribute to minimising the risk or spread of disease.

Ensuring livestock are, and remain, free from serious infectious diseases allows you to maximise farm productivity and minimise animal discomfort, stock losses and medical costs.

The biosecurity management practices to be implemented at the Yurunga Dairy site are in accordance with:

- AHA *Farm Biosecurity for Livestock Producers guideline* (Animal Health Australia, 2013); and,
- Dairy Australia *Dairy Biosecurity Healthy Farms brochure* (Dairy Australia, 2020).

The appropriate biosecurity management methods are detailed in Table 18. It is critical to the farm productivity to ensure that these actions are being implemented daily at the site.

The biosecurity management measures are presented in Table 18.

Table 18 Biosecurity Management

Element	Management Measure
Dairy Design	<p>Only one entry point to the dairy should be used to facilitate easy recording of all movements into and out of the complex.</p> <p>Roads and loading ramps should be located in fenced-in areas away from the livestock, as diseases and weed seeds can be transported on the vehicle wheels or visitors' shoes.</p> <p>Signage regarding biosecurity measures implemented on-farm should be clear, concise, visible to all, and frequent enough to support the message.</p> <p>Damaged signs should be replaced or fixed as soon as possible.</p> <p>Carcass disposal areas should be in a separate area to the feeding area to minimise chance of being exposed to botulism.</p>
Access Control	<p>Marked roadways and signage will be used to control the movement of incoming and outgoing vehicles, machinery, and equipment.</p> <p>Before entering the dairy complex, all visitors (e.g., working veterinarians, consultants, sales/company representatives) must report to the office and complete a biosecurity assessment.</p> <p>Visitors log must be maintained that includes the following information:</p> <ul style="list-style-type: none"> • Date • Time in • Name • Time out • Company • Contact number • Signature • Biosecurity risk assessment <p>People involved with or visiting intensive feeding systems should exercise good hygiene practices such as:</p> <ul style="list-style-type: none"> • wearing clean clothes and footwear • washing hands after contact with: <ul style="list-style-type: none"> ○ livestock, working dogs and pets ○ manure, dirt, and other waste material ○ feed material • avoid wearing dirty clothes and/or footwear out of the feeding system. <p>Visitors that pose a high biosecurity risk are not permitted to access animal or commodity/feed areas unless the following precautions are completed:</p> <ul style="list-style-type: none"> • cleaning or changing clothing and footwear • washing hands <p>Visitor contact with livestock should be limited as much as possible.</p>
Equipment and Machinery	<p>No machinery or equipment is to be routinely used for multiple activities such as handling stockfeed, manure, or dead stock. Where required, all equipment and machinery shall be thoroughly washed down to remove all potential sources of cross-contamination.</p>

Element	Management Measure
	Any equipment to be used in an intensive feeding system should be clean.
Staff Training	<p>All staff are aware of the possibility for disease introduction, especially emergency diseases, as outlined in the AUSVETPLAN.</p> <p>All staff are aware of the potential sources of disease transmission, including:</p> <ul style="list-style-type: none"> • Livestock and feed commodities; • Visitors and employees; • Vehicles, equipment, and machinery; • Feral animals and wildlife; and • Manure and effluent. <p>All staff involved in the daily monitoring of livestock health are trained in the early detection of livestock diseases and are aware of their roles under the Emergency Animal Disease (EAD) Action Plan.</p> <p>Introduced stock should be kept isolated from existing stock in a quarantine area for at least seven days in order to establish health status and identify illnesses.</p> <p>All staff should be informed of the restricted animal material feeding ban.</p>
Animal Movement	<p>Records of all stock transactions and movements should be maintained and kept up-to-date.</p> <p>Introduced stock should be vaccinated and treated for parasites.</p> <p>Introduced stock should be isolated from existing stock in a quarantine area for at least seven days to establish health status and identify illnesses.</p>
Animal Health	<p>All animals are assessed for disease and physical injuries upon intake. The inspection should be documented.</p> <p>Individually treated animals must be carefully identifiable to avoid accidental milk contamination.</p> <p>Daily health checks and observations are conducted, and inspection records are kept.</p> <p>Sick/infected animals should be immediately isolated in the quarantine/hospital pens and treated accordingly.</p> <p>Disease/death records should be kept for reporting and evaluation of changed in mortality/morbidity rates.</p> <p>Where a potential emergency disease outbreak is suspected, requirements of the Emergency Animal Disease (EAD) Action Plan are implemented as detailed in the contingency planning procedure.</p>
Dead Stock Management	<p>To minimise odour generation, dead stock should be immediately disposed of in:</p> <ul style="list-style-type: none"> • Manure stockpile placed with the controlled drainage area; or • On-site burial pit.

Element	Management Measure
	<p>Mortalities are exclusively handled on equipment that is not used in feed processing.</p> <p>Prior to burial, details about the diseased animal are documented, including:</p> <ul style="list-style-type: none"> <li>• Date, <li>• Lot number/owner, <li>• Individual number, <li>• Cause of death, and <li>• All tags are removed (NLIS, management and dairy). <p>All animals that died on the dairy will be subjected to a necropsy. If there are any unusual signs surrounding the death, a consultation with the local veterinarian is recommended.</p> <p>The animal is placed in the manure stockpile and covered with a minimum of 0.6m of hay/sawdust and manure to aid in the decomposition of the animal and prevent odour generation and fly/ vermin breeding. When an animal is placed in the manure stockpile, the location is marked for future reference.</p> <p>The carcase is kept covered at all times and is left in the stockpile for 12 months. This allows for the total active composting plus curing.</p> <p>In the event of mass mortalities at the dairy, a burial pit would be constructed in accordance with the AUSVETPLAN Enterprise Manual – Dairy (Cattle) Industry.</p>
Feed and Water	<p>Stockfeed should be sourced from suppliers who operate under a quality assurance program that has a biosecurity component.</p> <p>Stockfeed should be protected from contamination by vermin or feral and domestic animals.</p> <p>Feed and water resources should be protected from pest and weed contamination.</p> <p>Feed and water troughs should be cleaned out regularly.</p> <p>Feed should be stored in a clean, dry area to prevent contamination and spoilage.</p> <p>Purchased feed should always be accompanied by a commodity vendor declaration (CVD) or by-product vendor declaration (BVD) to ensure it is fit for purpose.</p> <p>Feed should not contain a high content of weed seeds that could germinate on the property.</p> <p>Old, spilt or contaminated feed should be disposed of safely, ensuring that stock and pests do not have access. Disposal methods may include burial or composting.</p> <p>Visitors should not feed stock.</p> <p>Labels of purchased feed should be checked to ensure that it is fit for purpose and specifically does not contain RAM.</p> <p>Gloves be worn when cleaning feed and water troughs to reduce the risk of disease transmission.</p>

Element	Management Measure
Spoilt Feed Management	All care is taken to minimise feed spillage during feed delivery.
	Feed residues are removed from feed bunks on a daily basis to minimise odour generation and/or vermin breeding.
	Spoilt or wet feed is removed from the bunks using a shovel or brush.
	The material is either thrown into the pen area for removal during pen cleaning operations or is taken straight to the manure stockpiling/composting area.
	Spoilt feed deposited in the manure stockpile area is subsequently mixed with the manure stored in stockpiles.
Pests and Weeds	A pest animal control program should be developed and implemented.
	Feed spills are cleaned up immediately to minimise breeding sites or attractants.
	Coordinated control is undertaken with neighbours.
	Rubbish dumps and carcass disposal areas should be operated in such a manner that does not attract pest animals to the area and the property.
	Silos, storage bins, and feed storage sheds should be in good repair and inspected regularly for any pest incursions.
	Any grassed areas around the dairy complex should be maintained regularly with mowing/slashing.
	A rotational schedule is developed and implemented to ensure that noxious weeds are control or eradication. This will also ensure that the species monitoring continues and that the schedule is changed if an issue arises.
	Feed storage is to be secured appropriately. The silage should be well-covered.

Appropriate gate signage will ensure that all visitors to the site are aware of the required procedures prior to accessing. An example of gate signage is provided in Figure 3.



Figure 3 Gate Signage

6.8 Biodiversity Conservation

Under the *Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999*, the approval will be referred to the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) if the development is likely to affect matters of national significance.

The dairy will be designed in accordance with:

- The *Biodiversity Conservation Act 2016* (Biodiversity Conservation Act 2016 No 63 - NSW Legislation, 2016); and,
- The *Native Vegetation Act 2003* (Native Vegetation Act, 2003).

The biosecurity management measures are presented in Table 19.

Table 19 Biodiversity Conservation

Element	Management Measure
Dairy Design	Natural buffers will be in design to maintain natural vegetation and protect sensitive areas.
	Wetlands in and around the dairy will be preserved to maintain biodiversity.
Access Control	Use fencing to establish wildlife corridors to connect habitats allowing safe movement of wildlife and promoting genetic diversity.
Pests and Weeds	Integrated pest management will be implemented to minimise chemical use and promote natural predators.
	Regular monitoring for invasive pest species.

6.9 Animal Welfare

The welfare of the animals at the dairy is an essential component of the business. Poorly handled/managed animals will not yield profitable sales and result in potential legal action against the business.

The dairy is intended to be constructed and managed in accordance with:

- *National Guidelines for Dairy Feedpads and Contained Housing* (Dairy Australia, 2024b);
- *Australian Animal Welfare Standards and Guidelines for Cattle* (Animal Health Australia, 2016);
- *Effluent System Design* (Dairy Australia, 2024a); and,
- *Effluent and Manure Management Database for the Australian Dairy Industry* (Dairy Australia, 2008).

The dairy will be designed and operated to ensure that it meets the requirement of all standards:

- Livestock should have access to nutritionally adequate food and sufficient good quality water to maintain health.
- Risk management of extreme weather, natural disasters, disease, injury and predation should be implemented and regularly assessed to minimise the impact of these threats to Livestock welfare.
- Well-designed handling facilities and equipment should be constructed and maintained to minimise the risk of any natural hazards, and animal injury and disease.
- Animal handling, movement and husbandry practices should be operated in a reasonable manner to minimise any distress or pain.
- Breeding management should apply appropriate practices to avoid unreasonable pain, distress and injury to the animals.
- Variable and sufficient supervision is needed to ensure the dairy is in sound and healthy condition, including regular inspection of stock density, availability of suitable feed, reliability of water supply, Livestock behaviour and health condition (e.g. age, pregnancy status, and disease prevention), climatic conditions and management practices.

The dairy animal health management methods are detailed in Table 20, it is critical to the farm productivity to ensure that these actions are being implemented daily at the site.

Table 20 Animal Health Management Measures

Element	Management Measure
Health Management	<p>Managers, or staff responsible for the health and well-being of Livestock, are to ensure that appropriate preventative measures for diseases that are commonplace in intensive feeding systems are in place, operational and clearly understood.</p> <p>A health management plan is to be developed and implemented at all times. The health management plan is to include:</p> <ul style="list-style-type: none"> • Arrival procedures; • Drug use; • Feeding; • General handling procedures; and, • Record keeping. <p>Livestock and infrastructure in the dairy are to be monitored daily to ensure that any problems concerning feeding or watering systems, sick animals, shy feeders or pen condition are identified and resolved.</p> <p>Body condition score is to be monitored on a regular basis.</p> <p>All livestock admitted to intensive feeding systems be in good health.</p> <p>Sick, injured or diseased livestock be given prompt and appropriate treatment or be humanely destroyed.</p> <p>Disease prevention measures should be implemented as appropriate.</p>

Element	Management Measure
	<p>All medications are to be administered in strict accordance with the manufacturer's instructions or under veterinary supervision.</p> <p>Medications used to treat livestock be recorded and withholding periods (WHP) and/or export slaughter intervals (ESI) noted and adhered to.</p> <p>Stockfeed subject to Withholding Period (WHP) and/or Export Slaughter Interval (ESI) restrictions not to be fed.</p> <p>If an illness or death is encountered without the cause being known or reasonably anticipated, it is the responsibility of management to carry out an appropriate investigation.</p> <p>Dead Livestock are to be removed from pens promptly and, if not required for post-mortem examination, disposed of appropriately.</p> <p>Where Livestock need to be euthanized, and the animal(s) is not immobile, it be restrained and all OH&S principles be complied with.</p> <p>Where Livestock need to be euthanized, it shall be conducted in a manner that results in immediate loss of consciousness and death while unconscious.</p> <p>Humane destruction of animals will be carried out by a competent person or under direct supervision of a competent person.</p> <p>Reasonable action is to be taken to protect Livestock from predation (i.e. fencing).</p> <p>All animals are inspected on intake for illness and physical injuries and records maintained of the inspection.</p> <p>Livestock are checked and observed daily for health and wellbeing and records of the inspection maintained.</p> <p>Sick or diseased animals should be removed and isolated in a sick pen and treated accordingly.</p> <p>Records of sickness and death should be kept for easy reporting and assessment of mortality and morbidity rate changes.</p> <p>In the event of a disease outbreak, notifiable diseases be reported to the appropriate authorities.</p> <p>Where a potential emergency disease outbreak is suspected, requirements of the Emergency Animal Disease (EAD) Action Plan are implemented as detailed in the contingency planning procedure.</p> <p>The following checks should be conducted and recorded prior to sale:</p> <ul style="list-style-type: none"> • animal has an appropriate NLIS tag in place and associated documentation • weight • health status • Livestock within withholding • periods and/or export slaughter intervals • time off feed • time off water • excess mud or dirt on skins.

Element	Management Measure
	<p>All reasonable precautions will be taken to minimise heat stress, cold stress and other environmental impacts.</p> <p>An Excessive Health Load Action Plan is recommended and all staff are to be trained in implementing this plan.</p>
Feed and Water	<p>All stock are to have sufficient access to feed.</p> <p>Feed troughs should not be allowed to be empty for more than 3 hours maximum.</p> <p>Livestock are not to have access to water which contains potentially toxic levels of salts, or other deleterious substances.</p> <p>Water resources are to be fresh (appropriate water quality), palatable and cool.</p> <p>Water quality tests are acquired of drinking water sources at least bi-annually to ensure water quality is adequate.</p> <p>Livestock should not be exposed to noxious chemicals and exposure to dust should be minimised.</p> <p>Livestock are to be provided with a diet which is nutritionally adequate to maintain health and meet the appropriate physiological requirements for growth.</p> <p>An appropriate fat/body condition score system should be used as a guide for the monitoring and planned feeding of livestock.</p> <p>Livestock introduced to an intensive feeding system should be given time to adjust to the new dietary regime, feeding environment and equipment.</p> <p>All individual feeds should be tested by an accredited laboratory for:</p> <ul style="list-style-type: none"> • Dry matter (DM) % • Crude protein (CP) % • Metabolisable energy (ME) • Neutral detergent fibre (NDF) % • Calcium & phosphorus % <p>All feeds are to be individually analysed to identify any mineral deficiencies.</p> <p>A minimum of 3 days water supply will be available in case of breakdown or emergency.</p> <p>Where Livestock are fed grain, water troughs should be cleaned regularly to minimise contamination.</p> <p>All mechanical equipment controlling the delivery of water to the feedpad area will be regularly inspected to ensure it is functioning adequately.</p> <p>Livestock will not be deprived of water for more than 24 hours. This period will be reduced in the event of hot weather.</p>

Element	Management Measure
	<p>Stockfeed should be sourced from suppliers who operate under a quality assurance program that has a biosecurity component.</p> <p>Stockfeed should be protected from contamination by vermin or feral and domestic animals</p> <p>Feed and water resources should be protected from pest and weed contamination.</p> <p>Feed and water troughs should be cleaned out regularly.</p> <p>Feed should be stored in a clean, dry area to prevent contamination and spoilage.</p> <p>Purchased feed should always be accompanied by a commodity vendor declaration (CVD) or by-product vendor declaration (BVD) to ensure it is fit for purpose.</p> <p>Feed should not contain a high content of weed seeds that could germinate on the property.</p> <p>Old, spilt or contaminated feed should be disposed of safely, ensuring that stock and pests do not have access. Disposal methods may include burial or composting.</p> <p>Visitors should not feed stock.</p> <p>Labels of purchased feed should be checked to ensure that it is fit for purpose and specifically does not contain RAM.</p> <p>Feed residues are removed from feed bunks on a daily basis to minimise odour generation and/or vermin breeding.</p> <p>Spoilt or wet feed is removed from the bunks using a shovel or brush.</p> <p>The material is either thrown into the pen area for removal during pen cleaning operations or is taken straight to the manure stockpiling/composting area.</p> <p>Spoilt feed deposited in the manure stockpile area is subsequently mixed with the manure stored in stockpiles.</p>
Feed Toxins	<p>Feed toxins are to be identified through laboratory analysis. Where a toxin is suspected the feed should be tested and a veterinarian consulted for specific treatments.</p> <p>Stockfeed declarations are to be obtained from suppliers including a description of the feed, chemical residue status and withholding periods and a statement detailing any contamination risk.</p> <p>To prevent mould formation:</p> <ul style="list-style-type: none"> • minimise grain moisture content at harvest (<15%) • remove old-grain, damaged kernels, and any foreign matter from storage silo's etc. • check grain periodically for temperature, moisture, and insect damage • if moulds and mycotoxins are suspected test a sample and formulate ration to account for quality of contaminated feed and class of stock to be fed (mature stock before feeding to younger stock) • dilute contaminated feed with good quality feed • feed binder materials such as bentonite.

Element	Management Measure
Flies and Parasites	<p>All livestock are to be inspected on arrival to the dairy for parasites, and if found to be infested should be treated and/or quarantined for sufficient time to prevent spread to other animals.</p> <p>Livestock are to be regularly inspected and tested for parasites.</p> <p>Worm control to be implemented to prevent scouring.</p> <p>Fly traps to be used where required.</p>
Staff Requirements	<p>Dairy staff are required to be competent in:</p> <ul style="list-style-type: none"> • livestock handling • inspecting and assessing livestock • maintaining records • planning and contingency planning, including: <ul style="list-style-type: none"> ○ animal health ○ feed and nutrition requirements ○ compliance with withholding periods ○ stock movements to ensure journeys satisfy welfare standards and address contingencies that may arise, with consideration to extremes of weather, nature of the journey, class and condition of livestock, and time off feed and water • humane destruction.

7. Environmental Monitoring & Records

Required ongoing environmental monitoring to be conducted as part of the dairy operations and records to be maintained are detailed in Table 21.

All sampling and monitoring required by this EMP shall be completed by suitably trained workers in order to carry out the requirements of this EMP.

The following information will be kept for all monitoring records:

- The date on which monitoring was undertaken;
- The time at which monitoring was undertaken; and,
- The name of the person who completed the monitoring.

All monitoring records are to be:

- In a legible form;
- Kept for at least five years; and,
- Produced in a legible form to any relevant authority who requests access to them.

Table 21 Environmental Monitoring Requirements & Records

Monitoring Item / Record	
General	
1	Property identification code (PIC)
2	Recording of daily stock numbers by Property Identification Code (PIC).
3	Livestock purchases by PIC.
4	Livestock sales/removal by PIC.
5	Livestock deaths by PIC.
6	Daily water use.
7	Daily weather records including: <ul style="list-style-type: none"> • Wind speed and direction; • Rainfall; and, • Temperature
8	Record of complaints.
9	Training records.
Animal Health	
1	Inbound health inspections.
2	Outbound health inspections.
3	Maintenance health checks.

Monitoring Item / Record	
4	Daily Livestock monitoring records.
5	Livestock health treatments.
6	Livestock growth rate.
7	Recording of feed fed.
8	Animal treatment records: <ul style="list-style-type: none"> • Treatment records; • Laboratory of veterinary results and reports; • Records associated with participation in surveillance programs; and, • Details of feral animal management programs.
9	Records of animal welfare certificates.
Noise	
1	Daily operational hours to be recorded.
2	Milk and feed trucking activities to be recorded.
3	Operation of machinery or equipment on site (e.g. tractors, pumps, generators, etc.) to be recorded.
Air Quality	
1	Record of dust suppression systems use.
2	Records of any use of gypsum or lime to treat sources of odour.
3	Dust monitoring of the site operations is to be performed daily by site operators. Any dust occurrence shall be recorded with details of cause and wind direction at the time of occurrence.
4	Any odours detected on site must be recorded daily, records should also include wind direction and speed at the time of odour occurring.
5	Any odour generating activities should be recorded when they occur, activities may include, but are not limited to: <ul style="list-style-type: none"> • Compost turning; • Livestock loading and unloading; • Livestock feeding times; • Pen cleaning; • Manure application; • Wastewater irrigation; and, • Nutrient application to cropping areas.
Water	
1	Record of incoming water (stored rain water, stored wastewater, stored tail-water) and outgoing irrigated water (irrigated rain water, irrigated bore water, irrigated wastewater, irrigated tail-water).

Monitoring Item / Record

- 2 Bore water use is to be monitored and recorded daily.
- 3 Groundwater should be monitored through the installation of proposed piezo's. Monitoring should be conducted on a monthly basis in the first year, and then an assessment for further analysis will be undertaken based on the initial results; however, quarterly sampling is generally considered sufficient.
- 4 Monitoring bores (piezo's) to be monitored in accordance with the requirements stipulated in the EPL or Development Consent for the site. Where there are no requirements stipulated the following monitoring regime is recommended to be implemented:
 - Temperature;
 - Standing water levels;
 - pH;
 - Electrical conductivity;
 - Total Suspended Solids;
 - Total Dissolved Solids;
 - Total nitrogen;
 - Nitrate;
 - Ammonia; and,
 - Total phosphorus.
- 5 Holding pond and Sediment Pond levels to be monitored regularly.
- 6 Records of the data and nature of cleaning and maintenance operations and any overtopping or spillages from wastewater storage pond.
- 7 Holding pond water is to be tested for the following parameters prior to release for the first wastewater irrigation application, then quarterly after this period:
 - Total Phosphorus;
 - Ortho Phosphorus;
 - Sodium Adsorption Ratio;
 - pH;
 - Potassium;
 - BOD;
 - Electrical Conductivity;
 - Total Kjeldahl Nitrogen;
 - Ammonium Nitrogen; and,
 - Total Nitrogen.
- 8 Where required by an EPL or Development Consent, records of any water quality monitoring of surrounding surface water (e.g. Murray irrigation channels).
- 9 Records of weekly visual monitoring performed on surface water.

 Land

Monitoring Item / Record

- 1 Any nutrients (other than wastes from the dairy) applied to the cropping areas (waste utilisation areas) are to be recorded. Records are to include:
 - Date and time of application;
 - Weather conditions during application (i.e. temperature, wind direction, etc);
 - Type of nutrients applied;
 - Quantity of nutrients applied;
 - Method of application; and,
 - Reasoning for nutrient application.

- 2 Soil monitoring of cropping areas is recommended to be performed annually (unless otherwise specified by the EPL or Development Consent). Soil monitoring is recommended to be conducted for the following parameters:
 - Available phosphorus (mg/kg);
 - Cation exchange capacity (cmol(+)/kg);
 - Electrical conductivity (dS/m);
 - Exchangeable calcium (cmol(+)/kg);
 - Exchangeable magnesium (cmol(+)/kg);
 - Exchangeable potassium (cmol(+)/kg);
 - Exchangeable sodium (cmol(+)/kg);
 - Nitrate;
 - pH; and,
 - Total organic carbon (%).

- 3 Erosion and sediment controls:
 - Daily checks of site controls by site operators;
 - Weekly recording of detailed site inspections; and,
 - Records of any soil movement into nearby waterways after rain events.

Waste

- 1 Waste receipt from waste contractor or waste receipt from local waste management centre to be kept on record for all general waste moved off site.

 - 2 Heat and moisture content of compost windrows.
 Compost moisture and temperature levels are monitored regularly and ensure that these levels are optimal to increase composting efficiency (45-65% moisture content, 40-65°C);
 The manure stockpiles will be sampled for the following parameters prior to application on site:
 - Total Phosphorus;
 - Ortho Phosphorus;
 - Sodium Adsorption Ratio;
 - pH;
 - Potassium;
 - Electrical Conductivity;
 - Total Kjeldahl Nitrogen;
 - Ammonium Nitrogen; and,
 - Total Nitrogen.

 - 3 Applications of wastewater irrigation and composted manure to WUAs. Information to include:
 - Date;
 - Time;
 - Quantity;
 - Rate of application;
-

Monitoring Item / Record

- Method of application; and,
 - Weather observation at time of application.
- 4 Record any pest species present in waste.
- 5 Records of all waste removed from the site and receipts from the facilities the waste is disposed at.
- 6 Number of carcasses composted or buried.
- 7 Manure (carcass stockpiles) monitoring.
Core temperatures are to be monitored weekly at a minimum of 10 spots along the windrow during the “active” phase. Temperatures need to be at 50-60°C within 2-3 days and remain at this level for at least 2 weeks.
- 8 Records of any use of lime (or flocculants) to treat sources of odour resulting from anaerobic conditions within the compost windrows or holding pond / sediment pond.
- Date and time of application;
 - Quantity of material applied;
 - Details of agitation methods used; and,
 - Reason for product application.
- 9 All hydrocarbon and other contaminated waste is to be stored on site in a covered and bunded area until it can be removed off site by a licensed contractor. Quantities of waste generated must be kept on record.
- 10 Hydrocarbons and other hazardous waste products that are removed off site must be recorded in a register for who transported the material off site and disposal location. All regulated wastes must be tracked.

Biosecurity

- 1 Property Risk Assessment & Map (as produced by the on farm biosecurity management plan).
- 2 Site access records.
- 3 Feed supply dockets.
- 4 Feed testing results.
- 5 Disease and pest monitoring records.
- 6 Crop and paddock treatment records.
- 7 Grain and fodder treatment records.
- 8 Introduced stock feed records.
- 9 Commodity Vendor Declarations.
- 10 Preparation of livestock for dispatch records.
- 11 NLIS records.
-

Monitoring Item / Record

- 12 Site to be checked for pests regularly.
- 13 All water holding areas to be checked for biting insects daily.
- 14 Site to be checked for any areas ponding water after rain events. The site should be free draining to the designated catchment areas.

Dangerous Goods & Hazardous Chemicals

- 1 Chemical inventory records are to be kept on site.
- 2 Safety data sheets for all hazardous chemicals are to be kept up to date and in a readily accessible area in case of emergency.

Emergency Management

- 1 Weekly checks that there is adequate water supply on site for emergency (i.e. bushfire and drought).
 - 2 Checking equipment tags on all emergency tools (e.g. fire extinguishers) are in date.
-

8. Reporting

Any reporting required by the EPL and Development Consent must be diligently completed in accordance with the stipulations detailed in these documents. This includes adhering to timelines, formats, and content requirements as mandated by the relevant regulatory authorities.

The EPL includes specific conditions that may require regular reporting. These include monitoring of emissions, effluent, manure or discharges that are to be collected and reported to demonstrate compliance against established limits. Modifications to the operations may also impact the environmental performance of the site and therefore need to be documented and reported.

The Development Consent requirements may include additional reporting obligations, related to the potential environmental impacts of the site. This includes the implementation and effectiveness of the EMP designed to mitigate environmental impacts. Compliance audits may initiate reporting on compliance to assess adherence to consent conditions.

In the event of any occurrences that result in environmental harm—such as spills, unauthorized discharges, or breaches of environmental standards—prompt reporting is required under the *Protection of the Environment Operations Act 1997*.

By ensuring compliance with all reporting obligations under the EPL, Development Consent, and the *Protection of the Environment Operations Act 1997*, the organization not only meets regulatory requirements but also contributes to the sustainable management of environmental resources and enhances overall operational integrity.

9. Operational Compliance

To ensure operational compliance of the site with relevant approvals, permits and legislative requirements, all site operations will comply with the items listed in Table 22.

Table 22 Operational Compliance

Incidents/Compliance failures	<p>Any non-compliance, complaints or incidents will be documented as soon as practical after they have occurred.</p> <p>Any site investigations and audit reports should be incorporated in the annual EMP review to ensure that improvements in environmental management are reflected for the upcoming year.</p>
Corrective action	<p>The dairy operations manager will ensure that corrective actions are completed within an appropriate time frame to ensure that this management plan is adhered to in future.</p>
Reporting	<p>The dairy operations manager will document details of all non-conformances, incidents, corrective actions and complaints.</p> <p>Where an incident causes, or is threatening to or may threaten to cause, environmental nuisance or pollution resulting in material or serious environmental harm, EPA must be informed within 24 hours of first becoming aware of the incident as per the requirements of the <i>Protection of the Environment and Operations Act</i>.</p>

10. Complaints Management

The objectives of community liaison and complaints handling will include:

1. Responsive Complaints Management
 - Dealing with complaints in a responsive manner so that stakeholders' concerns are managed effectively and promptly
2. Timely Communication
 - A verbal response will be provided to the complainant as soon as possible and within a maximum of two hours from the time of the complaint (unless the complainant requests otherwise).
 - A detailed written response will then be provided, if required, to the initial complainant within one week.

Any formal complaints received regarding the management and operation of the dairy are to be responded to as soon as practical after the complaint is received. The recorded details should include:

- The time and date of the complaint;
- The means by which the complaint was made (e.g. phone, mail, etc.);
- Any details identifying the complainant that are freely provided (e.g. name, contact details, etc.);
- For dust, odour and noise complaints record relevant weather conditions (e.g. wind direction, wind speed, rainfall, temperature, etc.);
- Details of the complaint investigation undertaken and the outcomes of that investigation;
- Measures applied to remedy any verified complaint;
- The name of person(s) responsible for dealing with the complaint and remediation; and,
- Details of any regulatory authorities contacted regarding the complaint or associated matters (e.g. agency, date & time of contact, contacted person(s), advice or directions given by those persons, and any other relevant details necessary to substantiate appropriate actions have been taken).

The complaints register will be kept by the Dairy Operations Manager for five (5) years.

11. Environmental Incident Procedures

All incidents will be reported as soon as practical within the occurrence of the incident happening to the Dairy Operations Manager to review and record.

The incident report form will contain the following information:

- Incident date;
- Incident type;
- Area/location;
- Incident description;
- Action taken;
- Date action was taken;
- Form completed by;
- Date reviewed by Manager; and,
- Manager's signature.

Under the *Protection of the Environment and Operations Act*, when an incident causes, or is threatening to cause environmental harm, EPA must be informed immediately / as soon as possible of Yurunga first becoming aware of the incident on 131 555.

Under the *Protection of the Environment and Operations Act*, the following people have a duty to notify a pollution incident occurring in the course of an activity that causes or threatens material harm to the environment:

- the person carrying on the activity
- an employee or agent carrying on the activity
- an employer carrying on the activity
- the occupier of the premises where the incident occurs

Only persons engaged in the activity resulting in the pollution incident, and occupiers of the land where the incident occurs, have a duty to report the incident.

Under section 150 of the *Protection of the Environment and Operations Act* the following information is to be supplied at the time of notification:

- a) the time, date, nature, duration and location of the incident,
- b) the location of the place where pollution is occurring or is likely to occur,
- c) the nature, the estimated quantity or volume and the concentration of any pollutants involved, if known,
- d) the circumstances in which the incident occurred (including the cause of the incident, if known), and,
- e) the action taken or proposed to be taken to deal with the incident and any resulting pollution or threatened pollution, if known.

In accordance with the EPL that will be issued to the site, written notification of the incident is to be supplied to the EPA within 7 days of the incident occurring.

12. Review and Improvement

This EMP is to be reviewed annually, or after any significant environmental incident, to ensure that the plan meets the requirements of the facility. Information to be considered when reviewing this management plan should include complaints, incidents, monitoring data and the results of any audit and inspection. The frequency of reviews may be revised where it can be demonstrated that the alternative frequency does not increase either the likelihood of environmental harm or the risk to human health and safety.

There is to be ongoing review and assessment of the equipment and resources required and environmental training and skills necessary to competently carry out any tasks required in this management plan. All staff members and other employees will ensure that at all times all reasonable and practical measures are applied to prevent environmental harm.

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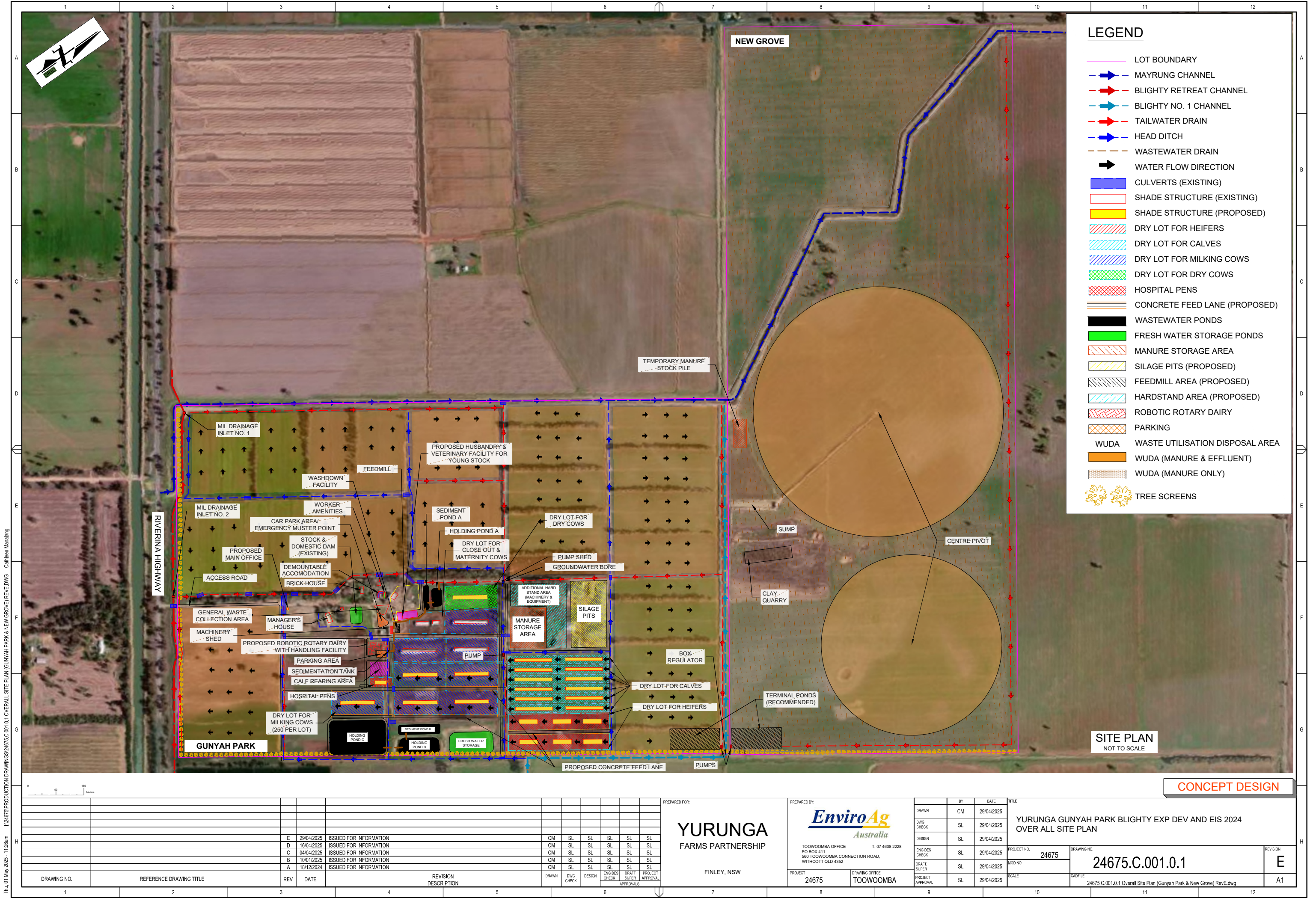
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14. Appendices

Appendix A. Site Layout

A-1

Appendix A. Site Layout



Thu, 01 May 2025 - 11:26am 1324675/PRODUCTION DRAWINGS/24675.C.001.0.1 OVERALL SITE PLAN (GUNYAH PARK & NEW GROVE) REVISED.DWG Cathleen Manalang